

# **MPO Partners Meeting**

## **SACOG - MTC - SJCOG**

Thursday, October 6 – Noon to 2 p.m.

**Sacramento Area Council of Governments**

1415 L Street, Suite 300, Sacramento, CA 95814

### **AGENDA**

1. Welcome & Introductions
2. Target Setting - Greenhouse Gas (GHG) Reduction Scenarios  
(Andy Chesley, Steve Heminger & Mike McKeever)
3. Passenger Rail Planning Coordination  
(Matthew Carpenter, SACOG)
4. Mega-Region Goods Movement Plan  
(Ken Kirkey or Matt Maloney, MTC)
5. Economic Development Partnerships  
(Rebecca Sloan, SACOG)
6. Next Steps

# Mega-Region Rail Collaborations

- State & Federal Funding Programs
- Changing Relationship with Amtrak driven by PRIIA Section 209
- Network Integration Planning
- 2018 State Rail Plan
- High Speed Rail

Agenda Item 3

## Highspeed Rail:

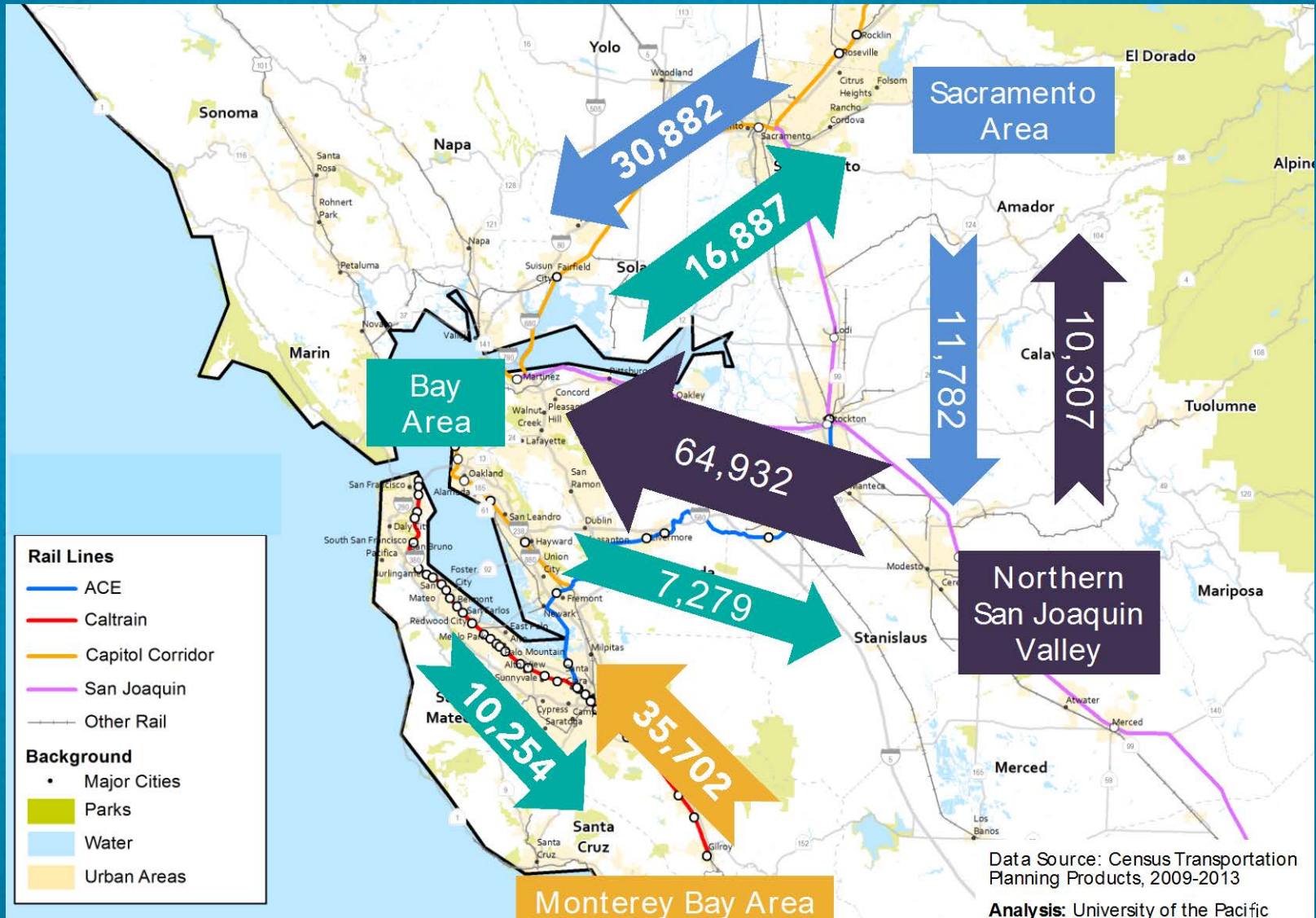
- Phase 1 (Blue) & Phase 2 (Gold)

## California's rail ownership

- Inter-city systems (Red)



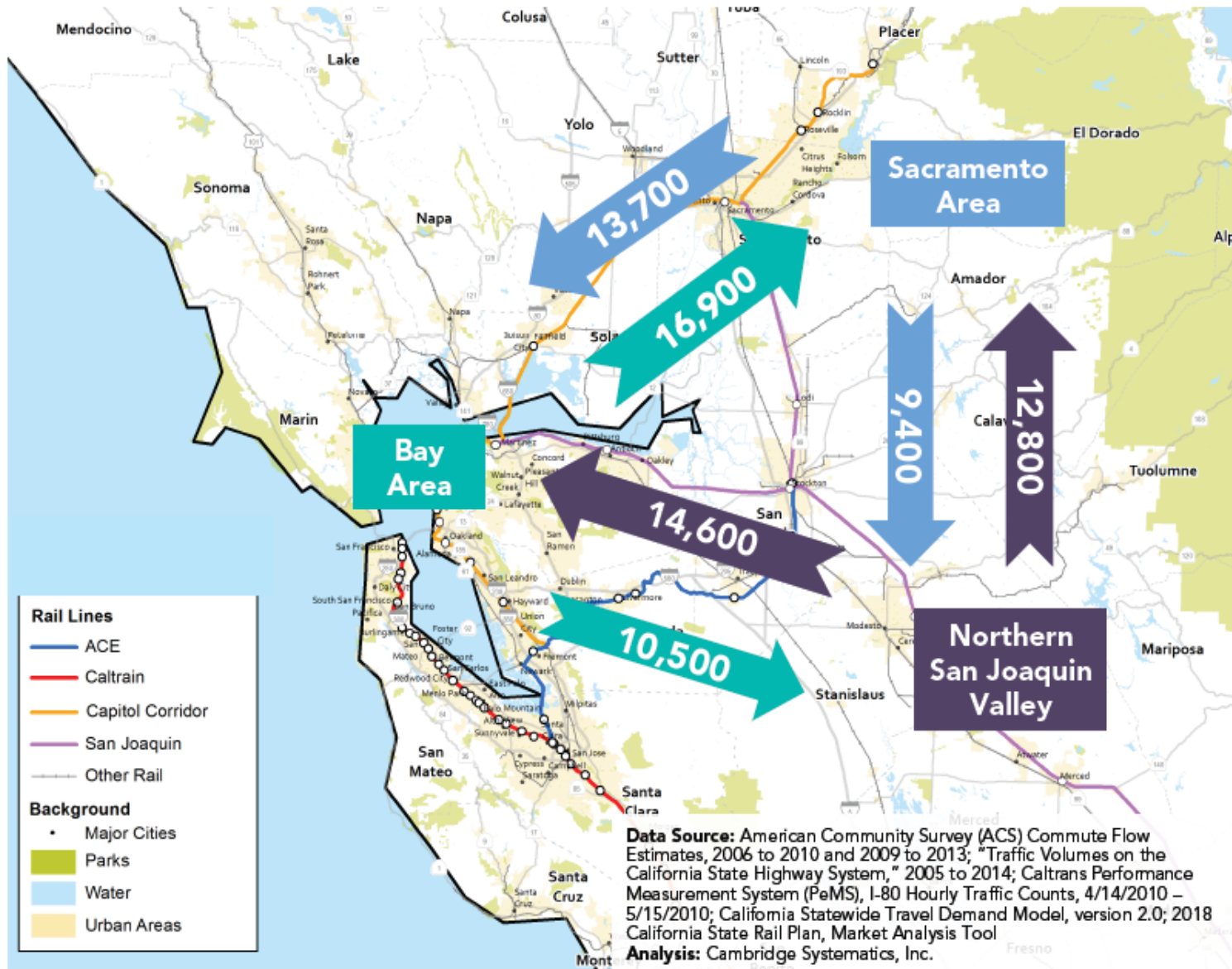
# Commute Travel in the Megaregion





# Non-Commute Travel in the Megaregion

Daily Interregional Non-Commute Travel, 2010

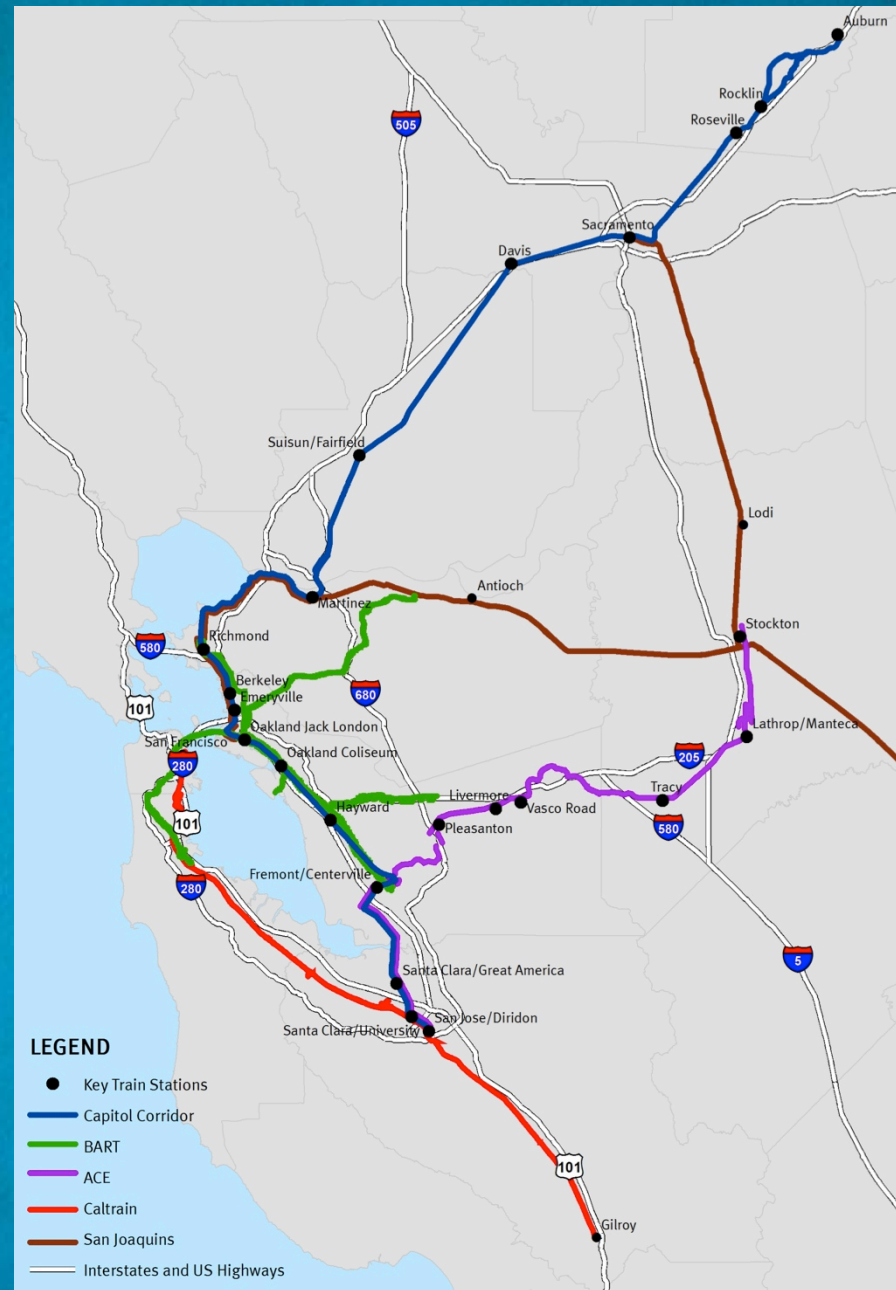
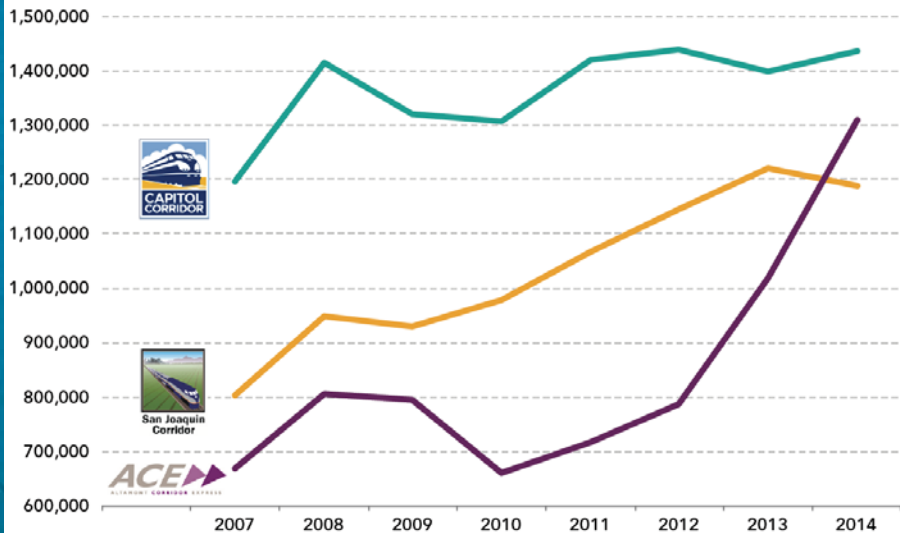




# Northern California Intercity Rail Ridership Trends

- Altamont Corridor Express (ACE)
- Amtrak Capitol Corridor
- Amtrak San Joaquins

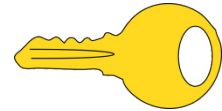
Megaregional Passenger Rail Ridership 2007-2014



# Capitol Corridor Service Integration is: Planning for Future Mobility Needs Now

## Vision Plan Key Concepts

- 1-hour travel time between Sacramento and Oakland
- Clockface frequency with 90 daily trains between Sacramento and San Jose
- Minimize freight and passenger railroad interference
- Increase railroad safety (grade separations, signal technology)



## Initial Vision Plan Ridership Estimates

| 2015 Service                         | 2040 Baseline<br>(2015 Service Levels) | 2040 Vision with<br>Growth* |
|--------------------------------------|--|-----------------------------|
| 1,402,300                            | 2,267,200                              | 6,112,567                   |
| <b>% increase above 2015 service</b> | <b>62%</b>                             | <b>336%</b>                 |

\*Average ridership growth for several alignment alternatives considered in the Vision Plan Update (2014).

# Capitol Corridor: Big Challenges – Crucial Opportunities

## CCJPA Vision Plan: Key Focus Areas

### Sacramento - Auburn

- Roseville 3<sup>rd</sup> Track Project will expand current capacity to operate up to 10 roundtrip trains in this segment
- Opens options to increase service levels to Auburn

### Suisun/Fairfield - Sacramento

- Reconstructed or new freight connections and routes are necessary to separate freight and passenger rail traffic

### Richmond – Suisun/Fairfield

- Route proximity to Bay presents existing storm surge and future sea level rise risks
- Alternative speedier alignments include Franklin Canyon tunnels or straighter coastal route and a new high-level crossing

### Oakland - Richmond

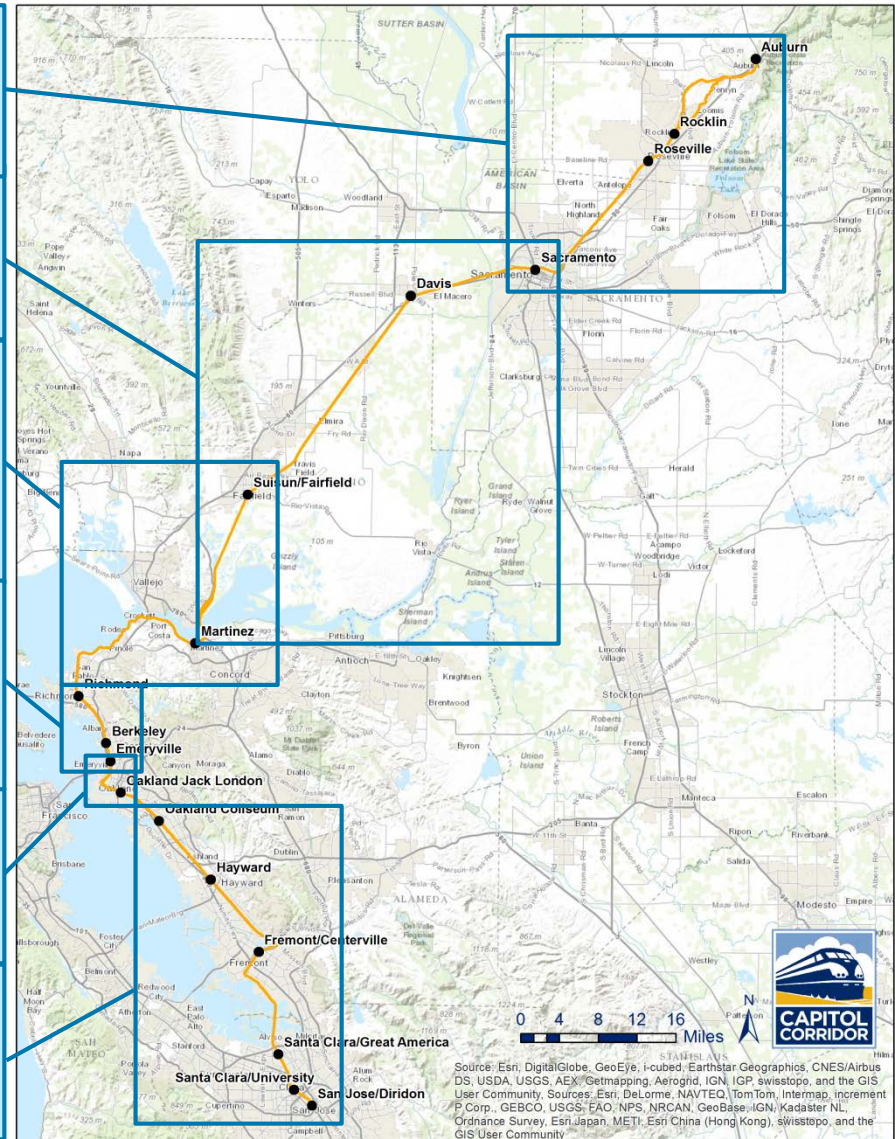
- No alternative at-grade alignments available in this segment
- ROW acquisition requires participation of multiple partners

### Oakland

- Changes to ROW in Jack London Square are critical
- No inexpensive options for potential grade-separated alignments

### San Jose – Oakland Coliseum

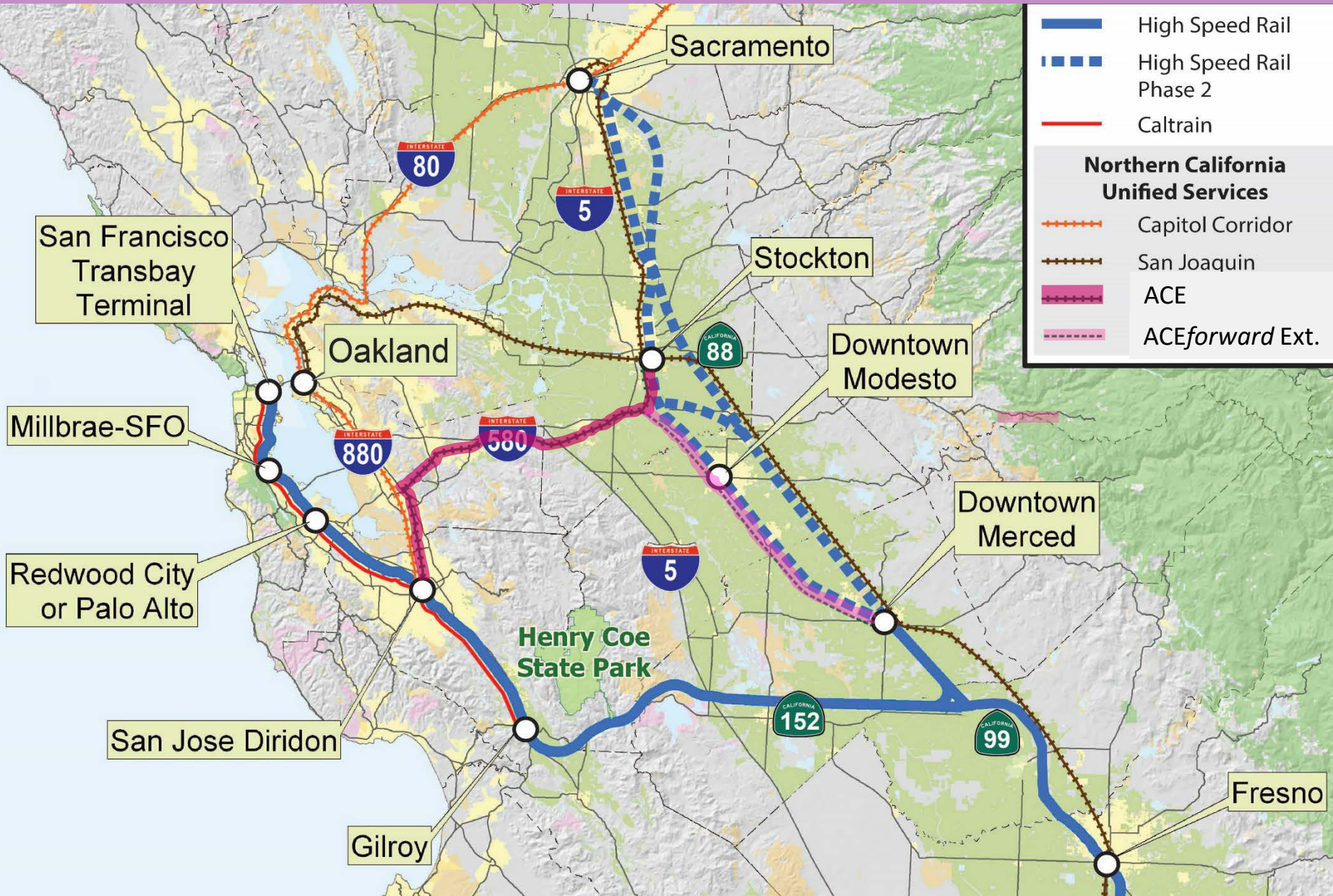
- Wetland and sea level rise considerations
- Several alternative alignment options exist with similar speed and capacity







# The New ACEforward Initiative



- High Speed Rail
- High Speed Rail Phase 2
- Caltrain

**Northern California Unified Services**

- Capitol Corridor
- San Joaquin
- ACE
- ACEforward Ext.





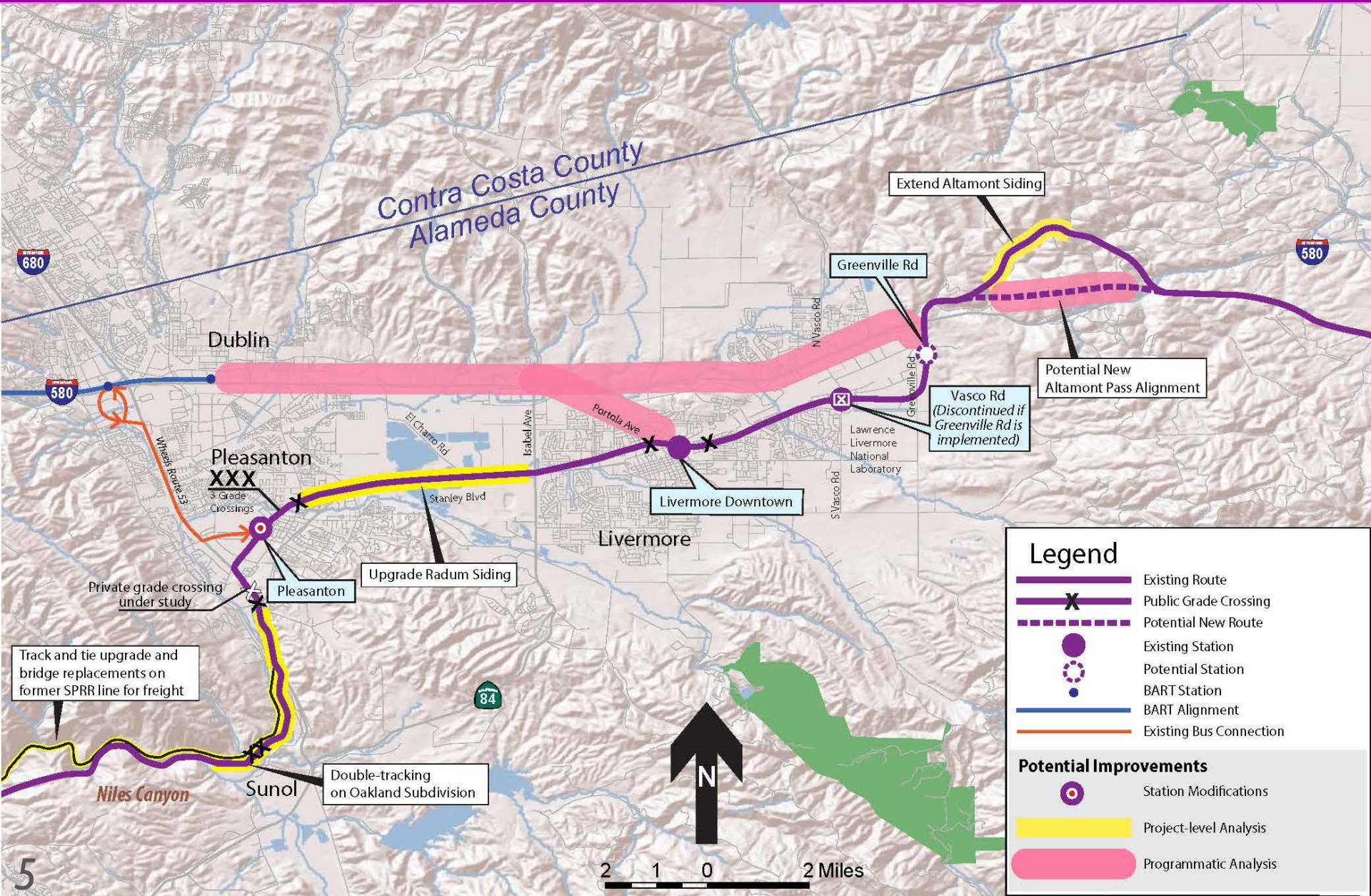
# ACE to Sacramento







# Tri Valley and BART Connectivity





Agenda Item 5



# THE NORTHERN CALIFORNIA MEGAREGION

Innovative, Connected, and Growing

June 2016



## About the Bay Area Council Economic Institute

Since 1990, the Bay Area Council Economic Institute has been the leading think tank focused on the economic and policy issues facing the San Francisco/Silicon Valley Bay Area, one of the most dynamic regions in the United States and the world's leading center for technology and innovation. A valued forum for stakeholder engagement and a respected source of information and fact-based analysis, the Institute is a trusted partner and adviser to both business leaders and government officials. Through its economic and policy research and its many partnerships, the Institute addresses major factors impacting the competitiveness, economic development, and quality of life of the region and the state, including infrastructure, globalization, science and technology, and health policy. It is guided by a Board of Trustees drawn from influential leaders in the corporate, academic, non-profit, and government sectors. The Institute is housed at and supported by the Bay Area Council, a public policy organization that includes hundreds of the region's largest employers and is committed to keeping the Bay Area the world's most competitive economy and best place to live. The Institute also supports and manages the Bay Area Science and Innovation Consortium (BASIC), a partnership of Northern California's leading scientific research laboratories and thinkers.

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## Acknowledgments

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**San Joaquin**  
Joint Powers Authority



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# Executive Summary

As the population of Northern California continues to grow, challenges in housing, land use, jobs, transportation, and the environment have crossed regional boundaries and are linking cities, counties, and regions together across wider geographies. These issues make planning at a megaregional scale increasingly necessary to achieve a broader footprint of economic prosperity and for California to reach its carbon reduction goals.

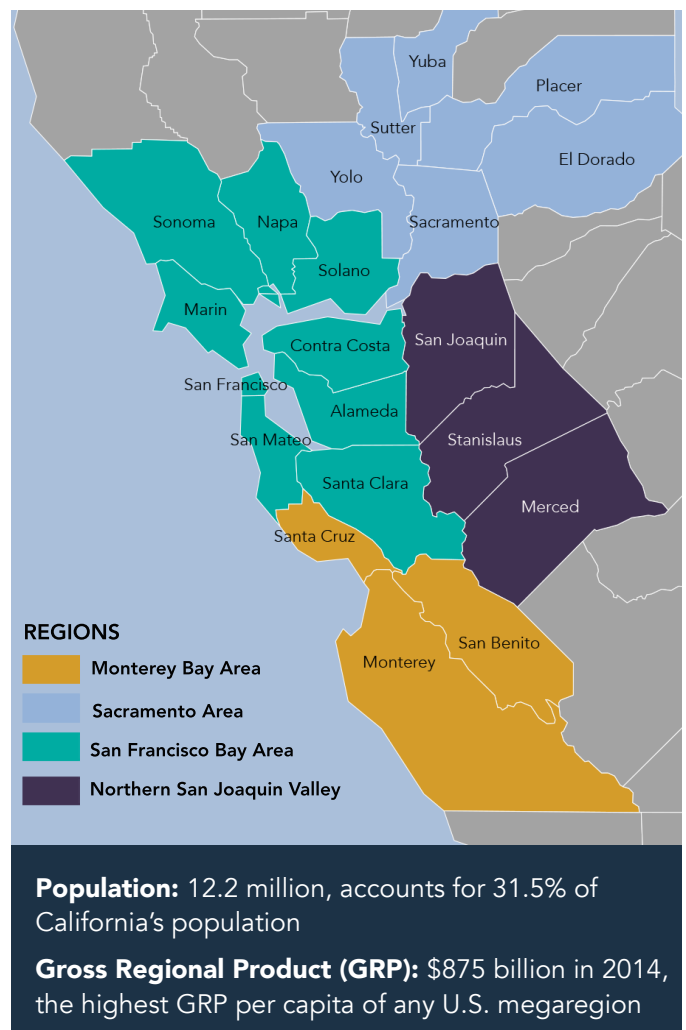
## Northern California Megaregion At a Glance

The Northern California Megaregion is composed of 21 counties grouped into four regions: Bay Area, Sacramento Area, Northern San Joaquin Valley, and Monterey Bay Area. It boasts one of the fastest growing economies in the country, joining the Texas Triangle and Gulf Coast as the only three megaregions to grow their gross regional product (GRP) at a compound annual rate greater than 5.0% since 2010.

**Population in the megaregion totaled 12.2 million in 2015.** Since 2000, the Sacramento Area and Northern San Joaquin Valley combine for the greatest share of the megaregion's population growth, with the grouping adding over 765,000 people. In comparison, the Bay Area has added 726,000 people over the same period.

**The Northern California megaregion includes three of the fastest growing counties in the state.** San Joaquin, Santa Clara, and Yolo counties were ranked second through fourth, respectively, in 2015 percentage population growth—all with a 1.3% annual increase.

**Since 2010, the Bay Area has accounted for three-quarters of megaregional job growth**—fueled by strength in technology- and information-related sectors. While the Bay Area had fully recovered from the recession by early 2012, the Northern San Joaquin Valley and the Sacramento Area have only recently reached their pre-recession employment peaks.



## Uncovering Connectivity in the Northern California Megaregion

The many connections that currently exist between the Bay Area, Sacramento Area, Northern San Joaquin Valley, and Monterey Bay Area provide evidence of a growing integration among these once-independent regions. Workers commute and goods move across each region's transportation system; housing markets blend together to give residents choices regarding affordability and proximity to work; and businesses, capital, and innovation take advantage of the megaregion's geographic scale to maximize economic returns.

**Potential exists for greater interconnectedness of the economic engines of the Northern California Megaregion.** New technologies have permeated industries such as food production, healthcare, and logistics, revolutionizing the way business is conducted and creating new types of companies, jobs, and economic opportunity for the entire megaregion in the process.

The megaregion's diverse set of universities, national laboratories, research institutions, entrepreneurs, and large and small businesses provides the foundation for a robust innovation system—arguably, the most dynamic in the entire world. Universities within the megaregion received over \$3.7 billion in 2014 for research and development, and they are increasingly partnering with business to commercialize these efforts. The megaregion's four national laboratories also provide thousands of direct jobs and are key cogs in the innovation environment.

Since 1990, the Sacramento Area has had the greatest increase of workers in the high-tech sector (on a percentage basis) of any California region, as the region's economy transformed from one rooted in agriculture to a much more diverse structure. Even with this growth, high-tech sectors make up only 6.7% of total Sacramento Area employment, below the average for the state.

By contrast, 19.1% of Bay Area workers were employed in high-tech sectors in 2014, and their numbers totaled over 685,000. High-tech employment in the Bay Area has grown by 18.7% (or over 108,000 jobs) since 2007,

giving it the biggest percentage increase of high-tech employment of any California region.

Educational attainment levels continue to be an issue that prevents companies from expanding across all parts of the Northern California Megaregion. In 2014, 70% of the Bay Area workforce had obtained some type of post-high school education. Conversely, this number is only 51% in the Monterey Bay Area and 49% in the Northern San Joaquin Valley.

**Housing affordability issues in the Bay Area have been one cause of the population influx in the inland portions of the megaregion.** With a median home value of nearly \$750,000 in 2015, Bay Area home prices are three times higher than the median price in nearby Northern San Joaquin Valley.

Divergence in housing affordability has become more pronounced following the recession:

- Only three metropolitan areas within the megaregion have 2015 median home prices above their 2006 levels: San Francisco (up 49.1% since 2006), San Jose (up 17.9%), and Santa Cruz (up 6.3%).
- Inland areas of the Northern California Megaregion have experienced home price movements in the opposite direction. The largest price declines since 2006 have occurred in Merced (down 48.4%), Stockton (down 36.3%), and Vallejo (down 32.5%).

Between 2004 and 2014, the Bay Area has experienced a total net migration loss of 143,500 people to other areas of the megaregion. The populations of the Northern San Joaquin Valley and the Sacramento Area in particular have been impacted by this population shift over the last decade.

**The interconnectedness of the megaregion's labor market presents challenges to the environment and opportunities for improved transportation connections.** While the megaregional workforce has increased by 17% between 1990 and 2013, commuters crossing regional boundaries have grown by 78%. Of all 191,500 commuters crossing regional boundaries in 2013, 68.7% were commuting into the Bay Area for work.

The growth of Northern San Joaquin Valley commuters to the Bay Area has been particularly dramatic, more than doubling from 1990 to 2013 and now comprising 15.8% of the Northern San Joaquin Valley's resident workforce.

The longest commutes in the megaregion originate in cities such as Pittsburg, Antioch, Brentwood, Tracy, and Lathrop. Additionally, San Joaquin County places in the top 10 nationally for its percentage of residents with a commute over 90 minutes long.

Each of the megaregional transit lines—Altamont Corridor Express (ACE), Capitol Corridor, and the San Joaquins—carries more than 1 million passengers annually, and ridership growth is especially strong on the routes serving the Northern San Joaquin Valley. All three of the systems also have ambitious plans to drive further ridership increases, and the future California High Speed Rail will bring even more passengers into these systems.

**The megaregion is the key economic unit for more integrated goods movement planning.** For 2015, it is estimated that just over \$1.0 trillion of freight moved to, from, or within the Northern California Megaregion. Trucking accounted for 74.1% of all of these freight flows.

Many of the megaregion's highway corridors carry between 5,000 and 15,000 trucks per day. However, segments of I-880, the I-580 Altamont Pass, and I-5 between Stockton and Manteca—which connect the Port of Oakland to the Northern San Joaquin Valley's intermodal terminals—carry between 15,000 and 37,000 trucks per day on average.

The most congested rail lines in the Northern California Megaregion are those that serve the dual purpose of freight and passenger movement. Projections for 2020 show that many of the major rail segments in the megaregion will be operating very near capacity, limiting the potential to increase the number of trips for freight and passengers.

## Policy Recommendations

There are urgent environmental and economic imperatives to plan for future population and job increases in a manner that does not stop at regional borders but extends across the megaregion. Broadening the job base and creating a more efficient transportation and goods movement network are necessary for the state and the Northern California Megaregion to reach greenhouse gas emissions reduction targets under the Sustainable Communities Act.

### INCREASING ECONOMIC PROSPERITY

#### Make Substantial Investments in Education Outside of the Bay Area

The issue of educational attainment is key to economic prosperity in the Northern California Megaregion, and it is an issue where mutual advocacy at the state level can lead to improved funding outcomes. It benefits the state and the megaregion as a whole for expanding businesses to locate in nearby geographies within the Northern California Megaregion, as opposed to other U.S. locations.

To achieve the needed level of workforce talent to realize a greater degree of "near-shoring," investments in the California State University system, the community college network, and apprenticeship programs should be made aggressively in those areas that need them most. Growing industries in inland areas—such as those related to healthcare, business services, and logistics—should be the targets of expanded community college certification efforts with curriculum input from the employer community.

#### Create Economic Development Structures that Cross County Lines

The current system of locally-oriented economic development efforts does not lend itself well to information sharing across the megaregion and can result in missed opportunities to have businesses expand, remain, or start within the Northern California Megaregion. This is especially true for Bay Area companies that are opening new offices in Seattle, Portland, or Austin, when places such as Davis or Sacramento could have provided similar workforce profiles and affordable office space.



### **Institute Statewide Tax Credit Programs to Incentivize New Business Development in Inland Areas**

The amount of capital that flows through the Bay Area is one of the main reasons that it has built a diverse economy that allowed it to quickly recover from the Great Recession. The Governor's Office of Business and Economic Development can incentivize the movement of more capital to other parts of the megaregion with a package of tax credits. This package can include a venture capital investment tax credit, a geographically targeted research and development tax credit, and a New Markets Tax Credit at the state level.

### **Create More Collaborative Efforts Across the Megaregion's Universities and National Laboratories**

An engagement summit focused on the role of universities and national laboratories as drivers of technology development and economic impact can help to create a more cohesive workforce development and innovation system amongst the megaregion's many research institutions. This summit would include the large private and public research universities in the megaregion, the megaregion's four national laboratories, and smaller institutions that act as important economic development drivers in their specific geographies.

## **IMPROVING MEGAREGIONAL CONNECTIVITY**

### **Support Improved and Expanded Service on Megaregional Rail Lines**

As the labor market becomes more megaregional in nature, improving transit options will be paramount to achieving improved megaregional mobility and the state's greenhouse gas emission reduction targets. The three megaregional transit lines have ambitious plans to grow their reach and their ridership:

- The ACEforward plan calls for six daily round trip trains by 2019 and at least 10 daily round trips by 2023 (increased from the four current round trips today). A second component of ACEforward extends its service area to the downtowns of Manteca, Modesto (by 2018), Turlock, and Merced (by 2022).

- Frequency and the time of day served are major impediments for the San Joaquins to serve the commuter market between the Bay Area, Northern San Joaquin Valley, and the Sacramento Area. A greater number of San Joaquins trips has the potential to serve more non-commute intercity trips, which include trips taken for business and leisure purposes.
- Capitol Corridor has a long-term vision to reduce travel times through a series of targeted major investments. The agency also plans to increase the number of daily round trips while extending service to Salinas in Monterey County and Auburn/Roseville in Placer County.

For California High Speed Rail to have its desired effect of improving connectivity across the state, it needs connections to a megaregional network that can efficiently distribute the regional and megaregional commuter market. Investments in the three rail systems in the megaregion can create expanded ridership that can also connect efficiently to high-speed rail.

### **Prioritize Rail Connectivity in the 2018 California State Rail Plan**

The entire megaregional transportation network would benefit from improved connections between its rail services. There are opportunities for investments in megaregional transit hubs in Livermore, San Jose, and Oakland, and they should be prioritized in the 2018 California State Rail Plan.

### **Use Megaregional Partners in Advocacy Efforts to Secure Funding; Simultaneously Explore Dedicated Sources of Infrastructure Finance**

Infrastructure projects that span the megaregion require partnership and support from a megaregional group of stakeholders. These projects have extensive megaregional benefits—they take vehicles off of roadways, lower greenhouse gas emissions, and improve local economies by making them more attractive places to live and work. These benefits need to be recognized across the megaregion so that a coalition can support efforts to gain funding from Sacramento and Washington.

Funding sources for intercity passenger rail improvements might include tapping into the 40% of cap-and-trade funding that is currently unallocated. There should be a larger, on-going allocation of cap-and-trade funds to intercity and commuter rail services. While the Transit & Intercity Rail Capital Program receives 10% of cap-and-trade revenues each year, intercity and commuter rail services are not well positioned to compete against local and regional transit services for these dollars.

### **Streamline Housing Approval Processes, Especially for Projects Served by Transit**

Governor Brown proposes that cities and counties require only “by-right” approval for certain types of housing projects. By-right approval can help to spur housing development across the Northern California Megaregion. Most importantly, it can facilitate higher density building near existing or planned rail stations that will give residents greater choice in where they live and work. Investments that increase train frequencies can have the effect of increasing demand for transit-oriented housing—this proposal can make that housing a reality. Additionally, the new stations that are built as a result of high-speed rail construction will more quickly promote economic revitalization, as developers will have more certainty of the types of building that will be approved.

## **RESTRUCTURING GOODS MOVEMENT**

### **Create a Structure for Passenger Rail and Freight Rail to Work Together**

The issue of growing demand for freight and passenger rail is unsustainable. With the megaregion’s transit operators planning enhanced service and freight operators wanting to keep right-of-way available for their own future expansion, coordination between private freight operators and public stakeholders needs to have a more defined structure to reach mutually beneficial outcomes.

The Metropolitan Transportation Commission in the Bay Area, the Sacramento Area Council of Governments, the regional transportation planning agencies of the Northern San Joaquin Valley, and the rail agencies of the Northern California Megaregion have begun working together to advance megaregional planning. This partnership should be the focal point that acts as the point of contact for engagement with private rail oper-

ators going forward. It can ensure that passenger rail efficiently links the megaregion while freight operators continue to meet their market objectives.

### **Support Investments to Limit Environmental Impacts of Goods Movement**

Many policies that can be implemented at the Port of Oakland have goods movement co-benefits that extend into the megaregion. For example, if more trucks load and unload at the Port of Oakland at night, truck traffic in the Northern San Joaquin Valley can shift away from peak travel times. An increased usage of technology in goods movement, such as improved tracking and coordination of truck arrival times at the port, can also limit the amount of time trucks spend idling while waiting to enter and exit.

The public sector should partner with private industry in making investments in goods movement. These investments might include more seamless rail connections and dredging to accommodate larger vessels in the Stockton shipping channel. The impacts of the \$880 million investment planned at the former Oakland Army Base will also stretch across the megaregion with large public benefits. These types of policies and investments that have megaregional significance should be supported at a similar geographic level.

### **Coordinate Advocacy for Dedicated Goods Movement Funding**

The Northern California Megaregion’s policymakers should help the state designate freight corridors of need. Projects identified in these corridors would be able to quickly access state funding when available and have the state’s support in efforts to garner funding from the recently-signed FAST Act, the federal government’s transportation spending plan. Future packages of freight rail investments supported by public funding might also be part of a deal that allows passenger rail to operate through dedicated rail corridors apart from freight traffic.



1

## Constructing the Northern California Megaregion

The Northern California Megaregion is a critical geography for coordinated economic and human capital development, and for planning and enabling connectivity through transportation networks. The many rail, road, labor, goods movement, and innovation connections that currently exist between the Bay Area, Sacramento Area, Northern San Joaquin Valley, and Monterey Bay Area provide evidence of a growing integration among these once-independent regions.

Continuing to develop and strengthen these connections is in the mutual interest of all of the component parts of the Northern California Megaregion. Encouraging shared economic growth and prosperity throughout the megaregion is also essential for the state as a whole, which relies heavily on the Bay Area as a source of job growth and state revenue. The Sacramento Area, Northern San Joaquin Valley, and Monterey Bay Area have distinct characteristics and assets that present opportunities to support a broader footprint of sustained economic growth.

As the Bay Area runs up against physical and political limitations on its ability to accommodate new growth, there are also urgent environmental and human imperatives to plan for future population and job increases in a manner that does not stop at regional borders but extends across the megaregion. The countless hours that commuters spend in traffic on the I-580 Altamont Pass, the I-80 corridor, or Highway 101 south of San Jose exact a growing toll on the

environment as well as on the people sitting in the cars and trucks clogging the entries to the Bay Area's job centers.

Broadening the job base in the areas where people live provides one remedy. Creating a more efficient transportation and goods movement network provides another. Both are necessary for the state and the Northern California Megaregion to reach its greenhouse gas emissions reduction targets under the Sustainable Communities Act. Each region in the state now has a land use and transportation strategy to reduce greenhouse gas emissions, yet the regional boundaries that have confined these efforts are increasingly becoming blurred.

The megaregion construct allows planners and policymakers to tackle these issues that connect regions. In 2013, nearly 175,000 individuals—or 5.0% of the region's workforce—commuted each day into the federally-designated nine-county Bay Area from outside of the region according to U.S. Census Bureau data. The Association of Bay Area Governments (ABAG) projects this number could grow by up to 53,000 workers by 2040.<sup>1</sup> Yet, "inter-regional" planning is just beginning to take place in the areas of housing, transportation, goods movement, and land use policies to account for this connectedness. These linkages and the environmental effects they can have require a larger scale of planning and coordination.



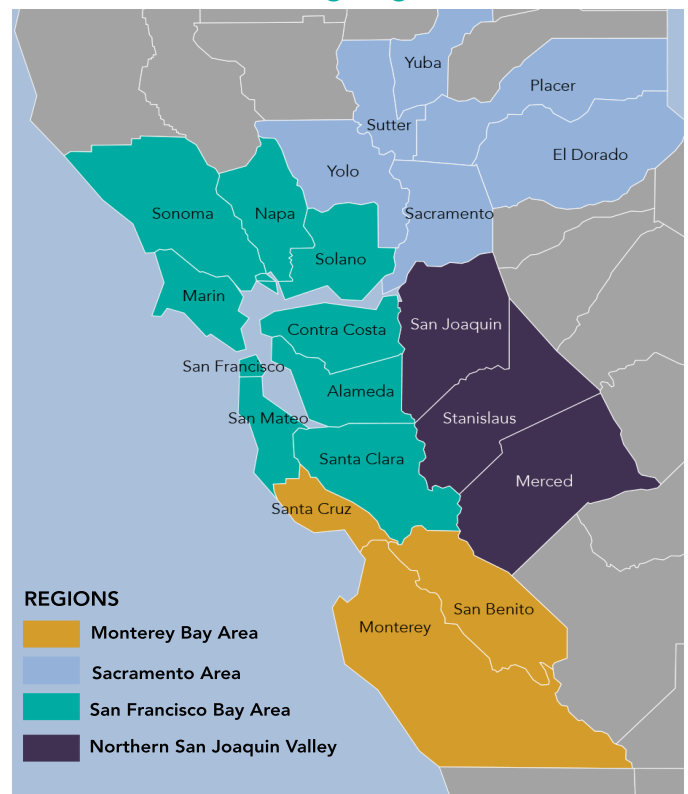
## What is the Northern California Megaregion?

Megaregions are generally defined as integrated sets of metropolitan centers and their surrounding areas, which are spatially and functionally connected through environmental, economic, and infrastructure interactions, generally with total population size exceeding five million people.<sup>2</sup> Definitions of the Northern California Megaregion vary across the research,<sup>3</sup> though all previous studies have been built around the following core areas: the Bay Area, including San Francisco, Oakland, and San Jose; Sacramento and surrounding communities stretching from as far east as Lake Tahoe and to Davis to the west; the Northern San Joaquin Valley, including the cities of Stockton, Modesto, Merced, Tracy, and Lathrop; and the coastal Monterey Bay Area, including Santa Cruz and Salinas.

This project defines the Northern California Megaregion as 21 counties, composed of 164 incorporated cities, divided into four sub-regions: the San Francisco Bay Area, the Sacramento Area, the Northern San Joaquin Valley, and the Monterey Bay Area. These 21 counties coincide with the jurisdictions of the major metropolitan planning organizations, the Metropolitan Transportation Commission (Bay Area MPO), the Sacramento Area Council of Governments (Sacramento Area MPO), and the Association of Monterey Bay Governments (Monterey Bay Area MPO). While the counties of the

Northern San Joaquin Valley—San Joaquin, Stanislaus, and Merced—maintain separate planning organizations, they are all unified by similar socioeconomic structures, as highlighted in the North San Joaquin Valley Index produced by the University of the Pacific.<sup>4</sup>

### Boundaries of the Megaregion



This project defines the Northern California Megaregion as 21 counties, composed of 164 incorporated cities, divided into four sub-regions: the San Francisco Bay Area, the Sacramento Area, the Northern San Joaquin Valley, and the Monterey Bay Area.

## The Growing Global Significance of Megaregions

As population continues to concentrate in growing metropolitan regions,<sup>5</sup> challenges in housing, land use, jobs, transportation, and goods movement have crossed regional boundaries and are linking cities, counties, and metropolitan regions together across wider geographies. From the largest instance of this occurrence in the U.S.—the grouping of cities along the northeastern seaboard from Washington, DC to Boston—the idea of a megaregion was born when Jean Gottmann dubbed the area “megalopolis” in 1957.

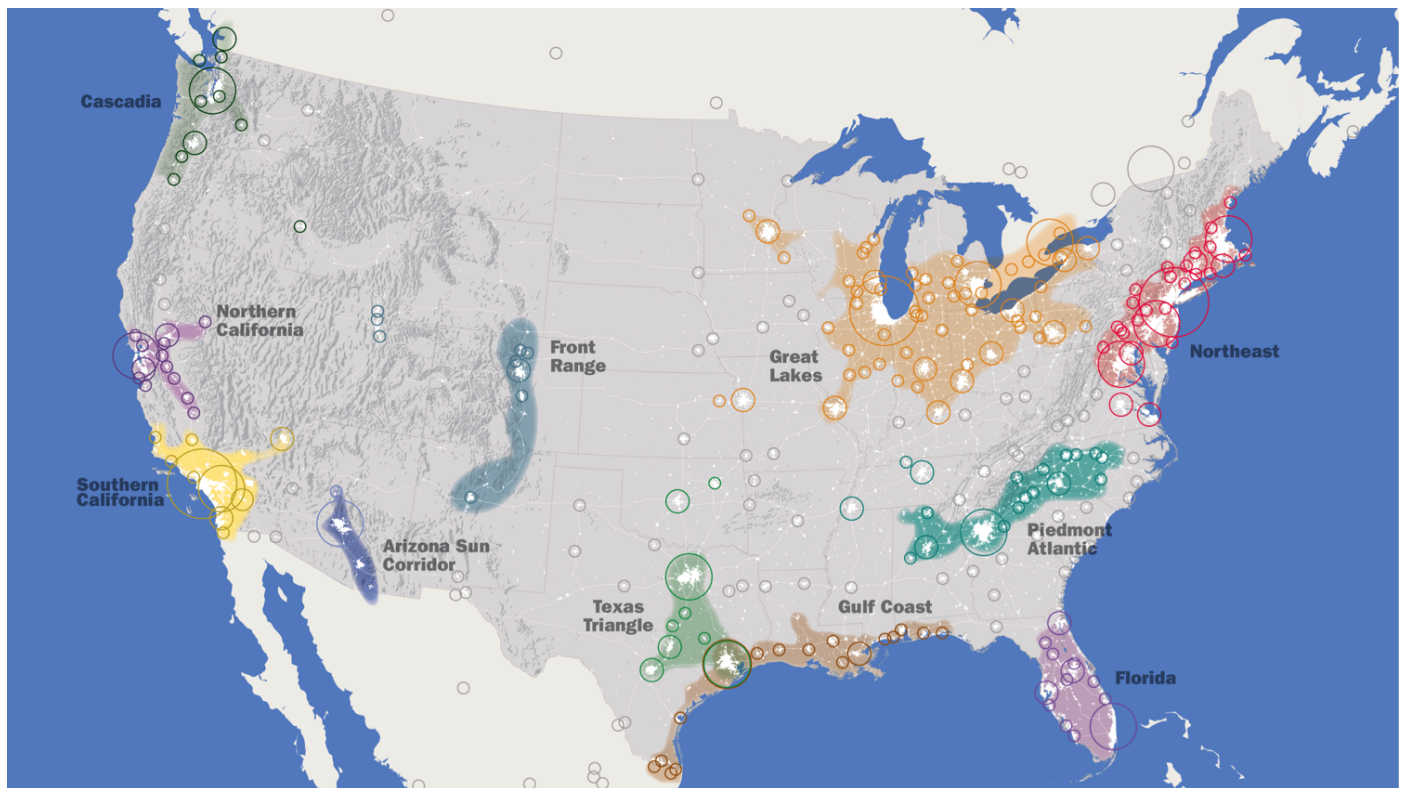
Between 1950 and 2000, America became a suburban and exurban nation, with population moving from the core downtown districts to suburbs.<sup>6</sup> This trend contributed to the formation of large suburbs and new cities surrounding new business districts. Megaregions were born out of these population groupings connected over vast geographies, leading urban planners and

policymakers to begin thinking of megaregions as the nation’s largest economic units.

The discussion of domestic megaregions has accelerated over the last decade as planning initiatives have broadened their geographic reaches. Since that time, multiple analyses have focused on defining megaregions in the U.S. In 2006, the Regional Plan Association—a regional planning organization for the 31-county New York-New Jersey-Connecticut area—found 11 emerging megaregions.

By 2050, projections show that 70% of the nation’s population growth and 80% of its employment will likely occur within these 11 megaregions—which occupy less than 20% of the land in the lower 48 states.<sup>7</sup> These numbers signal how core these areas have become to the U.S. economy.

### Megaregions Defined by the Regional Plan Association



Source: Regional Plan Association

# 2

## The Economic Drivers of the Northern California Megaregion

With a gross regional product of \$875 billion in 2014, the Northern California Megaregion accounted for 5.0% of total U.S. gross domestic product (GDP). This figure makes it the fifth largest megaregional economy and the most productive, with the highest GDP per capita. The Northern California Megaregion also boasts one of the fastest growing economies in the country since 2010. It joins the Texas Triangle and Gulf Coast as the only three megaregions to grow their GDP at a compound annual rate greater than 5.0% since 2010; however, the growth in Texas has a strong correlation with oil prices, which have fallen sharply since 2014.

**The Northern California Megaregion Compared to Other U.S. Megaregions**  
Sorted by Gross Regional Product (GRP)

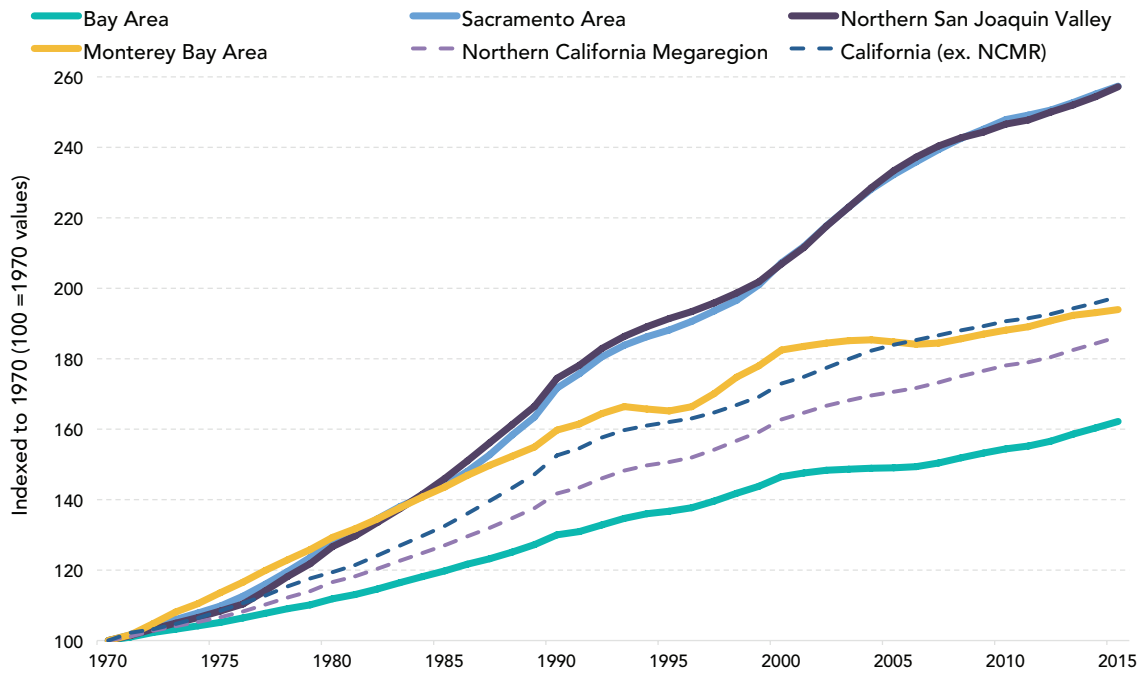
| Megaregion                 | Square Mileage | 2014 Population   | 2014 GRP (\$ in millions) | 2010-2014 GRP CAGR | 2014 GRP Per Capita (\$) | % of 2014 U.S. GDP |
|----------------------------|----------------|-------------------|---------------------------|--------------------|--------------------------|--------------------|
| Northeast                  | 61,942         | 54,782,704        | 3,750,607                 | 3.27%              | 68,463                   | 21.53%             |
| Great Lakes                | 205,452        | 55,696,501        | 2,747,601                 | 3.63%              | 49,332                   | 15.77%             |
| Southern California        | 61,986         | 25,368,827        | 1,412,877                 | 3.42%              | 55,693                   | 8.11%              |
| Texas Triangle             | 85,312         | 21,283,372        | 1,338,669                 | 6.98%              | 62,897                   | 7.69%              |
| <b>Northern California</b> | <b>24,149</b>  | <b>12,063,285</b> | <b>875,579</b>            | <b>5.28%</b>       | <b>72,582</b>            | <b>5.03%</b>       |
| Gulf Coast                 | 59,519         | 14,286,289        | 872,818                   | 5.18%              | 61,095                   | 5.01%              |
| Piedmont Atlantic          | 59,525         | 18,448,418        | 815,170                   | 4.01%              | 44,186                   | 4.68%              |
| Southern Florida           | 38,356         | 18,323,894        | 769,259                   | 3.75%              | 41,981                   | 4.42%              |
| Cascadia                   | 47,226         | 8,780,816         | 543,703                   | 3.90%              | 61,919                   | 3.12%              |
| Front Range                | 56,810         | 5,892,278         | 316,988                   | 4.15%              | 53,797                   | 1.82%              |
| Arizona Sun Corridor       | 48,803         | 5,977,688         | 259,698                   | 3.59%              | 43,445                   | 1.49%              |

**Data Source:** Regional Plan Association America 2050, "Defining U.S. Megaregions"; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Census Bureau, American Community Survey

**Analysis:** Bay Area Council Economic Institute

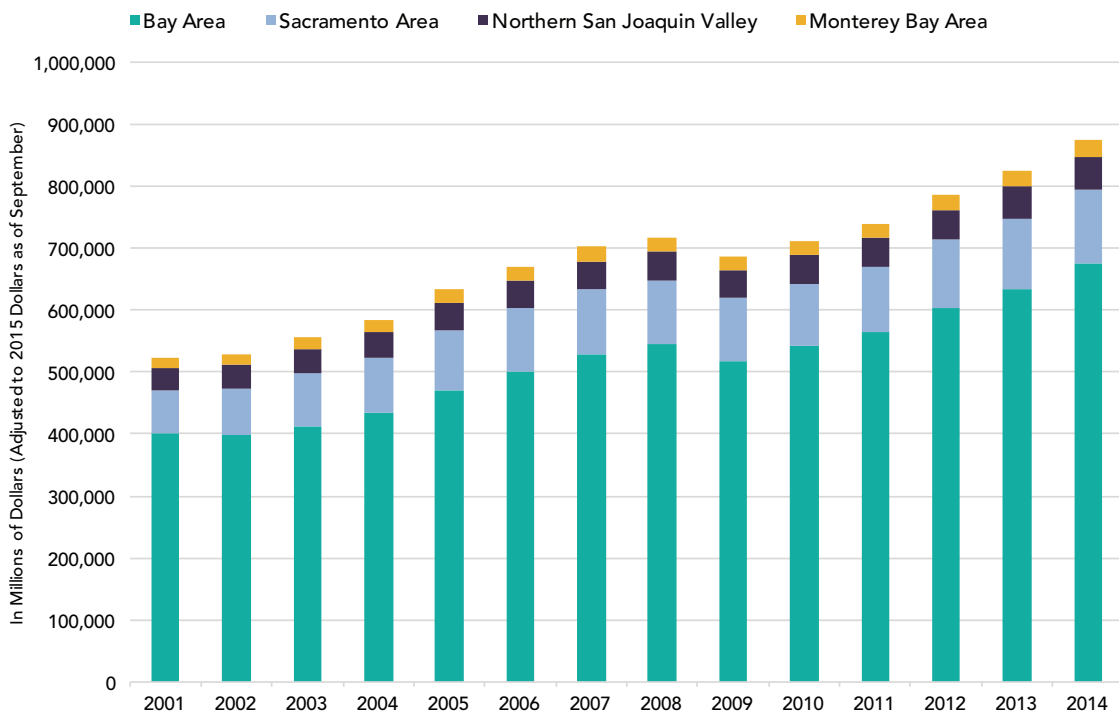


### Regional Population Growth Relative to 1970



**Data Source:** California Department of Finance and American Decennial Census  
**Analysis:** Bay Area Council Economic Institute

### Gross Regional Product of the Northern California Megaregion



**Data Source:** U.S. Department of Commerce, Bureau of Economic Analysis  
**Analysis:** Bay Area Council Economic Institute

The vast majority of the Northern California Megaregion’s economic activity is concentrated in the Bay Area, particularly in San Francisco and Silicon Valley—two of the economic powerhouses of the megaregion. While the Bay Area’s share of gross megaregional product is significant, at 77.3%, the Sacramento Area and the Northern San Joaquin Valley have been growing their economies at a similar rate since the turn of the century—with all three areas posting growth rates between 65% and 70% since 2001.<sup>8</sup>

## Inland Population Spikes Since 2000






As of January 2015, the 21-county Northern California Megaregion was home to more than 12.2 million people, or 31.5% of the state’s total population. Seven of the state’s 20 largest cities, based on population, can be found in the megaregion.

When breaking down the megaregion into its component regions, the Sacramento Area and the Northern San Joaquin Valley are the fastest growing areas on a percentage basis over the long term. Since 2000, the

Sacramento Area and Northern San Joaquin Valley together account for the greatest share of the megaregion’s absolute population growth, with the grouping adding over 788,000 people. In comparison, the Bay Area added 787,000 people over the same period. However, since 2010, the Bay Area’s population growth has accelerated, and its 1.15% annual increase over the last five years leads the megaregion.

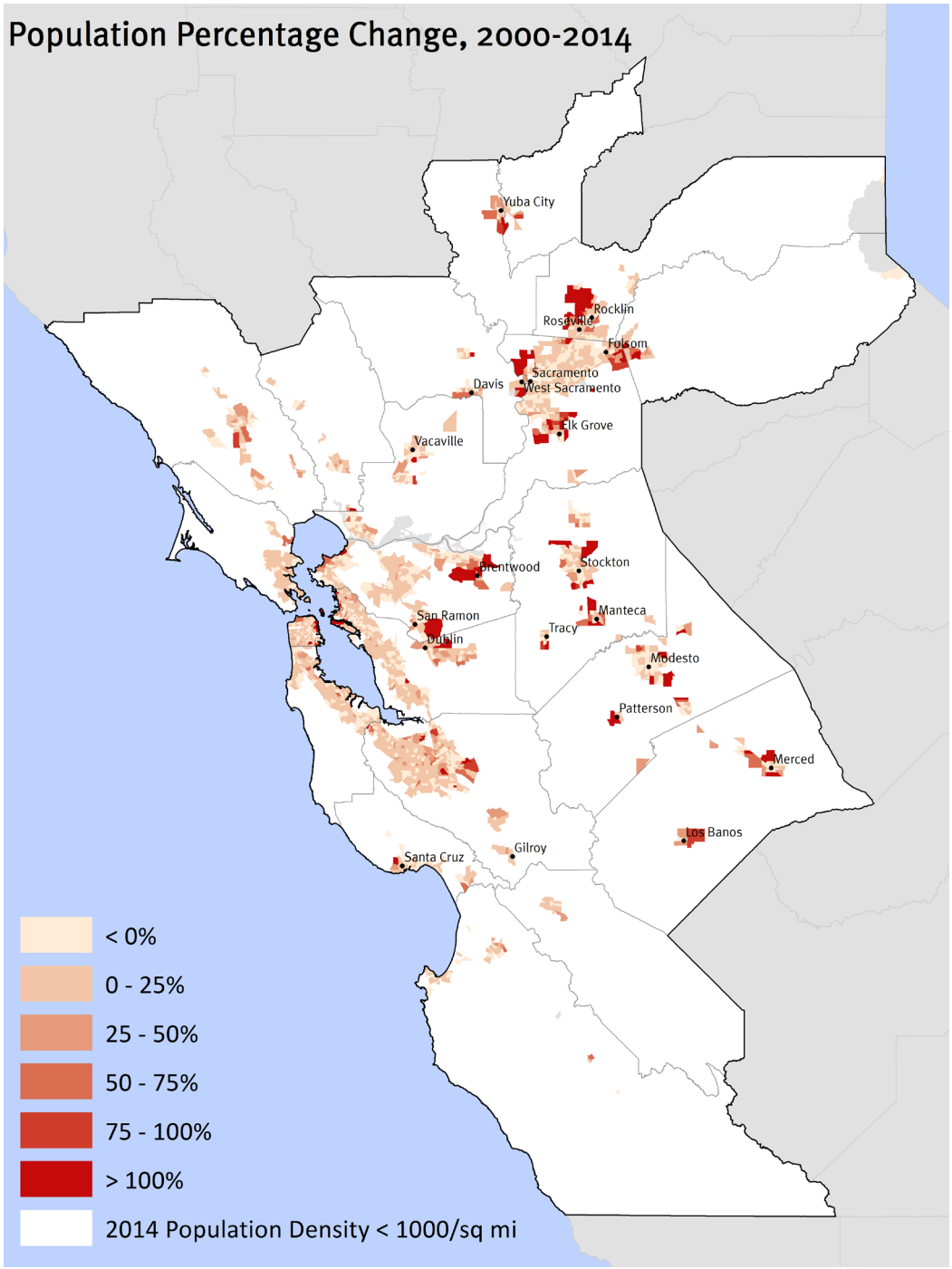
San Joaquin, Santa Clara, and Yolo counties were ranked second through fourth, respectively, in percentage population growth in 2015—all reporting a 1.3% increase. Projecting forward, the California Department of Finance expects a continued population influx for the Sacramento Area and Northern San Joaquin Valley. Between 2015 and 2030, the state estimates annual population increases of 1.1% and 1.4% for the Sacramento Area and Northern San Joaquin Valley, respectively.<sup>9</sup> With these areas leading the way on a percentage basis, the Northern California Megaregion is expected to add nearly 1.9 million additional people by 2030—boosting its total population to over 14 million. The rate of population growth for the megaregion (15.3% total over 15 years) outpaces the expectation for the rest of the state of California (12.5%).<sup>10</sup>

## Regional Population and Employment Statistics for the Northern California Megaregion

| Region                                 |  Bay Area |  Sacramento |  Northern San Joaquin Valley |  Monterey Bay Area |  Northern Calif. Megaregion |
|--|--|--|--|---|--|
| Population, 2015                       | 7,571,297  | 2,417,548  | 1,527,943  | 762,676   | 12,279,464   |
| Annual Population Change, 2010-2015    | 1.15%  | 0.86%  | 0.98%  | 0.80%   | 1.05%  |
| Percent of Megaregion Population, 2015 | 61.66%   | 19.69%   | 12.44%   | 6.21%   | 100%   |
| Percent of Megaregion Employment, 2015 | 67.62%   | 17.71%   | 9.00%  | 5.67%   | 100%   |

**Sources:** California Department of Finance, State of California Employment Development Department

**Analysis:** Bay Area Council Economic Institute



Source: California Department of Finance

Analysis: Bay Area Council Economic Institute, Capitol Corridor Joint Powers Authority

A more dispersed population has created more points of connectivity within the megaregion, as population centers are growing in the spaces between large urban hubs. Displayed in **Appendix A**, the fastest growing cities in the Northern California Megaregion since 2000 are concentrated in areas outside of the nine-county Bay Area, and include the cities of Elk Grove, Yuba City, Rocklin, West Sacramento, Roseville, and Tracy.

Of the 16 cities in the megaregion growing at an annual rate greater than 1.5%, 12 are located in the Sacramento Area and the Northern San Joaquin Valley. Of note, the fastest growing cities in the Bay Area are located not in the core, but in the Tri-Valley (San Ramon), eastern Contra Costa County (Brentwood), and Southern Santa Clara County (Gilroy). The map below highlights these fast-growing cities and their population change since 2000.



## Employment Trends Shaped by Pace of Recovery from Recession

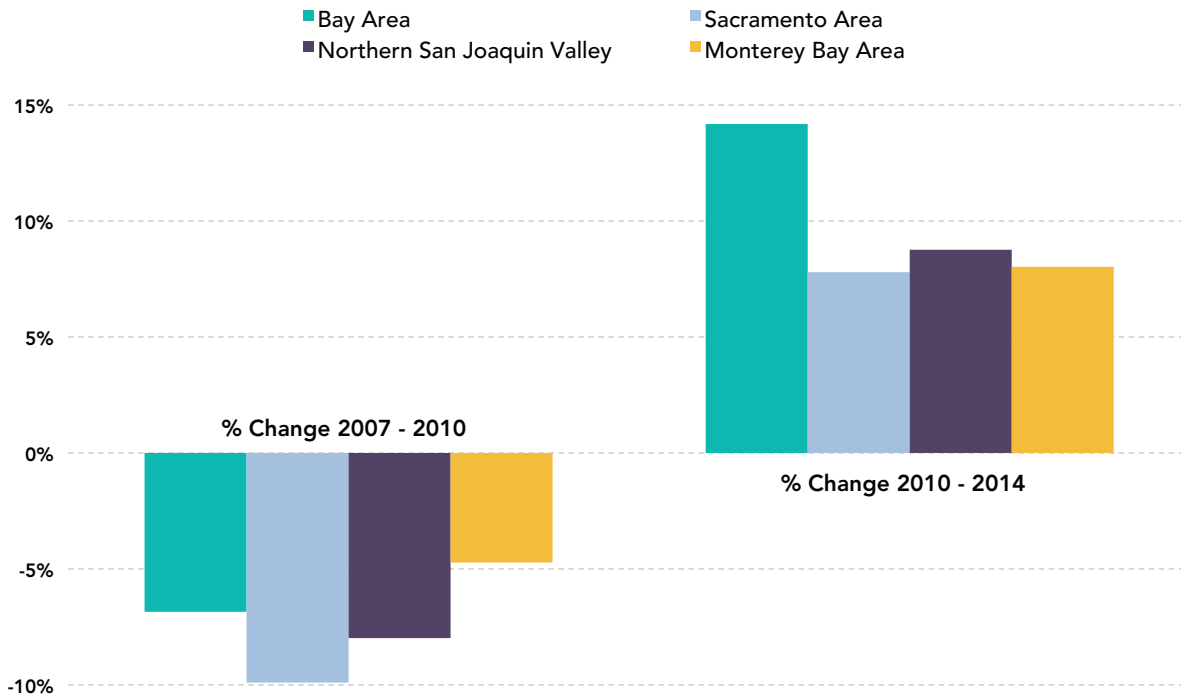
The Bay Area has long been the jobs driver of the megaregion, with 67.6% of employment in 2015. While the burst of the dot-com bubble produced sharp employment losses in the Bay Area—and the region has just recently returned to its job levels from 2000—other parts of the megaregion grew employment throughout the period up to the Great Recession. Leading the way, the Sacramento Area produced job growth of 13.8% between 2000 and 2007, while the Northern San Joaquin Valley posted an 11.0% increase.

Since 2010, the Bay Area has accounted for three-quarters of megaregional job growth—fueled by

strength in technology- and information-related sectors. Inland regions have experienced a much slower jobs recovery, as their employment growth rates have been only half of what has been produced in the Bay Area, which had fully recovered from the recession by early 2012. In contrast, the Northern San Joaquin Valley reached its pre-recession job peak by the end of 2014, and the Sacramento Area has just recently brought its employment numbers back to where they were in 2007.

More recent data suggests that the fast jobs recovery experienced in the Bay Area is beginning to spread to inland regions. The Stockton-Lodi metropolitan area posted the seventh fastest job growth of any U.S. region for March 2016—a 4.1% year-over-year increase.<sup>11</sup> That level of job growth ranks above both the San Francisco and Silicon Valley metropolitan areas.

### Percent Employment Change Pre- and Post-Recession



**Data Source:** State of California Employment Development Department  
**Analysis:** Bay Area Council Economic Institute

## The Importance of the Megaregion in Planning

Economic connections across the Northern California Megaregion date back to the Gold Rush era. Sacramento, San Francisco, San Jose, and Stockton were incorporated within five months of each other in 1850, and Oakland was incorporated not long after in 1852. These cities were tied together not only by networks of rail and water infrastructure, but also the flow of capital and commodities between core centers and the lesser-developed areas further from the coast.

These early interdependencies have grown to create a series of cities, suburbs, and exurbs that form a cohesive economic unit. For example, workers commute and goods move across each region's transportation system; housing markets blend together to give residents choices regarding affordability and proximity to work; and businesses, capital, and innovation take advantage of the megaregion's geographic scale to maximize economic returns.

As the economies of the Northern California Megaregion become even more interconnected, planning at a megaregional scale is increasingly necessary for the following reasons:

**1. Potential exists for greater interconnectedness of the economic engines of the Northern California Megaregion.** The innovation environment that the Bay Area is known for is beginning to develop in places outside of Silicon Valley, such as the Sacramento region and the

Northern San Joaquin Valley. More clustered markets and integrated innovation ecosystems can play a key role in generating more economic value for the entire megaregion.

- 2. The interconnectedness of the megaregion's labor market presents challenges and opportunities to future economic prosperity.** Housing affordability issues in the Bay Area have been one cause of the population influx in the inland portions of the megaregion. But this shift has caused increasing congestion on the megaregion's roadways, providing transit systems and transportation agencies an opportunity to plan for projects in a more coordinated manner.
- 3. The megaregion is the key economic unit for more integrated goods movement planning.** Approximately \$1 trillion in freight flows through and within the megaregion each year. Planning for a goods movement future that creates greater efficiencies and minimizes impacts on the transportation system and the environment presents a significant opportunity for planning and policy coalescence on a megaregional scale.

This report will tackle these three topics in the following sections by identifying the evidence that suggests the megaregional economy operates as a single unit, shedding light on the challenges to increased connectivity, and detailing recommendations for policymakers and planners that can facilitate strategic economic growth in the Northern California Megaregion.

A growing number of megaregional interdependencies have formed a cohesive economic unit. Workers commute and goods move across each region's transportation system; housing markets blend together to give residents choices regarding affordability and proximity to work; and businesses, capital, and innovation take advantage of the megaregion's geographic scale to maximize economic returns.



# 3

## Connecting the Megaregion's Economic Engines

Each of the four regions that make up the Northern California Megaregion has a unique mix of businesses that form the region's economy:

- In the Bay Area, the technology sector and services associated with it have driven the **Professional & Business Services** industry to 19.0% of regional employment in 2014.
- In the Sacramento Area, **Government**, which includes positions associated with state and local government, as well as in public K-12 and higher education, represents 25.2% of employment.
- The Northern San Joaquin Valley is the state's crossroads for goods movement, including agricultural trade and fulfillment centers for online shoppers, and jobs in **Trade, Transportation, & Utilities** make up 21.4% of employment.
- The Monterey Bay Area's rural geography makes **Farming**, at 20.7% of employment, the dominant industry.

The industry mix in the megaregion is also evolving rapidly, especially as economies have been re-shaped following the Great Recession. **Appendix B** provides detailed information on industry growth rates since 2007 by region. Across all four regions, the Educational & Health Services industry has grown employment by more than 20% since 2007. Employment in Leisure & Hospitality is also up across all regions over the same period.

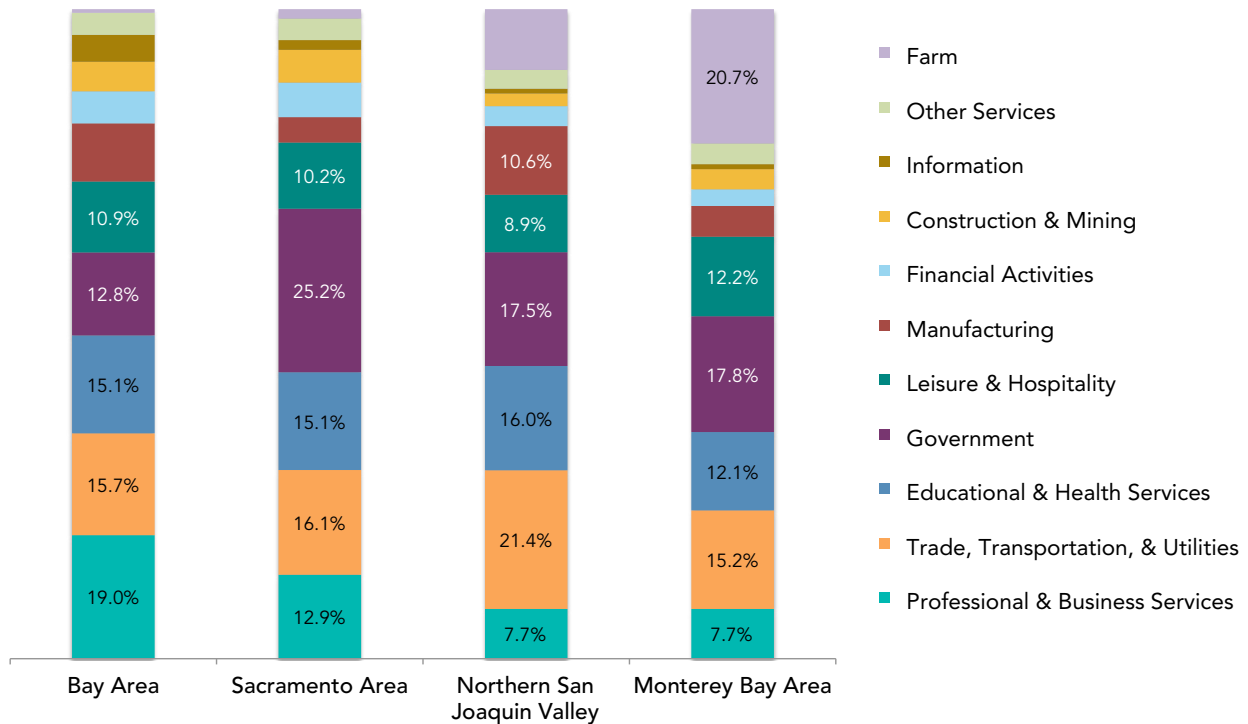
These two trends reflect a broader domestic economic shift to a greater proportion of service economy jobs—one that the Bay Area has benefitted from due to its high concentration of jobs in service industries. Employment totals in industries reliant on goods production, including Manufacturing and Construction, remain well below their pre-recession levels in the megaregion—explaining the slow economic recovery in areas more reliant on these industries.

As these structural shifts in the economy occur, however, one constant continues to drive economic growth in the most prosperous regions: innovation. While the Bay Area has long been known around the world for being home to companies that invent, create, and market some of the most advanced products and services, this environment for innovation is beginning to develop in other parts of the megaregion.

Capacity constraints in the Bay Area, newly developing economic strength in inland areas, and proximity to Silicon Valley are a few of the reasons driving this shift. This section will detail the potential for a greater degree of economic interconnectedness in the megaregion, especially as it relates to the megaregion's innovation economy. Barriers to this type of growth also exist, and the section will close with an examination of the policy solutions that can lead to the megaregional economy capturing more jobs and economic activity.



## Megaregion Employment by Industry, 2014



Data Source: State of California Employment Development Department  
 Analysis: Bay Area Council Economic Institute

## Potential for Greater Economic Interconnectedness

The group of key industries described previously provides strong complementarity across the megaregion. With each region providing advantages to a differing array of industries—these may include access to talent and capital, lower cost of living, or more available space—the megaregional economy is dependent on diversity. A diverse set of industries has long been a feature of the megaregion, as each region’s economic puzzle pieces originally fit together to form a connected agro-industrial economy linking the Bay Area’s financial industries and consumer markets to the trade routes and production centers further away from the coast.<sup>12</sup>

Today, the corners of the megaregion are increasingly linked by the innovation economy, as new technologies have permeated industries such as food production, healthcare, and logistics, revolutionizing the way

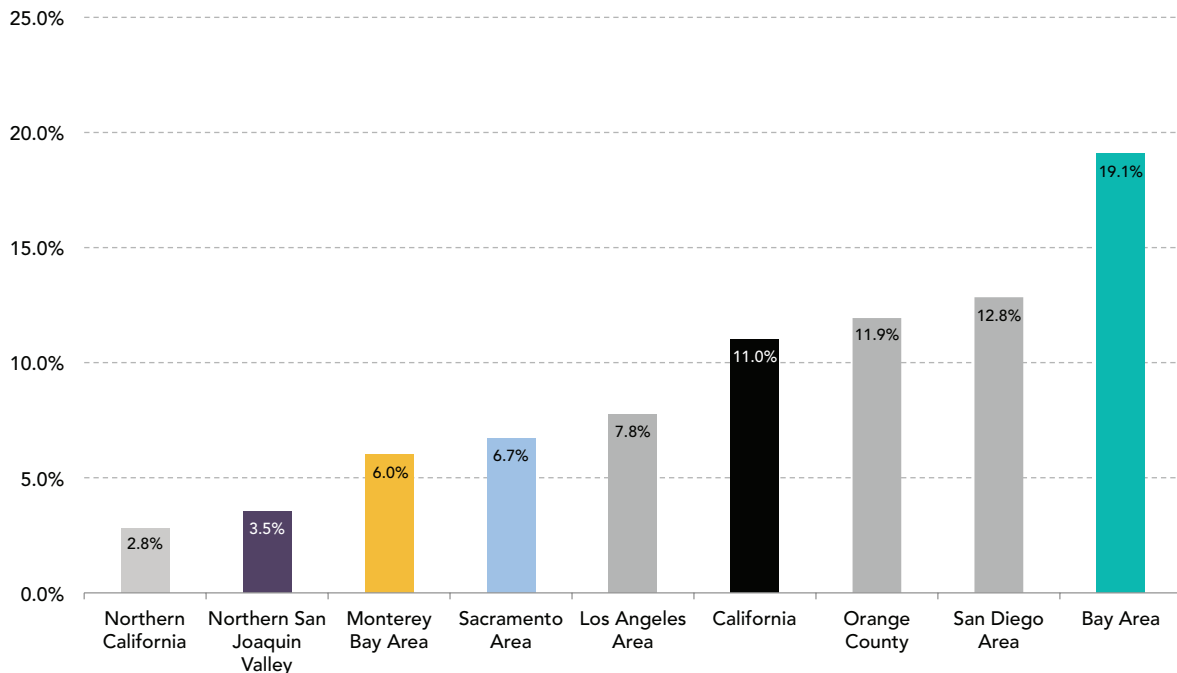
business is conducted and creating new types of companies, jobs, and economic opportunity in the process.

### Creating a More Distributed High-Tech Sector in the Megaregion

High-tech jobs and the industries that employ them are increasingly viewed as important economic drivers because they have been more resilient over the past 10 years to economic downturns and they create more indirect jobs than any other industry.<sup>13</sup> Additionally, rapid growth and high wages are associated with occupations in science, technology, engineering, and math (STEM). However, employment in high-tech sectors remains a relatively small percentage of total employment in the inland areas of the Northern California Megaregion:

- Since 1990, the Sacramento Area has had the greatest increase of workers in the high-tech sector<sup>14</sup> (on a percentage basis) of any California region, as the region’s economy transformed from one rooted

## Share of Regional Employment in High-Tech Sectors, 2014



**Note:** Data includes employment in private industries only.  
**Data Source:** Quarterly Census of Employment & Wages, State of California Employment Development Department  
**Analysis:** Bay Area Council Economic Institute

in agriculture to a much more diverse structure. **Its employment in high-tech sectors grew from 22,700 in 1990 to over 60,000 in 2014.** Even with this growth, high-tech sectors make up only 6.7% of total Sacramento Area employment.

- By contrast, **19.1% of Bay Area workers were employed in high-tech sectors in 2014**, and their numbers totaled over 685,000. Recent expansion of high-tech sectors has been concentrated in the Bay Area. High-tech employment in the Bay Area has grown by 18.7% (or over 108,000 jobs) since 2007, giving it the biggest percentage increase of high-tech employment of any California region.
- **Long-term growth of high-tech jobs has not only occurred in urban core areas.** The Northern San Joaquin Valley posted a 56.1% increase in these jobs from 1990 to 2014, and the Monterey Bay Area saw a gain of 29.3% over the same period.<sup>15</sup> More recent data points to slowing growth, though the Monterey Bay Area has witnessed its high-tech employment grow by 10.5% since 2010.

## Cataloging the Innovation Assets of the Megaregion

The megaregion's diverse set of universities, research institutions, entrepreneurs, and businesses provides the foundation for a robust innovation system—arguably, the most dynamic in the entire world.

At the heart of this system is a group of leading universities, stretching across the Northern California Megaregion. These universities include Stanford University, UC Berkeley, UC San Francisco, University of San Francisco, Santa Clara University, San Jose State, and St. Mary's College in the Bay Area; UC Davis and Sacramento State in the Sacramento Area; UC Merced and University of the Pacific in the Northern San Joaquin Valley; and UC Santa Cruz in the Monterey Bay Area.

The eight schools displayed in the chart on the following page received over \$3.7 billion in 2014 for research and development and rank in the top 300 for R&D domestically. Together, they represent 5.5% of national R&D spending at higher education institutions.<sup>16</sup>

## Public and Private Science and Engineering Research and Development Investments (\$ in millions)

| University          | Rank in R&D Investments | Investments in 2014 |
|---------------------|-------------------------|---------------------|
| UC San Francisco    | 5                       | 1,084               |
| Stanford University | 9                       | 959                 |
| UC Berkeley         | 23                      | 744                 |
| UC Davis            | 25                      | 712                 |
| UC Santa Cruz       | 123                     | 152                 |
| San Jose State      | 205                     | 44                  |
| UC Merced           | 242                     | 24                  |
| Sacramento State    | 300                     | 13                  |

**Data Source:** National Science Foundation, National Center for Science and Engineering Statistics, Higher Education R&D Survey

**Analysis:** Bay Area Council Economic Institute

The schools of the University of California system also participate in the California Institutes for Science and Innovation program created by the state in 2000. Two of the four institutes link the universities of the megaregion with the business community:

- QB3 - the California Institute for Quantitative Biosciences** - is a cooperative venture between UCSF, UC Berkeley, and UC Santa Cruz that focuses on the intersection of biological sciences and information technology. QB3 researches innovation in the area of diagnostics, synthetic biology, therapeutics, and translational medicine.

- CITRIS - the Center for Information Technology Research in the Interest of Society** - links research capacities at UC Berkeley, UC Davis, UC Merced, and UC Santa Cruz to shorten the timeline between research and commercialization. CITRIS's research areas include healthcare, intelligent infrastructure, sustainable energy, and uses for big data.

These centers for innovation and other university programs (detailed in the adjoining case studies) create the foundation for innovation in the megaregion. From these, new workforce talent, technologies, and ideas are produced that often lead to startup formation—companies that can become major employers and technological pioneers as they grow.

In addition to its universities, the Northern California Megaregion benefits from being home to four national laboratories—the largest concentration of laboratories of any megaregion in the country. **Lawrence Livermore National Laboratory (Livermore), Lawrence Berkeley National Laboratory (Berkeley), Sandia National Laboratory (Livermore), and SLAC National Accelerator Laboratory (Menlo Park)** provide thousands of jobs in the megaregion.

Federal investment in these laboratories pumps billions of dollars into the megaregional economy and can spawn new businesses and industries as these institutions continue to expand their reach beyond the laboratory walls. At the center of the megaregion, the Livermore Valley Open Campus is a newly-opened joint venture between Sandia and Lawrence Livermore that encourages lab collaboration with partners in academia and industry. In Livermore, the national laboratories also draw employees from the Northern San Joaquin Valley and the Sacramento Area, making them critical institutions in expanding the innovation economy across the Northern California Megaregion.



# Spotlight on the University of California

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## UC DAVIS: INNOVATING AT THE HEART OF THE MEGAREGION

With over 35,000 enrolled students, the UC Davis campus is an important cog and driver of innovation in the Northern California economy. With four colleges and six professional schools, its location on the boundaries of the Bay Area, Sacramento Area, and Northern San Joaquin Valley help it to support a broad range of entrepreneurial activity that has impacts across the megaregion. As the top-ranked university for agriculture and veterinary medicine in the nation, UC Davis plays a key role in the agricultural technology sector, from breeding disease-resistant crop varieties to creating new nutritional technologies.

In launching the **Venture Catalyst** program in mid-2013, UC Davis set its sights on supporting new ventures based on university research. Through the Venture Catalyst program, entrepreneurs are able to grow their ideas through support services, workshops, proof-of-concept funding, business incubators, and access to industry experts. The program also engages economic development and innovation networks from across the megaregion to link the program to other technology-based innovation programs.

The **UC Davis World Food Center** provides another avenue for the university to fuel entrepreneurship. The World Food Center is using its research to showcase new investment opportunities, to move ideas from concept into commercialized products, and to create partnerships with the private sector. UC Davis's partnership with Mars, Inc. to form the Innovation Institute for Food and Health is a prime example of how the World Food Center's facilities can be used to spur private sector innovation.

The **California Lighting Technology Center** specializes in technologies to accelerate the development and commercialization of energy-efficient lighting. The center partners with designers, manufacturers, utilities, and government agencies to produce new technologies, patents, and license agreements in its laboratories.

## UC SANTA CRUZ: LEVERAGING PROXIMITY TO SILICON VALLEY

The UC Santa Cruz campus has recently moved to focus on technology commercialization and startup activity, and it has considerable opportunity in nearby Silicon Valley where many of the innovations produced by students and researchers eventually become commercialized. UC Santa Cruz has built a particular strength in genomics, as it was the home of the International Human Genome Project and its Genomics Institute continues to lead research in the field.

UC Santa Cruz has a unique connection to the Bay Area through the university's **Silicon Valley Center**, which hosts almost as many students as the main campus, most in continuing education programs with a technology focus. The broader vision for the Silicon Valley Center includes acting as the entrepreneurial portal not just for UC Santa Cruz students, but also for the entire University of California system.

## UC MERCED: SHAPING THE FUTURE OF INNOVATION IN THE VALLEY

The UC system's newest campus, UC Merced, has been in operation since 2005, and has taken an innovative approach to its technology functions—emphasizing a connection between new venture development and community engagement. The campus is currently home to 448 graduate and 6,237 undergraduate students, with targeted growth to 10,000 students by 2020.

The recently opened **UC Merced Venture Lab** is the campus's best example of innovation. As an incubator, its participants receive mentorship and support from the university, the business community, and entrepreneurs and investors who advise the program. The Venture Lab has also partnered with the City of Merced, which is looking to diversify its economy and wants to retain more of the university's graduates as long-term members of the community.

## Venture Capital Has Room to Expand Beyond Silicon Valley

While Silicon Valley and San Francisco start-ups attract an outsized amount of interest from investors, companies based in Sacramento or other parts of the Northern California Megaregion have not tapped into the venture capital boom occurring in the Bay Area. In 2015, over \$27.3 billion was invested by venture capitalists in Bay Area companies. This number accounts for 81.2% of all venture capital investments in California and 46.5% of all venture capital investments in the U.S. In 2015, just \$43.2 million in venture capital investments were made in companies based in Sacramento and the surrounding area.<sup>17</sup>

Of the venture capital investments that have been made within Northern California (but outside of the Bay Area) in the last five years, the majority has occurred in the business and financial services fields and within healthcare. This represents a clear shift from the investment cycle of the 2000s, when companies related to computers, electronics, and telecommunications received the bulk of the area's investment dollars.

The investment levels displayed in the chart on the following page may signal difficulty for firms located outside of the Bay Area to access investments from Silicon Valley venture capitalists. While the depth of the venture capital system and the amount of money invested in Northern California pales in comparison to that of Silicon Valley, the area's burgeoning innovation environment can make it a new geography for investment going forward.

## The Megaregion Has the Land and Space to Take Advantage of the Bay Area's Physical Capacity Constraints

Available spaces and relatively cheap rent are attracting growing companies to the inland portions of the megaregion. Monthly office rental rates now top \$6.00 per square foot in San Francisco, while Sacramento and Stockton are below \$2.00 per square foot.

Industrial rental rates follow the same trend, as average rents in San Jose-Silicon Valley were \$1.12 per square foot in the fourth quarter of 2015, more than double the rates for inland cities.

## The Sacramento Area Grows a Venture Capital Environment

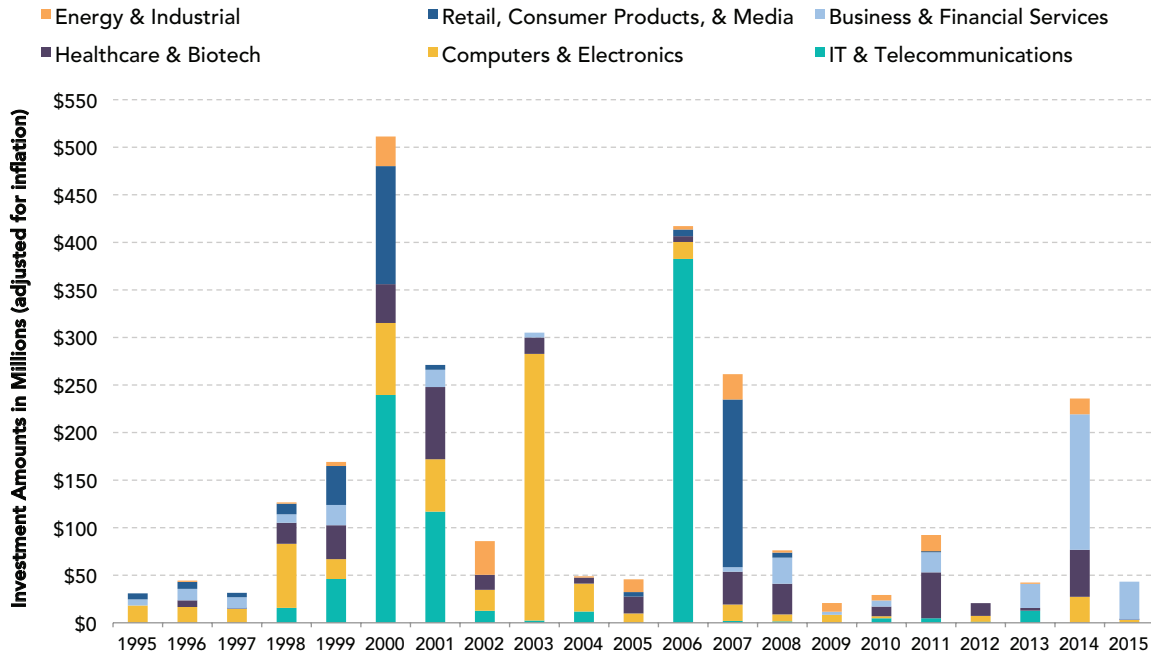
Venture capitalists are not just confined to Silicon Valley. The Sacramento Area has its own network of venture capital funds, including:<sup>18</sup>

**Velocity Venture Capital**, based in Folsom, was launched in 2005 and has made investments in local companies—such as **Emtrain**, a human resources compliance training platform, and **Revionics**, a software company that creates predictive analytics for retailers. Velocity Venture Capital recently opened an accelerator space in Downtown Sacramento for entrepreneurs to build their ideas into companies. Cloud computing start-up **Averro** announced it would establish its headquarters in the new space.

**Wavepoint Ventures**, with offices in Menlo Park and El Dorado Hills, targets investments in communities that have a critical mass of innovation but that are underserved by the venture capital industry. Wavepoint was an early investor in Davis-based **Marrone Bio Innovation**, a leader in biologic pesticides and plant health solutions, which raised \$57 million in an initial public offering in 2014.

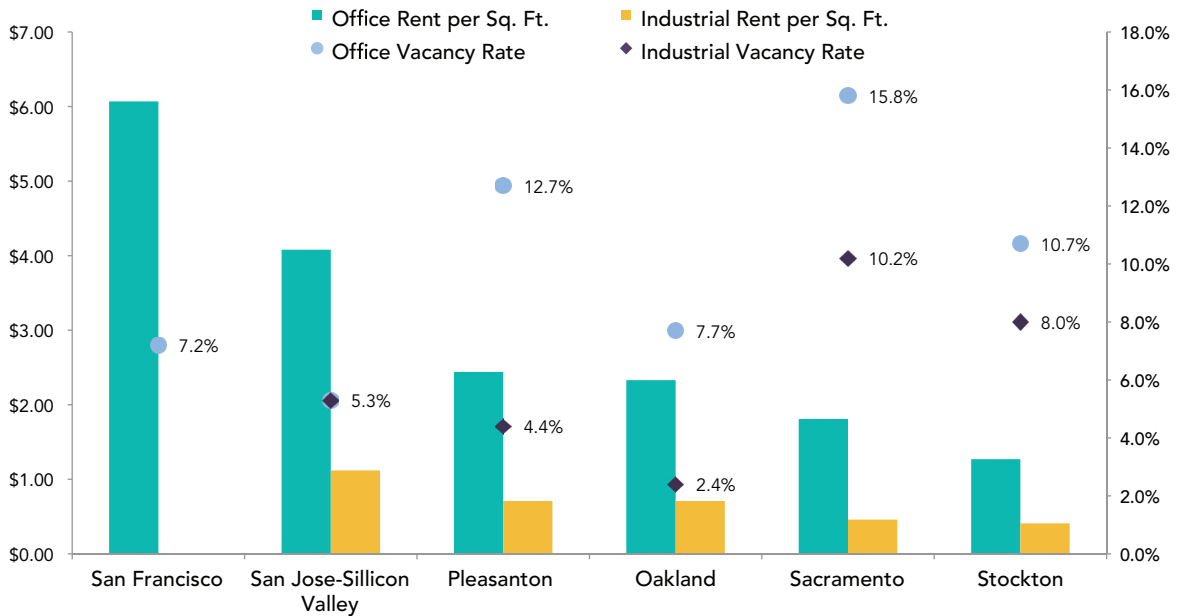
**Moneta Ventures**, based in Folsom, launched a new \$19 million fund in April 2015. The fund invests in early stage companies in the software and cloud services, IT services, and internet and consumer services sectors. In addition, a small portion of capital is dedicated to fund companies that help grow the healthcare service practice in the Sacramento Area. Moneta Ventures had its first successful investment exit in early 2016, producing a 2.8x return on **MindTickle**, a Sunnyvale-based company that delivers cloud-based sales training for numerous industries.

### Venture Capital Investments in Northern California Excluding the Bay Area



Data Source: PricewaterhouseCoopers/National Venture Capital Association MoneyTree™ Report, Data: Thomson Reuters  
 Analysis: Bay Area Council Economic Institute

### Office and Industrial Rental and Vacancy Rates Monthly Values for Fourth Quarter 2015



Note: Industrial data for San Francisco not represented due to limited industrial real estate within the city  
 Data Source: Colliers International Market Reports  
 Analysis: Bay Area Council Economic Institute



## Barriers to Expanded Economic Prosperity in the Megaregion

As the economies of the megaregion expand, challenges exist to spreading these gains more broadly across geographies.

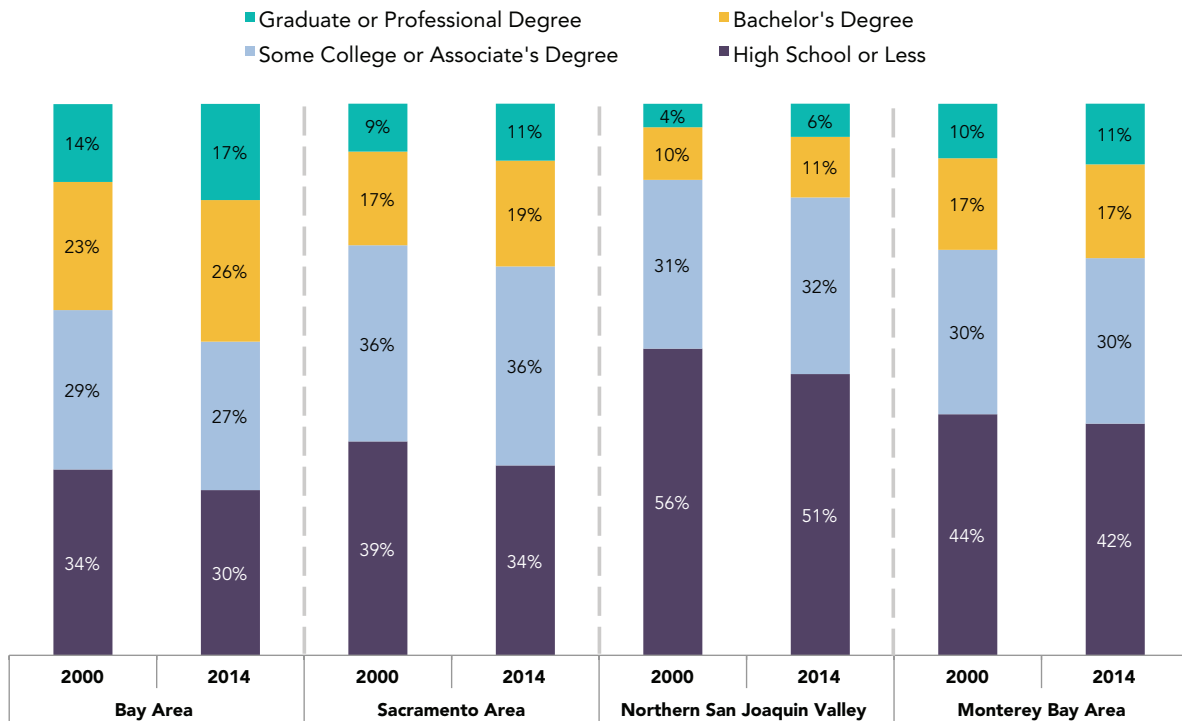
### Education Levels in Inland Areas Lag Behind

It is well known that the Bay Area boasts one of the most highly educated populations in the U.S., but other areas within the megaregion have a distinctly different workforce makeup. This talent profile plays a key role in the location decisions of large employers, but can also offer them an ability to locate middle-skilled roles, such as those in warehousing and manufacturing, within the megaregion.

The following statistics from the American Community Survey depict the differences in educational attainment across the megaregion:

- In 2014, 70% of the Bay Area workforce had obtained some type of post-high school education. Conversely, this number is only 51% in the Monterey Bay Area and 49% in the Northern San Joaquin Valley.
- Educational attainment levels for the Sacramento Area have risen since 2000, with 30% of the working population now having a bachelor's degree or higher—both a product and a cause of the burgeoning technology economy in the area.
- The Northern San Joaquin Valley working population is also undergoing a shift toward a more highly educated population. The change in worker education levels in the Northern San Joaquin Valley is partially attributable to the movement of households out of the Bay Area to more affordable locations—which is explored in the next section.

### Educational Attainment in the Northern California Megaregion



**Note:** Included population includes those 25 years old and older  
**Data Source:** U.S. Census Bureau, 2014 five-year American Community Survey, and 2000 Decennial Census  
**Analysis:** Bay Area Council Economic Institute

## The Cost of Doing Business in California Remains High

According to an August 2014 study by the California Foundation for Commerce & Education, California ranks in the bottom 10 in business costs, with high costs of taxes, litigation, and energy.<sup>19</sup>

While these added costs can place a burden on some businesses, many companies continue to start, expand, or relocate in California. For higher-value businesses, the state's large consumer demand, proximity to foreign markets, highly-skilled talent, and network of universities and research centers often can offset the additional costs imposed by regulation and other state policies. However, lower-value-added functions with smaller profit margins, such as manufacturing assembly—which has a talent and land use profile that fits well in the Northern San Joaquin Valley—are more likely to feel burdened by the state's regulatory environment.

## Creating a Bigger Economic Pie in the Northern California Megaregion

The following policy recommendations can bring a greater degree of economic prosperity to all corners of the Northern California Megaregion.

### **Recommendation #1: Make Substantial Investments in Education Outside of the Bay Area**

The issue of educational attainment is key to economic prosperity in the Northern California Megaregion, and it is an issue where mutual advocacy at the state level can lead to improved funding outcomes. It is important for regional and state leaders to recognize the potential of "near-shoring" for Bay Area businesses. It benefits the state and the megaregion as a whole for expanding businesses to locate in nearby geographies within the Northern California Megaregion, as opposed to other U.S. locations.

To achieve the needed level of workforce talent to realize a greater degree of "near-shoring," investments in the California State University system, the community college network, and apprenticeship programs should be

made aggressively in those areas that need them most. These investments can provide more tailored education that meets local workforce needs. Growing industries in inland areas—such as those related to healthcare, business services, and logistics—should be the targets of expanded community college certification efforts with curriculum input from the employer community.

### **Recommendation #2: Create Economic Development Structures that Cross County Lines**

The current system of locally-oriented economic development efforts does not lend itself well to information sharing across the megaregion and can result in missed opportunities to have businesses expand, remain, or start within the Northern California Megaregion. This is especially true for Bay Area companies that are opening new offices in Seattle, Portland, or Austin, when places such as Davis or Sacramento could have provided similar workforce profiles and affordable office space.

In the Great Lakes Megaregion, a cross-county, multi-state economic development organization was formed in 2012, encompassing 21 counties from the Milwaukee area, Chicago area, and northwest Indiana. Leaders from Wisconsin, Illinois, and Indiana began the Alliance for Regional Development by leveraging access to Lake Michigan to attract private investment in water-intensive industries. The organization is now focusing its work on four areas in need of a coordinated megaregional response—workforce development, innovation, transportation and logistics, and green growth—with the hope of overcoming job-creation rates that lag behind other megaregions.

Economic development organizations from across the megaregion should explore partnerships to create a more megaregional reach. Examples of cross-county economic development exist within the megaregion that provide best practices for creating a network of more comprehensive economic development functions:

- The **Greater Sacramento Area Economic Council** works within six counties to drive job growth and new business creation.
- The **California Central Valley EDC** operates across eight counties and acts as a central point of

coordination for businesses looking to move to or expand within the Central Valley.

- The **San Joaquin Partnership** has opened an office in Silicon Valley to work with those businesses that are looking to expand in inland areas.

Efforts to attract and retain businesses within the Northern California Megaregion should be focused across a spectrum of industries and business sizes. Cross-county collaboration may be possible in the food and beverage industry, especially in connecting the megaregion's many wine-growing regions or the growing farm-to-table movement. Small urban manufacturers in need of a larger production footprint could also be accommodated throughout the megaregion while still maintaining access to large consumer markets.

### **Recommendation #3: Institute Statewide Tax Credit Programs to Incentivize New Business Development in Inland Areas**

The amount of capital that flows through the Bay Area is one of the main reasons that it has built a diverse economy that allowed it to quickly recover from the Great Recession. The Governor's Office of Business and Economic Development can incentivize the movement of more capital to other parts of the megaregion with the following package of tax credits:

#### **Venture Capital Investment Tax Credit**

To create a stronger market for venture capital investments across the state, California can employ a tax credit for investments made in areas that have traditionally not received a high share of investment—such as the Sacramento Area and Northern San Joaquin Valley. This tax credit would offset gains from investments made in job-creating enterprises that are located in specified counties. If the venture capital landscape were to expand more broadly across the state and the Northern California Megaregion, other areas could become larger hubs for innovative new technologies.

#### **Geographically Targeted R&D Tax Credit**

California is one of many states that offers a research and development (R&D) tax credit, currently set at 15% of qualifying research activity conducted within the state. This tax credit has been pivotal to California building one of the most robust innovation environments in the nation and attracting new businesses to take part in it. However, the firms that have taken advantage of this tax credit are overwhelmingly located in the Bay Area and near Los Angeles.<sup>20</sup> For other parts of the state to attract new R&D intensive businesses, the R&D tax credit should be doubled in geographies that have historically not benefitted from the credit—including the counties of the Sacramento Area, the Northern San Joaquin Valley, and the Monterey Bay Area.

#### **California New Markets Tax Credit**

The New Markets Tax Credit (NMTC) is a federal program designed to provide private investors with a tax incentive for business investments made in undercapitalized communities. Fourteen states have adopted similar state-level credits that allow them to provide an added incentive to businesses making investments in low-income neighborhoods; however, no similar California credit exists.

The federal NMTC program has deployed over \$40 billion in tax credit authority to community development entities (CDEs) across the nation over the last 15 years. Many of these CDEs have a multi-state service area and they often make NMTC investments that leverage similar tax credits at the state level. Because California has no such credit to offer, it is less attractive to CDEs that have received an allocation from the federal NMTC program. A state-level credit, like the one proposed in Assembly Bill 185, would result in California being better positioned to receive investments in the parts of the state in need of economic development capital.



#### **Recommendation #4: Create More Collaborative Efforts Across the Megaregion's Universities and National Laboratories**

An engagement summit focused on the role of universities and national laboratories as drivers of technology development and economic impact can help to create a more cohesive workforce development and innovation system amongst the megaregion's many universities. This summit would include the large private and public research universities in the megaregion, the megaregion's four national laboratories, and smaller institutions that act as important economic development drivers in their specific geographies.

From this summit, these institutions can gain a perspective on how to leverage and coordinate their individual efforts in a more megaregional manner. Examples might include:

- Creation of a megaregional corps of consulting post-docs and advanced graduate students to serve as both a technical resource for companies as well as a resource for generating more industry-prepared graduates and trainees from academic programs.
- Formation of more industry and academia partnerships based on the specific capabilities of particular academic centers and laboratories. These partnerships can contribute to technology transfers that will help startups grow in developing industry clusters across the megaregion, such as agtech, biotech, and advanced manufacturing. The CalCharge program, which links laboratories, universities, and businesses involved in battery storage to help commercialize ideas can serve as a model for a more expansive megaregional collaborative network.

## Spotlight on Higher Education

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### **UNIVERSITY OF THE PACIFIC: INTEGRATING THE MEGAREGION**

The University of the Pacific plays an important role in the megaregion with its main campus in Stockton and campuses in Sacramento and San Francisco. With 6,650 students—most based in Stockton—the university may be small in relative size, though its unique footprint gives it a megaregional scale. Its San Francisco campus, opened in 2014, in the South of Market area is a brand new \$151 million, 400,000 square foot space. It houses the university's dentistry, music therapy, audiology, food studies, and data sciences programs. In Sacramento, the university has a 13-acre full-service campus that has recently introduced a number of new programs.

The University of the Pacific is home to multiple research centers. The **Pacific Resources Research Center** was created with support from industrial partners and is focused on advancing the construction and materials industry. Researchers work with cement and concrete companies to increase the utility of their waste products. The **John T. Chambers Technology Center** opened in 2010, and it provides lab space to teachers, researchers, and industry partners in the areas of engineering and computer science.



# 4

## Moving to a Megaregional Labor Market

Many of the expanding industries and their employment explored in the previous section are concentrated within urban centers, such as San Francisco and Silicon Valley—this dynamic is shown on the map on the following page. But households are increasingly moving into the geographic center of the megaregion, including eastern Contra Costa and Alameda counties and the Northern San Joaquin Valley.

This dynamic is played out in the ratio of jobs-to-households, which is displayed for each county in the megaregion in the adjacent table. Higher ratios suggest an area has more jobs than employed residents living in the county, whereas a lower ratio implies that employed residents are traveling to other counties for work.

Jobs-to-household ratios are highest in the Bay Area. However, a higher ratio does not necessarily lead to economic prosperity, as the counties with the highest jobs-to-household ratios also have the highest housing costs—a product of too few homes being available for the local workforce.

On the other end of the spectrum, a jobs-to-household ratio near one is also not ideal, as many households will have more than one employed resident. In the Northern San Joaquin Valley, the region with the lowest ratio, more than 15% of the workforce is commuting out—a dynamic that has limited the potential of the local economy. This movement has created a shortage of talent and wage pressure for local employers in the healthcare, construction, and manufacturing industries.

### Jobs-to-Housing Balance in the Megaregion

| Bay Area              | Households       | Jobs             | Ratio       |
|-----------------------|------------------|------------------|-------------|
| Alameda               | 551,734          | 721,700          | 1.31        |
| Contra Costa          | 380,183          | 344,700          | 0.91        |
| Marin                 | 103,034          | 112,000          | 1.09        |
| Napa                  | 49,631           | 74,200           | 1.50        |
| San Francisco         | 348,832          | 639,400          | 1.83        |
| San Mateo             | 258,683          | 372,200          | 1.44        |
| Santa Clara           | 614,714          | 993,400          | 1.62        |
| Solano                | 142,521          | 129,900          | 0.91        |
| Sonoma                | 186,935          | 198,200          | 1.06        |
| <b>Regional Total</b> | <b>2,636,267</b> | <b>3,585,700</b> | <b>1.36</b> |

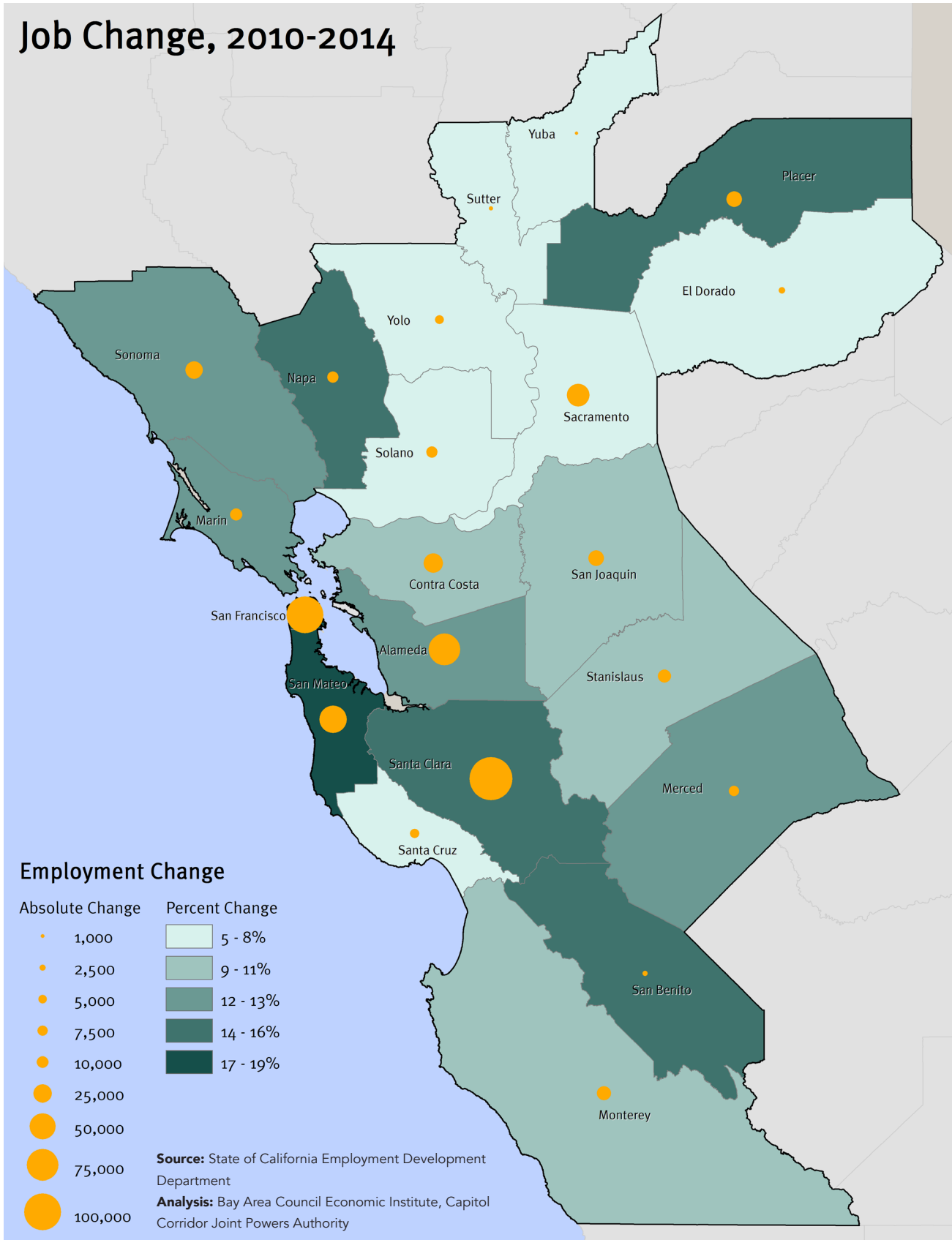
| Sacramento Area       | Households     | Jobs           | Ratio       |
|-----------------------|----------------|----------------|-------------|
| El Dorado             | 67,220         | 50,600         | 0.75        |
| Placer                | 134,111        | 145,500        | 1.08        |
| Sacramento            | 519,460        | 602,000        | 1.16        |
| Sutter                | 31,723         | 28,400         | 0.90        |
| Yolo                  | 70,953         | 101,600        | 1.43        |
| Yuba                  | 24,712         | 15,900         | 0.64        |
| <b>Regional Total</b> | <b>848,179</b> | <b>944,000</b> | <b>1.11</b> |

| NSJV                  | Households     | Jobs           | Ratio       |
|-----------------------|----------------|----------------|-------------|
| Merced                | 76,516         | 76,300         | 1.00        |
| San Joaquin           | 217,343        | 224,600        | 1.03        |
| Stanislaus            | 168,090        | 175,700        | 1.05        |
| <b>Regional Total</b> | <b>461,949</b> | <b>476,600</b> | <b>1.03</b> |

| Monterey Bay Area     | Households     | Jobs           | Ratio       |
|-----------------------|----------------|----------------|-------------|
| Monterey              | 125,115        | 183,200        | 1.46        |
| San Benito            | 17,121         | 16,100         | 0.94        |
| Santa Cruz            | 94,219         | 103,500        | 1.10        |
| <b>Regional Total</b> | <b>236,455</b> | <b>302,800</b> | <b>1.28</b> |

**Data Sources:** 2014 American Community Survey, five-year estimates; State of California Employment Development Department  
**Analysis:** Bay Area Council Economic Institute

# Job Change, 2010-2014



## Evidence of the Expansive Scope of the Northern California Labor Market

A high cost of living has pushed many Bay Area households to look for cheaper geographies—oftentimes relocating within the megaregion. The impacts of this intra-regional migration have furthered economic linkages within the Northern California Megaregion, but have increased congestion on roadways and transit systems.

### Housing Costs Differ Substantially Across the Megaregion

The relatively high jobs-to-housing balance in the Bay Area has fueled housing prices that make the region one of the most expensive places to live in the country.<sup>21</sup> With median home values in San Francisco and San Mateo counties exceeding \$1 million, the cost of living discussion has intensified in the Bay Area, and migration figures point to a movement of residents to more affordable Bay Area counties. The total number of households moving into Alameda and Contra Costa counties from San Francisco increased by 29% between 2006 and 2012.<sup>22</sup>

But the high-cost housing environment is not exclusive to San Francisco and Silicon Valley. According to the California Association of Realtors' Housing Affordability Index, only 22% of Alameda County residents and 21% of Santa Cruz County residents could afford the median-priced house in 2015.<sup>23</sup> By contrast, this affordability figure is 46% for Sacramento County and between 38% and 55% for the counties of Northern San Joaquin Valley.

With a median home value of nearly \$750,000 in 2015, median Bay Area home prices are three times higher than the median price in nearby Northern San Joaquin Valley. This divergence in housing affordability has become even more pronounced following the recession. In fact, only three metropolitan areas within the megaregion have 2015 median home prices above their 2006 levels: San Francisco (up 49.1% since 2006), San Jose (up 17.9%), and Santa Cruz (up 6.3%).

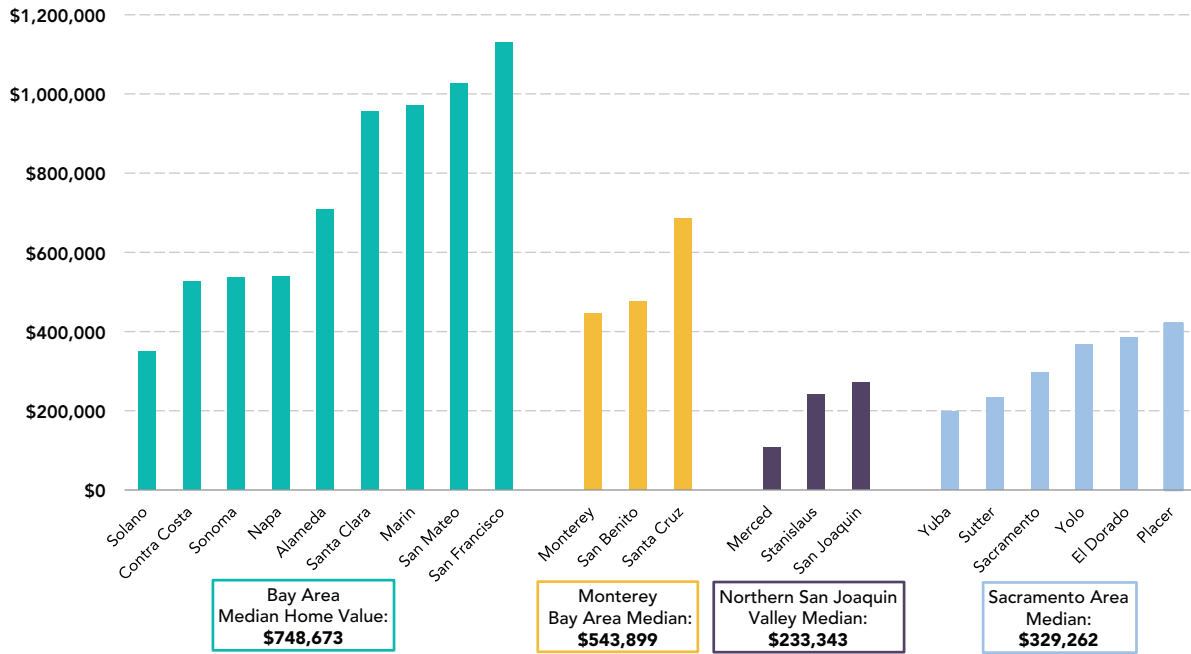
Inland areas of the Northern California Megaregion have experienced home price movements in the opposite direction. The largest price declines since 2006 have occurred in Merced (down 48.4%), Stockton (down 36.3%), and Vallejo (down 32.5%). The chart on the following page provides median home price details back to 2006 in nominal dollars. These price shifts help to explain the migratory change detailed in the following section.

Housing construction in areas outside of the Bay Area slowed considerably following the foreclosure crisis, but is now beginning to rebound in Sacramento, Placer, and San Joaquin counties. The U.S. Census Bureau Building Permits Survey shows each of these counties permitting over 2,000 new units in 2015. Housing permits granted in the Sacramento Area, Northern San Joaquin Valley, and Monterey Bay Area accounted for one-third of all permitted units in the Northern California Megaregion during 2015.

With a median home value of nearly \$750,000 in 2015, Bay Area home prices are three times higher than the median price in nearby Northern San Joaquin Valley. This divergence in housing affordability has become even more pronounced following the recession, and it has fueled intra-regional migration that has furthered economic linkages within the Northern California Megaregion.

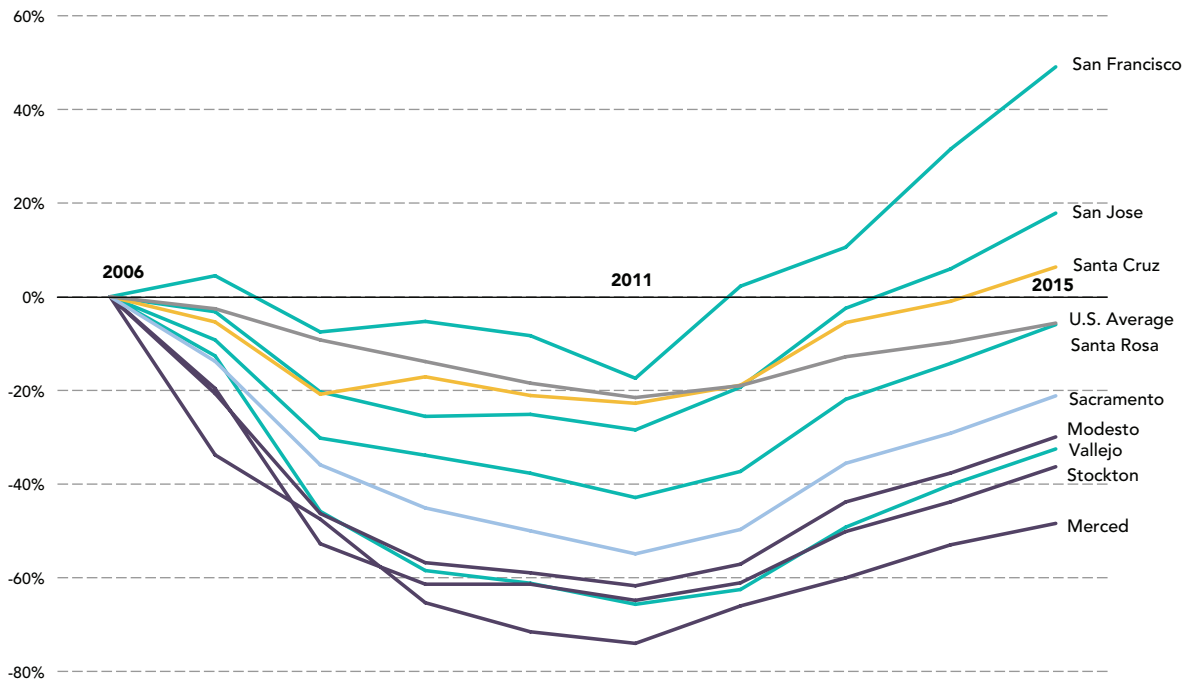


### Median Home Values by County, 2015



**Note:** Regional medians are found using weighted averages based on the number of single-family detached homes per county  
**Data Source:** Zillow.com; California Department of Finance, Demographic Research Unit  
**Analysis:** Bay Area Council Economic Institute

### Change in Metro Area Median Home Values Since 2006



**Data Source:** Zillow.com  
**Analysis:** Bay Area Council Economic Institute

## Migratory Patterns Show Movement to Inland Areas

Between 2004 and 2014, the Bay Area experienced a total net migration loss of 143,500 people to other areas of the megaregion. While the Bay Area population has increased over this time, its major source of net inflows has been international immigrants.

The populations of the Northern San Joaquin Valley and the Sacramento Area have seen the biggest impacts of the migration away from the Bay Area:

- In the Northern San Joaquin Valley, the region has had a net increase of 67,500 residents moving from other parts of the megaregion between 2004 and 2014. This in-migration has been an important driver in the San Joaquin Valley’s population growth.
- In the Sacramento Area, the net in-migration from the megaregion totaled 87,000 people between 2004 and 2014. The region also has gained

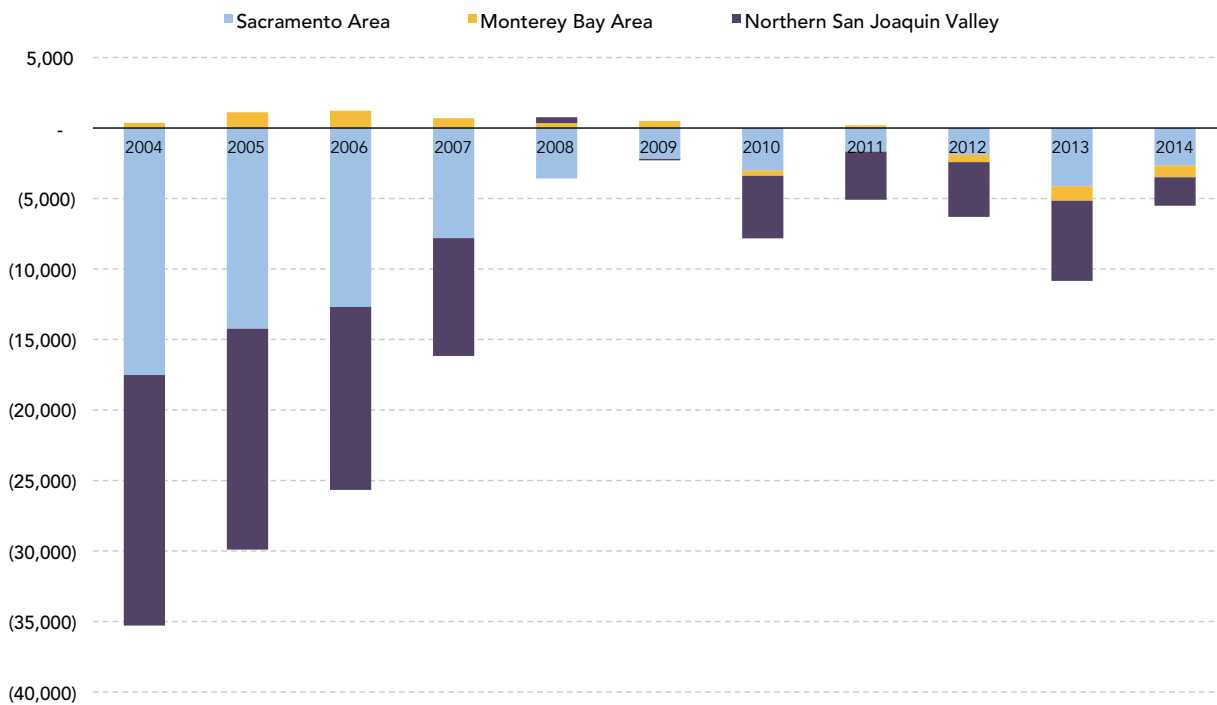
population from positive net migration totals between the Northern San Joaquin Valley. Of all domestic inflows into the Sacramento Area over the 10-year period, 60.0% originated from within the Northern California Megaregion.

## Travel Flows Show Increasing Megaregional Connections

Inter-regional daily commuters—those residents that move between regions to reach their workplace—in the Northern California Megaregion have increased by 83,950 between 1990 and 2013. Their total number reached 191,500 individuals in 2013.<sup>24</sup>

While the megaregional workforce has increased by 17% over this period, commuters crossing regional boundaries (as defined in this report) have grown by 78%. The migration data presented previously showed a large movement of households out of the Bay Area to other areas in the megaregion. Many of these households, however, continued to work in the Bay Area,

**Bay Area Net Migration Patterns, 2004-2014**  
within the Northern California Megaregion



**Data Source:** U.S. Internal Revenue Service, Statistics of Income Division  
**Analysis:** University of the Pacific, Bay Area Council Economic Institute

which has pushed inter-regional commuting numbers upward.

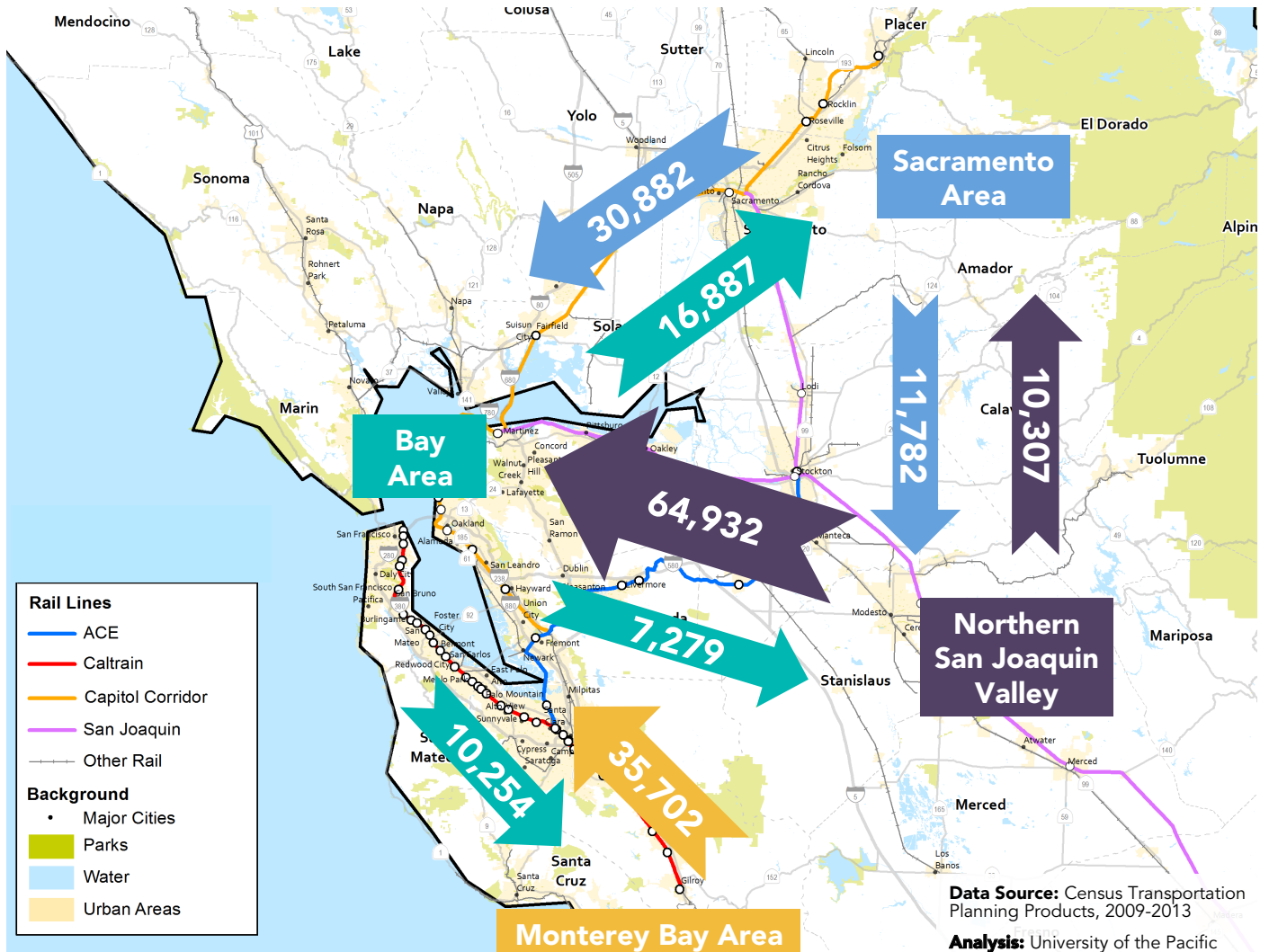
The growth of Northern San Joaquin Valley commuters to the Bay Area has been particularly dramatic, more than doubling from 31,670 in 1990 to 64,930 in 2013. Other key commute flow statistics include:<sup>25</sup>

- In total, 15.8% of the workforce residing within the Northern San Joaquin Valley commutes out of the region for work each day.
- In the Sacramento Area, only 4.5% of the residential workforce leaves the region daily.

- Of all 191,500 commuters crossing regional boundaries in 2013, 68.7% were commuting into the Bay Area for work.

Commuter flows are only a part of the traffic on megaregional transportation systems. Non-commute trips—those related to leisure or business travel—also cross regional boundaries, often during the same peak commute times when congestion is at its worst. The map displayed in **Appendix C** shows that there were nearly 78,000 daily non-commute trips that were interregional in 2010, highlighting the economic connections present in Northern California.

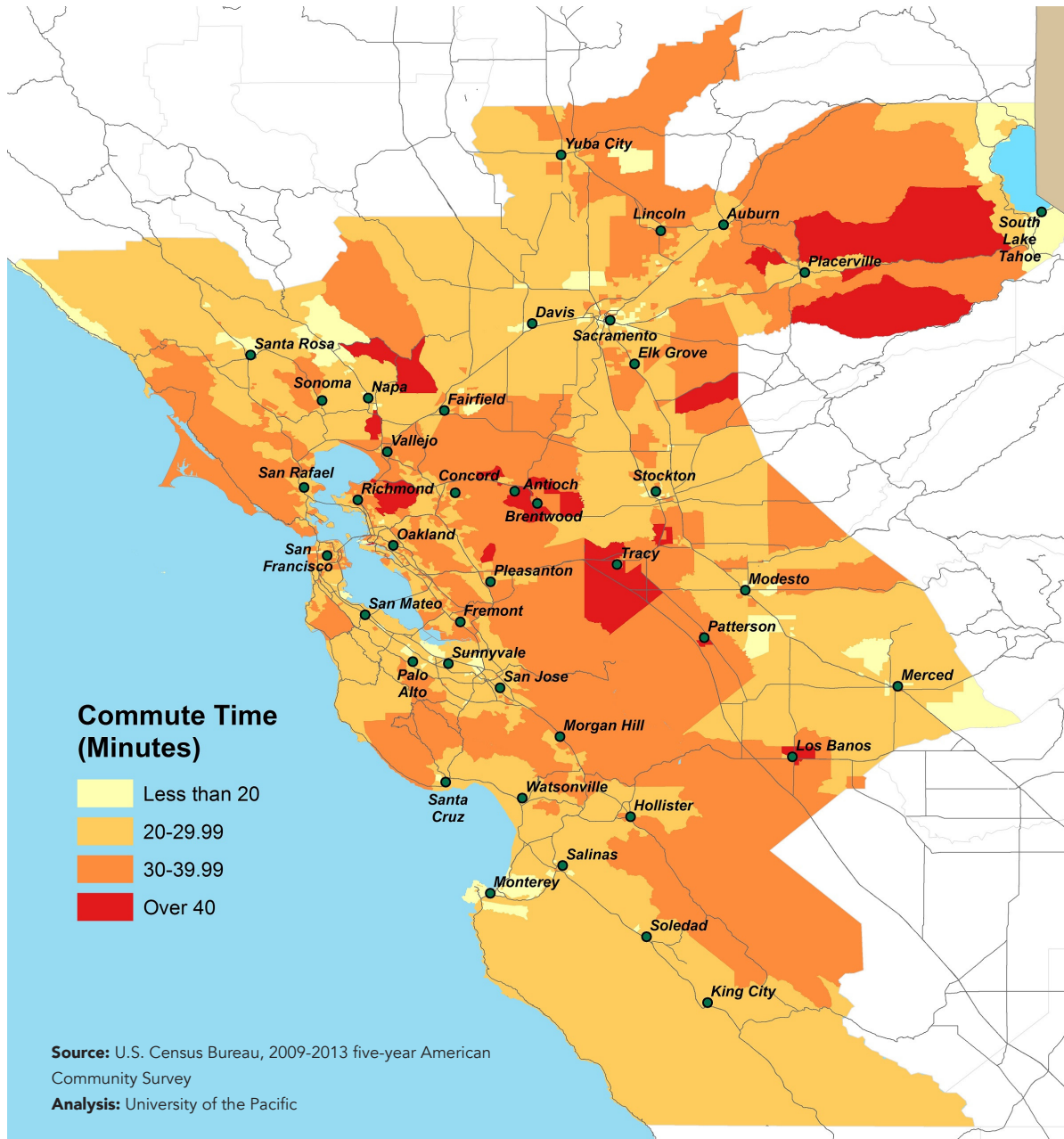
### Daily Commuters Crossing Regional Boundaries, 2013



The areas at the heart of the megaregion—those situated along the regional boundaries—are the places that are feeding many of these inter-regional commuters into the transportation system. To illustrate this point, the longest commutes in the megaregion originate in cities such as Pittsburg, Antioch, Brentwood, Tracy, and Lathrop, as displayed in the following maps.

These are also the areas where housing construction and population growth are at high levels. For example, approximately 4,000 homes are being built in Lathrop as part of the first phase of the River Islands development, which is detailed in the case study on the following page. Construction of the River Islands project is expected to generate about 500 building permits per year through 2020.

### Commute Length in the Northern California Megaregion, 2013





# Spotlight on Housing

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## **RIVER ISLANDS IN LATHROP – HOUSING AND A HOME FOR BAY AREA BUSINESS AT THE HEART OF THE MEGAREGION**

River Islands is a mixed-use master planned community in Lathrop developed by The Cambay Group. The community is being built on approximately 5,000 acres of land along 14 miles of the San Joaquin River. At the time of completion—estimated in 25 years—the project is expected to have 11,000 single-family homes, apartments, townhomes, and condos, as well as over 5 million square feet of commercial space. Current home prices start from \$400,000 and can reach over \$600,000; with the addition of custom homes along the San Joaquin River, the price could reach well over \$1 million.

The River Islands community sits close to Tracy and is about 30 miles from the Tri-Valley area. Residents have access to four major freeways: I-5, I-205, I-580, and Highway 99. Additionally, the Altamont Corridor Express (ACE) serves the community, with its nearest stop located 3 miles away at the Lathrop/Manteca station. ACE has published plans for a new potential station at the River Islands Business Park, which could someday allow for a reverse commute on the train. The community's central location will also give its residents access to San Francisco, San Jose, and Sacramento.

The 350-acre River Islands Business Park is currently shovel-ready. Zoning for the development specifically restricts warehousing and industrial use, both of which have lower employment densities when compared to other uses. The Business Park is zoned for research and development, office, higher education, medical, technology, and associated services. An economic development fund, unique to River Islands, has also been established to provide incentives for new businesses. Residential development fees, totaling \$55 million, will be allocated to businesses based on the number and types of jobs created.

River Islands will provide a wide range of lifestyle amenities, compatible with a live-work-play-learn lifestyle. These include lakes, parks, playing fields, a town center with retail areas, and a number of on-site schools at all grade levels. For example, top-scoring River Islands Technology Academy, a K-8 charter school, provides science, technology, engineering, and math curriculum and uses digital devices at a 1:1 ratio for classroom learning and home studies.

The community is designed to be both sustainable and high-tech. In March 2016, the White House singled out River Islands as the first and only development in the U.S. to implement gray water conservation technology at a household level. In addition, approximately 40% of River Islands is devoted to open space, which includes land for wildlife mitigation and the preservation of agriculture.

## Transportation Inefficiencies Are Constraining Megaregional Movement

Residents of the Northern California Megaregion have few attractive options in making their elongating commutes. The highway corridors that carry megaregional commuters are experiencing growing vehicle volumes, and the constrained reach and schedules of transit systems are only able to serve a small portion of the increasing number of commuters.

### Increasing Inter-Regional Commutes Add to Highway Congestion

Workers commuting to San Francisco and the East Bay have the highest mean travel time of any metropolitan area in the nation. Over 2.0% of all workers in the San Francisco-Oakland-Fremont metropolitan statistical area have commutes that last more than 90 minutes. Additionally, San Joaquin County places in the top 10 nationally for its percentage of residents with a commute over 90 minutes long.<sup>26</sup> These lengthy commutes can be explained in part by the long distance traveled, and also by the growing amount of congestion on interregional roadways.

On weekdays in 2014, an average of 602,000 vehicles entered or exited the nine-county Bay Area from other parts of the Northern California Megaregion—representing an increase of 38% since 1992.<sup>27</sup> The majority of these vehicles utilize megaregional gateway corridors, which connect the Northern San Joaquin Valley, the Monterey Bay Area, and the Sacramento Area to the Bay Area.

These corridors include:

- **Interstate 80** connecting Sacramento and Davis to Solano County,
- **Highway 17** between Santa Cruz and San Jose,
- **Highway 101** between San Benito and Santa Clara counties, and
- **Interstate 580/205** linking Alameda County and the Northern San Joaquin Valley.

### Congestion Grows in the Tri-Valley

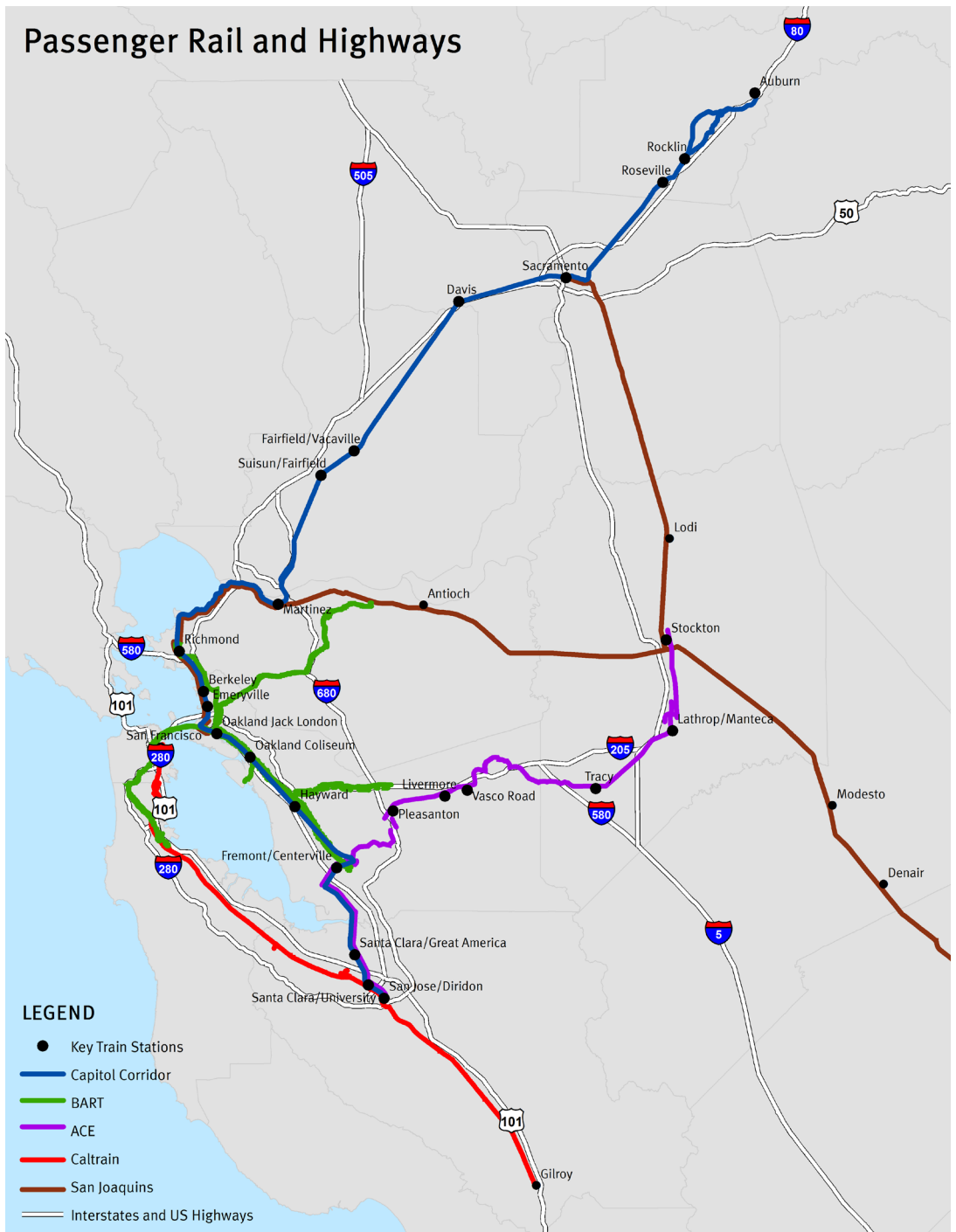
The Tri-Valley area is situated on the east side of the Bay Area, composed of the cities of Dublin, Pleasanton, Livermore, Danville, and San Ramon, and it provides a unique case study of how the lack of megaregional planning has transportation systems in the area. The Tri-Valley straddles I-580—a major thoroughfare for commuters and the main conduit between the Northern San Joaquin Valley and the Port of Oakland. Interstate 580 from the San Joaquin County boundary through the Tri-Valley ranks eighth on the Metropolitan Transportation Commission's list of most delayed corridors in the Bay Area. Between 2011 and 2013, average daily vehicle hours of delay on I-580 through the Tri-Valley grew by 26%.

With congestion growing, express lanes have been installed in both directions of I-580, spanning 14 miles in the Tri-Valley corridor. Express lanes maximize the efficiency of the entire highway by offering excess carpool lane capacity to solo drivers willing to pay a toll. They also employ a dynamic pricing strategy depending on the real-time level of congestion.

The Tri-Valley is home to stations for BART and Altamont Corridor Express (ACE), but there is currently a 10-mile gap between these systems. Connecting them has the potential to reduce travel time and to provide passengers with improved mobility from the Northern San Joaquin Valley to the Tri-Valley and all reaches of the Bay Area. Goods movement can also benefit from congestion relief in the heavily traveled I-580 Altamont Pass corridor.

## Transit Systems Provide Limited Alternatives to Roadways

Only three of the Northern California Megaregion’s many transit operators are truly megaregional in their nature—Capitol Corridor and the San Joaquin Corridor (both of which run Amtrak service), and the Altamont Corridor Express. Ridership on all three of these systems has increased as the geography of job and population growth has led to longer commutes. Growing connectivity between regional economies has also produced demand for more intercity trips during off-peak commute hours.



**Analysis:** Bay Area Council Economic Institute, Capitol Corridor Joint Powers Authority

Each of the megaregional transit lines carries more than 1 million passengers annually, and ridership growth is especially strong on the routes serving the Northern San Joaquin Valley.

### Capitol Corridor (operated by Amtrak)

The third most traveled intra-state corridor in the Amtrak system, **Capitol Corridor had total ridership of 1.48 million in 2015**. Of these trips, 65% were work related, highlighting the system's importance to the movement of workers in the Northern California Megaregion.

Capitol Corridor operates 15 daily round trips between Sacramento and Oakland. Seven of these daily round trips extend to San Jose and one connects to Auburn in Placer County. Bus connections also extend Capitol Corridor's reach to San Francisco. The route has 17 stations and is run on 170 miles of track primarily owned and dispatched by Union Pacific Railroad. The Capitol Corridor Joint Powers Authority manages the service through an operating agreement with Amtrak.

### San Joaquins (operated by Amtrak)

With ridership of 1.18 million in 2015, San Joaquins service is the fifth most traveled intra-state corridor in the Amtrak system. The San Joaquins has six daily round trips (four between Oakland and Bakersfield, and two between Sacramento and Bakersfield) traveling through 11 counties, with 17 stations, over 364 miles. Amtrak San Joaquins Thruway bus service also offers travel to more than 135 destinations, including Los Angeles, San Diego, San Francisco, Napa, Las Vegas, and Reno.

As of July 2015, administrative responsibility for the San Joaquins service was transferred from the state to the San Joaquin Joint Powers Authority, which includes representation from many of the counties served. **The San Joaquins service is deploying a seventh daily round trip in June 2016**, and is now working with state officials to secure the funding necessary for capital improvements to run an eighth daily round trip.

### Altamont Corridor Express (ACE)

ACE operates commuter rail service with four weekday round trips between Stockton and San Jose at peak hours. **In 2014, the ACE system carried nearly 1.3 million passengers**. ACE trains make the two-hour trip between Stockton and San Jose over 86 miles of track owned by Union Pacific Railroad.

Ridership on ACE has doubled in the last five years due to growing commuter demand from the Northern San Joaquin Valley to the Tri-Valley and Silicon Valley area. Additionally, ACE added a fourth round trip in 2012, which gave riders more flexibility. ACE's most heavily used station of origin for the morning westbound commute is Tracy, and its most used destination station in the morning is Great America in Santa Clara. Ridership to and from these stations underscores the growth that the Northern San Joaquin Valley has experienced in recent years and the trend of many of its residents commuting to Silicon Valley for work.

### Shared System Between Passenger and Freight Rail Limits Ability to Improve Service

All passenger rail operations in the Northern California Megaregion—with the exception of BART and Caltrain—operate on track owned by private freight operators. As the three megaregional rail agencies look to expand ridership through extensions of their infrastructure and/or more frequent trains, their ability to improve service levels is complicated by this relationship that is dependent on freight rail.

Depending on the various arrangements between freight and passenger rail operators, there are limited opportunities to run more trains. For example, only 20 round trip slots between Oakland and Sacramento are currently available for passenger service, with the restriction that these trains have 40-minute headways. These frequency and scheduling restrictions limit the ability to expand service during peak hours.

The investments necessary to add capacity under this shared corridor approach—passing tracks or dedicated tracks for each service—are costly, but represent the main hurdle to achieving the recommendations outlined below. It should be recognized, however, that adding capacity in existing right-of-way is much less costly than implementing entirely new rail corridors. A further discussion of the relationship between passenger and freight rail can be found in Section 5.



# Spotlight on High Speed Rail

In January 2015, the California High Speed Rail Authority broke ground on the nation's first high-speed rail system in downtown Fresno. This initial segment will be a piece of a line connecting the Central Valley and Silicon Valley that is expected to begin passenger service in 2025. High-speed trains will run through the Northern California Megaregion, extending from Bakersfield to San Francisco, tying into an electrified Caltrain corridor, and ultimately reaching the Transbay Transit Center. A station in Merced will provide service to San Jose in less than an hour, providing a new, high-speed link between the Northern San Joaquin Valley and Silicon Valley.

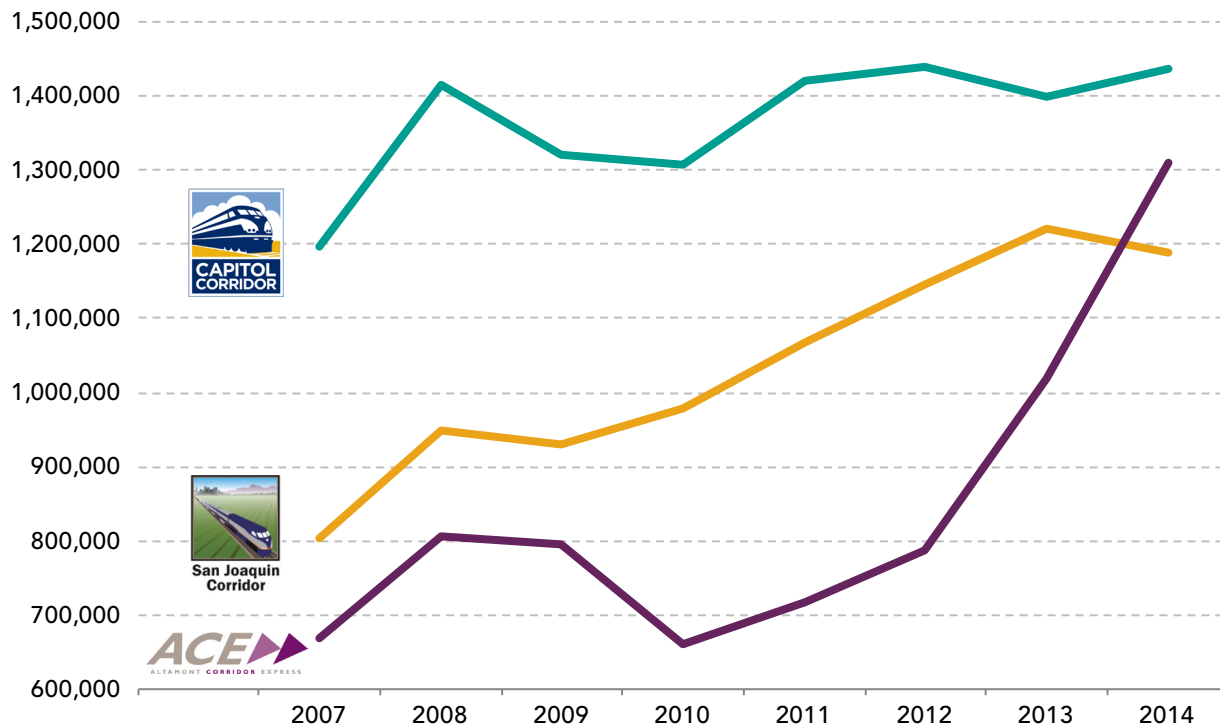
The High Speed Rail Authority's 2016 Business Plan lays out a sequence of construction projects, with the first phase of the high-speed rail system connecting San Francisco to the Los Angeles area, and a second phase adding service to Sacramento and San Diego. Construction is being funded using state bonds that voters approved with the passage of Proposition 1A in 2008, federal funding provided through the American Recovery and Reinvestment Act of 2009, and an ongoing appropriation of the state's cap-and-trade revenues (though these proceeds are subject to volatility in receipts from carbon credit auctions). Once ridership and revenue are demonstrated on the initial segments, the High Speed Rail Authority will engage private operators to manage the system.

The High Speed Rail Authority has also been working with rail agencies across the state to make progress on improved network integration. Linking commuter and intercity rail investments to high-speed rail will ensure greater ridership numbers and more seamless commutes for users. In the Northern California Megaregion, enhanced connectivity between the planned station in Merced and Sacramento is a priority. In addition, the Silicon Valley to Central Valley segment will connect to Amtrak San Joaquins service at the Madera station, and Caltrain, BART, Capitol Corridor, ACE, and high-speed rail service will all meet in San Jose.

High Speed Rail and the Northern California Megaregion



## Megaregional Passenger Rail Ridership 2007-2014



**Note:** Capitol Corridor ridership data prior to 2013 have been adjusted downward by 17.5% from reported data due to over-estimation of ridership related to multi-ride ticketing.

**Data Source:** American Public Transportation Association; National Association of Railroad Passengers

**Analysis:** Bay Area Council Economic Institute

## Investing in Needed Housing and Transportation Infrastructure

When the California High Speed Rail Authority announced that its first phase of project construction will route track between Bakersfield and the Bay Area, instead of Los Angeles, the imperative to create a more unified and connected megaregional transportation network grew substantially. For High Speed Rail to have its desired effect of improving connectivity across the megaregion and the state, it needs connections to a network that can efficiently distribute the regional and megaregional commute market. Housing policy changes that target transit-oriented development and faster construction can work in combination with a cohesive megaregional transit system to facilitate the movement of an expanding population.

### Recommendation #1: Support ACE's Growing Ridership with Improved Levels of Service

Altamont Corridor Express trains need to increase their frequency of service and expand to additional markets to serve the growing commuter demand between Silicon Valley and the Northern San Joaquin Valley and to become a true megaregional intercity transit option. The ACEforward plan calls for six daily round trip trains by 2019 and at least 10 daily round trips by 2023 (increased from the four current round trips today). A second component of ACEforward extends its service area to the downtowns of Manteca, Modesto (by 2018), Turlock, and Merced (by 2022).

ACE forecasts ridership of up to 5.9 million by 2025 if all new train and extension projects are completed, an increase of 340% from ridership levels today. The extension would position ACE as a connecting service for the initial segment of High Speed Rail being built between San Jose and the Central Valley. Extending ACE can also provide economic benefits to local communities in the Northern San Joaquin Valley, as transit-oriented development can revitalize downtown areas that have become isolated.

### ACEforward Extension (dashed line)



With a future ACE connection to a High Speed Rail station in Merced, plans should also be developed and funding put in place to extend the ACE service north to Sacramento. A Sacramento connection for High Speed Rail is included in the Phase 2 portion of the High Speed Rail plan; however, funding for construction of this segment has not been secured, and its completion may be many years away. An extension of ACE from Stockton to Sacramento can provide a more near-term transportation solution and allow ACE to serve the Sacramento Area in addition to the Northern San Joaquin Valley and Bay Area.

### Recommendation #2: Make Capitol Corridor a More Attractive Option for Commuters

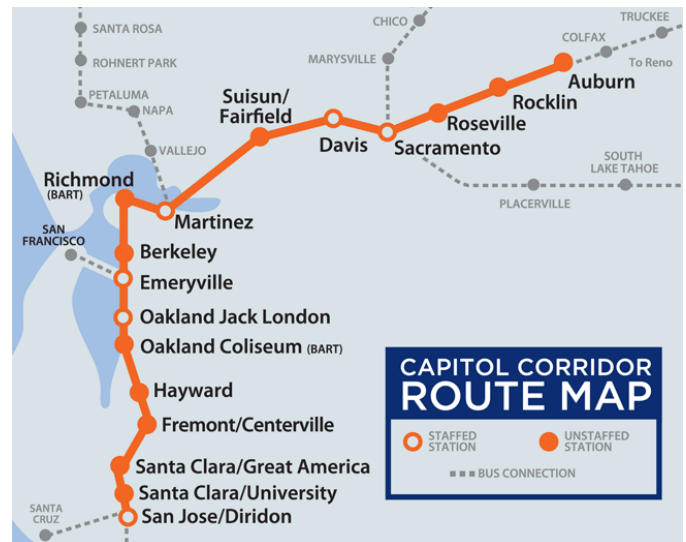
Capitol Corridor can greatly improve the business interactions between the Sacramento Area and the Bay Area. It can also serve the entire megaregion with connections to high-speed rail, BART, ACE, and other regional transit systems. However, its frequencies and travel times keep it from reaching its full potential.

Capitol Corridor travels between Oakland and Sacramento in 1 hour and 45 minutes. It connects passengers between San Jose and Sacramento in about 3 hours. Capitol Corridor has a long-term vision to reduce these travel times to 1 hour and 90 minutes, respectively, through a series of targeted major investments. These include a new transfer station to BART at West Oakland and more direct alignments that allow for higher speeds.

In the near term, Capitol Corridor hopes to increase its daily service frequency through the following strategies:

- Increase Oakland to San Jose service from seven to 11 daily round trips, with a longer-term vision to have 15 round trips through the entire corridor, from San Jose to Sacramento.
- Expand service to Auburn and Roseville in Placer County. These existing stations are served by one westbound morning train and a late afternoon train in the eastbound direction. Infrastructure improvements could lead to 10 daily round trips between Sacramento and Roseville.
- Extend service to Salinas in Monterey County, with a plan for two daily round trips that could expand to as many as six over time. Union Pacific Railroad track already runs to Salinas, but track improvements and station planning would need to occur to facilitate passenger use.

### Capitol Corridor Route Map



### **Recommendation #3: Improve and Expand the San Joaquins Amtrak Service**

Currently, the San Joaquins service has only two daily round trips between the Northern San Joaquin Valley and Sacramento. The first San Joaquins train arrives in Sacramento at around 12:30 p.m.; the second train arrives in Sacramento at 11:30 p.m. at night. The same issue exists for the service between the Northern San Joaquin Valley and Oakland. There are currently four daily round trips between the Northern San Joaquin Valley and Oakland (a fifth is being added in June 2016). However, the first of these trains does not arrive in Oakland until about 11:00 a.m., giving them limited usefulness for business travelers that would want to make a trip between the Northern San Joaquin Valley and the East Bay/San Francisco.

Frequency and the time of day served are major impediments for the San Joaquins to serve the commuter market between the Bay Area, Northern San Joaquin Valley, and the Sacramento Area. The San Joaquins also have the potential to serve a greater amount of non-commute intercity trips, which include trips taken for business and leisure purposes.

### **Recommendation #4: Prioritize Megaregional Rail Connectivity at the State Level**

The entire megaregional transportation network would benefit from improved connections between its rail services. In addition to building a seamless connection between ACE and High Speed Rail in Merced, there are opportunities for investments in megaregional transit hubs in Livermore, San Jose, and Oakland. These investments should be prioritized in the 2018 California State Rail Plan, which Caltrans is currently working to formulate, and in state legislation that can help to quicken project delivery.

#### **Livermore Connects the Bay Area and the Northern San Joaquin Valley**

Today, no seamless connections are available for passengers who wish to utilize the BART system in conjunction with ACE. With the goal of connecting BART and ACE, the Altamont Regional Rail Advisory Committee (comprised of representatives from both Alameda County and San Joaquin County) is now

exploring options for a connection in Livermore that would improve mobility between the Bay Area and the Northern San Joaquin Valley and provide more highway capacity in a critical goods movement corridor.

The proposed BART extension to Livermore at Isabel Avenue can fill a portion of the current 10-mile gap between the Dublin/Pleasanton BART station and ACE. A direct connection between ACE and BART is a logical next step, either through an extension of ACE to meet BART at Isabel Avenue or an extension of BART to Greenville Road in Livermore. Either option would boost ACE ridership<sup>28</sup> and BART ridership and eliminate car trips through the I-580 Altamont Pass.

Connecting BART and ACE has been made a priority in the Bay Area Regional Rail Plan. The state legislature can also prioritize this link with the passage of Assembly Bill 2762, which would create a joint powers authority to plan and deliver a connection between BART and ACE in Livermore. The single purpose agency model has been previously deployed in California, with the Metro Gold Line Foothill Extension Construction Authority providing a successful example from Los Angeles.

#### **San Jose as a Future Transit Hub for the Megaregion**

The California High Speed Rail Authority plans to begin passenger service on a line between San Jose and Bakersfield by 2025. Additionally, the Santa Clara County Valley Transportation Authority seeks to extend BART to San Jose by 2025. San Jose's Diridon Station already is home to service provided by ACE, Caltrain, and Capitol Corridor. With two new rail services arriving in San Jose in 2025—and both bringing significantly more riders—improvements to the Diridon Station are paramount to allow easy connections between all five services.

#### **Transbay Corridor in Need of Capacity Improvements**

Leaders in the Bay Area have begun discussing the need for a second transbay transit crossing and regional agencies are currently studying investment needs in the transbay corridor—including a second tube that could carry BART or other standard gauge rail. One concept for this link involves a new transit terminal in Oakland, which would connect BART, Capitol Corridor, and San Joaquins services. While a project of this magnitude would take years to plan, finance, and execute, it also



has importance to the megaregion as another means to move commuters into and out of core areas on transit.

**Recommendation #5: Use Megaregional Partners in Advocacy Efforts to Secure Funding; Simultaneously Explore Dedicated Sources of Infrastructure Finance**

Infrastructure projects that span the megaregion require partnership and support from a megaregional group of stakeholders. The ACE, San Joaquins, and Capitol Corridor projects described above require a significant amount of coordination and capital investment.

These projects have extensive megaregional benefits—they take vehicles off of roadways, lower greenhouse gas emissions, and improve local economies by making them more attractive places to live and work. These benefits need to be recognized across the megaregion so that a coalition can support efforts to gain funding from Sacramento and Washington.

Funding sources for intercity passenger rail improvements might include tapping into the 40% of cap-and-trade funding that is currently unallocated. There should be a larger, on-going allocation of cap-and-trade funds to intercity and commuter rail services. While the Transit & Intercity Rail Capital Program receives 10% of cap-and-trade revenues each year, intercity and commuter rail services are not well positioned to compete against local and regional transit services for these dollars.

A dedicated allocation to conventional rail—through a separate cap-and-trade pot—can create better linkages to the future High Speed Rail system. It will also simultaneously improve the transportation system in the Northern California Megaregion, which will become increasingly necessary as the population expands.

More innovative, long-term solutions include tolling on highway corridors that are adjacent to intercity rail lines. This option could expand the Bay Area's express lane program—which collects tolls from solo drivers for their use of the carpool lane—to adjacent counties. These tolls could be collected on a megaregional basis and serve as the foundation of funding for intercity rail service. For example, tolling along the I-80 corridor would help to fund Capitol Corridor, and tolls collected on portions of I-5 and I-580 would support ACE.

Other funding solutions for intercity rail investments could also come from an increased gas tax, vehicle miles traveled fees, and increased vehicle registration fees—all of which should receive more attention at the state level as a means to produce sustainable financing streams for the state's infrastructure improvements.

**Recommendation #6: Streamline housing approval processes in areas across the megaregion, especially those that are served by transit**

In May 2016, Governor Brown proposed a change to state law that would streamline certain local housing approval processes. The state, especially its coastal metropolitan areas, has historically underbuilt housing.<sup>29</sup> California's local finance structures encourage cities to build commercial developments, which are accompanied by higher tax receipts, over residential developments, which can cause a financial drag given the need to provide public services. Local resistance has been a major cause of this underbuilding as opponents of new housing can use the California Environmental Quality Act (CEQA) review process to delay construction, producing additional legal costs for developers.

The governor proposes that cities and counties require only "by-right" approval for certain types of housing projects. Infill, multi-family developments that conform with existing general plan and zoning rules would qualify for by-right approval if 20% of the units are set aside as affordable for low-income households. This threshold falls to 10% for projects near an existing or planned transit stop. Projects that go through the by-right process would be exempt from CEQA review and cities and counties would be given 30 days for review.

By-right approval can help to spur housing development across the Northern California Megaregion. Most importantly, it can facilitate higher density building near existing or planned rail stations that will give residents greater choice in where they live and work. Investments that increase train frequencies can have the effect of increasing demand for transit-oriented housing—this proposal can make that housing a reality. Additionally, the new stations that are built as a result of high-speed rail construction will more quickly promote economic revitalization, as developers will have more certainty of the types of construction that will be approved.



# 5

## Viewing Goods Movement through a Megaregional Lens

The goods movement system has a direct connection to the transportation investments detailed in the previous section, as both passengers and goods share the same infrastructure. Goods movement also plays a significant role in the megaregional economy, both as a provider of jobs and as a facilitator of trade for businesses across the megaregion.

For 2015, it is estimated that just over \$1.0 trillion of freight moved to, from, or within the Northern California Megaregion. This goods flow is concentrated in Alameda County, where the Port of Oakland serves as the megaregion's main port of entry and exit. It handles 99% of all containerized international trade that moves through the Northern California Megaregion.<sup>30</sup>

Trucks play a key role in moving products away from the Port of Oakland to their end users, and to the port for shipment. Oftentimes these truck trips—especially those that are carrying agricultural products—originate or end in the Northern San Joaquin Valley. Because of this connection, creating a more efficient goods movement system is not just a priority for Alameda County or the Bay Area region, it can be viewed as a megaregional issue that links together all of the jurisdictions in the Northern California Megaregion.

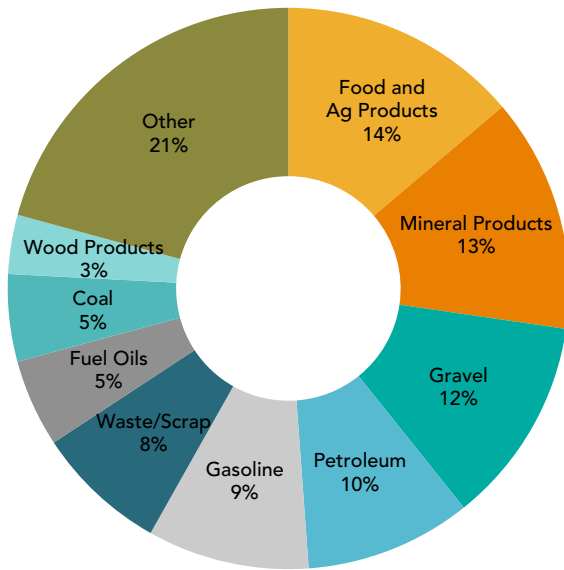
### Trucking is the Key Mode for Goods Movement

Trucking accounts for 74.1% of all Northern California Megaregion freight flows. These trucks are key to the movement of food and agricultural products produced in the Central Valley for consumption in California and around the world. To highlight this point, the Port of Oakland's most significant export commodities by value are fruit and nuts.

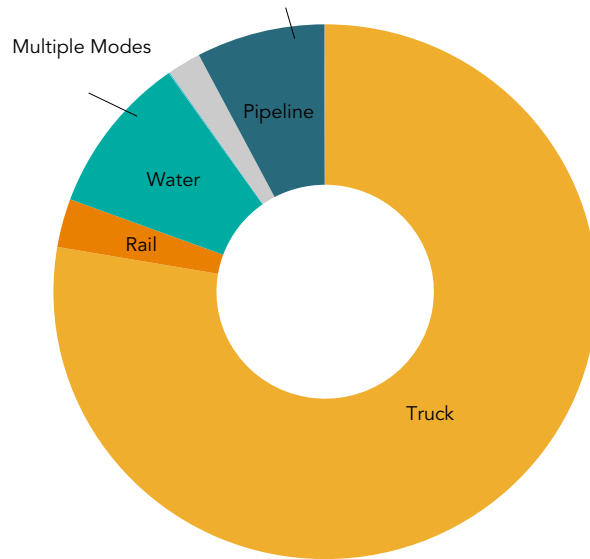
Trucks are also the main mode of transportation for goods that will eventually travel via rail. Since very little intermodal rail traffic originates or ends within the Bay Area, trucks are used to carry goods to and from intermodal rail terminals located in the Central Valley.

The Bay Area has multiple key interregional truck corridors feeding into and out of the region's main port facilities—which include ports in Oakland, San Francisco, Richmond, Benicia, and Redwood City. Many of these corridors carry between 5,000 and 15,000 trucks per day. However, segments of I-880 and the I-580 Altamont Pass—which connect the Port of Oakland to the Northern San Joaquin Valley and are major gateways for goods moving to and from Southern California—carry between 15,000 and 37,000 per day on average.<sup>31</sup>

**Megaregion Freight Flows by Commodity**  
2015 Estimates Based on Weight



**Megaregion Freight Flows by Mode**  
2015 Estimates Based on Weight

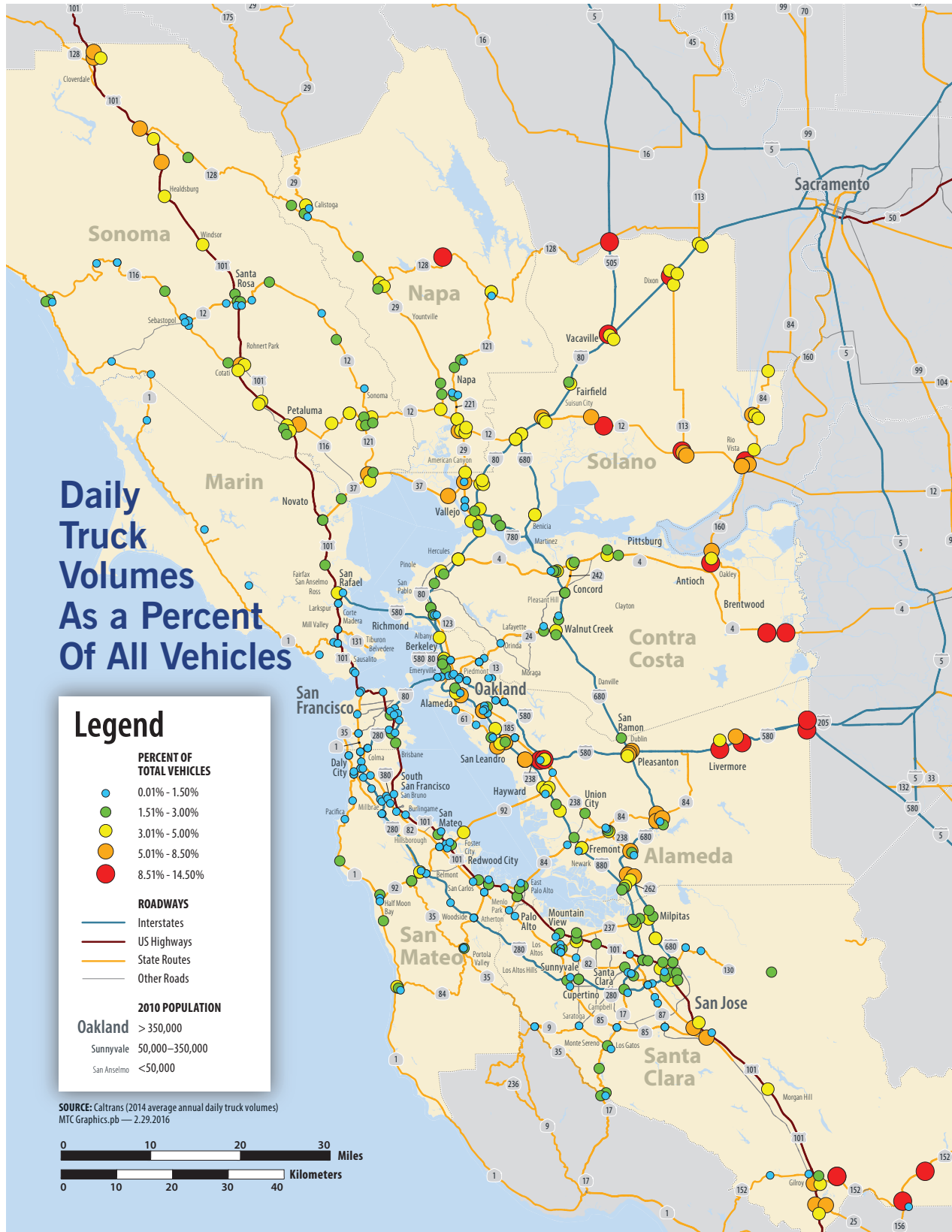


**Data Source:** Freight Analysis Framework  
**Analysis:** Bay Area Council Economic Institute

In addition to the transportation challenges faced in the Bay Area, Interstate 5 in the Northern San Joaquin Valley is one of the most heavily trucked corridors in the megaregion. From north of Stockton to Manteca, average truck volumes range between 20,000 and 30,000 per day.<sup>32</sup> The I-5 corridor connects to the Port of Stockton and intermodal freight transfer terminals in Stockton and Lathrop—which are two of only 12 such facilities in California, and two of only three inland transfer facilities serving the Central Valley.

These centrally located facilities have been key aspects of goods movement and logistics becoming large and growing portions of the Northern San Joaquin Valley economy, providing a main source of employment growth in recent years. Amazon has opened fulfillment centers in Tracy and Patterson, and Best Buy, Home Depot, Restoration Hardware, Safeway, and Costco have opened warehouses and logistics operations within the region.

In 2015, it is estimated that just over \$1.0 trillion of freight moved to, from, or within the Northern California Megaregion, and trucking accounted for 74.1% of all megaregional freight flows. These trucks are key to the movement of food and agricultural products produced in the Central Valley for consumption in California and around the world.



Analysis: Metropolitan Transportation Commission



## Challenges and Opportunities for Megaregional Goods Movement

Goods movement activity operates on much of the same infrastructure as commuter infrastructure. Increasing population numbers and a more expansive goods movement network mean that trucks and cars will both continue to need access to roadways in the Northern California Megaregion. Passenger and freight rail has the same issue, as both occupy the same track. Absent an increase in highway or rail capacity, the existing system will need to be utilized in a way that maximizes existing throughput, while minimizing negative effects to goods movement efficiency and the environment.

### Passenger Rail and Freight Rail Occupy the Same Track

The most congested rail lines in the Northern California Megaregion are those that serve the dual purpose of freight and passenger movement. Two national (Class I) freight rail lines operate through the megaregion, the Burlington Northern Santa Fe (BNSF) and the Union Pacific Railroad (UPRR).

Capitol Corridor, San Joaquins, and Altamont Corridor Express trains use UPRR and BNSF track under operating agreements that allow the passenger trains an allotment of windows for service throughout the day. However, projections for 2020 usage show that some of these rail segments will be operating very near capacity.

### Forecasted 2020 Capacity for Major Rail Lines

| Operators  | From       | To         | Number of Main Tracks | Daily Freight Trains | Daily Passenger Trains | Total Daily Trains | Average Capacity | Volume/Capacity Ratio |
|------------|------------|------------|-----------------------|----------------------|------------------------|--------------------|------------------|-----------------------|
| CC / UPRR  | Sacramento | Martinez   | 3/2                   | 22                   | 34                     | 56                 | 75               | <b>74.7%</b>          |
| CC / UPRR  | Martinez   | Richmond   | 2                     | 22                   | 44                     | 66                 | 75               | <b>88.0%</b>          |
| CC / UPRR  | Richmond   | Emeryville | 3/2                   | 30                   | 44                     | 74                 | 75               | <b>98.7%</b>          |
| CC / UPRR  | Emeryville | Oakland    | 2                     | 30                   | 42                     | 72                 | 75               | <b>96.0%</b>          |
| ACE / UPRR | Niles      | Stockton   | 1                     | 11                   | 12                     | 23                 | 30               | <b>76.7%</b>          |
| SJ / BNSF  | Stockton   | Martinez   | 2/1                   | 12                   | 10                     | 22                 | 30               | <b>73.3%</b>          |

Source: AECOM and Cambridge Systematics calculations, San Francisco Bay Area Goods Movement Plan

While the slotting system utilized today does result in on-time performance for passenger trains and efficient use for freight trains, increasing frequencies of either use going forward will result in the other experiencing declining reliability. UPRR is the owner of the bulk of the track and wants to preserve its future capacity, so any infrastructure upgrades it does make need to have a positive return on investment. UPRR is currently planning improvements within its existing right-of-way in the Niles Subdivision that will improve capacity and access on the southern route to the Port of Oakland.

## Inland Ports are Underutilized

Small ports in Stockton and West Sacramento can become more important cogs in the Northern California Megaregion's goods movement system. While the Port of Oakland is the major shipper for the megaregion, and San Francisco and Oakland airports play important roles in international trade, Stockton and West Sacramento sit in important locations that can allow them to limit truck trips that would otherwise be traveling into the Bay Area.

The Port of Stockton is a leading bulk commodity port. Its main commodities for international trade include fertilizer, rice, sulfur, and low sulfur coal. In 2014, the port handled over 230 vessels, the highest number of ships in a year in its 82-year history. The port moved 4.1 million metric tons of cargo valued at over \$1.5 billion, a sharp increase from 2003 when its shipments totaled just \$227 million in value.

The Port of West Sacramento is a publicly owned port that moved 331,000 tons of cargo during 2015. Historically a shipper for the region's rice, the port also contains cement import facilities with capacity to handle as much as 4 million tons annually.

While these two facilities are small in comparison to the \$45 billion that moves through the Port of Oakland, they both have excess shipping capacity for bulk commodities that can be used strategically in megaregional goods movement.

## Restructuring the Goods Movement Landscape

The Northern California Megaregion requires an ability to coordinate goods movement policies at a broader scale. While metropolitan planning organizations in the megaregion are meeting to discuss common challenges and opportunities, the question of appropriate oversight for a large goods movement network remains. Rather than creating new levels of government, the following recommendations identify gaps that policy changes on a megaregional scale can fill.

### **Recommendation #1: Create a Structure for Passenger Rail and Freight Rail to Work Together**

The issue of growing demand for freight and passenger rail is unsustainable. With the megaregion's transit operators planning enhanced service and freight operators wanting to keep right-of-way available for their own future expansion, coordination between private freight operators and public stakeholders needs to have a more defined structure to reach mutually beneficial outcomes.

Currently, the California State Transportation Agency is responsible for the statewide rail plan. However, a more coordinated structure to identify and prioritize key rail projects, optimize existing rail routes, and negotiate the acquisition of right-of-way is needed with a focus on the Northern California Megaregion. It can ensure that passenger rail efficiently links the megaregion while freight operators continue to meet their market objectives.

The Metropolitan Transportation Commission in the Bay Area, the Sacramento Area Council of Governments, the regional transportation planning agencies of the Northern San Joaquin Valley, and the rail agencies of the Northern California Megaregion have begun working together to advance megaregional planning. This partnership should be the focal point that acts as the point of contact for engagement with private rail operators going forward.

### **Recommendation #2: Support Investments to Limit Environmental Impacts**

The most congested highways in the megaregion are those that facilitate truck movement to and from ports, including I-880 and the I-580 Altamont Pass. Traffic on these highways is also a contributor to greenhouse gas emissions. Congestion has reached a point where many trucks are only able to make one trip per day between the Northern San Joaquin Valley and the Port of Oakland; in the past, two trips per day were possible.<sup>33</sup>

Many policies that can be implemented at the Port of Oakland have goods movement co-benefits that extend into the megaregion. For example, if more trucks load and unload at the Port of Oakland at night, truck traffic in the Northern San Joaquin Valley can shift away from peak travel times. An increased usage of technology in goods movement, such as improved tracking and coordination of truck arrival times at the port, can also limit the amount of time trucks spend idling while waiting to enter

and exit. These types of policies that have megaregional significance should be supported at a similar geographic level.

The public sector can also partner with private industry in making investments in goods movement. These investments might include more seamless rail connections and dredging to accommodate larger vessels in the Stockton shipping channel. The impacts of the \$880 million investment planned at the former Oakland Army Base will also stretch across the megaregion with large public benefits. These investments include a new bulk marine terminal; trade and logistics warehouse space for imports and exports; and a new rail system to serve both the bulk marine terminal and the new trade and logistics facilities. Estimates suggest that the additional throughput of domestic intermodal cargo that will be handled through the Oakland Army Base redevelopment could take more than 700 trucks per day off of I-580.<sup>34</sup>

### **Recommendation #3: Coordinate Advocacy for Dedicated Goods Movement Funding**

At the state level, Proposition 1B was the last major statewide goods movement investment program—it was

approved by voters in 2006. Through the Trade Corridor Improvement Fund, it provided \$2.5 billion statewide. However, much of that funding has now been spent, and transportation agencies are looking for other means to invest in goods movement infrastructure. Goods movement projects have been key pieces of recently passed or proposed county sales tax measures to fund transportation improvements. As counties across the megaregion bring transportation expenditure plans to voters in the future, those projects that have a dual goods movement and passenger movement component should receive priority.

The Northern California Megaregion's policymakers should also help the state designate freight corridors of need. Projects identified in these corridors would be able to quickly access state funding when available and have the state's support in efforts to garner funding from the recently-signed FAST Act, the federal government's transportation spending plan. Future packages of freight rail investments supported by public funding might also be part of a deal that allows passenger rail to operate through dedicated rail corridors apart from freight traffic.

## APPENDIX A

## Megaregion Cities Population Ranking by Growth Rates

For Cities with 2015 Population Over 50,000 Residents, Sorted by Compound Annual Growth Rate

| Population Rank | City                | County        | 2000 Population | 2010 Population | 2015 Population | Annual Growth Rate ('10-'15) | Annual Growth Rate ('00-'15) |
|-----------------|---------------------|---------------|-----------------|-----------------|-----------------|------------------------------|------------------------------|
| 54              | Brentwood           | Contra Costa  | 23,302          | 51,453          | 56,493          | 1.89%                        | 6.08%                        |
| 9               | Elk Grove           | Sacramento    | 76,298          | 152,652         | 162,899         | 1.31%                        | 5.19%                        |
| 55              | Dublin              | Alameda       | 30,023          | 45,681          | 55,844          | 4.10%                        | 4.22%                        |
| 45              | Yuba City           | Sutter        | 36,758          | 64,818          | 66,363          | 0.47%                        | 4.02%                        |
| 31              | San Ramon           | Contra Costa  | 44,722          | 71,788          | 78,561          | 1.82%                        | 3.83%                        |
| 49              | Rocklin             | Placer        | 36,330          | 56,720          | 60,252          | 1.22%                        | 3.43%                        |
| 59              | West Sacramento     | Yolo          | 31,615          | 48,582          | 51,272          | 1.08%                        | 3.28%                        |
| 13              | Roseville           | Placer        | 79,921          | 118,180         | 128,382         | 1.67%                        | 3.21%                        |
| 26              | Tracy               | San Joaquin   | 56,929          | 82,800          | 85,296          | 0.60%                        | 2.73%                        |
| 36              | Manteca             | San Joaquin   | 49,255          | 66,776          | 73,787          | 2.02%                        | 2.73%                        |
| 34              | Folsom              | Sacramento    | 51,884          | 72,139          | 74,909          | 0.76%                        | 2.48%                        |
| 40              | Rancho Cordova      | Sacramento    | 54,979          | 64,024          | 69,112          | 1.54%                        | 2.10%                        |
| 29              | Merced              | Merced        | 63,893          | 78,860          | 81,722          | 0.72%                        | 1.65%                        |
| 57              | Gilroy              | Santa Clara   | 41,464          | 48,853          | 53,000          | 1.64%                        | 1.65%                        |
| 39              | Turlock             | Stanislaus    | 55,811          | 68,279          | 71,043          | 0.80%                        | 1.62%                        |
| 5               | Stockton            | San Joaquin   | 243,771         | 291,275         | 306,999         | 1.06%                        | 1.55%                        |
| 19              | Antioch             | Contra Costa  | 90,532          | 102,277         | 108,298         | 1.15%                        | 1.20%                        |
| 41              | Pittsburg           | Contra Costa  | 56,769          | 63,181          | 67,628          | 1.37%                        | 1.17%                        |
| 15              | Santa Clara         | Santa Clara   | 102,361         | 116,184         | 120,973         | 0.81%                        | 1.12%                        |
| 50              | Cupertino           | Santa Clara   | 50,602          | 58,084          | 59,756          | 0.57%                        | 1.11%                        |
| 3               | Sacramento          | Sacramento    | 407,018         | 466,740         | 480,105         | 0.57%                        | 1.11%                        |
| 58              | Watsonville         | Santa Cruz    | 44,246          | 51,246          | 52,087          | 0.33%                        | 1.09%                        |
| 35              | Pleasanton          | Alameda       | 63,654          | 70,135          | 74,850          | 1.31%                        | 1.09%                        |
| 8               | Santa Rosa          | Sonoma        | 147,595         | 167,302         | 173,071         | 0.68%                        | 1.07%                        |
| 25              | Livermore           | Alameda       | 73,464          | 80,932          | 85,990          | 1.22%                        | 1.06%                        |
| 53              | Woodland            | Yolo          | 49,155          | 55,400          | 57,525          | 0.76%                        | 1.05%                        |
| 47              | Santa Cruz          | Santa Cruz    | 54,593          | 59,871          | 63,789          | 1.28%                        | 1.04%                        |
| 18              | Fairfield           | Solano        | 96,178          | 103,224         | 111,891         | 1.63%                        | 1.01%                        |
| 38              | Milpitas            | Santa Clara   | 62,698          | 66,672          | 72,606          | 1.72%                        | 0.98%                        |
| 17              | Berkeley            | Alameda       | 102,743         | 112,363         | 118,780         | 1.12%                        | 0.97%                        |
| 42              | Palo Alto           | Santa Clara   | 58,598          | 64,352          | 66,932          | 0.79%                        | 0.89%                        |
| 1               | San Jose            | Santa Clara   | 895,131         | 946,954         | 1,016,479       | 1.43%                        | 0.85%                        |
| 56              | Novato              | Marin         | 47,630          | 52,000          | 53,575          | 0.60%                        | 0.79%                        |
| 12              | Sunnyvale           | Santa Clara   | 131,844         | 139,865         | 148,028         | 1.14%                        | 0.77%                        |
| 48              | Lodi                | San Joaquin   | 57,011          | 62,110          | 63,719          | 0.51%                        | 0.74%                        |
| 6               | Fremont             | Alameda       | 203,413         | 213,524         | 226,551         | 1.19%                        | 0.72%                        |
| 24              | San Leandro         | Alameda       | 79,452          | 84,831          | 88,441          | 0.84%                        | 0.72%                        |
| 7               | Modesto             | Stanislaus    | 188,861         | 201,911         | 209,186         | 0.71%                        | 0.68%                        |
| 44              | Davis               | Yolo          | 60,308          | 65,558          | 66,757          | 0.36%                        | 0.68%                        |
| 32              | Mountain View       | Santa Clara   | 70,708          | 73,958          | 77,914          | 1.05%                        | 0.65%                        |
| 22              | San Mateo           | San Mateo     | 92,482          | 97,106          | 101,429         | 0.87%                        | 0.62%                        |
| 46              | South San Francisco | San Mateo     | 60,552          | 63,623          | 66,193          | 0.80%                        | 0.60%                        |
| 11              | Hayward             | Alameda       | 140,030         | 143,921         | 152,889         | 1.22%                        | 0.59%                        |
| 51              | Petaluma            | Sonoma        | 54,550          | 57,791          | 59,540          | 0.60%                        | 0.59%                        |
| 2               | San Francisco       | San Francisco | 776,733         | 804,989         | 845,602         | 0.99%                        | 0.57%                        |
| 30              | Napa                | Napa          | 72,585          | 76,856          | 78,971          | 0.54%                        | 0.56%                        |
| 37              | Union City          | Alameda       | 66,869          | 69,625          | 72,744          | 0.88%                        | 0.56%                        |
| 28              | Redwood City        | San Mateo     | 75,402          | 76,766          | 81,838          | 1.29%                        | 0.55%                        |
| 10              | Salinas             | Monterey      | 142,685         | 150,514         | 154,720         | 0.55%                        | 0.54%                        |
| 20              | Richmond            | Contra Costa  | 99,216          | 103,764         | 107,346         | 0.68%                        | 0.53%                        |
| 23              | Vacaville           | Solano        | 88,642          | 93,090          | 94,702          | 0.34%                        | 0.44%                        |
| 33              | Alameda             | Alameda       | 72,259          | 73,717          | 76,638          | 0.78%                        | 0.39%                        |
| 52              | San Rafael          | Marin         | 56,063          | 57,608          | 59,214          | 0.55%                        | 0.37%                        |
| 43              | Walnut Creek        | Contra Costa  | 64,296          | 64,240          | 66,868          | 0.81%                        | 0.26%                        |
| 14              | Concord             | Contra Costa  | 121,872         | 122,109         | 126,069         | 0.64%                        | 0.23%                        |
| 4               | Oakland             | Alameda       | 399,566         | 391,475         | 410,603         | 0.96%                        | 0.18%                        |
| 16              | Vallejo             | Solano        | 117,148         | 116,798         | 119,683         | 0.49%                        | 0.14%                        |
| 21              | Daly City           | San Mateo     | 103,625         | 101,186         | 105,810         | 0.90%                        | 0.14%                        |
| 27              | Citrus Heights      | Sacramento    | 85,071          | 83,382          | 85,147          | 0.42%                        | 0.01%                        |

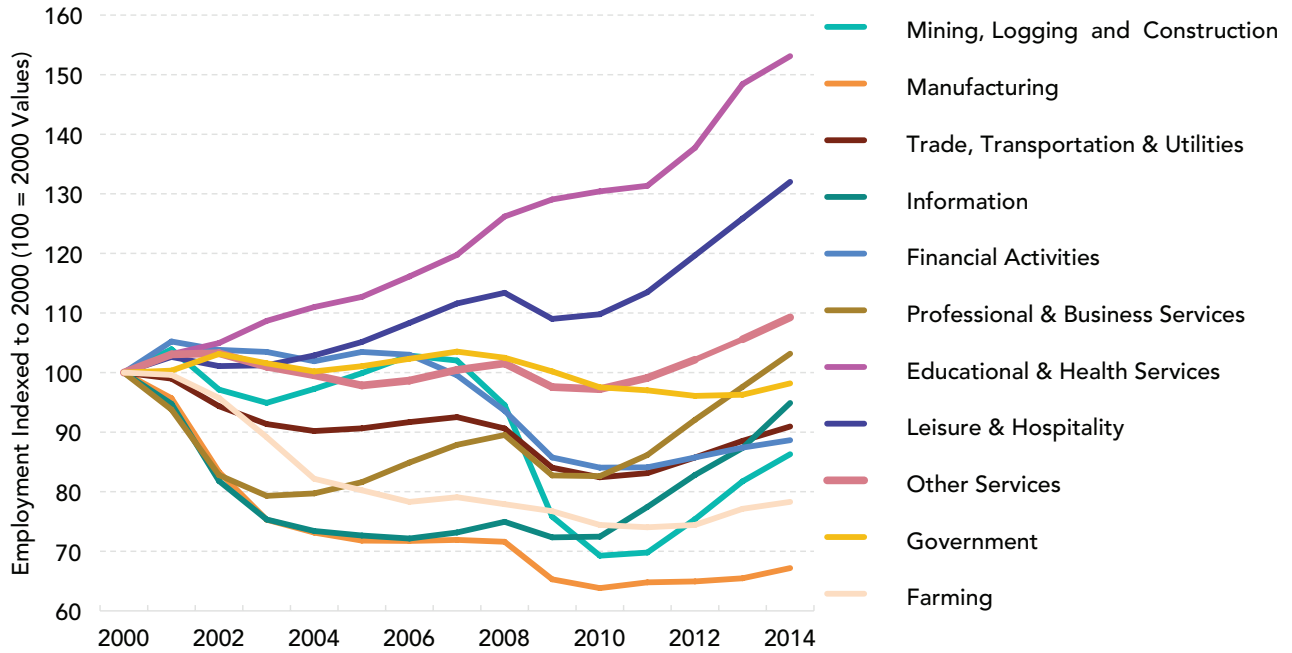
Source: State of California, Department of Finance

Analysis: Bay Area Council Economic Institute

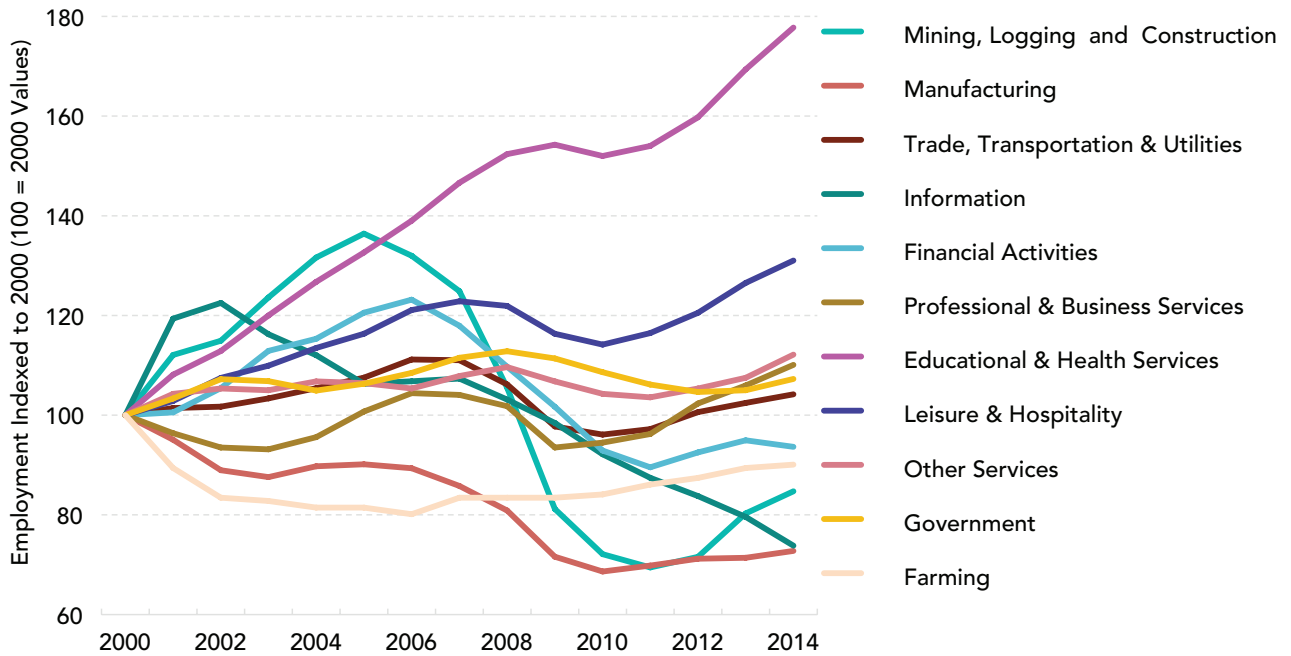


**APPENDIX B**

**San Francisco Bay Area Employment by Sector**

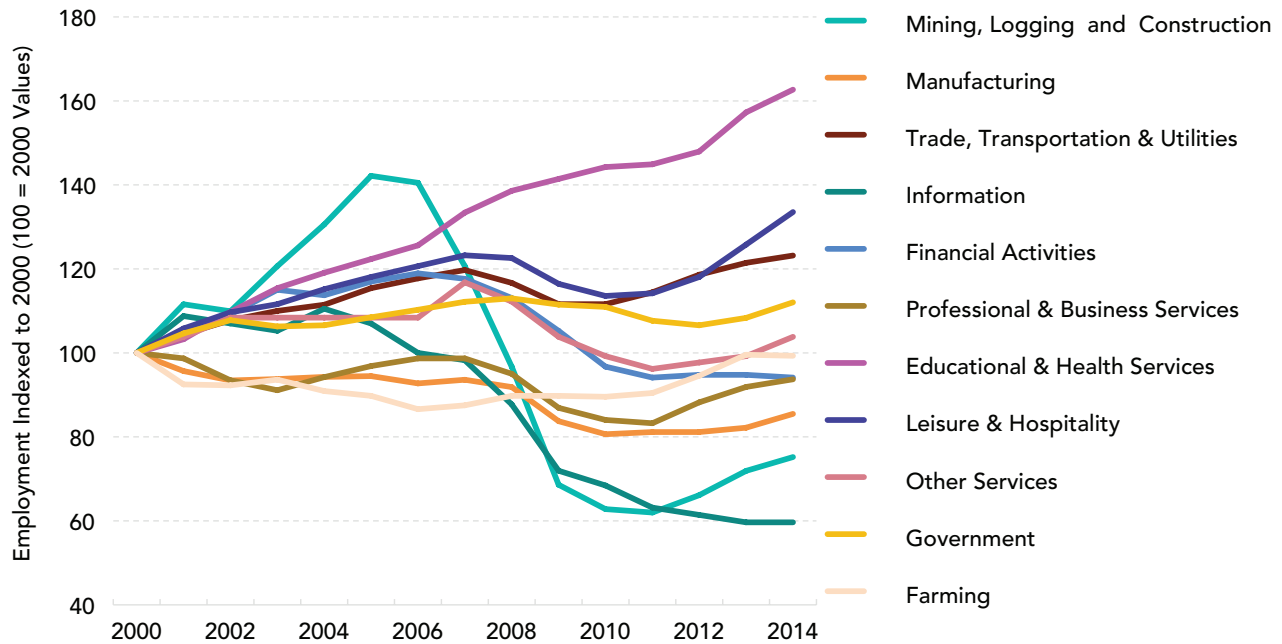


**Sacramento Area Employment by Sector**

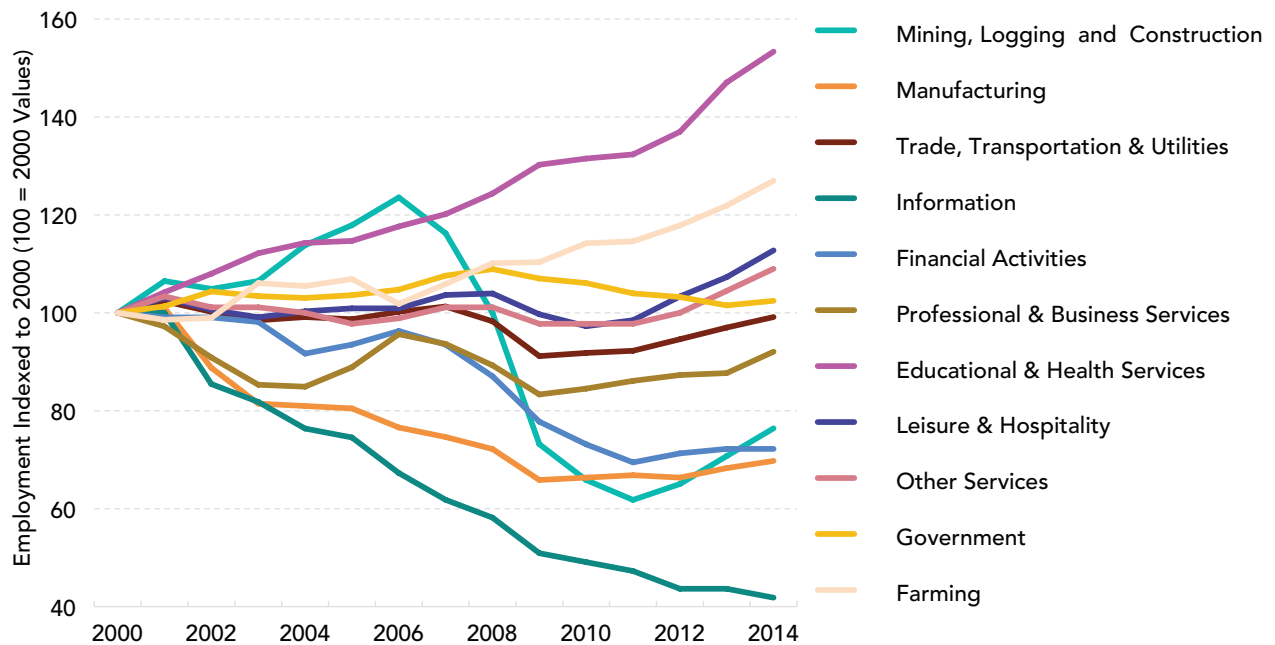


APPENDIX B, CONTINUED

Northern San Joaquin Valley Employment by Sector



Monterey Bay Area Employment by Sector

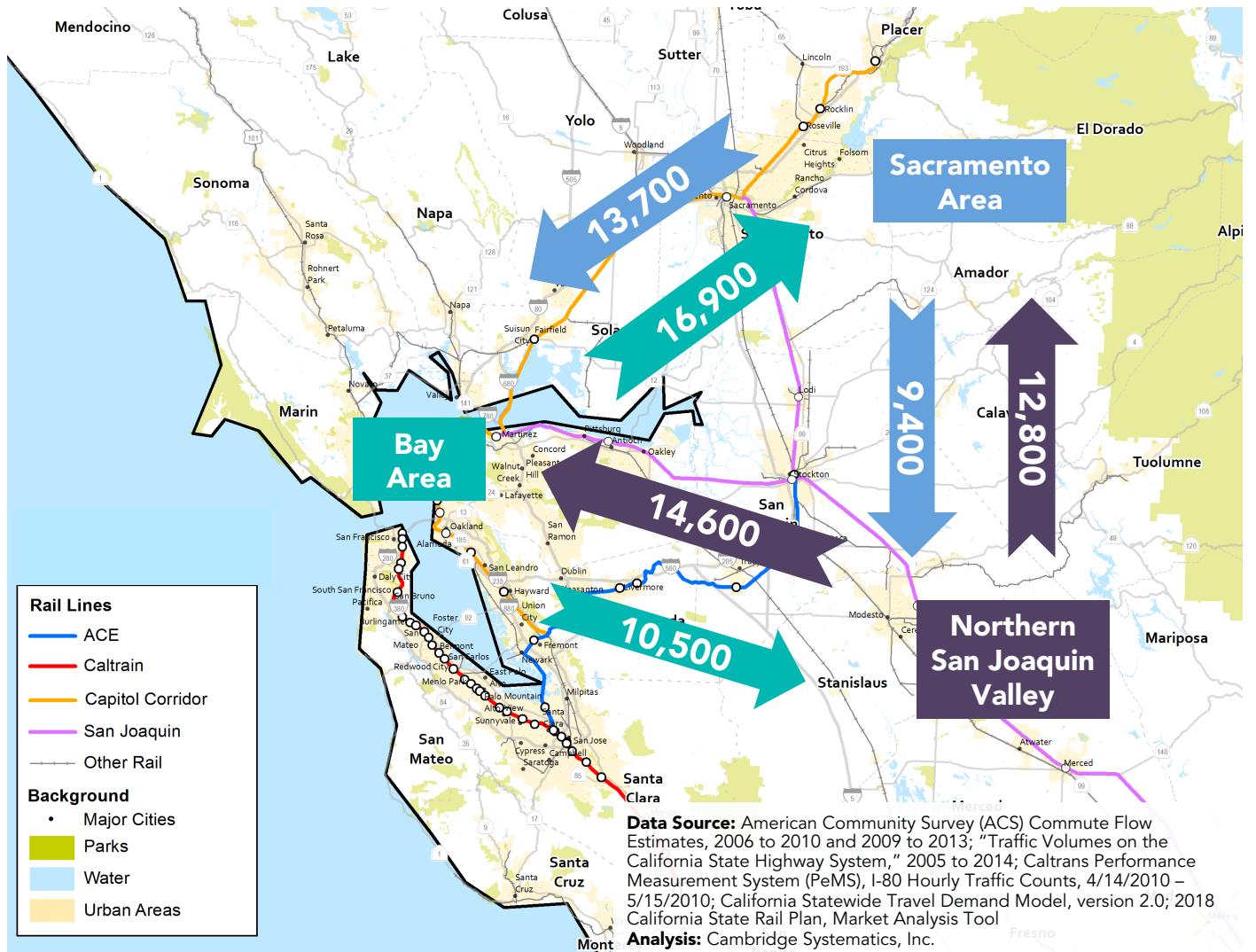


Data Source: State of California Employment Development Department

Analysis: Bay Area Council Economic Institute

## APPENDIX C

### Daily Interregional Non-Commute Travel, 2010



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## ENDNOTES

1. Association of Bay Area Governments. "Final Regional Forecast 2010-2040," Memo to ABAG Executive Board from Cynthia Kroll, January 14, 2016.
2. Ross, Catherine and M. Woo. "Identifying Megaregions in the US: Implications for Infrastructure Investment," in *Megaregions: Planning for Global Competitiveness*, edited by C.L. Ross. Washington, DC: Island Press, 2009.
3. For example, the Regional Plan Association analysis of domestic megaregions from 2006 included 31 counties in the Northern California Megaregion, stretching east to Reno and south to Fresno.
4. The North San Joaquin Valley Index can be accessed at: <http://www.pacific.edu/nsjv>.
5. The country's 388 metropolitan areas house 84% of the U.S. population and generate over 90% of national gross domestic product, giving credence to the idea that the domestic economy is driven by this collection of large metropolitan areas. Katz, Bruce and Jennifer Bradley. *The Metropolitan Revolution: How Cities and Metros are Fixing our Broken Politics and Fragile Economy*. Washington, DC: Brookings Institution Press, 2014.
6. Glaeser, Edward. "Do Regional Economies Need Regional Coordination?" In *The Economic Geography of Megaregions*, edited by K.S. Goldfel. The Policy Research Institute for the Region, Princeton University, 2007.
7. America 2050. "A national strategy for prosperity, equity and sustainability" [Draft prospectus], April 21, 2006.
8. Since 2001, gross regional product from the Bay Area has grown by 68.3%; the Sacramento Area has posted 69.2% growth; Northern San Joaquin Valley has increased output by 65.6%; and the Monterey Bay Area has grown by 49.4%. All data taken from the Bureau of Economic Analysis.
9. This projected rate of growth is slightly below the 1.5% compound annual population growth that the Sacramento Area and Northern San Joaquin Valley each experienced between 2000 and 2015.
10. Data taken from California Department of Finance Report P-4, "State and County Projected Households, Household Population, Group Quarters, and Persons per Household: 2015-2013." Accessed at: <http://www.dof.ca.gov/research/demographic/reports/projections/view.php>.
11. Calculations made using Bureau of Labor Statistics data release for March 2016.
12. Schafran, Alex. "Rethinking Mega-Regions: Sub-Regional Politics in a Fragmented Metropolis," *Regional Studies*, July 2013.
13. High-tech jobs have a local employment multiplier of 4.3. From: Bay Area Council Economic Institute. "Technology Works: High-Tech Employment and Wages in the United States," December 2012. Accessed at: <http://documents.bayareacouncil.org/TechReport.pdf>.
14. High-tech sectors are defined as those workers employed in 31 industries that have significant concentration of occupations in STEM fields. These industries are: Petroleum and coal products; basic chemicals; resin, rubber, and synthetic fibers; pharmaceutical and medicine; industrial machinery, commercial equipment manufacturing; engine, turbine, and power equipment; other machinery manufacturing; audio and video equipment; semiconductors and electronic components; control instruments; optical media; electrical equipment; aerospace products; pipeline transportation; software publishers; telecommunications carriers; telecommunications; data processing and hosting; information services; architectural and engineering services; computer systems design; management, scientific, and technical consulting services; scientific research and development; management of companies and enterprises; forestry; oil and gas extraction; and electric power generation, transmission, and distribution. For a more detailed definition of high-tech industries, see: Wolf, Michael and Dalton Terrell. "The high-tech industry, what is it and why it matters to our economic future," U.S. Bureau of Labor Statistics. Vol. 5, No. 8, May 2016.
15. Data taken from the Bureau of Labor Statistics Quarterly Census of Employment and Wages.
16. Research and development investments are defined as any investments by federal, state, or local governments, businesses, or other institutions made



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## ENDNOTES, CONTINUED

specifically in university-led basic and applied research efforts in the areas of science and engineering.

17. Data displayed in this section taken from PricewaterhouseCoopers/National Venture Capital Association MoneyTree Report. Accessed at: <https://www.pwcmoneytree.com/>.

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21. Khouri, Andrew. "Bay Area home prices soar," Los Angeles Times, May 14, 2014.

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23. Data taken from the California Association of Realtors, accessed at: <http://www.car.org/marketdata/data/haitraditional/>.

24. The 191,500 individuals crossing regional boundaries each day is greater than the 188,025 individuals presented in the map because it includes movement between regions with minimal commute flows, such as between the Monterey Bay Area and the Northern San Joaquin Valley.

25. Data taken from the Census Transportation Planning Products, using the 2009-2013 Five-Year American Community Survey (ACS).

26. Rapino, Melanie A. and Allison K. Fields. "Mega Commuters in the U.S.: Time and Distance in Defining the Long Commute using the American Community Survey," Journey to Work and Migration Statistics Branch, Social, Economic, and Housing Statistics Division, United States Census Bureau, 2013.

27. Data taken from the Metropolitan Transportation Commission's Vital Signs website.

28. ACE forecasts that a direct connection between ACE and BART at Greenville Road in Livermore will add nearly 865,000 riders to ACE per year by 2025. This forecast assumes all other proposed extensions and service improvements have been completed by 2025.

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31. "San Francisco Bay Area Goods Movement Plan," Draft Final Report. Prepared by Cambridge Systematics, Inc. February 2016. Accessed at: [http://mtc.ca.gov/sites/default/files/RGM\\_Draft\\_Plan\\_v6\\_Feb9\\_2016.pdf](http://mtc.ca.gov/sites/default/files/RGM_Draft_Plan_v6_Feb9_2016.pdf).

32. Eberhardt School of Business, Business Forecasting Center. "Regional Analyst," July 2013. Produced in partnership with the San Joaquin Council of Governments.

33. Interview with Port of Oakland staff.

34. "Alameda County Goods Movement Plan, Task 3C – Identify Gaps, Needs, Issues, and Deficiencies," prepared by Cambridge Systematics, Inc. and AECOM. Accessed at: [http://www.alamedactc.org/files/managed/Document/17512/FR\\_3C%20ACTC\\_Needs\\_Issues\\_Opps\\_Final.pdf](http://www.alamedactc.org/files/managed/Document/17512/FR_3C%20ACTC_Needs_Issues_Opps_Final.pdf).

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## NOTES







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