Bay Area Jobs First Collaborative

CALIFORNIA JOBS FIRST

REGIONAL PLAN PART 1

SUBMITTED TO:

Governor's Office of
Planning and Research

DECEMBER 2023

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Executive Summary

The Bay Area Jobs First Collaborative's Regional Plan Part 1 report provides a comprehensive baseline assessment of the Bay Area, its stakeholders, and the factors influencing its economic, environmental, and health conditions. A comprehensive understanding of the region's present conditions is necessary to formulate effective strategies that will help the Bay Area transition to a sustainable economy that creates high-quality employment opportunities.

This report is descriptive in nature, and none of the information contained herein should be construed as recommending investments or resource allocations to particular areas of the region and/or in specific sectors of the economy. Those strategic investments and resource allocation recommendations will be presented in the Bay Area Jobs First Collaborative's Regional Plan Part 2 report to be released in the summer of 2024.

Stakeholder Mapping

The Regional Plan Part 1 report provides a stakeholder mapping highlighting the complex interplay of influences shaping the region. This stakeholder mapping is rooted in the principles of effective collaboration, sustainability, and regional development. This analysis aids in the identification of potential conflicts and opportunities for collaboration. Moreover, it is a vital driver for achieving sustainability objectives, recognizing the need for diverse stakeholder involvement.

This mapping allows for the integration of disinvested communities within the region that continue to grapple with economic challenges hindering their progress and limiting opportunities for residents. High unemployment rates, inadequate access to quality education, limited healthcare options, and insufficient infrastructure are some of the pervasive issues that these communities continue to face. These economic barriers create a cycle of disadvantage, perpetuating poverty and social disparities. Understanding the unique economic challenges of disinvested communities in the Bay Area is essential to developing effective strategies for sustainable change.

Regional Summary

Economy and Economic Development

The analysis of the Bay Area's economy and economic development acknowledges the region's changing population dynamics, emphasizing the increase in diversity, particularly in Asian and Latino communities. While the Bay Area has recovered from pandemic-related employment losses, wage inequities, human capital disparities, and uneven employment opportunities persist, especially in rapidly growing low-wage sectors.

Key findings from the Economy and Economic Development analysis include:

» The Bay Area is facing a declining population and an aging population.

» The Bay Area is more diverse today than five years ago.

» The Bay Area has largely recovered the employment losses suffered during the COVID-19 pandemic, but not all workers in the region are benefiting from the recovery.

» Although the Bay Area has a robust labor force, it suffers from inequities in wages, human capital, and employment and career opportunities.

» The fastest-growing occupations in the Bay Area over the next 10 years are projected to be primarily low-wage occupations that currently do not pay a living wage.

- Education and workforce training are neither necessary nor sufficient to allow career progression for workers in the fastest-growing occupations.
- Equal access to educational opportunities is important, but lifting job quality is a must to ensure essential jobs are no longer paying poverty-level wages.

Public Health

The analysis on equity in public health provides a snapshot of the Bay Area's baseline public health, climate, and economic security data by discussing social determinants of health. Social determinants of health are conditions in the environments where we live, work, and play that affect our health outcomes. The public health analysis of the Bay Area underscores the importance of empowering communities to address longstanding power imbalances affecting health opportunities and outcomes.

Using data from the Healthy Places Index (HPI), a composite of 23 social determinants of health indicators that are all strongly associated with life expectancy at birth, the analysis identifies 25 "priority ZIP codes" that have HPI percentiles below 50 and are overburdened by climate, economic, and other health and social inequities.

Key findings from the Public Health Analysis Include:

- Priority ZIP codes are diverse but segregated, with significant overrepresentation of minority groups, indicating exposure to inequitable social conditions.
- All priority ZIP codes have high poverty rates and low income and employment levels. The disparity between living and minimum wages in these areas, especially in the Bay Area, raises concerns about economic security.
- Issues like high diesel particulate matter, impervious surface cover, heat, and sea level rise inundation are prevalent in these ZIP codes; none of the priority ZIP codes have ozone percentile levels below the 50th percentile; and a few of the priority ZIP codes have concerning water quality.
- Low homeownership rates, high housing costs, overcrowded living conditions, and deficits in education, voting, and census participation are common in priority areas.
- Health indicators such as insurance rates, life expectancy, and outcomes for chronic conditions are generally below the 50th percentile, highlighting the impact of social determinants on health.

Climate and Environmental Impact

The analysis explores the anticipated climate and environmental impacts on the Bay Area's industries, economy, and workforce. It highlights the economic vulnerabilities due to climate-induced changes, the diverse impacts across sectors, and the urgent need for strategies to mitigate these challenges. It also underscores the urgent need for proactive strategies to address the region's vulnerabilities to climate change. This study will be helpful in framing strategies to build resilience across the Bay Area, particularly for marginalized communities disproportionately affected by these changes.

Key findings from the Climate and Environmental Impact analysis include:

- The Bay Area's economy is at risk from climate change impacts on natural resources, built environments, and its workforce.
- Climate change will impact all sectors, affecting natural systems and critical infrastructure, including transportation, water, and energy.
- Worker health and productivity in various industries will suffer due to rising temperatures, wildfires, and unpredictable precipitation.
- Industries like agriculture, manufacturing, and trade are vital to the region's economy and all face significant climate risks.
- Climate change also influences land use and growth decisions, with sea level rise, droughts, and wildfires determining where housing and business infrastructures expand.
- Climate impacts and mitigation efforts are not evenly distributed, but disproportionately affect marginalized communities.
- Health risks from temperature changes, precipitation variations, and wildfires present both direct and indirect threats.
- Not all climate vulnerabilities are location-specific. Some communities will face compounded climate and health vulnerabilities that are challenging to quantify using place-based indicators.

Labor Market Analysis

The labor market dynamics in the Bay Area reveal stark disparities in job quality and access. A considerable proportion of the workforce is engaged in precarious employment, with challenges more pronounced across gender, race, education, and occupational categories.

Barriers such as housing and transportation costs and a geographical mismatch between residences and workplaces further exacerbate these disparities. The analysis also highlights the most prevalent occupations across various income levels.

Key findings from the Labor Market Analysis include:

- Approximately 55% of workers are in jobs lacking a living wage, health insurance, and full-time, full-year employment.
- Substantial challenges and disparities remain, particularly for women, Black, and Hispanic workers who are disproportionately in precarious jobs.
- In the Bay Area, households earning 80% of the median income face housing costs above the 30% affordability threshold.
- Issues like long commuting hours, childcare affordability, and geographical mismatches hinder access to high-quality jobs.
- Formal education and skill training are positively correlated with high-quality employment in the Bay Area, but there are significant disparities in the educational and skill training opportunities available to workers, especially women, immigrants, and workers of color.

Industry Cluster Analysis

The Regional Plan Part 1 report provides foundational data on the Bay Area's employment profile, highlighting the disparities in job growth across different sectors. The analysis shows significant growth in high-skilled industries like technology, business services, and manufacturing, contrasted with declines in lower-wage sectors, which were particularly affected by the COVID-19 pandemic.

Key findings from the Industry Cluster Analysis include:

- Compared to other parts of California, the industries that lead in the Bay Area require a highly skilled workforce.
- The region's largest sectors include Professional and Business Services, Education and Health Services, and Trade, Transportation, and Utilities.
- Professional and Business Services, which has occupations in administration, management, legal services, scientific research, and computer systems design, accounts for more than one fifth of all jobs in the region.
- Since 2017, the most substantial job growth has occurred in technology-related fields, specifically Information and Professional and Business Services, which have seen growth rates of 21% and 7%, respectively, adding more than 110,000 jobs.
- Industries with lower average wages have seen a significant decline in employment in the Bay Area, particularly due to the COVID-19 pandemic and the shift to remote work.

Strength, Weaknesses, Opportunities, and Threats

Regional Strengths

Stakeholders were asked to identify strengths of the region that contribute to equitable economic resilience and growth of sustainable industry clusters. The analysis identified the following themes: natural resources; infrastructure; education; economic and research innovation; community and culture; and workforce.

Regional Weaknesses

Stakeholders were asked to identify challenges that hinder equitable economic resilience and growth of sustainable industry clusters. The analysis identified the following themes: socio-economic disparities; lack of representative data; social determinants of work; environmental justice; and systems alignment and coordination.

Regional Opportunities

Stakeholders were asked to identify opportunities available for equitable economic resilience and growth of sustainable industry clusters. The analysis identified the following themes: funding; infrastructure; regional marketing trends; policies; and public support.

Regional Threats

Stakeholders were asked to identify challenges that pose risks to the region. the analysis identified the following themes: education; housing; disparities; climate; regional trends; and perception.

Conclusion

The Bay Area Jobs Collaborative's Regional Plan Part 1 report presents a dual narrative of challenges and opportunities for the Bay Area, stressing the importance of addressing longstanding and systemic disparities, while highlighting the region's economic resilience. It emphasizes the importance of collaborative efforts to capitalize on regional strengths and minimize vulnerabilities in order to ensure high-quality employment opportunities and an equitable and sustainable economic future for the region.

SECTION 1

Introduction

CONTRIBUTOR

Enrique Lopezlira

UC Berkeley Center for Labor Research and Education

The California Jobs First Fund is a $600 million program to build a sustainable and equitable economy throughout the state. California Jobs First focuses on supporting new strategies to diversify local economies and develop industries that create high-quality, broadly accessible jobs for all Californians. Led by the Governor's Office of Planning and Research (OPR), the Office of Business and Economic Development (GO-Biz), and the California Labor Workforce Development Agency (LWDA), California Jobs First was created to encourage a resilient and fair recovery from the economic challenges posed by COVID-19 through new initiatives and tactics that broaden the scope of local economies (Governor's Office of Planning and Research, n.d.).

In the Bay Area and 12 other regions across California, organizations have come together to create Jobs First Collaboratives that include balanced representation from workforce, community, labor, business, government, economic development, education, philanthropy, and Indigenous communities. The state has selected one Jobs First Collaborative in each region to receive a grant and lead the planning and implementation, establish regional inclusive economic planning entities, and lead research and development activities to develop strategic and economic development plans for the region.

The Bay Area Jobs First Collaborative (BAJFC) is helming the effort for the Bay Area region, which includes the nine counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. The BAJFC is tasked with uniting diverse partners and organizations and overseeing the delivery of work products throughout the different phases of the program.

A. Bay Area Jobs First Regional Convener and Fiscal Agent

All Home is the BAJFC Regional Convener. All Home advances regional solutions that disrupt cycles of poverty and homelessness, redress racial disparities, and create more economic mobility opportunities for people with extremely low incomes. As the convener of the Bay Area Jobs First Collaborative, All Home provides staffing support to the collaborative and coordinates contracted research partners as well as facilitation, technical assistance, and other consulting support.

The Bay Area Good Jobs Partnership for Equity (BAGJPE)—an association of 10 workforce development boards (WDBs) and regional workforce planning units across the nine-county Bay Area region—is the Fiscal Agent for the Bay Area Jobs First Collaborative, with the San Francisco Office of Economic and Workforce Development (SFOEWD) as the Fiscal Lead. BAGJPE is an association with 100% of boundaries overlapping the Bay Area California Jobs First region and includes Alameda County WDB, Sonoma County WDB, WDB of Contra Costa County, NOVAworks, Oakland WDB, Richmond WDB, WDB of Solano County, work2future, SFOEWD, and Workforce Alliance of the North Bay (Marin and Sonoma). BAGJPE/SFOEWD provides contract administration staffing and infrastructure to the BAJFC.

B. Vision and Guiding Principles

The Bay Area Jobs First Collaborative vision and guiding principles are the underlying approach to the organization, process, and proposals being developed to accomplish the California Jobs First Planning Phase goals, including the Regional Plan Part 1 report.

i. Vision

To re-envision regional economic development planning centered around the values of equity, high road employment, sustainability, and climate resilience and shaped by workers and impacted community members themselves.

ii. Guiding principles

1. Climate resilience led by frontline communities and workers.
2. Lift up job quality, grow high road jobs, elevate racial equity and worker voice.
3. Honor local without losing the power of the region.
4. Inclusive, democratic, grassroots governance.
5. Take action towards transformational change.

C. Governance Structure

With these principles at the forefront, the BAJFC has implemented a governance structure that is representative and inclusive of stakeholders across the region and reflects its commitment to developing a fair and equitable process. The BAJFC governance structure includes: a Steering Committee; a Research, Planning, and Community Engagement Committee; and Sub-Regional Tables, all communicating with and rolling up to the overall BAJFC Regional Convener (**Exhibit 1.1**).

i. BAJFC Steering Committee

The BAJFC established a 21-member Steering Committee reflective of stakeholder groups across the Bay Area. Each Steering Committee member may elect an alternate to serve with them in case they are unable to attend. Three Steering Committee members serve as Co-Chairs for the group, working closely with the Regional Convener.

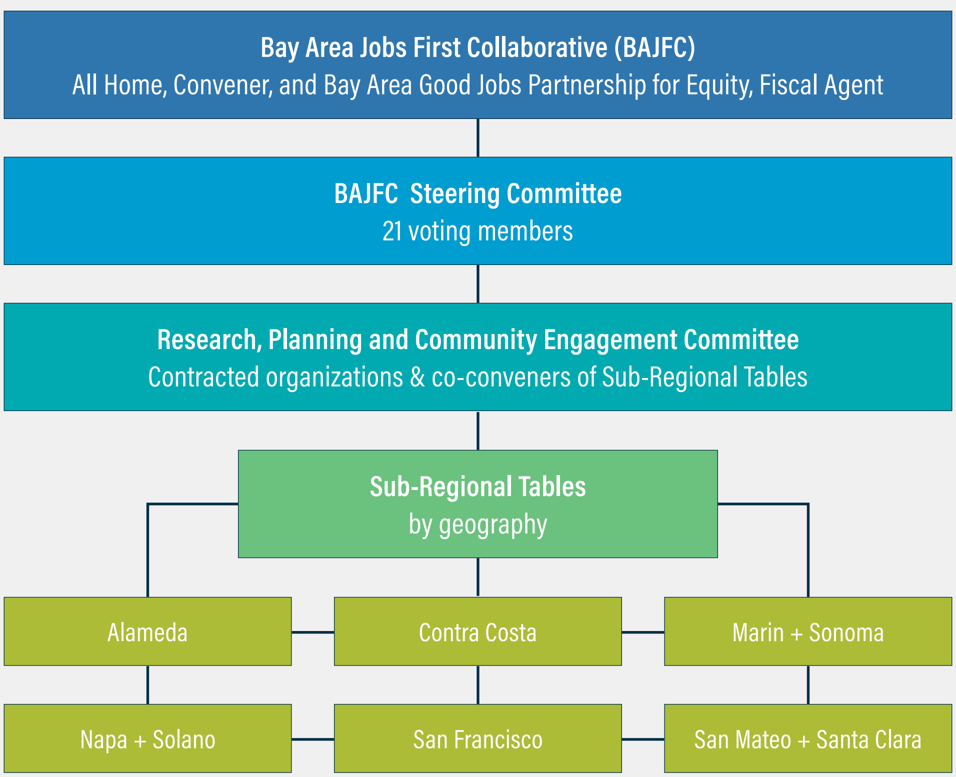
ii. Sub-Regional Tables

The BAJFC established a structure of Sub-Regional Tables to ensure the community voice is included throughout the California Jobs First process. Given the geographic size and diversity of the Bay Area region, six Sub-Regional Tables were defined: (1) Alameda; (2) Contra Costa; (3) Marin and Sonoma; (4) Napa and Solano; (5) San Francisco; and (6) San Mateo and Santa Clara. Each Sub-Regional Table is responsible for outreach to and engagement with stakeholders and community members in their subregion, by establishing a general structure that applies equitable practices such as shared leadership, clear roles and responsibilities for co-conveners, and principles for inclusive representation from all groups.

iii. Research, Planning, and Community Engagement Committee

The Research, Planning, and Outreach Committee is part of the BAJFC's governance structure along with the Regional Convener, Fiscal Lead, Steering Committee, and Sub-Regional Tables. The Research, Planning, and Community Engagement Committee focuses on bringing together, developing, and implementing the research, analysis, and community engagement activities undertaken during the Phase One Planning Process. Membership of this group includes Sub-Regional Table co-conveners, representatives from organizations contracted to conduct research and analysis or outreach and engagement, and Steering Committee members with expertise or interest in helping the committee in question achieve its goals.

EXHIBIT 1.1 | Bay Area Jobs First Collaborative governance structure



Source: Bay Area Jobs First Collaborative (BAJFC), 2023.

Regional Plan Part 1

As part of the California Jobs First planning phase, each California Jobs First Collaborative is tasked with developing an inclusive regional economic plan guided by the principles of the Bay Area Jobs First Collaborative and elements of a high road strategy. This Regional Plan Part 1 report is the first of those plans.

This report provides a snapshot of the socio-economic conditions in the region through: stakeholder mapping; a regional summary; a labor market analysis; an industry cluster analysis; and a SWOT (strength, weaknesses, opportunities, and threats) analysis. Please see **Appendix A** for a detailed explanation of the methodology. The BAJFC Regional Plan Part 1 report also addresses the California Jobs First objectives (Economic Development Department, n.d.):

» Equity—a key consideration requiring analyses to prioritize the needs and interests of disinvested communities, particularly those historically excluded from planning and economic development processes.

» Sustainability—focusing on self-sustaining economic development that aims for a carbon-neutral, climate-resilient economy benefiting the region's communities.

» Job quality and access—a focus on identifying and promoting jobs that offer high road wages, health benefits, pensions, advancement opportunities, worker input, stability, predictable schedules, and safe working conditions.

» Economic competitiveness and resilience—emphasizing strategies to avoid, withstand, and recover from economic shocks, ensuring the region can effectively compete in the global economy and deliver prosperity to its communities.

iv. Research partners

The Bay Area Jobs First Collaborative contracted with research partners to lead the development of the Regional Plan Part 1 report. These research partners include:

The UC Berkeley Center for Labor Research and Education (Labor Center):
The Labor Center is a public service and outreach program of the Institute for Research on Labor and Employment at the University of California, Berkeley. Founded in 1964, the Labor Center conducts research and education on issues related to labor and employment. The UC Berkeley Labor Center is the leading the research, analysis, and production of the Regional Plan Part 1 report.

Bay Area Council Economic Institute: The Bay Area Council Economic Institute is made up of a team of five researchers with backgrounds in public policy, economics, statistics, urban planning, finance, and international relations. It pairs this wide range of experiences with pro bono expertise within their networks to create reports on economic issues key to Bay Area's future economic sustainability.

The UC Berkeley Center for Law, Energy, and the Environment: The Center for Law, Energy, and the Environment (CLEE) channels the expertise of the Berkeley Law community—faculty, staff, and students—into pragmatic, creative policy solutions to critical environmental and energy challenges.

Human Impact Partners: The mission of Human Impact Partners (HIP) is to transform the field of public health to center equity and build collective power with social justice movements. Through applied research, advocacy, and organizing, HIP has a commitment to building community power.

Chris Benner, Ph.D., and Justin Scoggins, M.S.: Chris Benner is director of the Institute for Social Transformation and the Everett Program for Technology and Social Change. Justin Scoggins is the Data Manger for the USC Equity Research Institute.

D. Regional Plan Part I: Community Engagement

The BAJFC and its research partners offered multiple opportunities for stakeholders and community groups to inform the development of the Regional Plan Part 1. These opportunities included:

- Presentations by the research teams to the monthly meetings of Bay Area stakeholders convened by the Regional Convener;
- Presentations by the research team to each of the six Sub-Regional Tables, working closely with each co-convener to identify best methods and approach for soliciting input and feedback;
- Bi-weekly updates and by the research team to the Bay Area Jobs First Steering Committee;
- Providing office hours for BAJFC Steering Committee members and Sub-Regional Table co-conveners to attend, ask questions, and offer suggestions on the research;
- Engaging Steering Committee members and Sub-Regional Tables in the development of the SWOT analysis;

- Providing Steering Committee and Sub-Regional Tables opportunities to review and comment on the draft Regional Plan Part 1 report provided to the State on August 31, 2023; and
- Providing Steering Committee and Sub-Regional Tables opportunities to review and comment on "Key Themes" emerging from the Regional Plan Part 1 report.

The BAJFC Steering Committee approved the final analyses presented in this report during its regularly scheduled meeting on November 17, 2023.

References

Bay Area Jobs First Collaborative (BAJFC). (2023). Unpublished internal BAJFC presentation.

Employment Development Department. (n.d.). *Solicitaton for Proposal, Community Economic Resilience Fund*. https://www.usgs.gov/apps/hera/floodTool.php

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SECTION 2

Stakeholder Analysis

CONTRIBUTORS

Aida Farmand
Enrique Lopezlira

UC Berkeley Center for Labor Research and Education

A. Introduction

This section presents an overview of stakeholders who have played pivotal roles in shaping the trajectory of the Bay Area Jobs First Collaborative (BAJFC) and will continue to influence its work as the process moves from planning to implementation. The objectives of our stakeholder mapping are rooted in the principles of effective collaboration, sustainability, and regional development. Central to this endeavor is the core challenge of rallying diverse stakeholders to catalyze the emergence of high-quality employment opportunities and facilitate the transition toward a resilient and sustainable economy within the Bay Area. This challenge arises from the need to implement strategic interventions that tackle both demand and supply considerations in the Bay Area's labor markets, while transitioning to a sustainable economy.

Stakeholder mapping is crucial for effective decision making and risk management. It aids in the identification of potential conflicts and collaboration opportunities. Moreover, it is a vital driver for achieving sustainability objectives, recognizing the need for diverse stakeholder involvement. Furthermore, stakeholder mapping can be utilized as a tool for organizations dedicated to corporate social responsibility, enabling them to navigate intricate stakeholder landscapes.

i. Methodology and data collection for stakeholder mapping

We used a comprehensive methodology and robust data sources that encompass a wide spectrum of organizations involved in the California Jobs First process in the Bay Area. Please see **Appendix A** for an explanation of the methodology.

This inventory includes:

» Organizations that actively participated in the initial planning stages of the Bay Area Jobs First Collaborative (BAJFC).

» Organizations that submitted letters of support for the proposal ultimately selected by the State.

» Current members of the BAJFC Steering Committee and regional co-conveners.

» Organizations that have consistently taken part in the monthly stakeholder meetings organized by the BAJFC Steering Committee.

» Organizations actively engaged in the Sub-Regional Tables.

» Labor Organizations: Groups representing the interests of workers and employees, contributing to the region's economic discourse.

- Workforce Development Boards: Organizations dedicated to enhancing workforce opportunities and skills development.
- City and County Economic Development Departments: Local government bodies actively involved in shaping the economic landscape of the region.
- Businesses and Employers: Private enterprises and employers with a vested interest in the economic vitality of the Bay Area.

This approach ensures that we have a well-rounded understanding of the diverse stakeholders involved in the California Jobs First initiative in the Bay Area, allowing for effective engagement strategies and informed decision-making processes. It is important to note that this analysis is not intended to be exhaustive, but rather serves as a supplement to the extensive institutional knowledge possessed by the organizations leading the California Jobs First process in the Bay Area. For the inventory of stakeholders please see **Appendix B**.

B. Stakeholder Outreach and Engagement Plan

The BAJFC developed the following vision and principles for outreach and engagement of stakeholders in the Bay Area.

i. Vision

"Meaningful engagement" means engagement designed to build a durable and lasting structure for community planning—not just "box checking," requesting "one-off" input from the community, or asking for input at the end of the process to get a sign off on the final plan. Part of this effort requires giving community members meaningful decision-making authority so that they are not passive participants, but rather active agents in shaping the vision for the future of their community and the region.

ii. Principles

- Engage community members directly.
- Be intentional about including marginalized communities and groups.
- Meet community members where they are, physically and with respect to their knowledge about regional issues.
- Address accessibility needs and design engagement to remove barriers to participation.

This vision and these guiding principles have guided the various community engagement efforts by the BAJFTC, including monthly meetings open to any stakeholder organization across the Bay Area, Sub-Regional Table convenings, and bi-weekly meetings of the BAJFC Steering Committee.

iii. Stakeholder engagement strategies by the BAJFC's research partners

At the outset of the Regional Plan Part 1 research phase, the research partners shared preliminary findings with the BAJFC Steering Committee, the inaugural meetings of the Sub-Regional Tables, and the monthly at-large meeting of stakeholders. In addition, the UC Berkeley Labor Center conducted interviews with Steering Committee members, seeking their valuable perspectives and expectations for the Regional Plan Part 1 report.

As part of the community engagement, the Sub-Regional Table co-conveners coordinated with the research team to gather input from the community. This engagement took place through a combination of online webinars and in-person meetings, recognizing the diverse preferences and accessibility of community members.

These engagement efforts extended beyond a one-way dissemination of information; they were designed to foster meaningful dialogue and collaboration. The research team, in conjunction with the Sub-Regional Tables, devised a series of probing questions that invited the community to provide valuable insights. For instance, the community was encouraged to articulate their perspectives on the most prominent gaps they perceived within their locality. These questions served as a catalyst for constructive conversations, enabling community members to actively contribute to the decision-making process and to shape the direction of initiatives aimed at addressing specific needs.[1]

C. Integrating Stakeholder Mapping Into Decision Making

Integrating stakeholder mapping into the decision-making process is a fundamental strategy in addressing challenges faced by disinvested communities in the region. These communities are often characterized by limited access to resources, inadequate infrastructure, and economic disparities. They therefore require targeted efforts to promote inclusive development. In this context, stakeholder mapping serves as a vital tool to identify and engage key actors who can contribute to alleviating the economic barriers confronting these marginalized areas.

Disinvested communities within the region continue to grapple with economic challenges that hinder their progress and limit opportunities for residents. High unemployment rates, inadequate access to quality education, limited healthcare options, and insufficient infrastructure are some of the pervasive issues these communities face. These economic barriers create a cycle of disadvantage, perpetuating poverty and social disparities. Understanding the unique economic challenges of each disinvested community is essential to developing effective strategies for sustainable change.

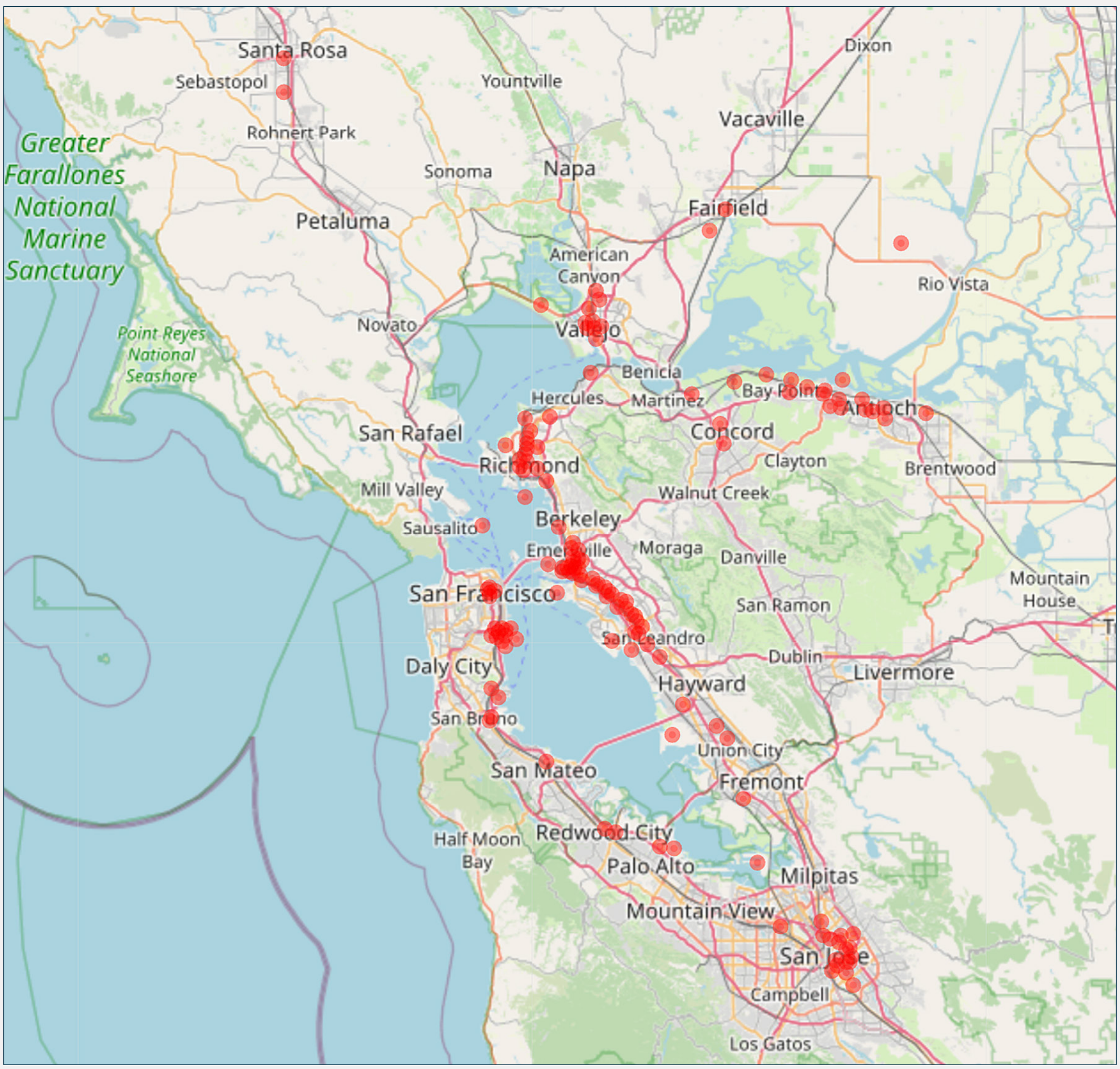
i. Identifying disinvested communities

Identifying disinvested communities is a multifaceted process. One approach is to utilize data from the California Environmental Protection Agency (CalEPA). CalEPA identifies census tracts as "disadvantaged" based on several criteria, including census tracts representing the 25% highest-scoring tracts in CalEnviroScreen 4.0, census tracts previously identified in the top 25% in CalEnviroScreen 3.0, census tracts with high amounts of pollution and low populations, and federally recognized tribal areas as identified by the Census in the 2021 American Indian Areas Related National Geodatabase (CalEPA, 2022).

The CalEnviroScreen methodology is grounded in scientific principles, including scientific literature that identifies socioeconomic and other sensitivity factors as "effect modifiers" that can increase health risk, depending on the combination of pollutants and underlying susceptibilities. Risk assessment principles are also applied, accounting for potential human sensitivity in deriving acceptable exposure levels. Additionally, established risk scoring systems use the formula: Risk = Threat × Vulnerability, as recognized by various emergency response organizations to score threats (CalEPA, 2022).

Exhibit 2.1 illustrates the disinvested areas in the Bay Area. Disinvested census tracts exist in seven out of nine counties in the Bay Area. In 2022, 9% of census tracts in the Bay area were disadvantaged. Of these 146 census tracts, there were 46 disinvested census tracts in Alameda County, 37 in Contra Costa County, 22 in Santa Clara County, 17 in San Francisco County, 13 in Solano County, 9 in San Mateo County, and 2 in Sonoma County. With 35 disinvested census tracts, Oakland has the highest number of disinvested tracts compared to other cities in the Bay Area.

EXHIBIT 2.1 | Disinvested areas in the Bay Area



Source: California Environmental Protection Agency, 2022.

Cities like Oakland, contain neighborhoods marked by concentrated poverty and a lack of essential amenities and services, resulting in substantial disparities in access to economic opportunities and upward mobility (Gourevitch et al., 2018; Turner et al., 2018). The problem of concentrated poverty has escalated significantly since the Great Recession (Kneebone & Holmes, 2016), disproportionately affecting people of color, who are more likely to reside in impoverished neighborhoods compared to White households with similar income or wealth levels (Aliprantis et al., 2019). The lack of access to economic opportunities in these neighborhoods can be attributed to historical public policies such as redlining and persistent discrimination (Greene et al., 2020; Kijakazi et al., 2016).

ii. Racial and economic segregation

Highlighting racially and economically segregated areas serves as a reminder of the disparities and inequalities that persist within a region. This recognition fosters a more inclusive and equitable approach to economic development, ensuring that the voices and concerns of these communities are not only heard, but also integrated into strategies aimed at fostering economic advancement for all. Ultimately, the acknowledgment of racial and economic segregation within stakeholder mapping forms the foundation for promoting fairness, inclusivity, and sustainable development.

Utilizing data sourced from the Index of Concentration at the Extremes, the Bay Area Equity Atlas has pinpointed regions exhibiting a notable accumulation of White wealth and areas marked by concentrated disadvantage, predominantly impacting communities of Black, Latino, and Asian American and Pacific Islander (AAPI) backgrounds (PolicyLink & USC Equity Research Institute, 2022). This analysis underscores the coexistence of significant pockets of White affluence alongside regions grappling with heightened poverty. In the Bay Area, the number of neighborhoods characterized by concentrated White wealth surpasses those marked by concentrated poverty among Black, Latino, or AAPI communities by a factor of six.

Additionally, the analysis brings to the forefront a distinct geographic divide present in the Bay Area. According to the Bay Area Equity Atlas, 164 of the region's 1,572 census tracts (10%) are areas of concentrated White wealth (PolicyLink & USC Equity Research Institute, 2022). These highly segregated neighborhoods are located in seven of the region's nine counties, with more than one half located in San Francisco, San Mateo, and Contra Costa Counties. Solano and Sonoma Counties are the only counties without any highly segregated neighborhoods of White wealth.

Moreover, many Black, Latino, and AAPI residents live in disinvested, higher-poverty neighborhoods, significantly limiting their access to essential resources such as employment opportunities, among other amenities crucial for economic success.

The ramifications of residing in these concentrated areas of disadvantage often extend beyond individual or familial circumstances.

For low-income Latino households, five neighborhoods have been identified as highly segregated. These neighborhoods are in Marin, Alameda, Contra Costa, and San Mateo Counties. Eleven census tracts in the region have been identified as highly segregated in terms of low-income Black households, with five located in Oakland, three in San Francisco, and one each in Vallejo, Pittsburg, and Antioch. Similarly, 11 census tracts are highly segregated areas for low-income Asian American and Pacific Islander households. These neighborhoods are exclusively situated in San Francisco, Alameda, and Santa Clara counties (PolicyLink & USC Equity Research Institute, 2022).

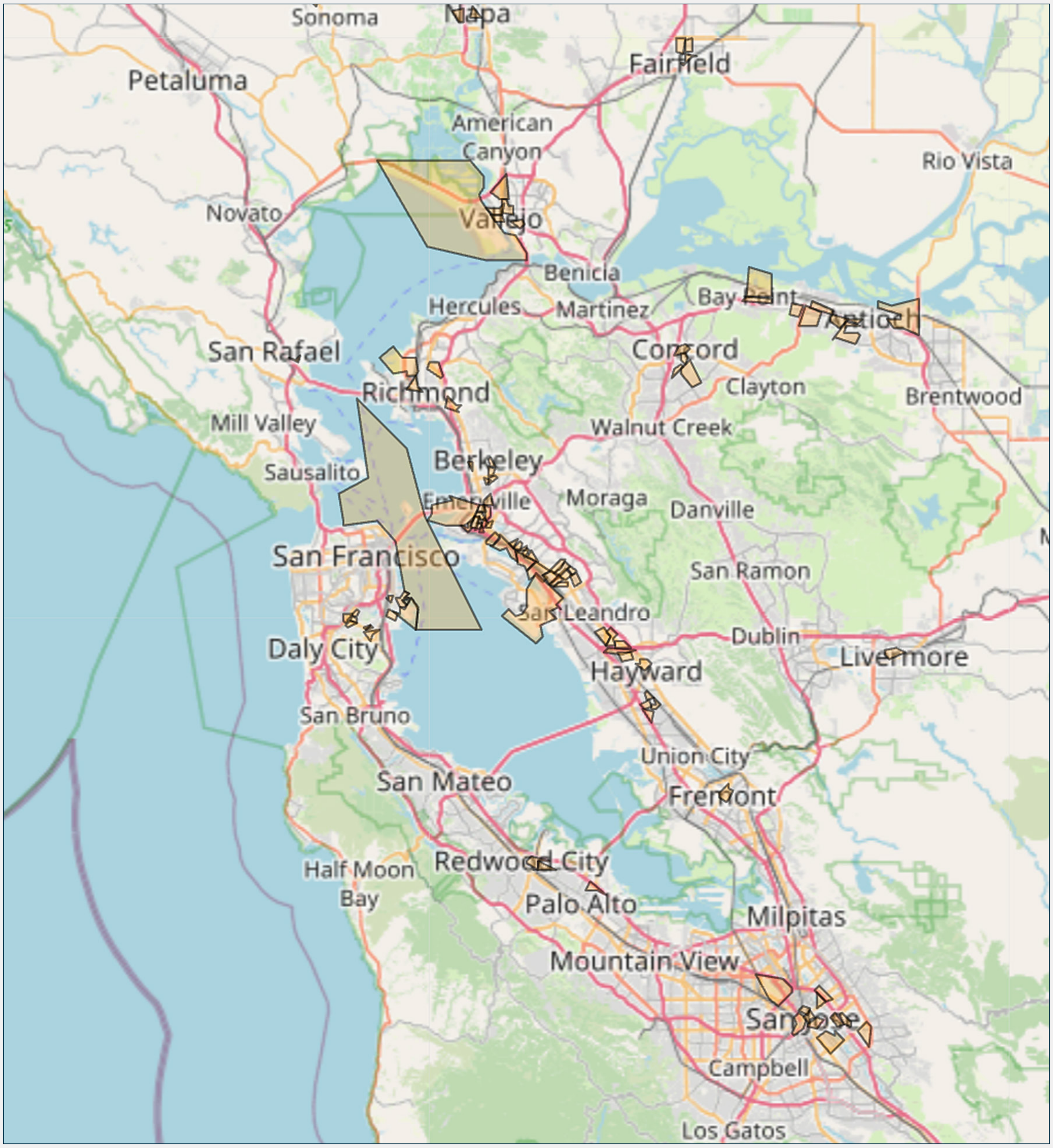
This divide is deepened by disparities between renters of color and White homeowners, shedding light on the critical issue of housing inequity within the region. The comprehensive examination of these patterns ultimately contributes to a deeper understanding of racial and economic segregation dynamics, aiding in the development of targeted strategies to promote greater equity, inclusivity, and sustainable growth throughout the Bay Area.

iii. Identifying areas of opportunity

Identifying areas of economic opportunity within the Bay Area can help stakeholders who want to use evidence-based indicators to assess the potential social impact of a planned development project. **Exhibit 2.2** illustrates the census tracts that were identified as "Opportunity Zones" within the Bay Area. Opportunity Zones are economically distressed communities where new investments may be eligible for preferential tax treatment. They were created as part of the Tax Cuts and Jobs Act of 2017. These zones aim to stimulate economic development and job creation by providing tax incentives to investors who put their money into businesses and properties located within designated Opportunity Zones.

Including Opportunity Zones in stakeholder mapping is crucial because they represent a unique and targeted mechanism for fostering economic development in disadvantaged areas. These zones have the potential to attract investment capital, spur job growth, and revitalize communities that have historically faced economic challenges, especially due to redlining and racial segregation. By identifying and engaging with stakeholders in Opportunity Zones, it becomes possible to coordinate efforts, leverage resources, and align strategies to maximize the positive impact on local economies and residents. Therefore, recognizing Opportunity Zones as stakeholders can facilitate a more comprehensive and effective approach to achieving economic growth and community development goals. Of the census tracts in the Bay Area, 6.8% were deemed Opportunity Zones. In total, there are 107 Opportunity Zones in the Bay Area.

EXHIBIT 2.2 | California Department of Finance-designated Opportunity Zone census tracts in the Bay Area



Source: California Department of Finance, 2018.

It is important to note that increased capital investment in Opportunity Zones—such as new real estate development projects—can raise prices and rents in disinvested communities, which can lead to the displacement of long-term residents and businesses. This issue of displacement is complicated further by the fact that government-led investment initiatives may themselves precede and/or promote widespread gentrification, leading to further changes in built and social environments (Mujahid et al., 2019). New investments may also create amenities that don't respond to the needs of existing residents and businesses, create jobs that are not accessible to local residents, or exacerbate environmental or health risks. Involuntary displacement can also affect community social cohesion when long-time residents, integral members of social networks, move out as a result of rising prices.

A comprehensive plan to address these economic barriers involves proactive outreach to organizations representing disinvested communities. Stakeholder mapping plays a central role in this endeavor by identifying relevant community-based organizations, advocacy groups, and nonprofits with a vested interest in these areas. By engaging with these stakeholders, decision makers can gain valuable insights into the specific needs and priorities of disinvested communities. This collaborative approach fosters inclusive decision-making processes that prioritize targeted investments in education, workforce development, infrastructure improvements, and equitable economic opportunities.

Endnotes

1 Some of these initiatives, such as a power map analysis of the Bay Area and focus groups with some vulnerable populations, will be completed in early 2024 and will be presented as addendums to this Regional Plan Part 1 report.

References

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SECTION 3

Regional Summary

SECTION 3.1

Regional Summary:
Economy and Economic Development

CONTRIBUTORS

Enrique Lopezlira

UC Berkeley Center for Labor Research and Education

Justin Scoggins

USC Equity Research Institute

A. Introduction

The following section of the Regional Summary provides a concise overview of the demographics and socio-economic conditions of the Bay Area in order to gain a thorough understanding of the economic terrain in the region, including disparities and potential opportunities. Since it has been three years since the onset of COVID-19, the analysis will also refer to the implications of the pandemic and subsequent recovery for the region's economy. Please see **Appendix A** for an explanation of the methodology.

B. Key Findings

The Bay Area is facing a declining population and an aging population. The shift to work from home and the opportunity this presented for workers to move away in search of more affordable housing reversed much of the population growth in the Bay Area over the past decade (Pietsch, 2022).

The Bay Area is more diverse today than five years ago. This diversity is primarily driven by increases in the share of the population that identify as Asian and Hispanic. The region's population is equally divided in terms of gender.

The Bay Area has largely recovered the employment losses suffered during the COVID-19 pandemic, but not all workers in the region are benefiting from the recovery. Although the Bay Area has a robust labor force, it suffers from inequities in wages, human capital, and employment and career opportunities.

The fastest-growing occupations in the Bay Area over the next 10 years are projected to be primarily low-wage occupations that currently do not pay a living wage. Education and workforce training are neither necessary nor sufficient to allow career progression for workers in the fastest-growing occupations. Equal access to educational opportunities is important, but lifting job quality is a must to ensure essential jobs are no longer paying poverty-level wages.

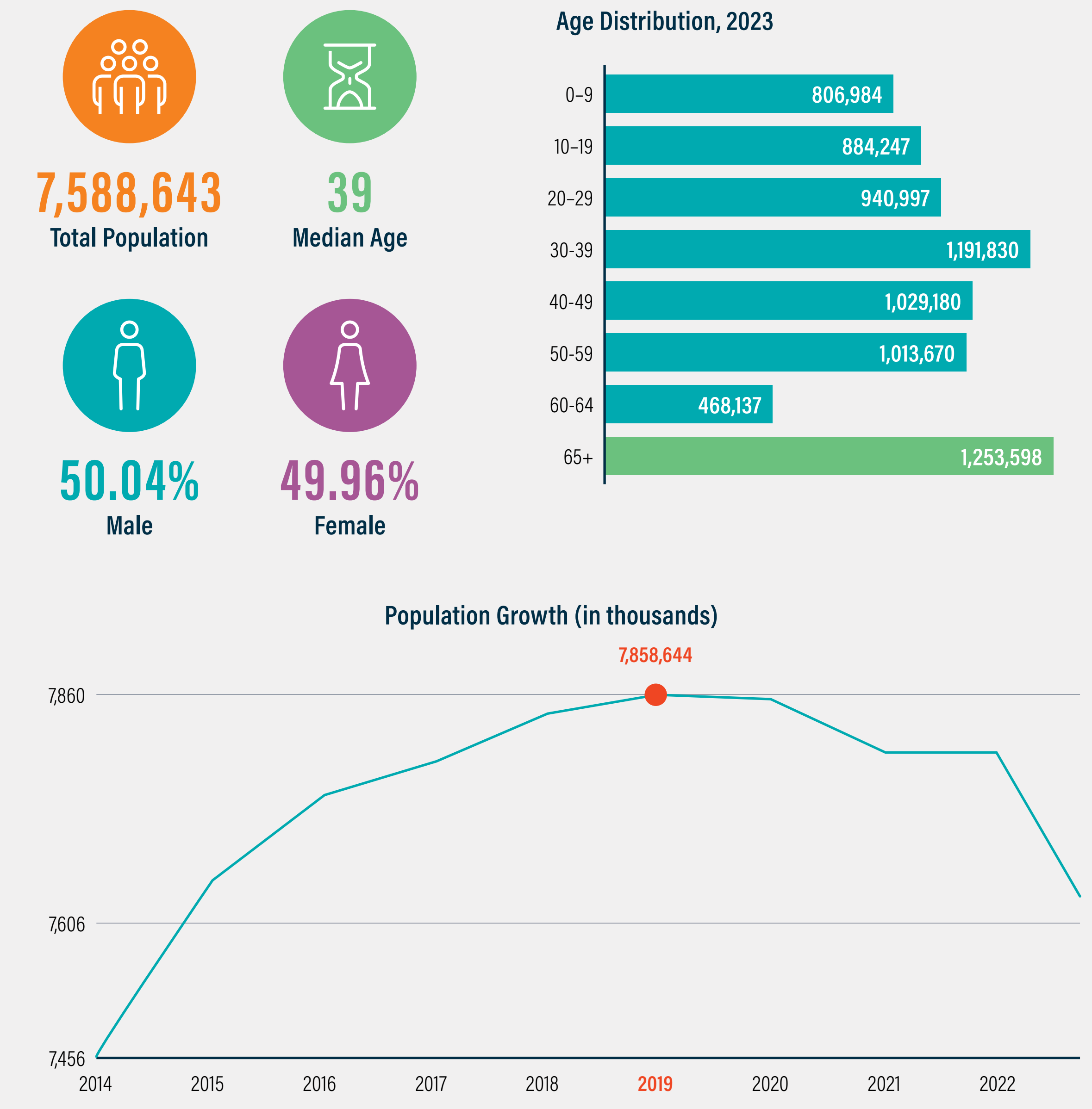
C. Population

The nine-county Bay Area is home to 7.6 million people. The population in the region is 3% lower than it was prior to the pandemic, reflecting the transition to remote work and suburbanization to avoid the region's high cost of housing. The population loss since 2020 reversed most of the population growth experienced in the region from the tech boom after the 2009 recession (**Exhibit 3.1**). In addition to population loss, the Bay Area is facing an aging population, with a median age (39 years) higher than both California and the United States (U.S. Census Bureau, n.d.).

EXHIBIT 3.1 | Bay Area population characteristics

People

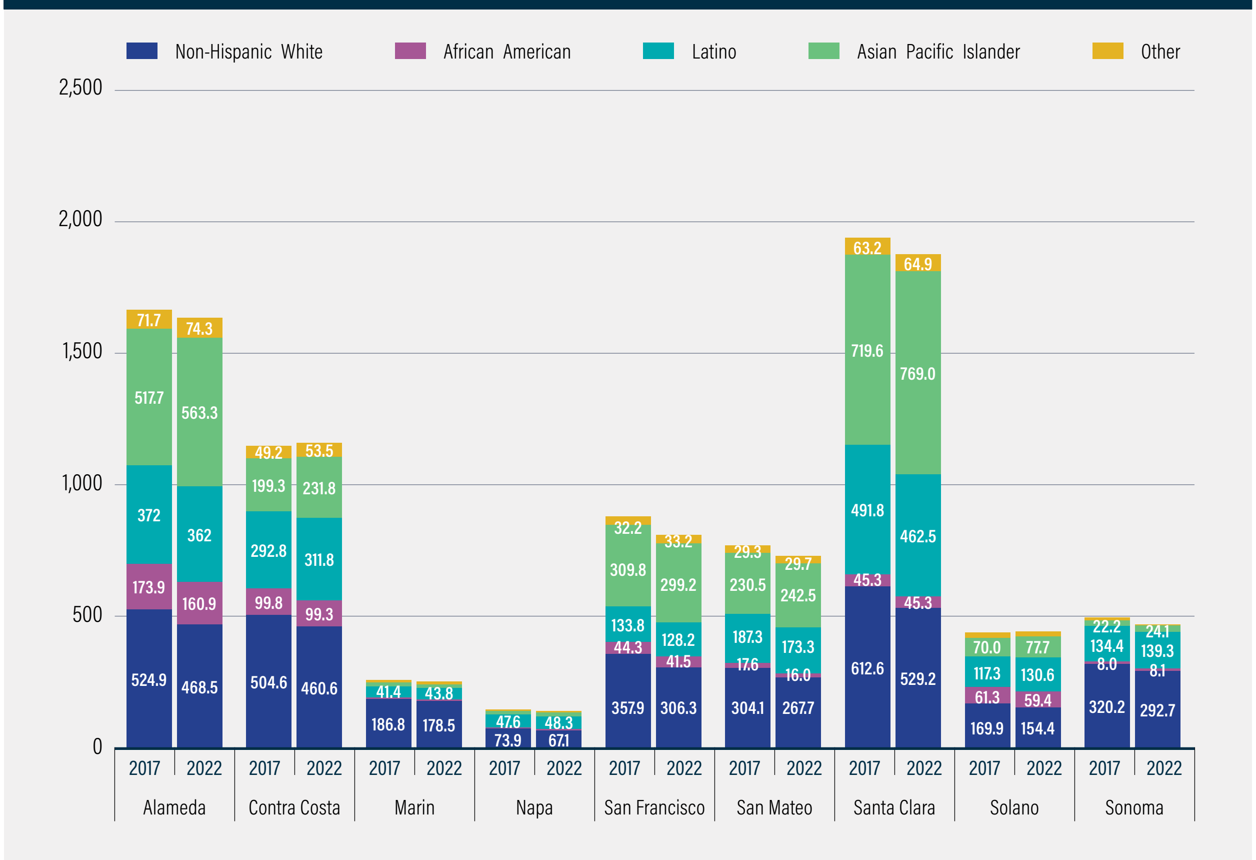
The total population covered by the Bay Area is 7,588,643. The median age is 38.86.



Source: Community and Place-Based Data Tool (GIS Planning, n.d.)..

Exhibit 3.2 shows that the population in the Bay Area has become more diverse over the past five years. The share of non-Hispanic White residents has decreased in each of the nine counties in the region. The increased diversity is primarily driven by an increase in the share of Asian and Latino residents. The share of the population that identifies as Asian has increased in every county, except San Francisco, while the share of the population that identifies as Hispanic has been growing in the northern and eastern counties of the Bay Area.

EXHIBIT 3.2 | Bay Area counties: Population by race/ethnicity (thousands), 2017, 2022

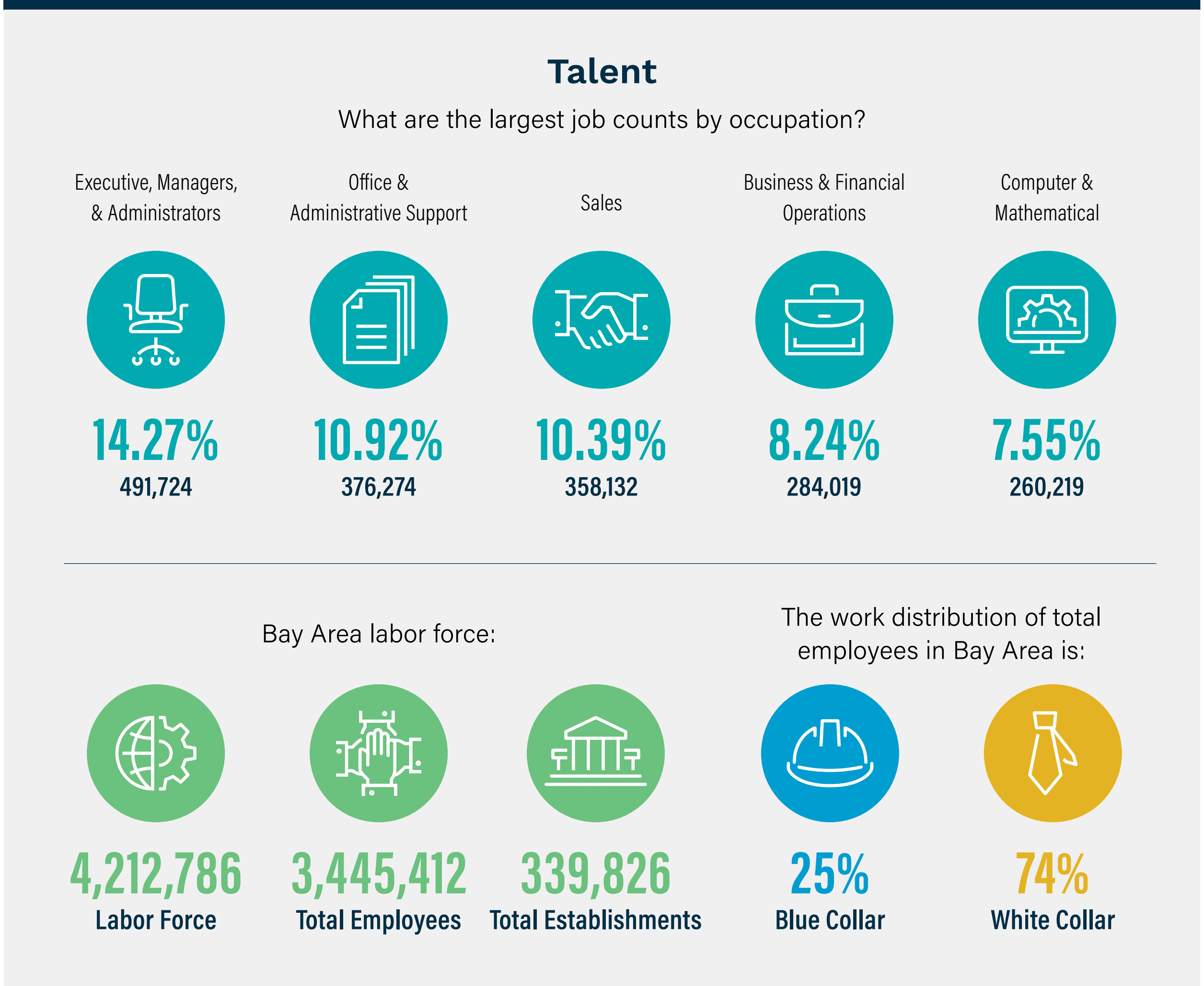


Source: California Department of Finance, 2023.

D. Labor Force

Exhibit 3.3 shows labor force information for the Bay Area. The region has a labor force of 4.2 million people, and three out of four workers employed in the Bay Area are white collar workers,[1] reflecting the largest occupations in the Bay Area by job counts: Executive, Managers, and Administrators; Office and Administrative Support; Sales; Business and Financial Operations; and Computer and Mathematical.

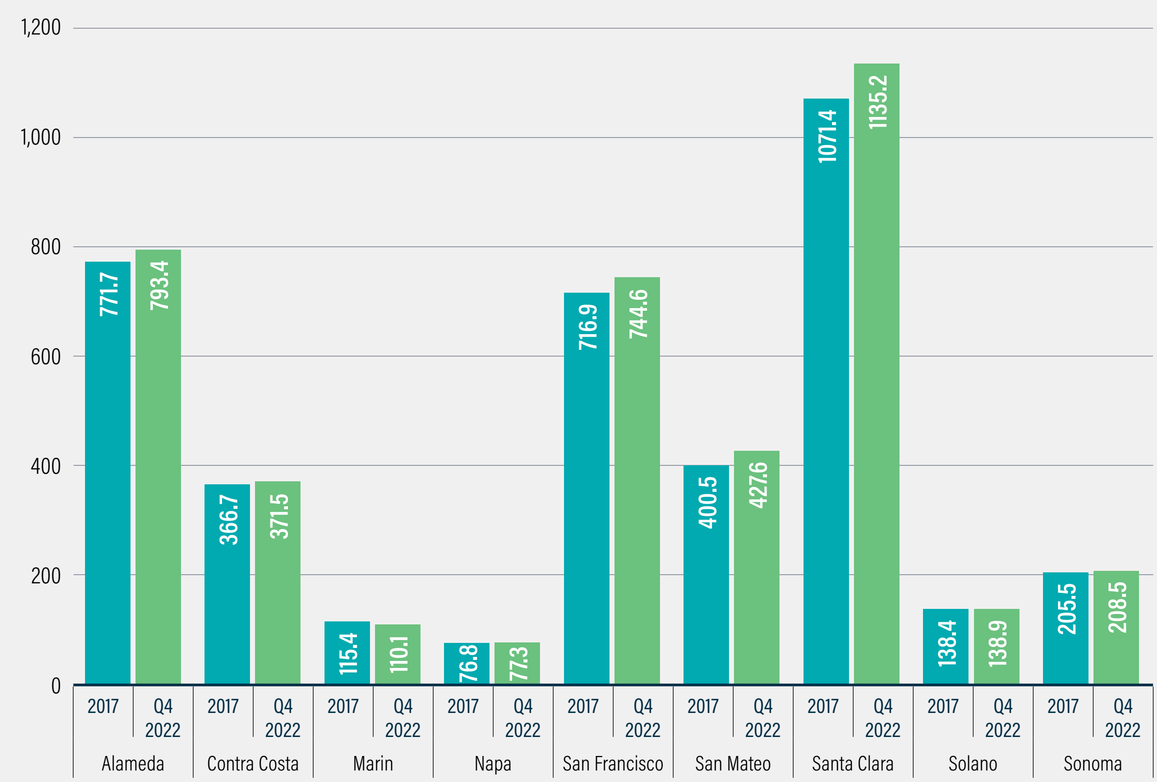
EXHIBIT 3.3 | Bay Area labor force characteristics, 2023



Source: Community and Place-Based Data Tool (GIS Planning, n.d.).

At the end of 2022, Bay Area employment had largely recovered the losses suffered during the pandemic. **Exhibit 3.4** shows that employment levels in the Bay Area were higher than in 2017 (when the economy was considered strong) in every county in the region, with the exception of Marin County.

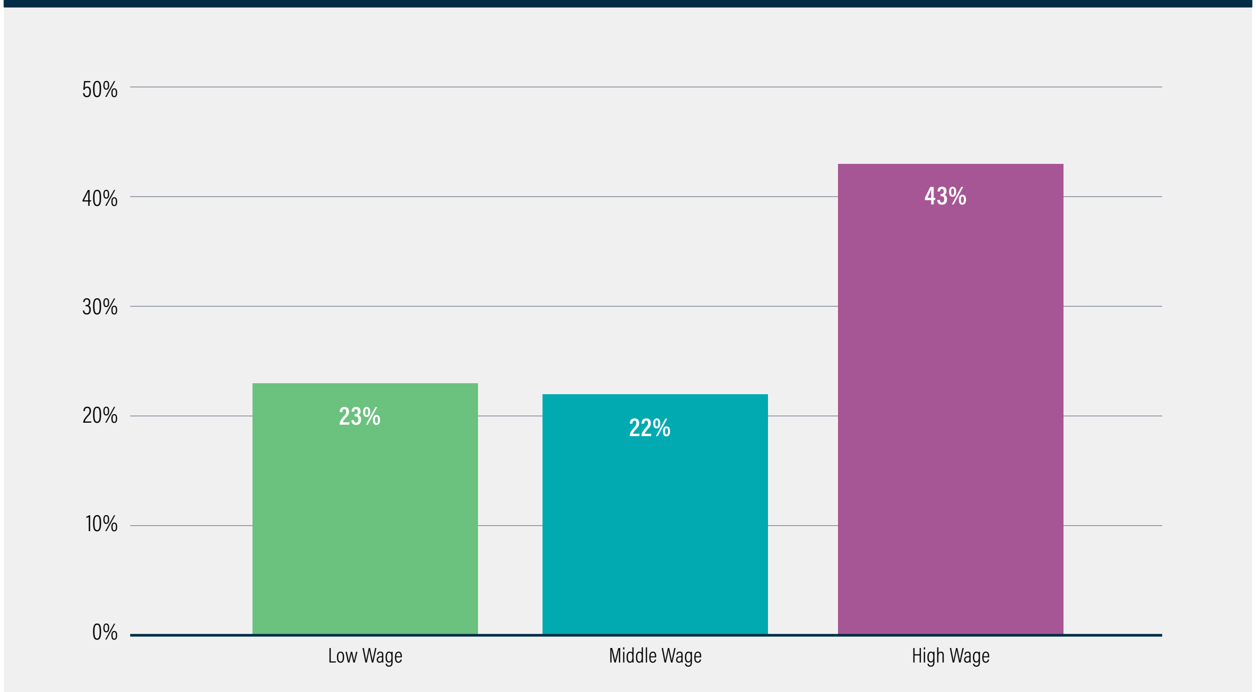
EXHIBIT 3.4 | Bay Area counties: Total employment (thousands), 2017 and Q4 2022



Source: Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics, 2023).

However, focusing on the increase in employment over time masks some challenges facing the Bay Area's labor force. **Exhibit 3.5** shows that not every instance of job creation constitutes positive job growth. In the Bay Area, the expansion of middle-wage jobs has consistently fallen behind, registering a mere 22% growth from 1990 to 2021. This disparity has left many workers of color performing essential work for inadequate pay. Enhancing job quality and implementing safeguards for workers across all sectors is imperative for constructing a more equitable and sustainable regional economy.

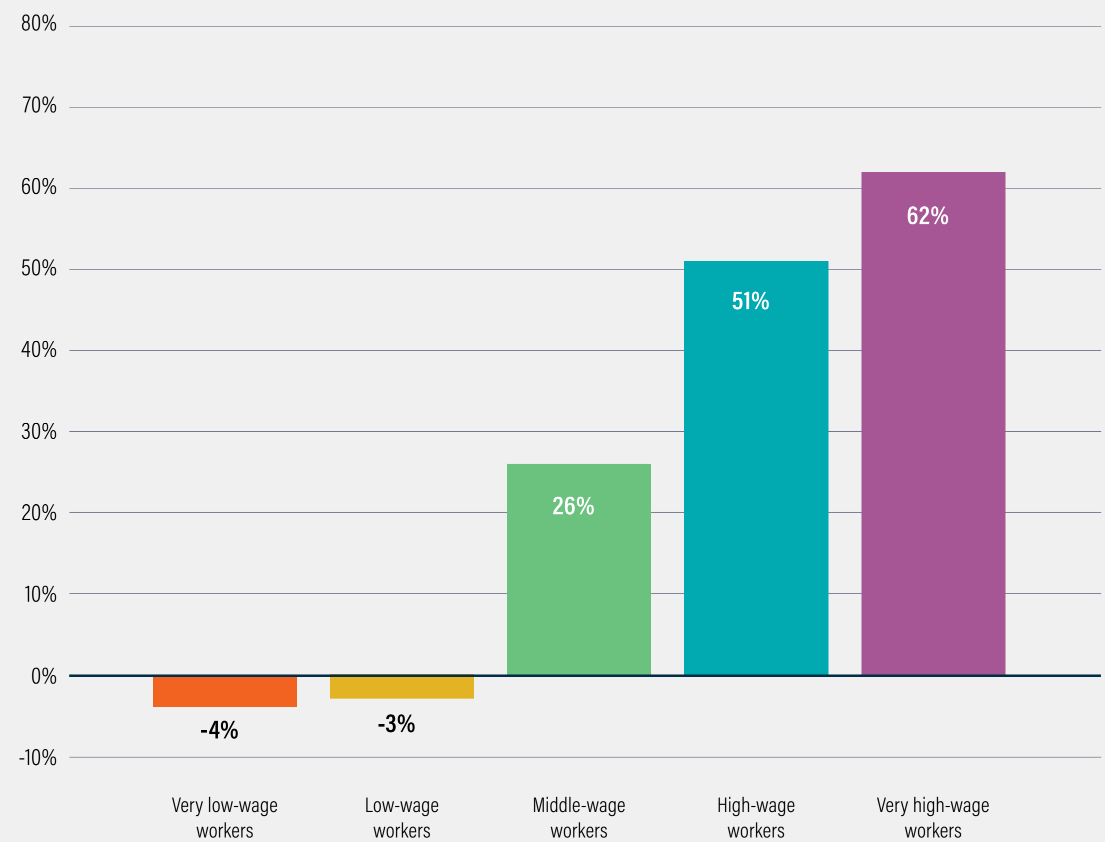
EXHIBIT 3.5 | Job growth in the Bay Area, by wage level, 1990-2021



Source: The State of Bay Area Workers Data Tool (Rework the Bay, 2021).

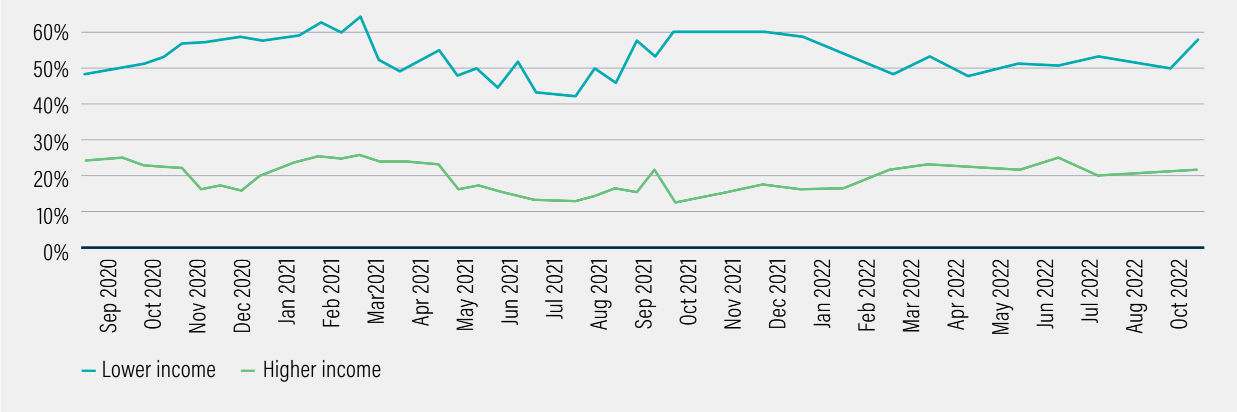
Exhibit 3.6 shows the impact of inadequate pay, combined with occupational segregation. Over the past two decades, workers in the highest wage jobs in the Bay Area have enjoyed tremendous gains in earned income, while workers in the lowest paying jobs have experienced negative growth in their earned income. Given these income gain disparities, it is not surprising that low-income adults in the Bay Area were hit hardest economically by the COVID-19 pandemic. Three years since the start of the pandemic, the share of these workers who continue to struggle to make ends meet is almost three times that of high-income adults (**Exhibit 3.7**).

EXHIBIT 3.6 | Earned Income growth for full-time workers in the Bay Area, by wage level, 1990-2020



Source: The State of Bay Area Workers Data Tool (Rework the Bay, 2021).

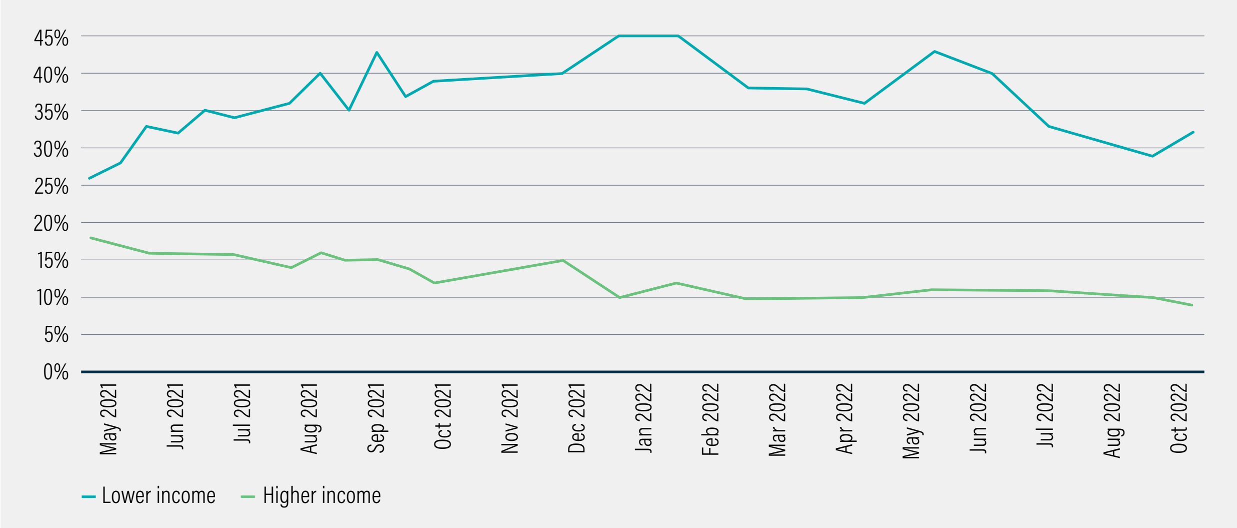
EXHIBIT 3.7 | Percent of adults in the Bay Area reporting that it was somewhat or very difficult to pay for usual expenses



Source: Bay Area Equity Atlas (Robbennolt, 2023).

Policies can exacerbate the struggles of low-income workers. Many of the safety net programs that were put in place during the COVID-19 pandemic have expired, yet challenges for low-income workers continue. **Exhibit 3.8** shows that one out of three low-income workers report are experiencing a loss in income, almost four times the share of high-income workers.

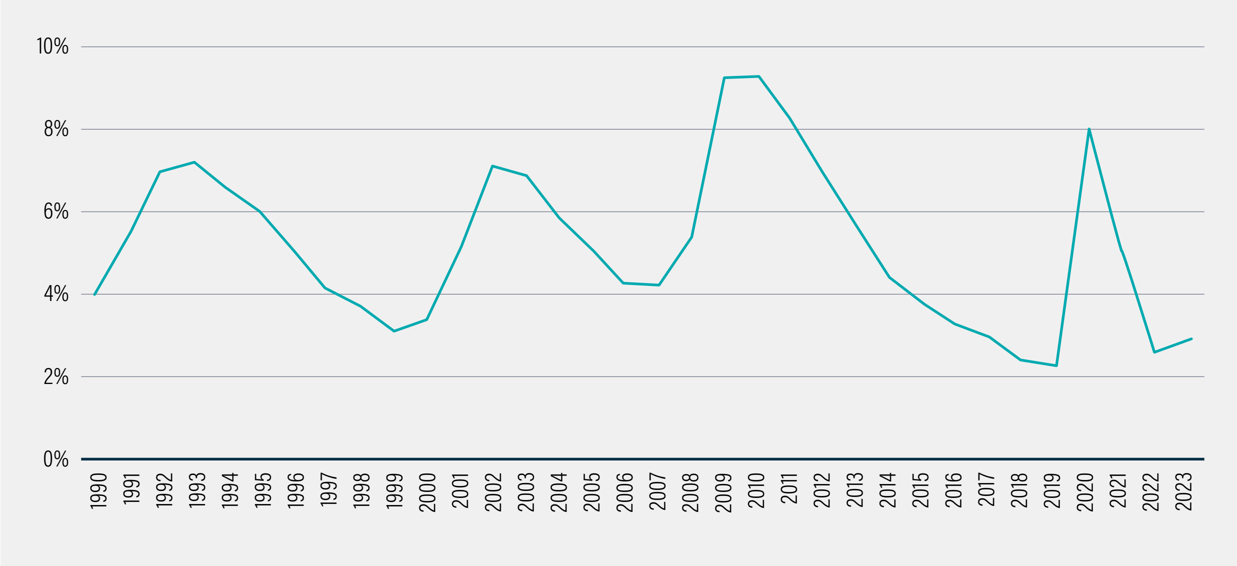
EXHIBIT 3.8 | Percent of Bay Area households that reported a loss in employment income



Source: Bay Area Equity Atlas (Robbennolt, 2023).

Although employment in the Bay Area has largely recovered from the economic shock of COVID-19, not all workers who want a job are able to get one. **Exhibits 3.9** through **3.11** show the unemployment rate, defined as the percentage of the labor force not working, for the counties of San Francisco, Alameda, and Santa Clara, the three largest job centers in the region. The exhibits show that the unemployment rate in each county is still higher than it was before the pandemic.

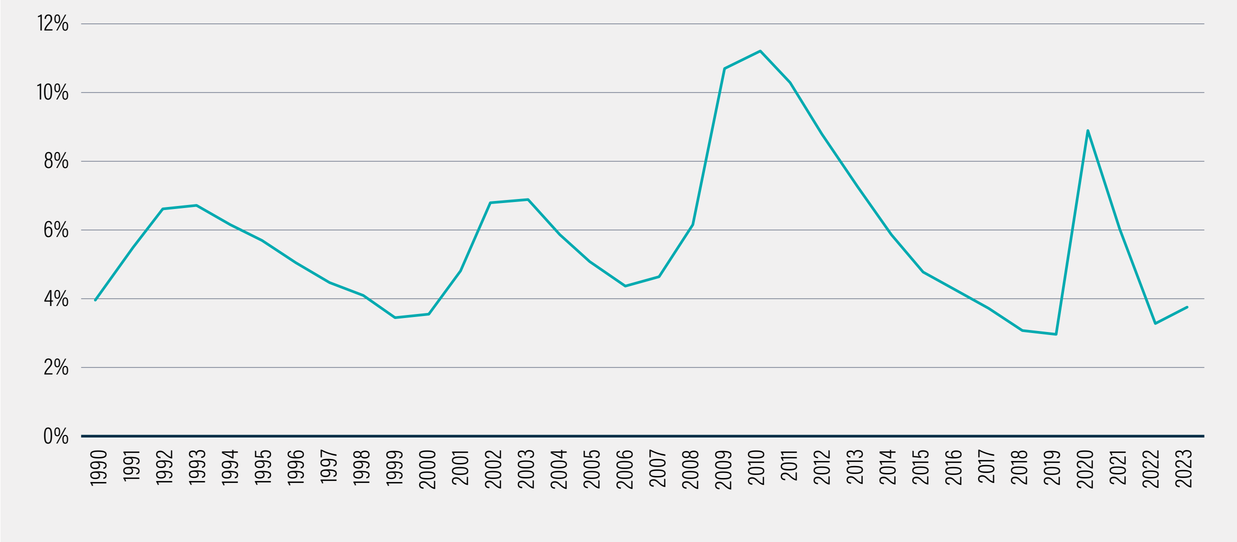
EXHIBIT 3.9 | San Francisco County average annual unemployment rate, 1990-2023*



Source: Local Area Unemployment Statistics (US Bureau of Labor Statistics, 2023).

*Data for 2023 reflects a January through June average.

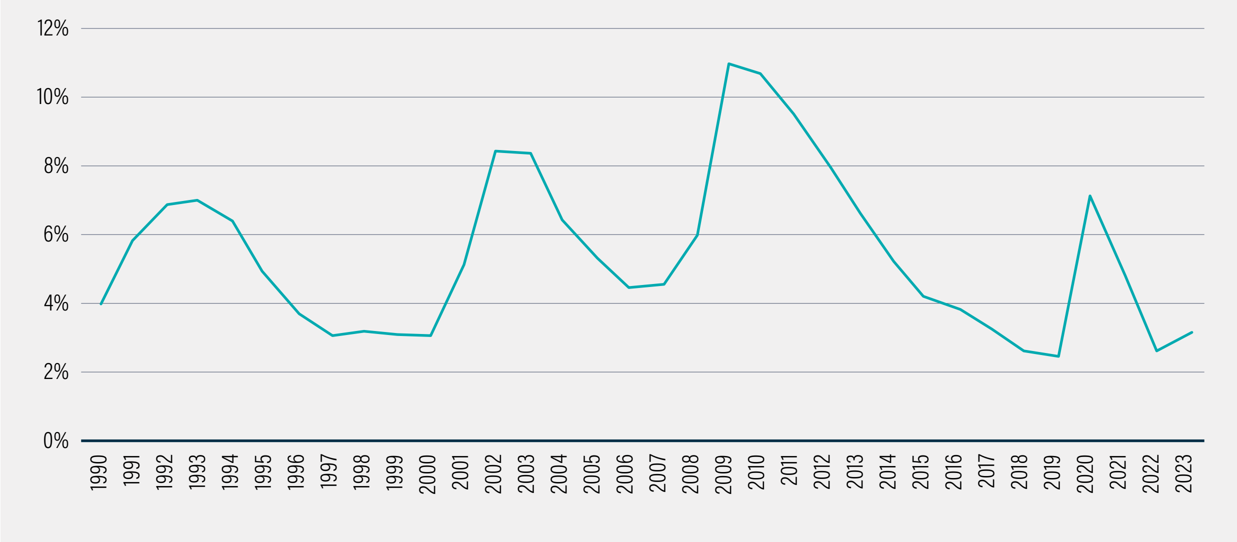
EXHIBIT 3.10 | Alameda County average annual unemployment rate, 1990-2023*



Source: Local Area Unemployment Statistics (US Bureau of Labor Statistics, 2023).

*Data for 2023 reflects a January through June average.

EXHIBIT 3.11 | Santa Clara County average annual unemployment rate, 1990-2023*

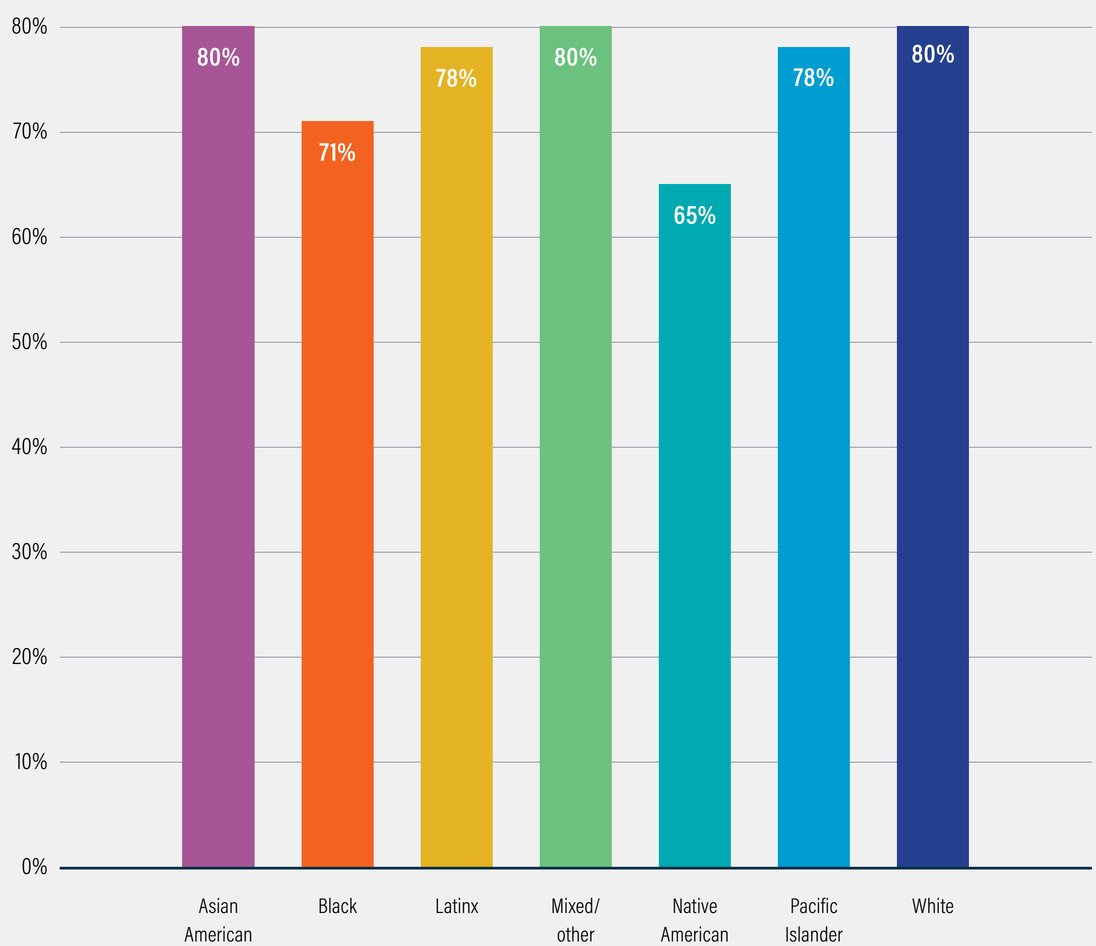


Source: Local Area Unemployment Statistics (US Bureau of Labor Statistics, 2023).

*Data for 2023 reflects a January through June average.

Not all workers face the same barriers to finding employment. Black and Native American workers in the Bay Area encounter lasting challenges in securing and retaining employment. Non-Hispanic White adults are 9% more likely than Black adults and 15% more likely than Native American adults to be employed (**Exhibit 3.12**).

EXHIBIT 3.12 | Bay Area employment to population ratio, by race and ethnicity, 2020

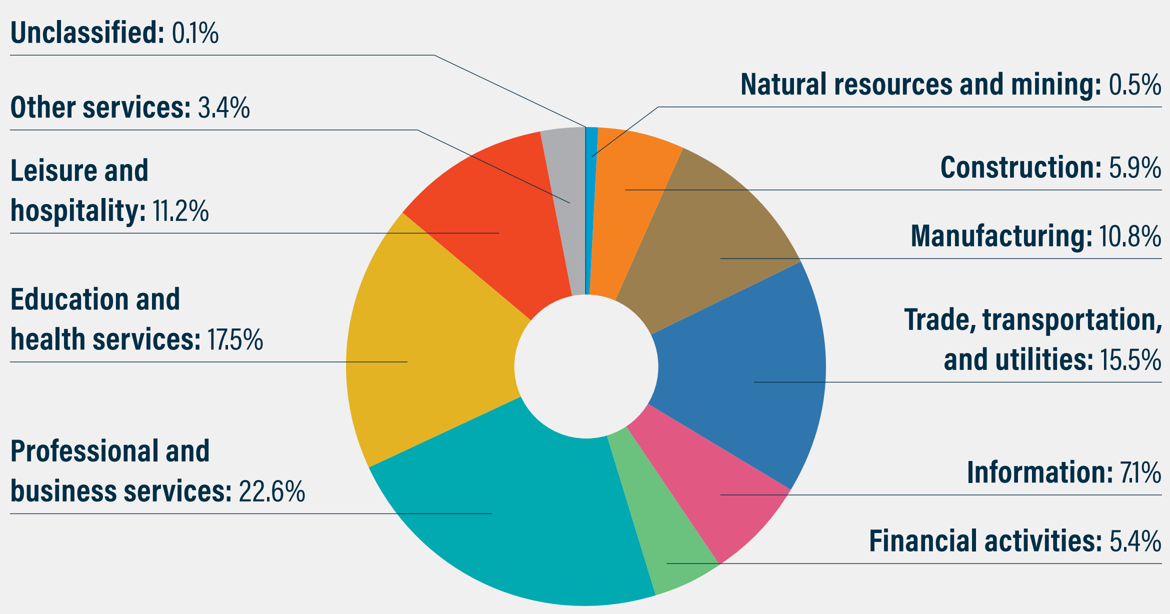


Source: The State of Bay Area Workers Data Tool (Rework the Bay, 2021).

E. Business and Industry

Exhibit 3.13 shows the distribution of Bay Area employment by industry super sectors as of the last quarter of 2022. Almost one quarter of employment in the Bay Area is in the Professional and Business Services super sector. Other large sectors are: Education and Health Services; Trade; Transportation and Utilities; Leisure and Hospitality; and Manufacturing.

EXHIBIT 3.13 | Bay Area employment in Q4 2022, by industry



Source: U.S. Bureau of Labor Statistics, 2023.

Note: This analysis contains the average employment estimates for the nine-county San Francisco Bay Area, which includes the following counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

At a more granular level, **Exhibit 3.14** shows the top 15 sectors in the region in terms of employees. The Health Care and Social Services sector employs the most workers, followed by: Professional, Scientific, and Technical; Accommodation and Food Services; and Education. These four sectors account for four out of ten employees in the Bay Area (GIS Planning, n.d.).

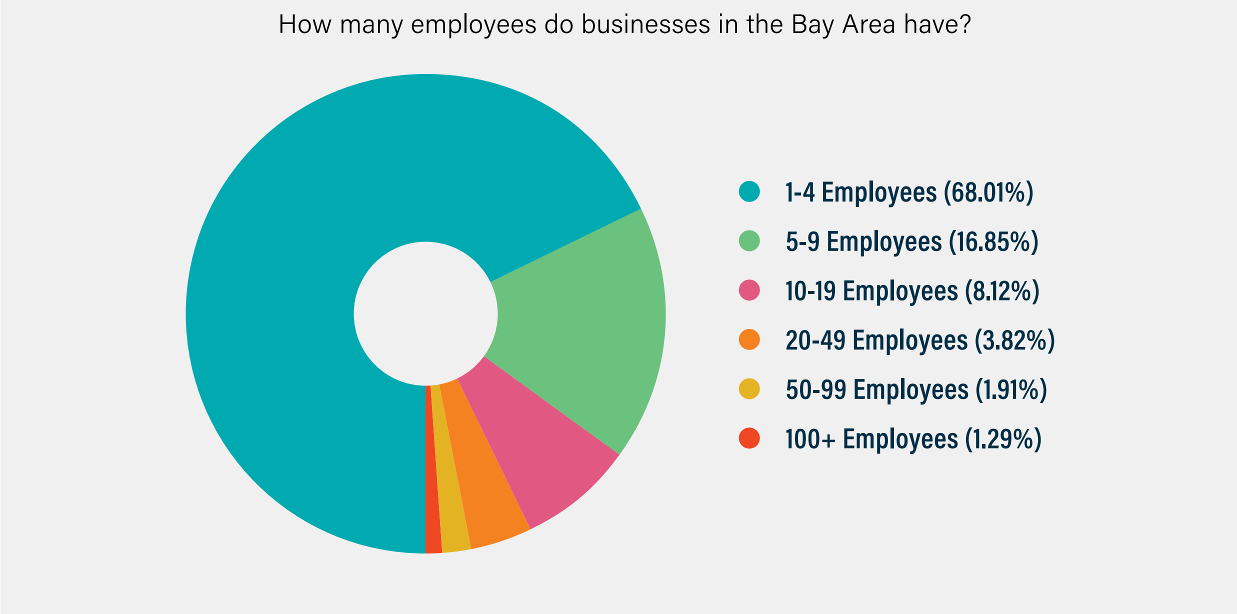
EXHIBIT 3.14 | Top Industries in the Bay Area, by number of employees, 2023

INDUSTRY	EMPLOYEES
Health Care and Social Services	557,138
Professional, Scientific, and Technical Services	425,218
Accommodation and Food Services	303,819
Education	292,979
Information	261,355
Retail: Home, Food, Automobiles, Personal Care	242,671
Manufacturing - Processed Food, Textiles, Clothing	240,874
Other Services - Repair, Personal Care, Laundry, Religious, etc.	220,402
Public Administration	199,733
Banking, Finance, and Insurance	175,470
Retail: Hobby, Media, General Merchandise	171,799

Source: Community and Place-Based Data Tool (GIS Planning, n.d.).

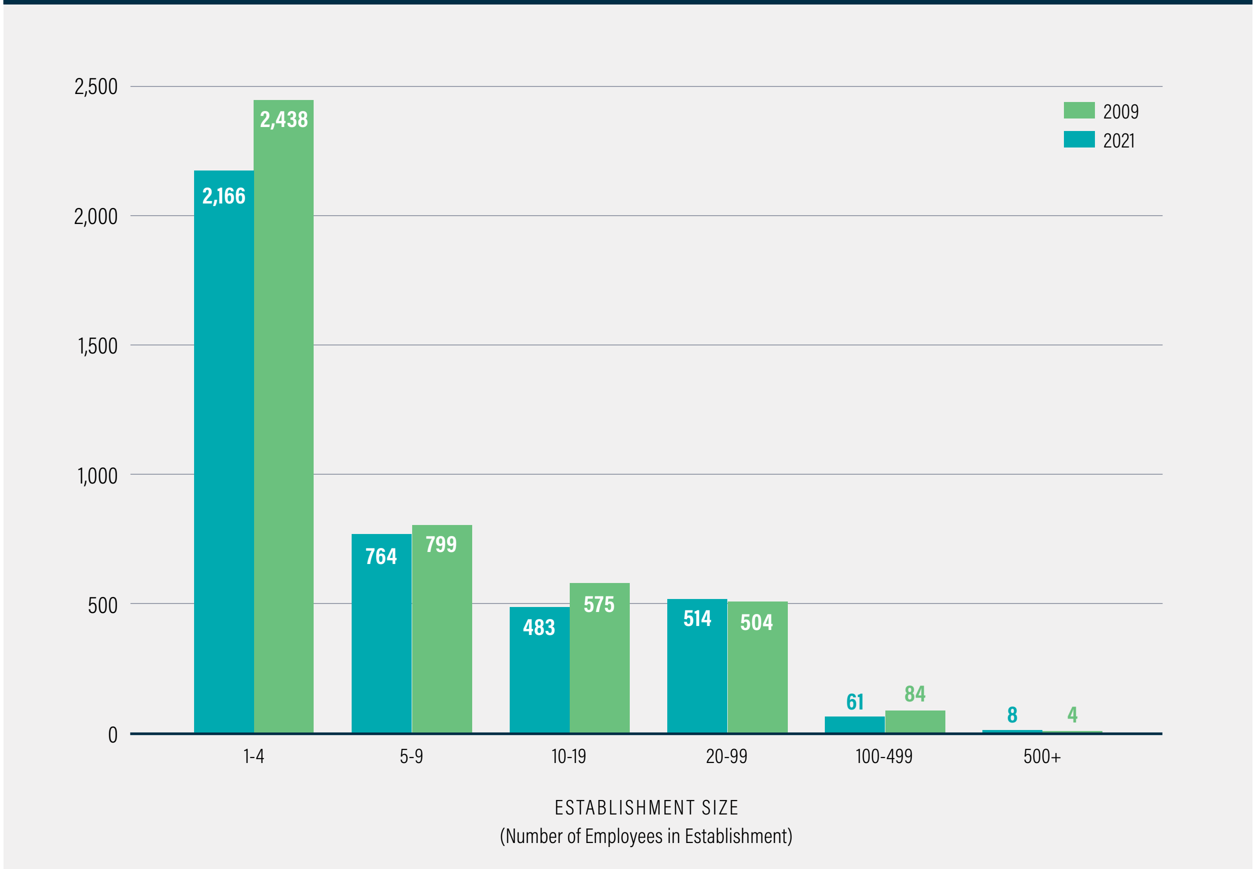
Although the Bay Area is home to large employers, such as Salesforce, Meta, Alphabet and Apple, two out of three businesses in the Bay Area employ fewer than five employees (**Exhibit 3.15**). **Exhibits 3.16** through **3.18** shows establishments by employee size for the three northern Bay Area counties of Napa, Solano, and Sonoma. Establishments with fewer than five employees account for most of the business formation in these counties over the past 10 years.

EXHIBIT 3.15 | Distribution of establishments in the Bay Area, by number of employees, 2023



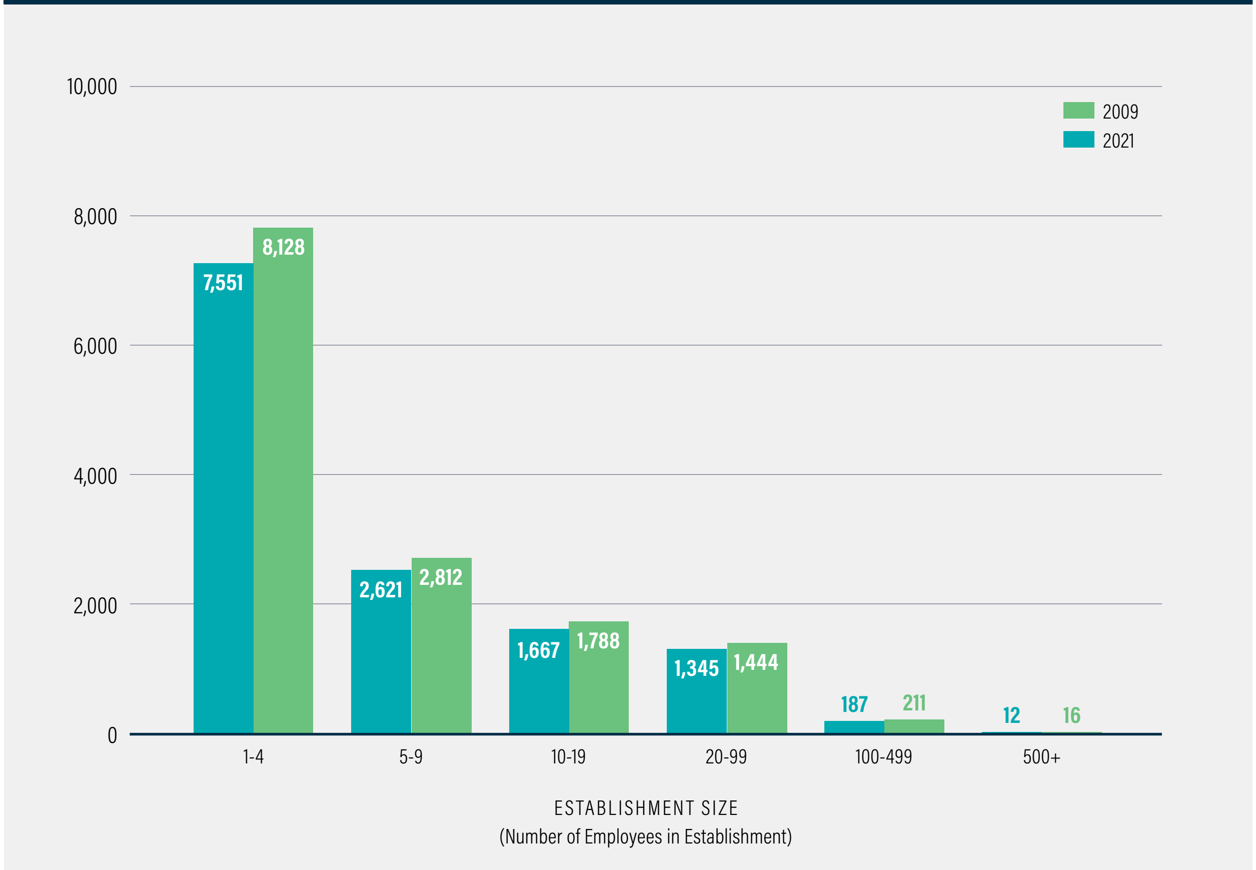
Source: Community and Place-Based Data Tool (GIS Planning, n.d.).

EXHIBIT 3.16 | Establishments in Napa County by number of employees: 2009 vs. 2021



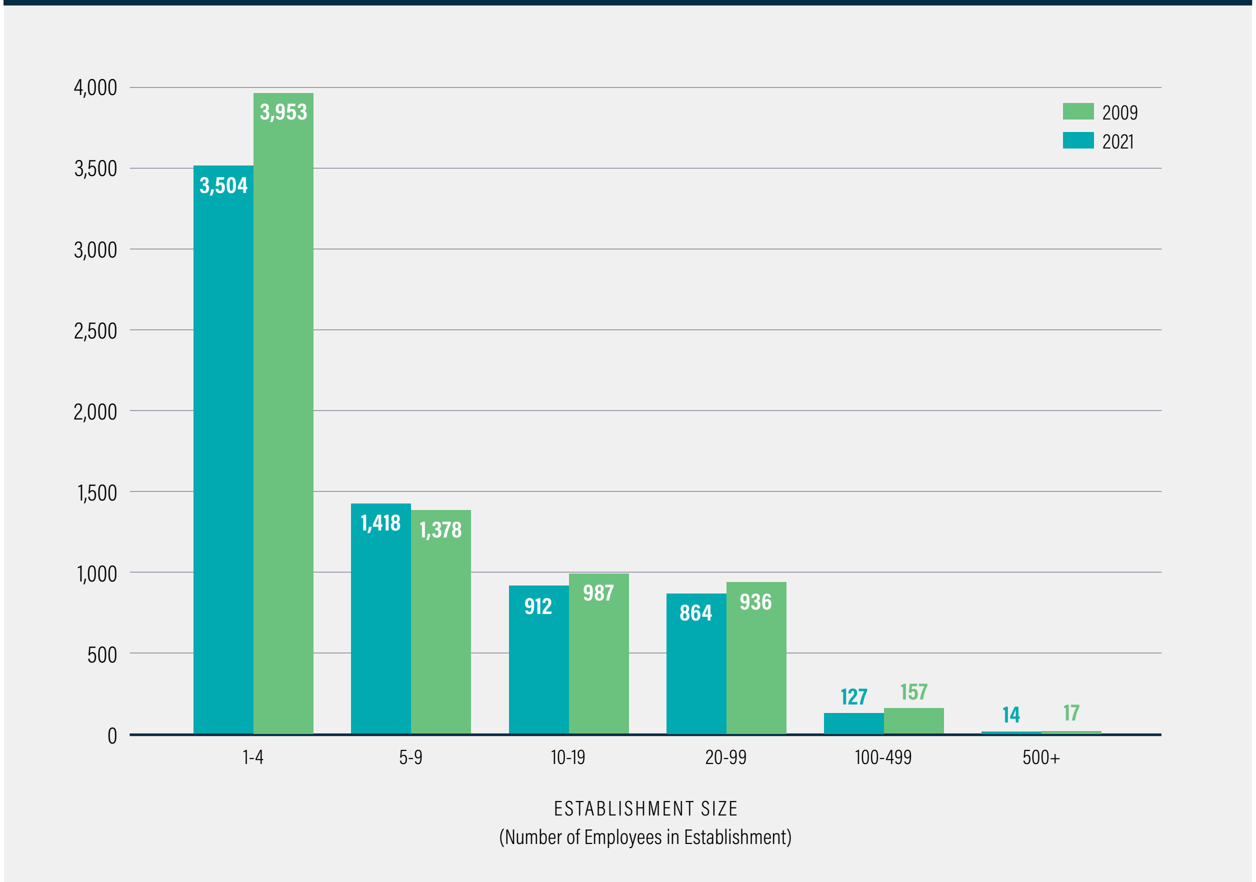
Source: U.S. Census Bureau, 2023.

EXHIBIT 3.17 | Establishments in Sonoma County by number of employees: 2009 vs. 2021



Source: U.S. Census Bureau, 2023.

EXHIBIT 3.18 | Establishments in Solano County by number of employees: 2009 vs. 2021



Source: U.S. Census Bureau, 2023.

F. Occupations

Exhibit 3.19 lists the top occupations in the Bay Area in terms of number of jobs. As described earlier, the top five occupations reflect that the distribution of employment in the Bay Area is skewed toward white collar employment. However, not all workers in the Bay Area are able to work in this type of occupation.

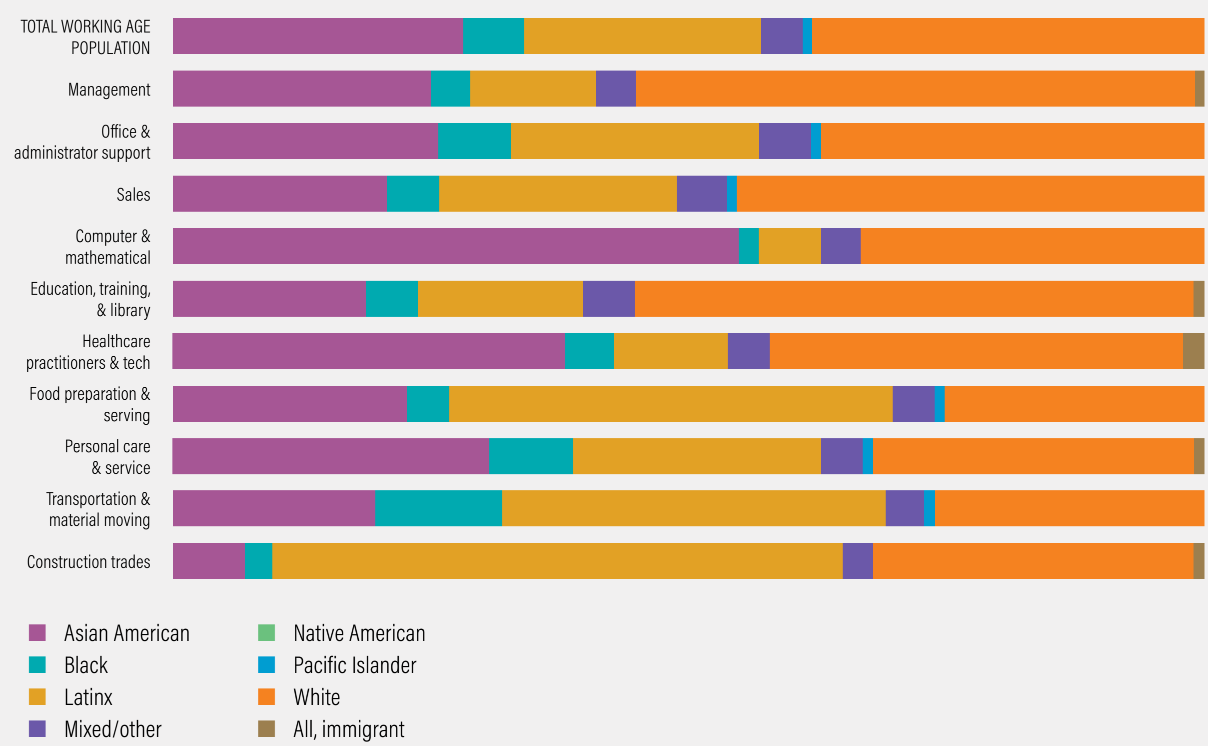
EXHIBIT 3.19 | Occupations with most jobs in Bay Area and their median hourly wage, 2022

INDUSTRY	MEDIAN HOURLY WAGE ($)	TOTAL JOBS
Office and Administrative Support Occupations	24.49	446,862
Management Occupations	72.16	373,801
Sales and Related Occupations	21.13	361,019
Business and Financial Operations Occupations	44.59	328,589
Computer and Mathematical Occupations	63.61	309,088
Food Preparation and Serving Related Occupations	16.03	292,030
Transportation and Material Moving Occupations	19.20	269,854
Education, Training, and Library Occupations	30.54	251,908
Healthcare Support Occupations	16.56	224,697
Healthcare Practitioners and Technical Occupations	55.31	194,627
Construction and Extraction Occupations	30.93	185,830
Building and Grounds Cleaning and Maintenance Occupations	18.58	170,807
Production Occupations	20.53	166,628
Personal Care and Service Occupations	16.72	138,075
Installation, Maintenance, and Repair Occupations	29.18	121,367
Architecture and Engineering Occupations	52.79	114,444
Arts, Design, Entertainment, Sports, and Media Occupations	31.83	102,797
Protective Service Occupations	25.82	76,288
Community and Social Service Occupations	28.76	71,981
Life, Physical, and Social Science Occupations	46.14	63,965
Legal Occupations	64.22	44,759
Farming, Fishing, and Forestry Occupations	17.14	19,058
Military-only Occupations	20.96	11,037

Source: Community and Place-Based Data Tool (GIS Planning, n.d.).

There are significant occupational disparities by race in our region. **Exhibit 3.20** highlights the occupational segregation of workers in the Bay Area. Black workers are overrepresented in Transportation and Material Moving as well as Personal Care and Service occupations. Hispanic workers are overrepresented in Construction Trades and in Food Preparation and Serving occupations. Asian workers are overrepresented in Computer and Mathematical, Healthcare, and Personal Care and Service occupations. White workers are overrepresented in Management occupations and in Education, Training, and Library occupations.

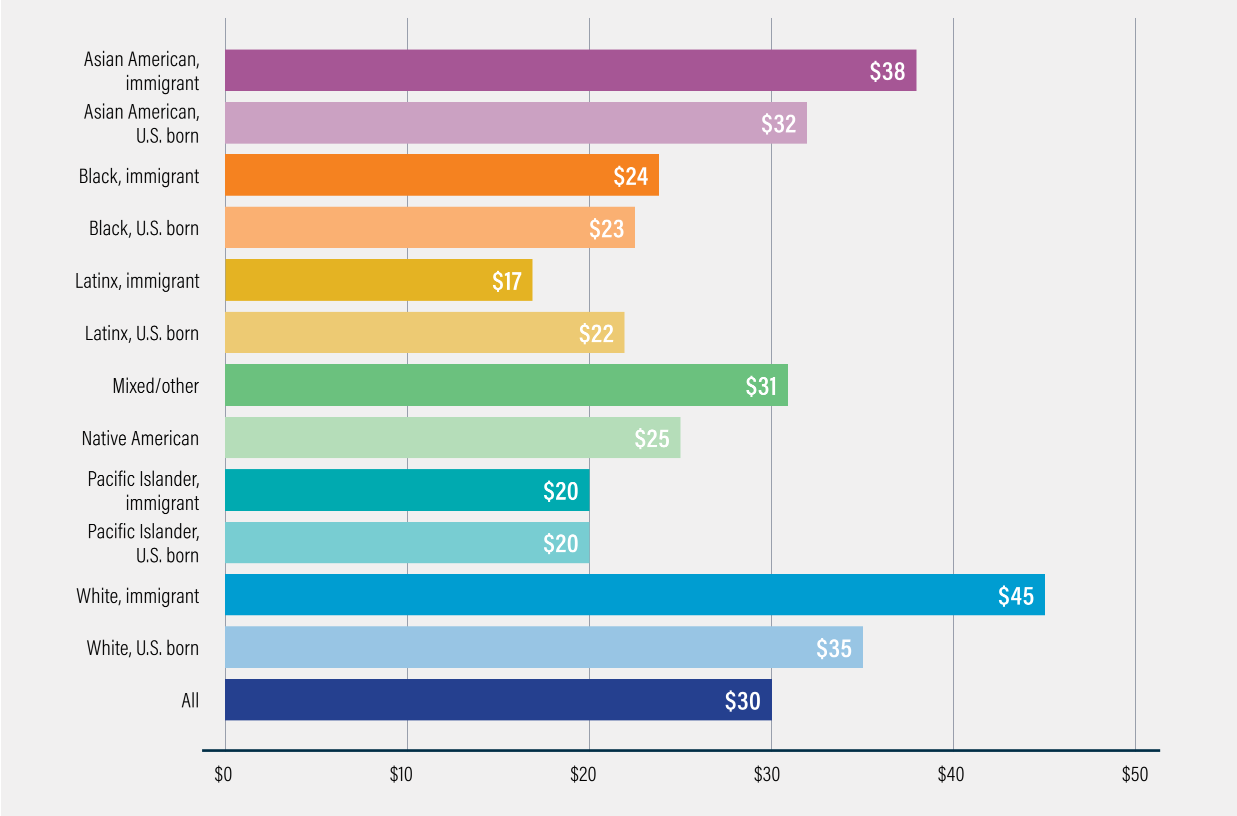
EXHIBIT 3.20 | Largest occupations in the Bay Area, by race and ethnicity, 2020



Source: The State of Bay Area Workers Data Tool (Rework the Bay, 2021).

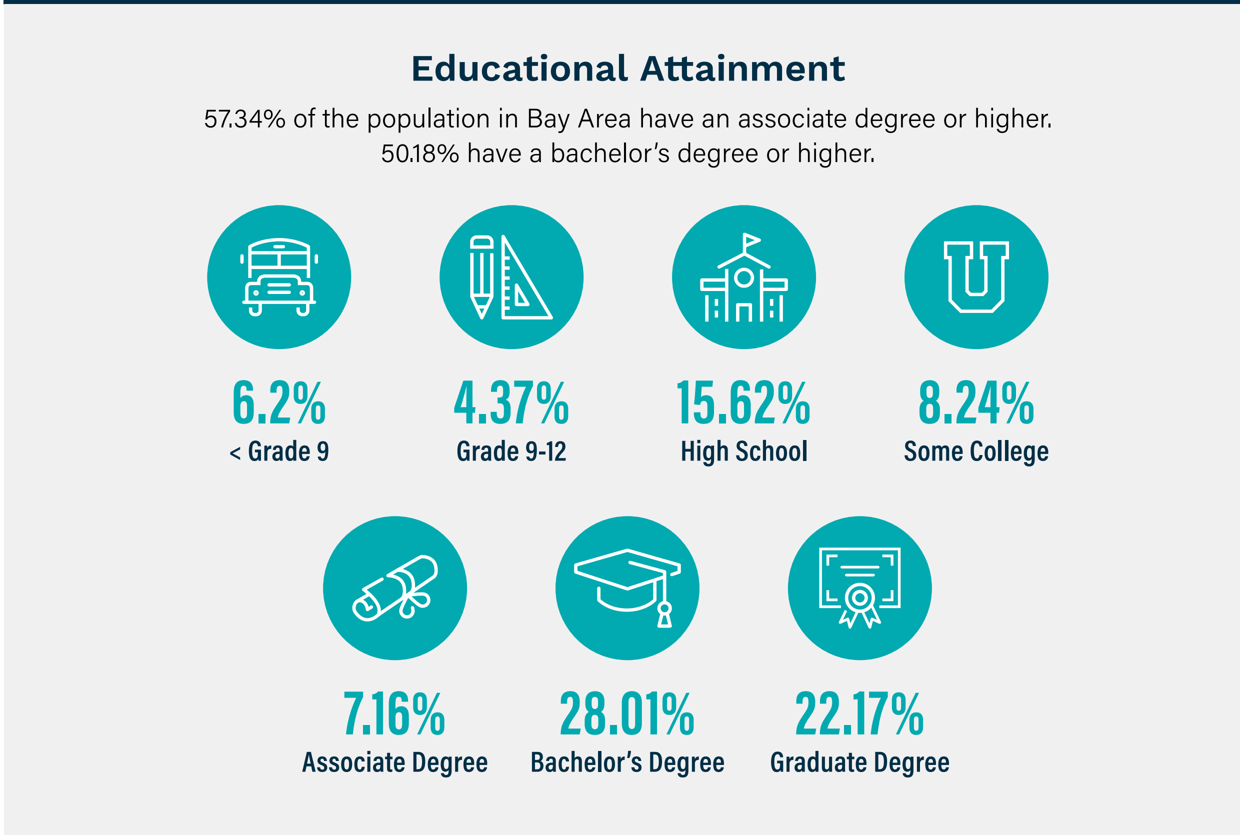
This occupational segregation contributes to economic inequality in the Bay Area in two ways: (1) workers of color are often excluded from the highest-paying occupations; and (2) due to historical and structural racism, jobs that are predominantly performed by workers of color or immigrants are paid less than other comparable work. **Exhibit 3.21** shows U.S.-born White workers earn a median wage 60% higher than those of U.S.-born Hispanic and Black workers. The disparity is even greater for immigrant workers. White immigrant workers earn a median wage that is more than 1.5 times the median wages earned by Black and Latino immigrant workers.

EXHIBIT 3.21 | Median wage in the Bay Area, by race and ethnicity, 2020



Source: The State of Bay Area Workers Data Tool (Rework the Bay, 2021).

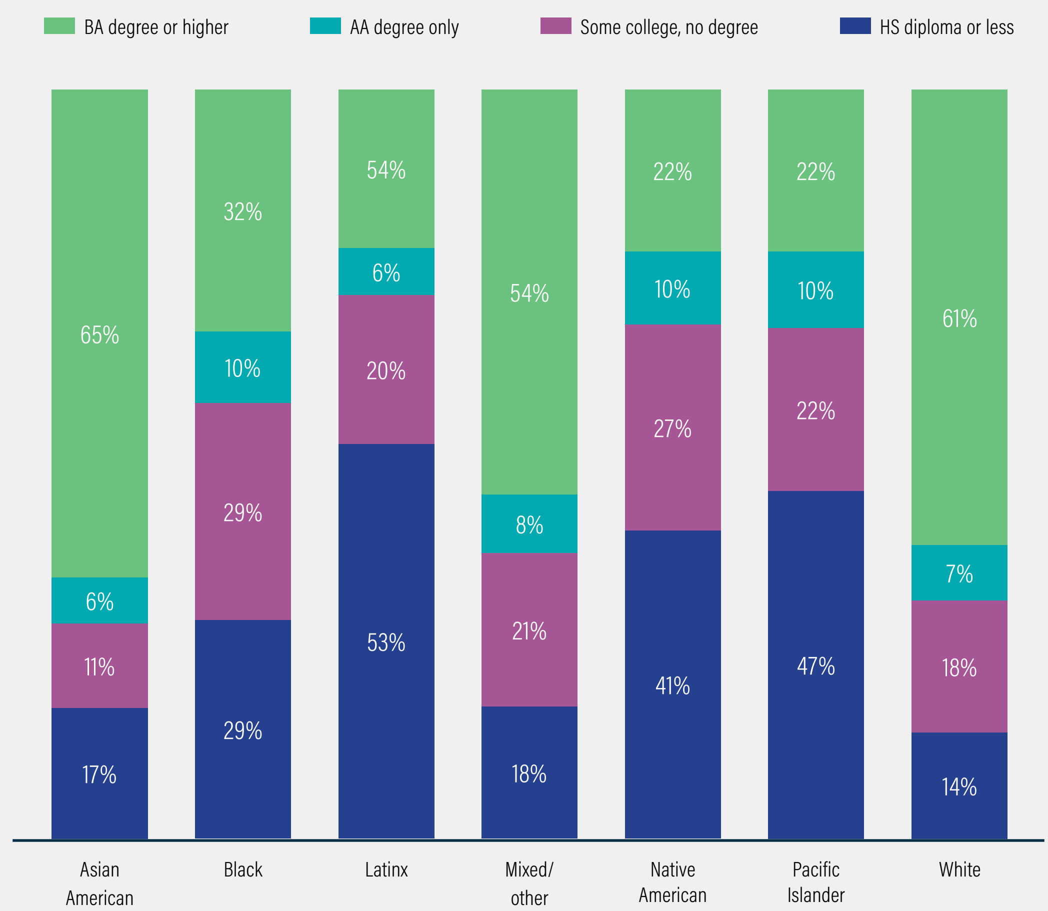
EXHIBIT 3.22 | Bay Area educational attainment, 2022



Source: Community and Place-Based Data Tool (GIS Planning, n.d.).

Educational attainment is significantly correlated with occupational segregation in the Bay Area. **Exhibit 3.22** shows the region has a highly educated population, with one in two adults having a bachelor's degree or higher. However, just as with occupations, there are significant disparities by race in the educational attainment of Bay Area workers. **Exhibit 3.23** shows White and Asian adults have much higher educational attainment than Black, Hispanic. and Native American adults. The share of White and Asian adults with a bachelor's degree or higher is twice that of Black adults and three times that of Hispanic and Native American adults.

EXHIBIT 3.23 | Educational attainment in the Bay Area, by race and ethnicity, 2020



Source: The State of Bay Area Workers Data Tool (Rework the Bay, 2021).

i. Long-Term Occupational Projections

Exhibits 3.24 through **3.30** lists the 10 fastest-growing occupations in the Bay Area's nine counties over the next 10 years. The occupations are ranked by projected percentage growth rate in employment between the years 2020 and 2030. In all counties, the fastest-growing occupations are primarily low-wage occupations currently paying less than a living wage. Given the low-wage nature of these growing occupations, the next question is, if these are occupations that the Bay Area will need in the future, how do we transform them into sustainable living wage occupations?

EXHIBIT 3.24 | Occupational projections: Napa County

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
35-2014	Cooks, Restaurant	780	1,500	92.3%	$19.43	$40,425
39-5092	Manicurists and Pedicurists	150	280	86.7%	$16.84	$35,041
31-9011	Massage Therapists	190	350	84.2%	$18.38	$38,229
39-3091	Amusement and Recreation Attendants	150	260	73.3%	$16.24	$33,773
35-3011	Bartenders	290	490	69.0%	$17.12	$35,606
35-1011	Chefs and Head Cooks	220	360	63.6%	$30.76	$63,963
43-4081	Hotel, Motel, and Resort Desk Clerks	300	490	63.3%	$18.01	$37,451
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers	440	710	61.4%	$17.14	$35,660
39-2021	Nonfarm Animal Caretakers	120	190	58.3%	$17.44	$36,278
13-1081	Logisticians	120	190	58.3%	$38.35	$79,758

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes “All Other” categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

EXHIBIT 3.25 | Occupational projections: Alameda and Contra Costa Counties

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
39-5092	Manicurists and Pedicurists	1,960	4,020	105.1%	$18.22	$37,900
39-5094	Skincare Specialists	630	1,240	96.8%	$19.28	$40,122
35-2014	Cooks, Restaurant	7,870	14,280	81.4%	$19.87	$41,326
39-5012	Hairdressers, Hairstylists, and Cosmetologists	1,530	2,760	80.4%	$17.85	$37,120
31-9011	Massage Therapists	960	1,690	76.0%	$35.88	$74,628
35-3011	Bartenders	2,270	3,910	72.2%	$18.29	$38,052
39-9031	Fitness Trainers and Aerobics Instructors	2,270	3,710	63.4%	$32.75	$68,126
29-1171	Nurse Practitioners	1,140	1,800	57.9%	$82.29	$171,151
35-1011	Chefs and Head Cooks	1,450	2,270	56.6%	$28.59	$59,473
39-3091	Amusement and Recreation Attendants	1,750	2,650	51.4%	$17.93	$37,306

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes "All Other" categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

EXHIBIT 3.26 | Occupational projections: San Francisco and San Mateo Counties

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
39-5092	Manicurists and Pedicurists	1,480	3,130	111.5%	$18.22	$37,900
39-5094	Skincare Specialists	570	1,130	98.2%	$18.95	$39,422
35-2014	Cooks, Restaurant	8,790	17,200	95.7%	$19.94	$41,455
35-3011	Bartenders	3,080	5,840	89.6%	$18.47	$38,431
39-5012	Hairdressers, Hairstylists, and Cosmetologists	1,390	2,600	87.1%	$17.87	$37,172
31-9011	Massage Therapists	850	1,510	77.6%	$28.46	$59,213
39-9031	Fitness Trainers and Aerobics Instructors	2,070	3,670	77.3%	$32.75	$68,126
35-1011	Chefs and Head Cooks	1,810	3,050	68.5%	$28.61	$59,507
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers	2,060	3,450	67.5%	$18.18	$37,798
35-9031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	1,370	2,230	62.8%	$18.12	$37,689

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes “All Other” categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

EXHIBIT 3.27 | Occupational projections: Santa Clara County

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
39-3091	Amusement and Recreation Attendants	1,370	2,760	101.5%	$18.31	$38,101
39-9031	Fitness Trainers and Aerobics Instructors	1,910	3,510	83.8%	$30.29	$63,004
39-5092	Manicurists and Pedicurists	1,650	3,010	82.4%	$18.53	$38,538
35-2014	Cooks, Restaurant	5,520	9,990	81.0%	$22.14	$46,064
39-5094	Skincare Specialists	420	750	78.6%	$20.23	$42,077
31-9011	Massage Therapists	730	1,250	71.2%	$29.43	$61,213
35-3011	Bartenders	2,030	3,410	68.0%	$18.49	$38,442
39-5012	Hairdressers, Hairstylists, and Cosmetologists	1,760	2,930	66.5%	$15.55	$32,344
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers	2,530	4,040	59.7%	$18.68	$38,847
29-1171	Nurse Practitioners	1,230	1,950	58.5%	$0.00	$0

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes "All Other" categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

EXHIBIT 3.28 | Occupational projections: Sonoma County

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
39-9031	Fitness Trainers and Aerobics Instructors	490	820	67.3%	$26.49	$55,104
35-2014	Cooks, Restaurant	1,890	3,110	64.6%	$19.63	$40,819
39-5092	Manicurists and Pedicurists	360	580	61.1%	$17.00	$35,372
39-3091	Amusement and Recreation Attendants	400	620	55.0%	$16.20	$33,698
39-1098	First-Line Supervisors of Personal Service & Entertainment and Recreation Workers	250	360	44.0%	$0.00	$0
35-1011	Chefs and Head Cooks	370	530	43.2%	$25.55	$53,154
39-2021	Nonfarm Animal Caretakers	610	870	42.6%	$17.75	$36,918
39-5012	Hairdressers, Hairstylists, and Cosmetologists	310	440	41.9%	$17.89	$37,195
35-3011	Bartenders	630	880	39.7%	$17.10	$35,553
11-9111	Medical and Health Services Managers	670	930	38.8%	$66.86	$139,064

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes “All Other” categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

EXHIBIT 3.29 | Occupational projections: Marin County

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
35-2014	Cooks, Restaurant	1,180	2,020	71.2%	$19.73	$41,041
39-9031	Fitness Trainers and Aerobics Instructors	600	960	60.0%	$32.75	$68,126
29-1171	Nurse Practitioners	140	220	57.1%	$82.28	$171,150
35-1011	Chefs and Head Cooks	190	290	52.6%	$29.27	$60,884
39-1098	First-Line Supervisors of Personal Service and Entertainment and Recreation Workers	230	340	47.8%	$0.00	$0
39-3091	Amusement and Recreation Attendants	330	480	45.5%	$17.96	$37,352
13-108	Logisticians	150	210	40.0%	$47.92	$99,670
11-9111	Medical and Health Services Managers	410	570	39.0%	$63.21	$131,471
27-2022	Coaches and Scouts	130	180	38.5%	$0.00	$49,825
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	160	220	37.5%	$22.40	$46,583

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes "All Other" categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

EXHIBIT 3.30 | Occupational Projections: Solano County

STANDARD OCCUPATIONAL CLASSIFICATION	OCCUPATIONAL TITLE	BASE YEAR EMPLOYMENT ESTIMATE	PROJECTED YEAR EMPLOYMENT ESTIMATE	PERCENTAGE CHANGE	MEDIAN HOURLY WAGE	MEDIAN ANNUAL WAGE
39-3091	Amusement and Recreation Attendants	390	900	130.8%	$17.75	$36,918
39-9031	Fitness Trainers and Aerobics Instructors	200	390	95.0%	$25.85	$53,772
29-1171	Nurse Practitioners	130	220	69.2%	$87.91	$182,853
39-5092	Manicurists and Pedicurists	420	710	69.0%	$15.67	$32,589
35-2014	Cooks, Restaurant	740	1,210	63.5%	$18.77	$39,050
53-3058	Passenger Vehicle Drivers, Except Bus Drivers, Transit and Intercity	540	860	59.3%	$0.00	$0
39-1098	First-Line Supervisors of Personal Service & Entertainment and Recreation Workers	160	250	56.3%	$0.00	$0
39-5012	Hairdressers, Hairstylists, and Cosmetologists	220	330	50.0%	$15.27	$31,758
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	140	210	50.0%	$19.06	$39,647
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers	330	480	45.5%	$16.13	$33,538

Fastest growing occupations are ranked by projected percentage change growth between 2020 and 2030. Wages are from the 2022 first quarter and do not include self-employed or unpaid family workers. An estimate could not be provided for wages listed as $0. Excludes "All Other" categories. These are residual codes that do not represent a detailed occupation. Occupations with employment below 120 in 2020 are excluded.

Source: Employment Projections Database (Employment Development Department, 2023).

Exhibits 3.31 through **3.34**, on pages 61-64, show show occupational career ladder analysis for four areas of the region: Solano, Napa, Sonoma, and Santa Clara Counties. The occupational career ladder analysis identifies some prominent and plausible career ladders within each of the key industries examined. Based on the most recent data available on the number of projected job openings in the region over the next 10 years, education and training requirements, and wage levels, it identifies some promising entry-level positions and feasible pathways to higher paying jobs. It is not intended to be comprehensive, but rather to provide an example of prominent career ladders that appear to exist using data that is specific to each region and industry that was analyzed.

Conclusion

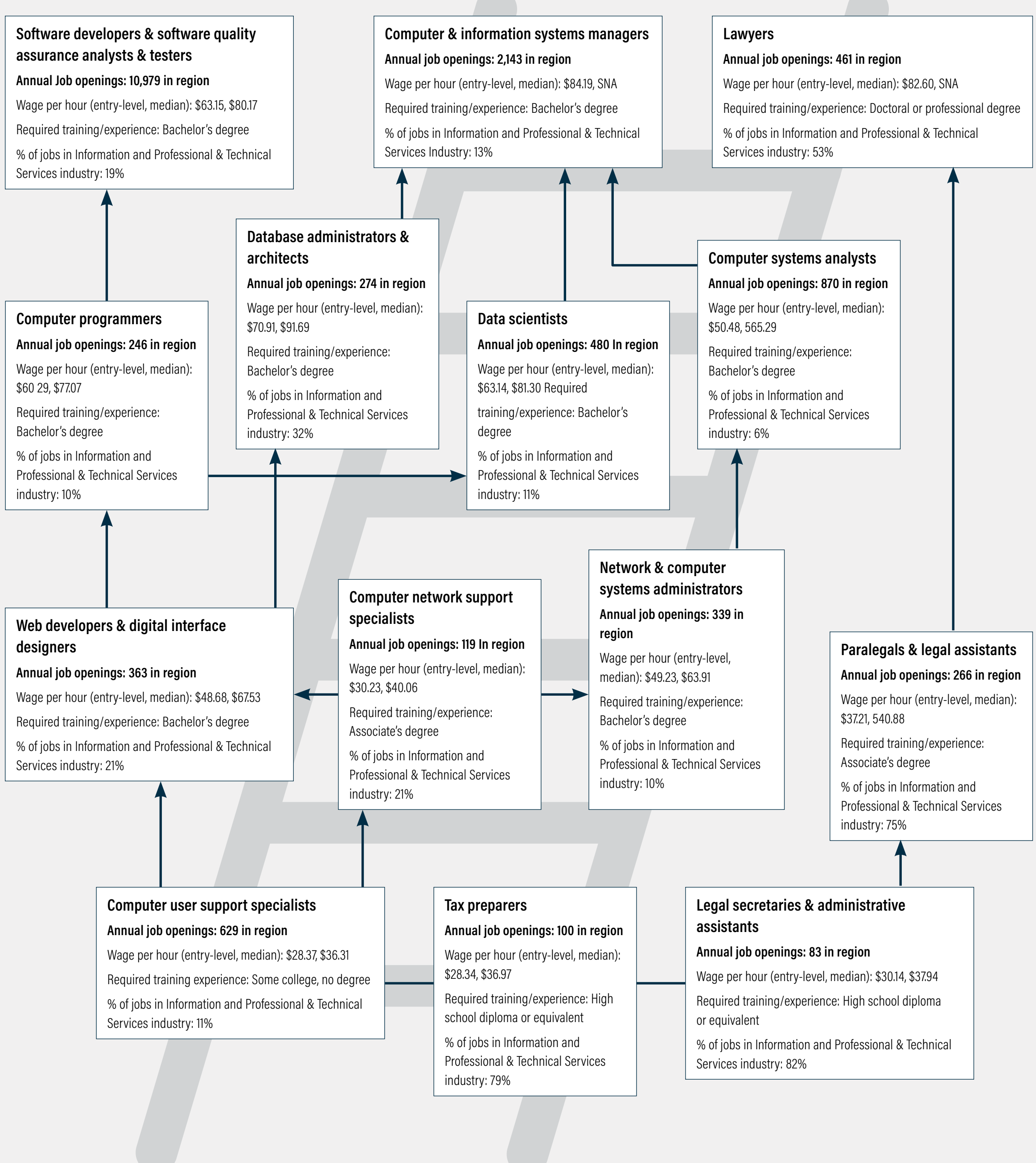
Like most of California and the country, the COVID-19 pandemic severely impacted the Bay Area's economy. Three years since the onset of the pandemic, the Bay Area has recovered most of the employment losses, but the recovery has been uneven. In particular, workers of color continue to face significant disparities, especially in terms of income inequality and occupational segregation. Although employment is growing, much of this growth is reinforcing and deepening these disparities as the region is not currently producing enough high-quality jobs to meet the needs of the workforce. Current projections show that, absent interventions aimed at a shift in direction, most of the fastest-growing occupations over the next decade will occur in low-wage occupations.

Endnotes

1 The term "white collar" is used to describe the office-based nature of these occupations (Dillender & Forsythe, 2022).

EXHIBIT 3.31 | Career ladder 1

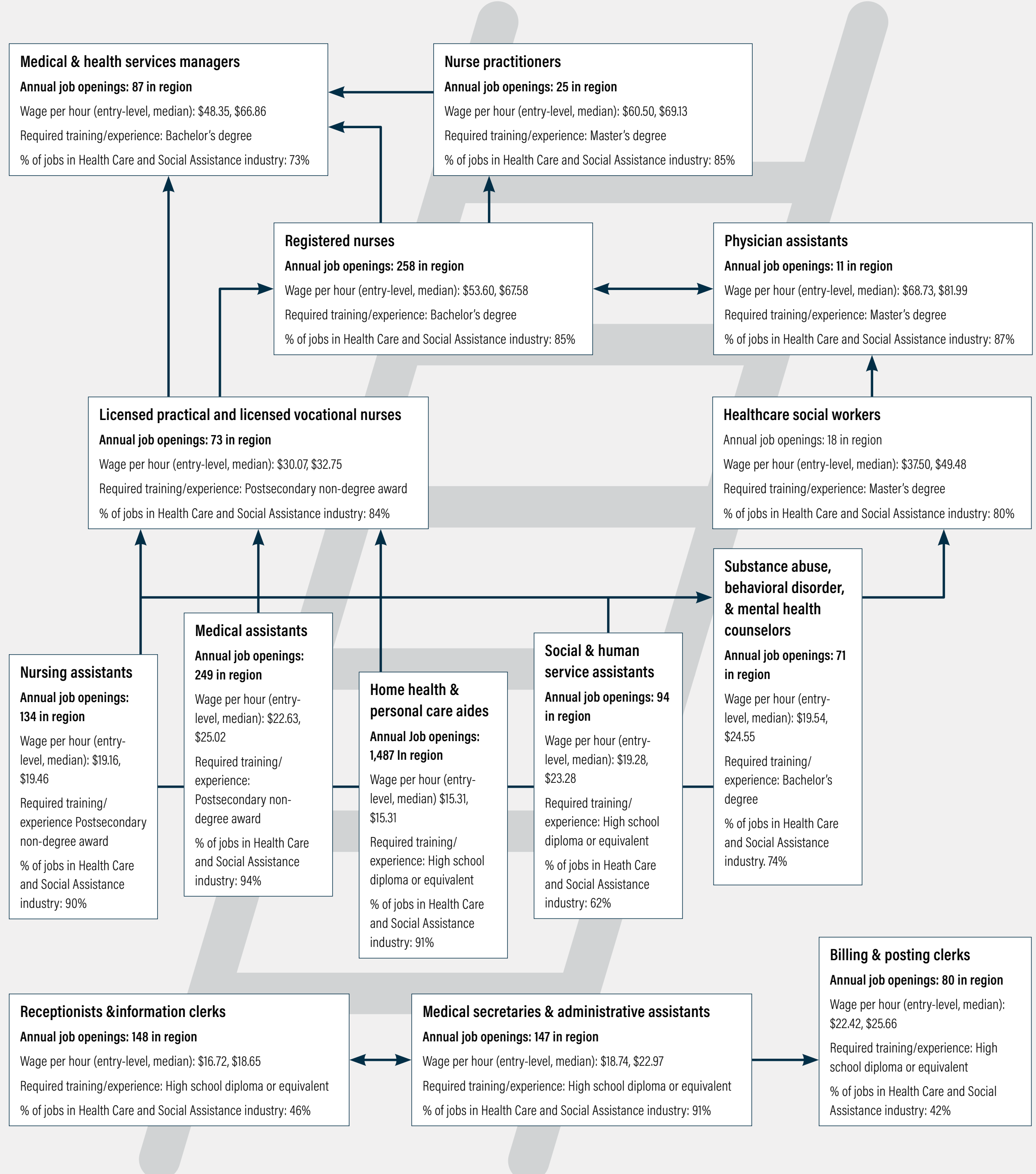
SAN JOSE-SUNNYVALE-SANTA CLARA REGION:
INFORMATION AND PROF. & TECH. SERVICES CAREER LADDER



Source: California Employment Development Department and U.S. Bureau of Labor Statistics, 2023.

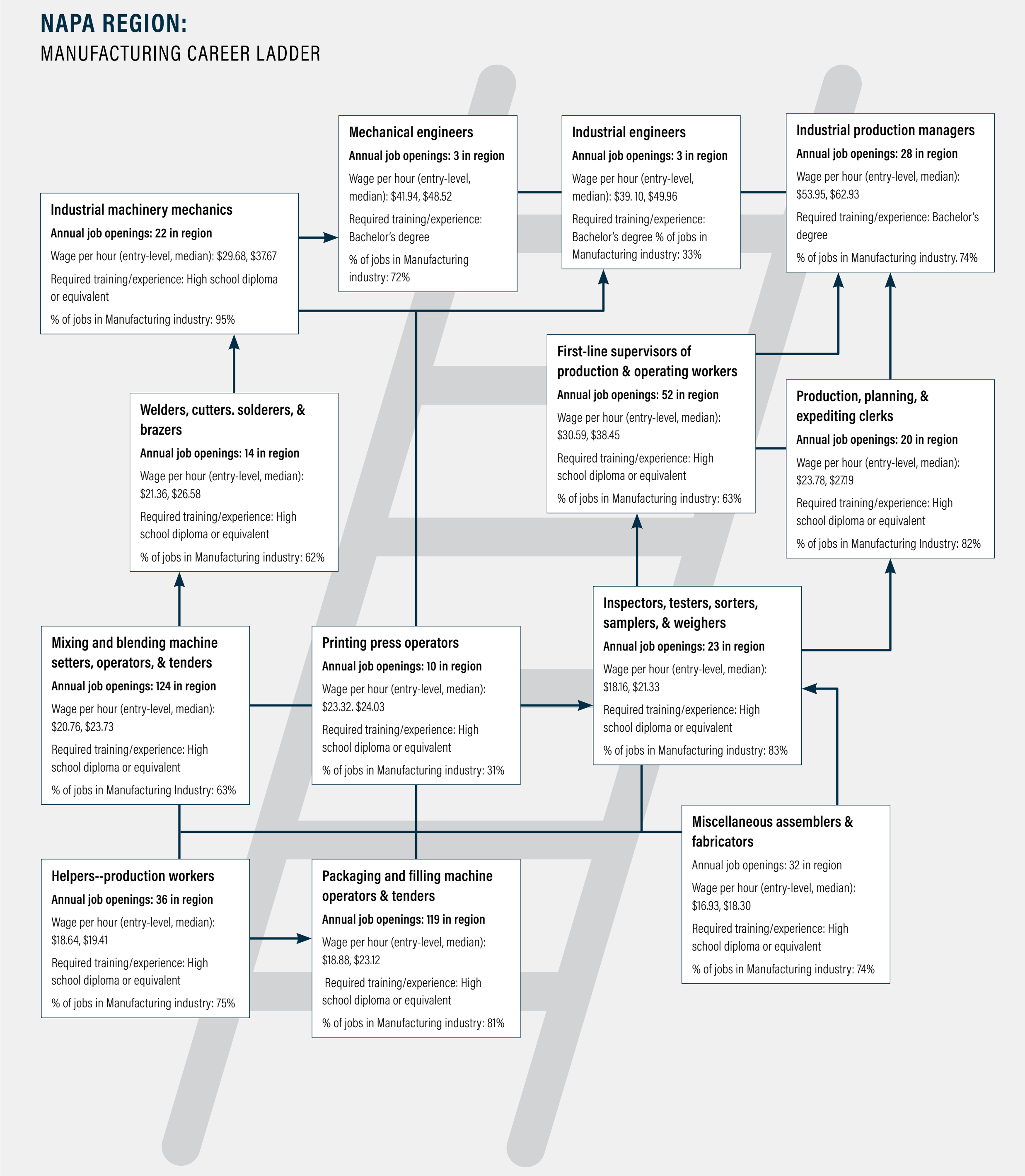
EXHIBIT 3.32 | Career ladder 2

SANTA ROSA-PETALUMA REGION:
HEALTH CARE & SOCIAL ASSISTANCE CAREER LADDER



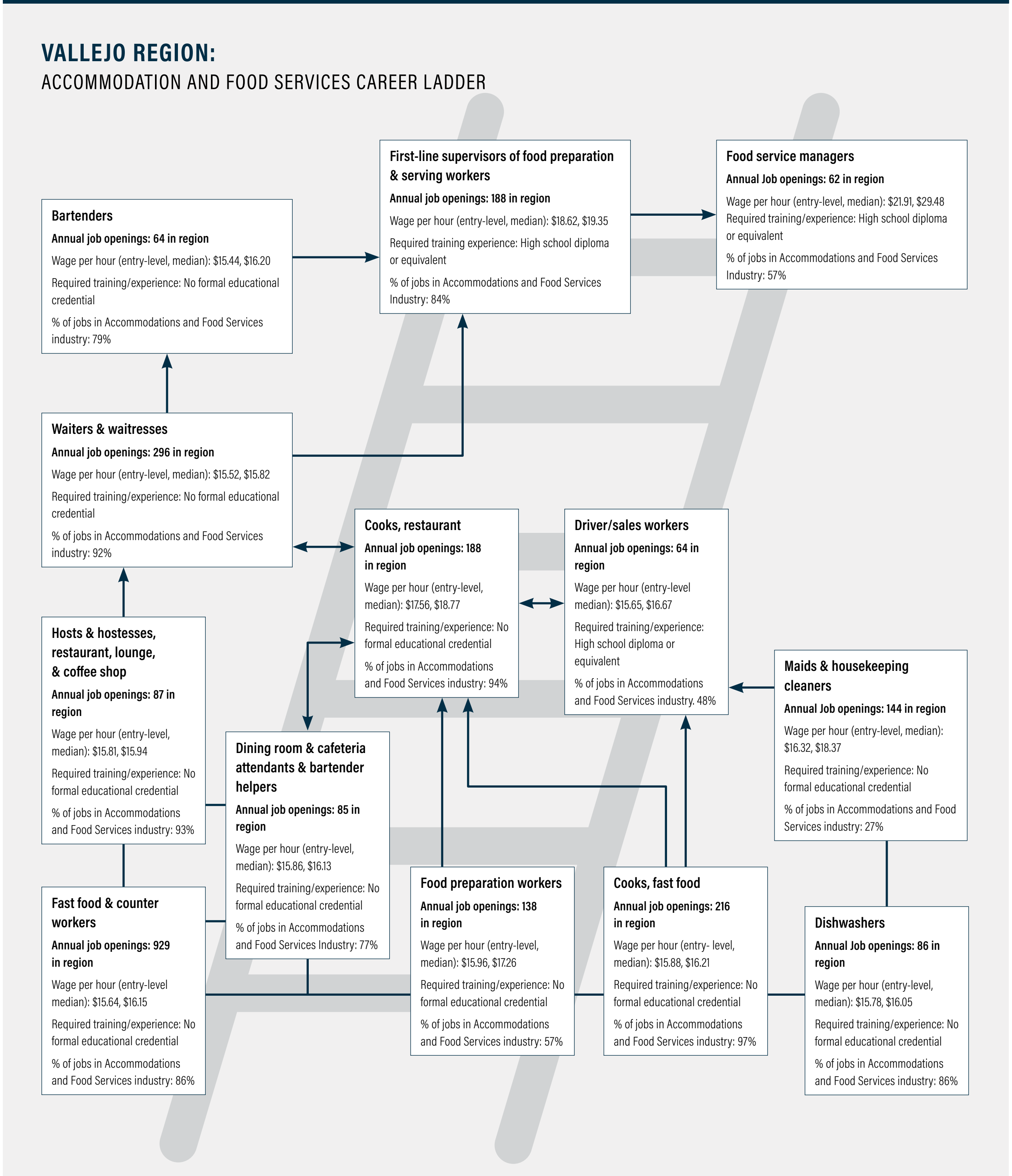
Source: California Employment Development Department and U.S. Bureau of Labor Statistics, 2023.

EXHIBIT 3.33 | Career ladder 3



Source: California Employment Development Department and U.S. Bureau of Labor Statistics, 2023.

EXHIBIT 3.34 | Career ladder 4



Source: California Employment Development Department and U.S. Bureau of Labor Statistics, 2023.

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SECTION 3.2

Regional Summary:
Public Health

CONTRIBUTORS

Elana Muldavin
Candace Cross
Solange Gould

Human Impact Partners

A. Introduction

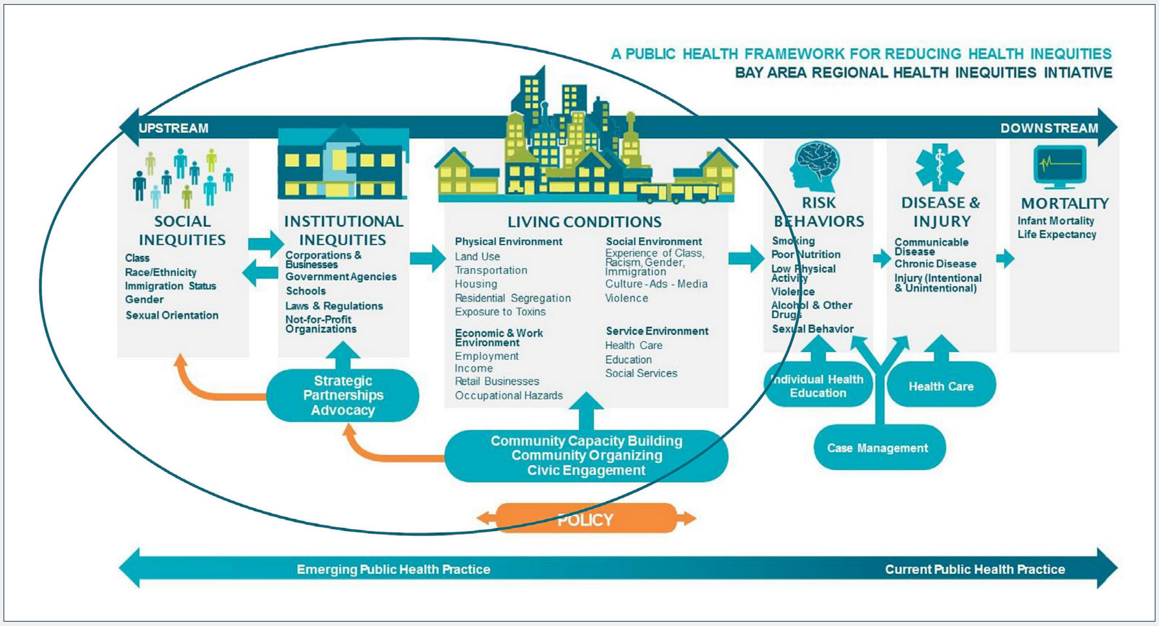
This public health analysis presents an equity-centered snapshot of the Bay Area Region's baseline public health, climate, and economic security data. The analysis discusses social determinants of health. Social determinants of health are conditions in the environments where we live, work, and play that affect our health outcomes. Social determinants have a profound impact on individual health throughout the lifetime: research suggests that only 20% of the factors that influence our health relate to clinical care, while the other 80% come from the social environment beyond medical walls (*County Health Rankings Model*, n.d.). Power—and deep power imbalances—affect the distribution of these conditions, resources, and amenities that shape health opportunity.

Community power building can change these imbalances and positively influence individual and community health. As defined by Lead Local, "community power building is the set of strategies used by communities most impacted by structural inequity to develop, sustain and grow an organized base of people who act together through democratic structures to set agendas, shift public discourse, influence who makes decisions and cultivate ongoing relationships of mutual accountability with decision makers that change systems and advance health equity" (Lead Local, n.d.). Community power building is particularly important for those who have been excluded from decision-making processes that impact their lives.

As seen in **Exhibit 3.35**, the Bay Area Regional Health Inequities Initiative's conceptual framework demonstrates how social inequities, which are shaped by power dynamics, become embedded in institutions, which in turn shape inequities in living conditions that drive inequitable health outcomes (Bay Area Regional Health Inequities Initiative, n.d.). According to public health organization Human Impact Partners' theory of change, the underlying reason inequitable conditions and outcomes are continually reproduced is the unequal distribution of power and systems of advantage that uphold unjust imbalances. To advance equity, we must confront and dismantle these unequal systems ("Our Theory of Change," n.d.). For that reason, we use the word "inequities" to describe unjust differences in health outcomes rather than "disparities." Disparities implies a difference, while inequities' appropriately attributes the cause of differential health outcomes to unjust systems, structures, and power dynamics.

Social determinants of health are shaped by social institutions and resource allocations and can therefore be re-shaped through new investments and policy decisions. California Jobs First investments are one such opportunity to shift power and resources towards communities that have been historically disinvested. To inform what these investments and shifts should look like, we must first understand the regional landscape of social determinants of health that are implicated in a California Jobs First planning process.

EXHIBIT 3.35 | Bay Area Regional Health Inequities Initiative's conceptual framework



Source: https://barhii.org/framework

This analysis presents social determinant of health data for the San Francisco Bay Area, with a focus on indicators related to equity, economic security, climate, and the environment. We focus on priority ZIP codes within the region, meaning places that are the most overburdened by social inequities. Please see **Appendix A** for a detailed explanation of the methodology.

i. Summary of findings

This section reviews social determinants of health data for priority areas within the region, meaning areas that have more unhealthy conditions as determined by their Healthy Places Index (HPI) score, an aggregation of 23 social indicators that are statistically associated with life expectancy at birth. For every indicator, there are multiple opportunities for interventions to address social inequities that underlie unequal health status. The HPI website describes these policy opportunities, which may be viewed by clicking on individual indicators.

Due to the scope of work for this analysis, we focus primarily on ZIP codes while still pointing out where census tracts below the 50th percentile are located and how they overlap with priority ZIP codes. ZIP codes and census tracts below the 50th percentile have a lot of consistency in terms of geographic spread. For the most part, the same geographic areas that show unhealthy conditions when looking at the ZIP code level also show unhealthy conditions when looking at the census tract level. Many of the lowest-percentile census tracts overlap with and are included within priority ZIP codes. In many other cases, census tracts below the 50th percentile do not overlap with priority ZIP codes, but are right next door, demonstrating a "clustering" of unhealthy conditions in one place. However, there are indeed some census tracts below the 50th percentile that neither overlap with nor form a "cluster" with priority ZIP codes. We suggest that decision makers utilize the online HPI tool to further explore these areas.

Although equity, climate, economic and other social conditions vary across priority ZIP codes, there are some trends in the data. In terms of equity, the priority ZIP codes are relatively diverse, with racial and ethnic diversity indices ranging from 48.1% to 78.8% and an average of 62.5%. By comparison, the racial and ethnic diversity index for the entire state of California is 52%. While there is diversity, there is not integration. Every single priority ZIP code is at least moderately segregated, and many meet criteria for "very segregated." Overrepresentation of Black and Latino residents is common in these ZIP codes. Although less common, some priority ZIP codes also have overrepresentation of American Indian/Alaska Native or Native Hawaiian/Pacific Islander residents with location quotients as high as 8.0, the highest of all location quotients in any priority ZIP code, for all racial groups. This overrepresentation tells us which groups are disproportionately exposed to inequitable social conditions that exacerbate inequitable health status.

Economic security is an area of need—and opportunity—in all priority areas. Every priority ZIP code has a poverty rate below the 50th percentile, most have a per capita income below the 50th percentile, and many have employment rates below the 50th percentile. Employment rates are typically high, so even employment rates close to 75% are below the 50th percentile. This, coupled with high poverty rates and low incomes, begs the question of whether wages are livable in the region. Indeed, the Bay Area has some of the highest costs of living in the entire state as per MIT's Living Wage Calculator, which can be used to view the living wage for states, cities, and metropolitan areas of interest. As an example, multiple priority ZIP codes are in the San Francisco-Oakland-Hayward metro area, where the living wage for one adult with no children is $23.72, yet the minimum wage is only $15.50 (Glasmeier, 2023).

In terms of the environment, diesel particulate matter is a concern for nearly all priority ZIP codes. Some of these ZIP codes have some of the highest concentrations of diesel particulate matter compared to all other ZIP codes in the state, as evidenced by percentile rankings as low as the 1st through 5th percentiles. Impervious surface cover is also a concern for nearly all priority ZIP codes. Heat is more mixed. Some of the priority ZIP codes inland have risk of extreme heat. Even when extreme heat does not meet threshold criteria, about one half of priority ZIP codes meet 50th-percentile threshold criteria for the urban heat island index. Tree canopy is also typically low, exacerbating both heat and pollution. Another theme is that many of the water-adjacent priority ZIPs are below the threshold of concern for populations in sea level rise inundation areas. The percentage of population living in a sea level rise inundation area ranges from roughly 1% to more than 80%, all below the 50th percentile despite the wide range. Small percentages such as 1% should not be dismissed, as they still represent hundreds of people who are at risk of harm from sea level rise. Finally, none of the priority ZIP codes have ozone percentile or PM 2.5 levels below the 50th percentile, and only a handful of the priority ZIP codes have concerning water quality.

Beyond environmental and economic indicators of interest, this analysis also names indicators related to housing, education, transportation, or social participation that fall below the 25th percentile compared to all ZIP codes across the state. The most common indicators to fall below this threshold relate to housing. Homeownership rates are typically low in priority ZIP codes, the percentage of low-income homeowners and renters who pay more than 50% of their income in housing costs are typically high, and housing is often crowded compared to other ZIP codes. Some ZIP codes even have a high percentage of housing without basic plumbing or kitchen facilities. In priority ZIP codes, other indicators that often fall below the 25th percentile relate to education, voting rates, and Census participation rates.

Finally, in terms of health, most priority ZIP codes have insurance rates, life expectancy, and key health outcome indicator rates (e.g., asthma, low birthweight, preterm birth, poor self-reported health) that fall below the 50th percentile threshold. The fact that ZIP codes whose overall HPI score falls below the 50th percentile also have health outcomes falling below the 50th percentile underscores the importance of social determinants of health. This is particularly true for life expectancy, which is associated with all 23 HPI indicators. In other words, this finding affirms the theory behind the Healthy Places Index and shows how social and health inequities go hand in hand. The next phase of California Jobs First planning should address these inequities with meaningful action by way of policy change and the distribution of resources and opportunities to these communities.

It is important to note that while this review focused on low-percentile indicators to highlight opportunities for strategy and intervention, each ZIP code has many areas of strength that fall above the 50th percentile and other areas of strength that are not represented in the data, but that can be captured through additional qualitative methods. Future California Jobs First planning should build upon the many strengths that exist within communities.

B. Social Determinant of Health Data for the Bay Area

i. Introduction to the Healthy Places Index

The data presented in this section draws from the Healthy Places Index (HPI). Developed by the Public Health Alliance of Southern California and visualized by Axis Maps, the HPI is a composite of 23 social determinant of health indicators that are all strongly associated with life expectancy at birth. Life expectancy at birth is widely regarded to be one of the most fundamental measures of population health and well-being. Because it captures all-age and all-cause mortality, from both injuries and communicable and non-communicable diseases, life expectancy is a useful tool to gauge the overall health of a community or population (Saito et al., 2014; Singh & Lee, 2021).

As noted, the HPI is a composite of 23 social determinants of health indicators that are all found to be statistically and strongly associated with life expectancy at birth, as assessed by a team of social epidemiologists and provided in their technical documentation (Delaney et al., 2018). These indicators are sourced from a variety of public datasets, such as the Census, and are organized into eight domains: economic, education, social, transportation, neighborhood, housing, clean environment, and healthcare access. There is also an overall HPI score. The full HPI technical documentation describes the statistical methods for generating domain weights and overall HPI score, which is the sum of weighted domain averages (Delaney et al., 2018). Not only are individual indicators associated with life expectancy at birth, the overall HPI score is highly correlated with life expectancy at birth, as well (Delaney et al., 2018).

The Healthy Places Index web interface (https://www.healthyplacesindex.org/) also includes hundreds of decision-support indicators. These indicators vary widely, from measures of climate change exposure and racial equity, to basic demographics and health outcomes. This data offers important context about equity, population characteristics, community conditions, environmental conditions, and more. Although these indicators are excluded from the HPI calculation because their statistical association with life expectancy at birth is not as well established, the tool also contains a review of the research literature that describes the relationship between many decision-support indicators and health outcomes.

Decision-support indicators and the 23 indicators included in the HPI may be viewed as a value or as a percentile. Percentiles range from 1 to 100 and compare values in the place of interest to the rest of the state. All data may be viewed at multiple geographic levels including county, city, ZIP code, or census tract. For example, a county-level percentile of 10 means that the county has healthier conditions than 10% of all other counties in the state. A ZIP code-level percentile of 99 means that the county has healthier conditions than 99% of all other ZIP codes in the state. HPI developers scaled all data in the same direction so that higher percentiles represent healthier conditions for all 23 indicators (Delaney et al., 2018). For decision-support indicators, there are some exceptions where lower percentiles actually represent healthier conditions. These indicators are noted in the tables in **Appendix C**.

This analysis focuses on climate/environmental, economic, and equity indicators since these are most relevant to the California Jobs First goal to build an equitable and sustainable economy across California's diverse regions and foster long-term economic resilience in the overall transition to a carbon-neutral economy. This includes indicators that are part of the Healthy Places Index, as well as decision-support indicators that are not included in the HPI score. The indicators we include, organized by domain, are:

- Economic security indicators:
  - Poverty – *included in HPI*
  - Employment – *included in HPI*
  - Per capita income – *included in HPI*
- Clean environment indicators:
  - Diesel PM – *included in HPI*
  - Drinking water contaminants – *included in HPI*
  - Ozone percentile – *included in HPI*
  - PM 2.5 – *included in HPI*
- Climate exposure and adaptive capacity indicators:
  - Impervious surface cover – *decision-support indicator*
  - Urban heat island index – *decision-support indicator*
  - Extreme heat days – *decision-support indicator*
  - Sea level rise – *decision-support indicator*
  - Wildfire risk – *decision-support indicator*
- Neighborhood indicators:
  - Park access – *included in HPI*
  - Retail density – *included in HPI*
  - Tree canopy – *included in HPI*
- Equity indicators:
  - Historically redlined – *decision-support indicator*
  - Location quotients – *decision-support indicator*
  - Residential segregation – *decision-support indicator*
  - Gini coefficient – *decision-support indicator*

- Health care and health outcomes:
  - Health insurance – *included in HPI*
  - Life expectancy – *decision-support indicator*
  - Asthma – *decision-support indicator*
  - Poor self-reported mental health – d*ecision-support indicator*
  - Poor self-reported physical health – *decision-support indicator*
  - Preterm birth – *decision-support indicator*
  - Low birthweight – *decision-support indicator*

Despite not being the primary focus, we also present data for indicators from other domains, such as housing or transportation, when the data shows unhealthy conditions in that area. Readers interested in learning more about the scientific literature associating these indicators with health may refer to the HPI map, which includes a brief summary of literature for each indicator. To view the summary literature, click "view indicators" on the HPI map, click the arrow in the gray circle to the right of the indicator you wish to read about, and then click "policy opportunities" in the window that appears. The public health summary is viewable under "What is the connection to health?" and below that is a guide of policy opportunities. A data dictionary of all indicators presented in this report, their source, their definition, and their year can be found in **Appendix E**.

ii. Literature review for key social determinants of health indicators

This section briefly reviews the literature that establishes a connection between the indicators listed above and health outcomes, with a particular focus on life expectancy at birth.

a. Economic security and health

Within the economic security domain, the social determinant of health indicators we focus on are poverty, income, and employment.

Economic security is a key contributor to health and well-being. Socioeconomic status, which includes employment and income, is a fundamental cause of disease and mortality, meaning that it influences multiple disease outcomes and mediates access to resources that can be used to avoid or minimize health risks (Link & Phelan, 1995; Phelan et al., 2004). Indeed, research shows that individuals, families, and communities need economic security to meet their basic needs (e.g., food, medical care) and manage disease (Braveman et al., 2011). Being employed and paid a living income facilitates access to these resources (Braveman et al., 2011). Financial strain through the course of life also creates chronic stress, or allostatic load, which is associated with poorer health outcomes (Guidi et al., 2020; Kahn & Pearlin, 2006).

Some of the health outcomes associated with income include better birth outcomes and protection against chronic diseases, including diabetes, kidney disease, liver disease, heart disease, hypertension, and stroke (Braveman et al., 2010; Glinianaia et al., 2013; Glymour et al., 2014; Pleis & Lethbridge-Cejku, 2007). Research also finds a very strong association between income and mortality (Braveman et al., 2010; Chetty et al., 2016; Cristia, 2007). Poverty is also associated with life expectancy, and inequities in life expectancy grow as level of poverty grows (Singh & Lee, 2021). Specifically, Singh and Lee (2021) find that individuals living in poverty have 10.5 years lower life expectancy than those with incomes at or above 400% of the federal poverty line and 8.9 years lower life expectancy compared to those with incomes 100% to 199% of the federal poverty line. Finally, employment has also been associated with life expectancy, with one study noting that the health-harming effects of unemployment are about equivalent to a 10-year increase in age (Assari, 2018; Roelfs et al., 2011; Tapia Granados et al., 2014). Evidence suggests that the relationship between income and life expectancy has been strengthening in recent years, meaning that inequities in life longevity are increasing (Chetty et al., 2016; Cristia, 2007).

Due to intersecting systems of power and privilege, women and people of color are disproportionately exposed to the health harms of economic insecurity. For example, research shows that Black Americans have lower life expectancy than White Americans at every level of income or education, which demonstrates the depth of systemic racism rooted in American history, culture, and major systems (Braveman et al., 2010). Similarly, a recent analysis from before COVID-19 to two years into the pandemic found that declines in life expectancy were greatest for Hispanic and non-Hispanic Black populations, particularly in lower-income areas (Schwandt et al., 2022). And finally, another study finds that Black people, women, and people with lower education typically gain less life expectancy from employment (Assari, 2018). These outcomes underscore the imperative for California Jobs First to prioritize racial justice and equity in all strategies and investments.

b. Clean environment and health

Within the clean environment domain, the social determinant of health indicators we focus on are diesel particulate matter, PM 2.5, ozone percentile, and water quality.

Living in a clean environment means that the air we breathe and the water we drink are absent of health-harming contaminants. Particulate matter, or PM, is a common air pollutant. PM is a mixture of solid particles and liquid droplets in the air that are so small they can get into the lungs and bloodstream (US EPA, 2016a). PM is associated with premature death, heart attacks, heartbeat irregularities, aggravated asthma, decreased lung function, and increased respiratory symptoms (US EPA, 2016b). The smallest of those particles, PM 2.5, poses the greatest risk to health and can be emitted by construction sites, unpaved roads, fields, smokestacks, and fires (US EPA, 2016a). PM 2.5 levels are associated with life expectancy. Namely, a 10 μg/m3 decrease in PM 2.5 is associated with a statistically significant increase in life expectancy of 0.35 years (Correia et al., 2013).

Diesel PM refers to another kind of particulate matter that is emitted from trucks, buses, ships, and other vehicles with diesel engines (*Diesel Particulate Matter*, 2015). Simply breathing exposed air, which is highest near ports, rail yards, and freeways, can lead to airway inflammation, vascular dysfunction, neuroinflammation, respiratory mortality, and exposure to carcinogens (Atkinson et al., 2016; Costa et al., 2017; *Diesel Particulate Matter*, 2015; Ema et al., 2013; Ghio et al., 2012; International Agency for Research on Cancer, 2014; Levesque et al., 2011; Mills et al., 2005).

Finally, ozone is another common air pollutant. Ozone is the main ingredient in smog and is created when pollutants emitted by cars, power plants, refineries, and more react in the presence of sunlight (US EPA, 2015b). Heat accelerates ozone production; when temperatures increase, so does ozone. Similar to PM, ozone is associated with difficulty breathing, asthma attacks, and aggravation of lung diseases like asthma, emphysema, and bronchitis (US EPA, 2015a). Ozone concentration is also associated with county-level life expectancy, even after controlling for other pollutants such as PM 2.5 (Li et al., 2016).

Water quality is another key aspect of a clean environment. Research shows that water quality improvements over time, including filtration and chlorination, have unequivocally reduced mortality and improved life expectancy (Cutler & Miller, 2005). Despite the existence of water-cleaning technologies, many communities across the state still do not have access to clean water. A 2022 analysis found that more than 370,000 Californians rely on drinking water that contains arsenic, nitrate, and/or hexavalent chromium contaminants at a level above state regulatory standards (Pace et al., 2022). Water contamination disproportionately impacts communities of color across the state (Pace et al., 2022). The health harms associated with nitrate, arsenic, or hexavalent chromium contamination include cancer, birth defects, miscarriages, cancers, kidney and liver damage, or nasal and skin irritation and ulceration (*Contamination of Groundwater*, n.d.; *Hexavalent Chromium*, n.d.). Lead is another common water contaminant that is associated with premature birth, nervous system damage, learning disabilities, impaired growth, anemia, and hearing problems (US EPA, 2016c).

Research suggests that social inequality is linked to environmental quality, in particular as it pertains to both air pollution and unsafe water (Cushing et al., 2015). Due to systemic racism, communities of color are disproportionately impacted by and exposed to pollution and other environmental concerns, including lead, contaminated water, and air pollution (Moses & Excell, 2020).

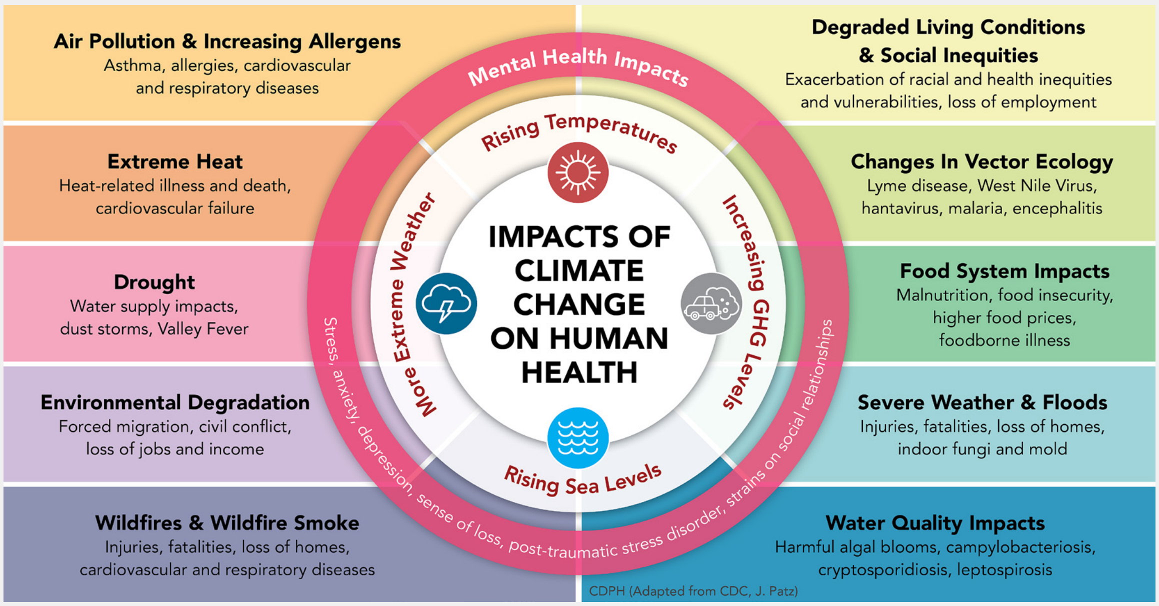
More information on pollution burden is discussed in the following section, 3.3 Regional Summary: Climate and Environmental Impacts.

c. Climate change exposures, adaptive capacity, and health

Climate change is causing changes to every natural, social, and built-environment system on which human health, life, and well-being depend. According to the California Department of Public Health, "Climate change-related health impacts can include increased number of cases of heat-related illness and death, more air pollution-related exacerbations of cardiovascular and respiratory diseases, increased injury and loss of life due to severe storms and flooding, increased occurrences of vector-borne and water-borne diseases, and stress and mental trauma from loss of livelihoods, property loss, and displacement" (California Department of Public Health, 2023).

The "San Francisco Bay Area Region Report," part of *California's Fourth Climate Change Assessmen*t, details regional conditions as of its publication in 2019. The report finds that the region's greatest climate threats to public health are extreme heat, coupled with lack of experience with heat and limited access to air conditioning in some areas; air pollution from ozone production and wildfires; flooding from sea level rise, which can also impact hazardous waste sites; climate-related disruption of transportation networks that bring people away from danger and to medical care; longer and more frequent droughts; and storms, including high-intensity rain (Ackerly et al., 2018). Within the region, specific climate experiences vary greatly between the more coastal urban areas and the more-inland suburban or exurban areas (Ackerly et al., 2018). As shown in **Exhibit 3.36**, these climate exposures are associated with a host of health risks including illness, injury, loss of homes, and impacted water supplies. The health impacts of climate change are not limited to physical health; increasing temperatures, drought, and climate disasters are also found to be associated with anxiety, depression, post-traumatic stress, and an increase in aggression (Padhy et al., 2015).

EXHIBIT 3.36 | Impacts of climate change on human health



Source: California Department of Public Health, Climate Change and Health Equity Section, visual adapted from CDC and Jonathan Patz, https://www.cdph.ca.gov/Programs/OHE/pages/CCHEP.aspx#

Low-income communities, some communities of color, older adults, children, Indigenous populations, people with chronic medical conditions or disabilities, pregnant people, outdoor workers, and those working in hot environments are most at risk to climate change (US EPA, 2022a). While some people experience physical vulnerability due to biological mechanisms, such as pregnant people or older adults, others experience vulnerability due to systemic oppression, such as low-income communities of color. These groups are not mutually exclusive, and some people experience layered physical and systemic vulnerabilities. The "San Francisco Bay Area Region Report" notes that socioeconomic inequities within the Bay Area create large differences in both who is impacted by climate threats and who has ability to prepare and recover (Ackerly et al., 2018).

Of particular note for California Jobs First are the risks workers face. Outdoor workers are disproportionately exposed to extreme temperatures, wildfire smoke, pollutants, pests, and biological hazards (Petek, 2022). These outdoor jobs—which include in industries such as agriculture, construction, landscaping, and more—are disproportionately held by Black and Latino individuals (Dahl & Licker, 2023). Indoor workers may also be exposed to extreme heat, especially those working in hot environments, such as food operations, warehouses, or manufacturing (Petek, 2022).

The specific climate change exposure indicators included in this analysis are extreme heat, wildfire risk, and sea level rise. For a more detailed discussion on these exposures, please see the following section, 3.3 Regional Summary: Climate and Environmental Impacts.

Adaptive capacity refers to the "ability of a human or natural system to adjust to climate change (including climate variability and extremes) by moderating potential damages, taking advantage of opportunities, or coping with the consequences" (US EPA, 2021). This analysis focuses on two indicators of adaptive capacity: urban heat islands and impervious surface cover.

Urban heat islands are areas with significantly higher temperatures than surrounding rural (or less urban) areas. As a result, the many health harms of extreme heat are exacerbated in urban heat islands. While natural vegetation cools ground temperatures, the materials typically used in urban areas absorb and radiate more of the sun's heat (US EPA, 2014a). Human activity, geographic features, and urban geometry can also lead to temperature increases in urban areas (US EPA, 2014a). Impervious surfaces, which are typically made of concrete or asphalt and can be found on roofs or parking lots, intensifying the urban heat island effect by retaining heat and limiting water absorption (Frazer, 2005; Vujovic et al., 2021). Impervious surfaces can also make flooding worse, intensify drought by reducing groundwater reserves, transport pollutants, and reduce water quality (Frazer, 2005; Water Science School, 2018). Research shows that people of color and households living below the poverty line are disproportionately exposed to impervious surfaces and the urban heat island effect due to historic redlining, disinvestment, and continued lack of parks, trees, and greening (Hsu et al., 2021; Jesdale et al., 2013).

d. Neighborhood characteristics and health

Within the neighborhood domain, the social determinant of health indicators we focus on are tree canopy cover, park access, and retail density. The reason we include these indicators is their relevance to climate exposures and economic security.

Trees and other vegetation found in parks help cool the environment and can reduce the effect of urban heat islands (US EPA, 2014b). Unshaded materials can be 20 to 45 degrees Fahrenheit warmer than shaded surfaces (Akbari et al., 1997; US EPA, 2014b). In addition to their cooling effect, trees and vegetation may reduce energy use, improve air quality, remove air pollutants, and enhance stormwater management and water quality (US EPA, 2014b). The public health impacts of trees and park access include reduced stress and increased health, wellness, physical activity, and social connectedness *(Funding Trees for Health*, 2017; Jiang et al., 2016; Kardan et al., 2015; Sallis & Spoon, 2014; Transportation Research Board & Institute of Medicine of the National Academies, 2005). Research has also documented the association between green space, tree canopy, and parks and life expectancy (Connolly et al., 2023; Donovan et al., 2022; Jonker et al., 2014; Rojas-Rueda et al., 2019). For example, a Los Angeles-based study predicted that the county population would gain 155,300 years of life expectancy if all areas currently below the median were brought to the county median of park acres—with the majority of gains being in areas that are predominantly Latino and Black (Connolly et al., 2023). Indeed, other research shows income- and race-based inequities in access to urban green space (Gerrish & Watkins, 2018; Watkins & Gerrish, 2018).

Retail density, on the other hand, relates to economic security. The HPI defines retail density as a "proxy for neighborhoods with a mix of uses and destinations, indicating areas with economic opportunities and transportation options." The relationship between economic opportunity and health has been established above. In terms of transportation, people living in neighborhoods with high retail density may have to travel less to fulfill their basic, social, and recreational needs. As a result, residents have lower transportation costs, more opportunities for physical activity, and more time to spend with their families and communities. The public health evidence is overwhelming: physical activity is good for health. According to the Centers for Disease Control and Prevention (CDC), physical activity can improve brain health, strengthen bones and muscles, and reduce risk of diseases including cardiovascular disease, Type 2 diabetes, infectious diseases, and some cancers (CDC, 2023). One study specifically looked into the relationship between neighborhood walkability and life expectancy and found that walkability is a predictor of longevity in mid-sized cities in particular (Riggs & Gilderbloom, 2016).

e. Health insurance and health

Within the health insurance domain, we include the percentage of adults who are insured.

Health care can be prohibitively expensive even with insurance, but especially without. When individuals and families have health insurance, they are more likely to seek care, including primary prevention, screening, and chronic disease care (Institute of Medicine [US] Committee on the Consequences of Uninsurance, 2002). It follows, then, that uninsurance is associated with mortality (Wilper et al., 2009). Health insurance also helps families prevent economic insecurity. A survey sent to a random sample of 3,200 bankruptcy filers across the United States found that 58.5% of respondents said medical expenses contributed to their bankruptcy, even after the Affordable Care Act (Himmelstein et al., 2019).

f. Racial and economic equity and health

Within the racial and economic equity domain, the social determinant of health indicators we focus on are historical redlining, racial and ethnic diversity, residential segregation, and income inequality.

As discussed earlier, unequal power dynamics create social inequities that become embedded in institutions, which in turn shape living conditions and create health inequities. This is evident in the literature reviewed above: for each domain, a disproportionate burden of unhealthy living conditions and health inequities are experienced by low-income communities of color, often specifically Black communities. The reason for this is racism. Racism is recognized as a root cause, or fundamental cause, of health inequities and inequities in social determinants of health (Malawa et al., 2021; Phelan & Link, 2015). Historically and in the present day, racism permeates the social systems and institutions that allocate resources, shape opportunity and material conditions, and ultimately determine who can be healthy and thrive. Experiences of racism and discrimination also deteriorate health directly through a process that researcher Arline Geronimus defines as "weathering" (Davies, 2023; Geronimus, 1992).

Historical redlining plays a significant role in shaping present-day racial inequities. In the wake of the Great Depression and home foreclosures, the federal government established new agencies to create a system of affordable home mortgages (Swope et al., 2022). These agencies, the Home Owners' Loan Corporation and the Federal Housing Administration, gave neighborhoods ratings to appraise "investment risk." Due to racism and other biases, the agencies considered neighborhoods with non-White, Jewish, or immigrant residents "high risk" for investment (Swope et al., 2022). These neighborhoods were marked in red, or "redlined," which subsequently barred them from receiving mortgages or other government support. Black neighborhoods were the most likely to be redlined (Richardson, 2020). This set the stage for "White flight" from these neighborhoods, segregation, intergenerational racial inequity in homeownership and wealth accumulation, and long-term neighborhood disinvestment (Swope et al., 2022).

To this day, formerly redlined neighborhoods experience concentrated economic disadvantage including lower incomes and lower economic mobility and associated health outcomes (Park & Quercia, 2020). In their scoping review of 33 studies, Swope and colleagues (2022) look beyond economic indicators to examine the association between historical redlining, environmental conditions, and health outcomes. Many of the indicators covered in this literature review were included in their analysis, including life expectancy, impervious surface cover, tree canopy, average temperatures, and more. Indeed, they found that the vast majority of studies provided evidence of an association between redlining and poorer environmental and health outcomes (Swope et al., 2022).

Other research, including a similar systematic review, have similarly found evidence of an association between historical redlining and present-day physical and mental health outcomes (Lee et al., 2022; Lynch et al., 2021).

Another legacy of redlining is present-day residential segregation. The association between segregation and health outcomes is well documented. As one review of the literature notes, residential segregation is one of the factors most responsible for "persisting Black-White inequalities in health" (Williams & Collins, 2001). In a review of 39 studies, Kramer and Hogue (2009) find that the vast majority of studies document a significant association between racial segregation and health outcomes, including mortality, pregnancy outcomes, self-rated health, and health behaviors such as injection drug use (Kramer & Hogue, 2009).

Segregation is a multidimensional construct that cannot be captured by a single indicator alone. Previous research has suggested using five dimensions to assess segregation: the distribution of racial groups, the degree of potential contact between racial groups within a place, the extent to which members of a racial group are together in one place, the degree to which a group is located near the center of an urban area, and the amount of physical space occupied by a group (Massey & Denton, 1988; Weinberg et al., 2003). This analysis features three indicators included in the Healthy Places Index that provide an estimation of these dimensions (Menendian et al., 2021).

The first, the racial and ethnic diversity index, shows the probability that two people chosen at random from a geography will be of different races or ethnicities. This is related to segregation yet distinct, as diversity does not imply integration. The second, the location quotient, measures over- or underrepresentation of a racial or ethnic group in a given geography compared to the county. Values over 1 suggest overrepresentation compared to the county, and values under 1 suggest underrepresentation compared to the county. The third, the index of dissimilarity, measures the degree of segregation between two racial groups by indicating the percentage of either racial group that would have to move to a different neighborhood to create perfect integration. Generally, values over 0.6 are considered highly segregated and values from 0.3 to 0.6 are considered moderately segregated (Menendian et al., 2021).

The final equity indicator, the Gini coefficient, is a measure of income inequality that ranges from 0 to 1. Zero means maximum equality where all people have an equal share of income, while one means maximum inequality where one person or group has all income (US Census Bureau, 2021). While individual income is an individual characteristic, income inequality is a characteristic of a particular social system or place (Lynch et al., 2004). The epidemiological literature strongly suggests that income inequality impacts population health in the United States (Lynch et al., 2004; Pickett & Wilkinson, 2015). One analysis found that state-level income inequality is associated with a host of physical and mental health concerns for residents across income levels (Matthew & Brodersen, 2018). In other words, income inequality hurts everyone.

It should be noted that income inequality is fundamentally intersectional with racial inequity. Because of systemic racism embedded in systems, laws, policies, and institutions since the founding of this country, including the history of redlining and present-day segregation, Black Americans are overrepresented in low-paying jobs, hold less generational wealth, and are more likely to live in poverty than White Americans ("Data on Poverty in the United States," 2022; *Racial Economic Inequality*, n.d.).

iii. Regional data

This section begins by presenting high-level regional data before moving into a discussion of why it is important to look at the ZIP code level.

Exhibit 3.37 presents population and racial demographics for each county within the nine-county Bay Area region. The data in this table are sourced from the HPI website. The HPI map may be viewed online at https://www.healthyplacesindex.org/ to see a breakdown of specific ethnicities within each racial category. **Exhibit 3.38** presents the overall HPI and domain rankings, per county. **Exhibit 3.39** is a visualization of the data in **Exhibit 3.38**.

EXHIBIT 3.37 | Racial demographics and population, by county

County	Population	American Indian or Alaska Native alone	Asian alone	Black or African American alone	Hispanic or Latino of any race	Native Hawaiian or other Pacific Islander alone	White alone	Some other race alone	Two or more races
Alameda	1,656,754	0.3%	29.9%	10.3%	22.4%	0.8%	31.4%	0.3%	4.5%
Contra Costa	1,142,251	0.2%	16.5%	8.4%	25.6%	0.5%	43.8%	0.3%	4.7%
Marin	259,943	0.2%	5.8%	2.1%	16.0%	0.1%	71.2%	0.9%	3.8%
Napa	139,623	0.3%	8.0%	2.0%	34.1%	0.2%	52.4%	0.4%	2.6%
San Francisco	874,961	0.2%	34.1%	5.0%	15.2%	0.3%	40.5%	0.4%	4.2%
San Mateo	767,423	0.2%	28.3%	2.2%	24.4%	1.3%	39.2%	0.4%	4.0%
Santa Clara	1,927,470	0.2%	36.3%	2.3%	25.5%	0.3%	31.5%	0.3%	3.6%
Solano	441,829	0.3%	15.0%	13.5%	26.5%	0.9%	38.0%	0.4%	5.5%
Sonoma	499,772	0.5%	4.0%	1.5%	26.7%	0.3%	63.2%	0.4%	3.3%

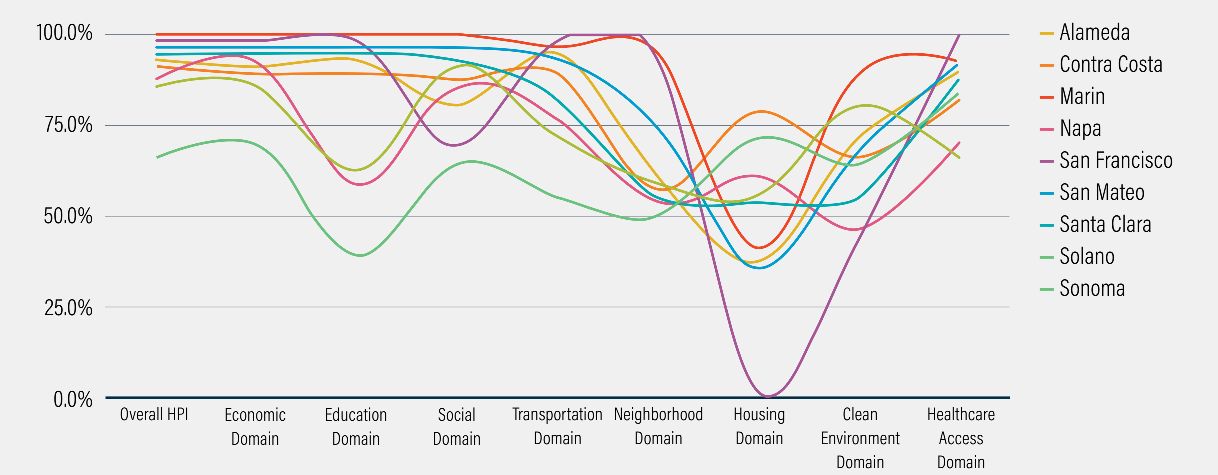
Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org

EXHIBIT 3.38 | Overall HPI percentile and HPI domain percentiles

County	Overall HPI	Economic Domain	Education Domain	Social Domain	Transportation Domain	Neighborhood Domain	Housing Domain	Clean Environment Domain	Healthcare Access Domain
Alameda	92.9	91.1	92.9	80.4	94.6	60.7	37.5	71.4	89.3
Contra Costa	91.1	89.3	89.3	87.5	89.3	57.1	78.6	66.1	82.1
Marin	100.0	100.0	100.0	100.0	96.4	94.6	41.1	89.3	92.9
Napa	87.5	92.9	58.9	85.7	76.8	53.6	60.7	46.4	69.6
San Francisco	98.2	98.2	98.2	69.6	98.2	92.9	1.8	42.9	100.0
San Mateo	96.4	96.4	96.4	96.4	92.9	75.0	35.7	67.9	91.1
Santa Clara	94.6	94.6	94.6	92.9	82.1	55.4	53.6	55.4	87.5
Solano	66.1	69.6	39.3	64.3	55.4	50.0	71.4	64.3	83.9
Sonoma	85.7	85.7	62.5	91.1	71.4	58.9	55.4	80.4	66.1

Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org

EXHIBIT 3.39 | Overall HPI percentile and HPI domain percentiles



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org

While it may be helpful to paint the broad strokes of social determinants of health across the region, the rest of this analysis does not focus on the county level. Using county-level public health data alone is both insufficient and inequitable. Social, environmental, and economic conditions vary greatly within a county. For example, all counties within the Bay Area have an HPI ranking above 66th percentile. However, when we look at all ZIP codes within the region, we see that there is a ZIP code in San Francisco County with a percentile of 5.8, compared to the San Francisco County percentile of 98.2. If we limit analyses to the county level, this community and the people living there will be overlooked and excluded. Instead, it is important to focus on a level of geography that allows us to see important within-county variations, while still being broad enough to capture community-level trends, needs, and action opportunities. For that reason, the rest of this analysis focuses on a smaller geographic level of analysis: ZIP codes.

Based on overall HPI percentile, we have identified what we call "priority ZIP codes," or areas where investments should be strategically targeted due to unhealthy living conditions that result from marginalization, disinvestment, and exclusion. These communities are overburdened by climate, economic, and other health and social inequities, and have HPI percentiles below 50. As such, California Jobs First investments should focus on improving social, environmental, and economic conditions within these regional subgeographies.

The reason we selected ZIP codes rather than census tracts, an even smaller unit of analysis, is due to the scale of the Bay Area region. There are more than 1,500 census tracts in the nine-county Bay Area region, 275 of which are below the 50th percentile compared to all census tracts across the state. By comparison, there are about 250 ZIP codes in the Bay Area, 25 of which are below the 50th percentile. This analysis intends to present information that is detailed enough to inform place-based strategies tailored to specific community conditions, which is why the analyses that follow discuss each ZIP code through an in-depth profile rather than solely reviewing trends across priority places. Discussing 275 individual places is beyond the scope and timeline of this analysis and beyond what would be digestible and actionable for audiences. In later sections, we discuss how census tract-based areas of need and ZIP code-based areas of need overlap, and we offer maps that visualize these overlaps.

iv. Methodology

This section discusses the methodology for identifying priority ZIP codes.

We first looked at the overall HPI rankings for all ZIP codes within the region. Across the nine-county region, for 246 ZIP codes, the HPI percentiles range from 5.8 to 100 with a mean of 77.9 and a standard deviation of 20.1. The median is 82.7. We then identified the ZIP codes below the 50th percentile compared to all ZIP codes in the state of California. Across the nine-county region, 25 ZIP codes have an HPI ranking that falls below the 50th percentile. **Exhibit 3.40** presents these ZIP codes, where they are, their HPI percentile, and their basic demographic information.

One ZIP code will be excluded from further discussion, 94704, because it is an area of Berkeley next to the University of California campus where many young students who are financially supported by their families, grants, and/or scholarships live. In this ZIP code, the economic and housing-related indicators in particular are low because of the circumstances of being a student. While certainly many students experience structural inequities and would benefit from structural changes that shift power, promote equity, and advance racial justice, the low HPI score in this area does not reflect regional living conditions in the same way as it does in other ZIP codes.

Seven priority ZIP codes are in Contra Costa County; four each in Alameda, Solano, and Santa Clara Counties; three in San Francisco County; and one each in San Mateo and Sonoma Counties. None of the ZIP codes in Marin or Napa Counties fall below the 50th percentile. Only six ZIP codes fall below the 25th percentile, compared to all ZIPs across the state, three of which are in Alameda County. Also of note are the varying population sizes across ZIPs, which range from slightly more than 2,000 to more than 97,000 inhabitants.

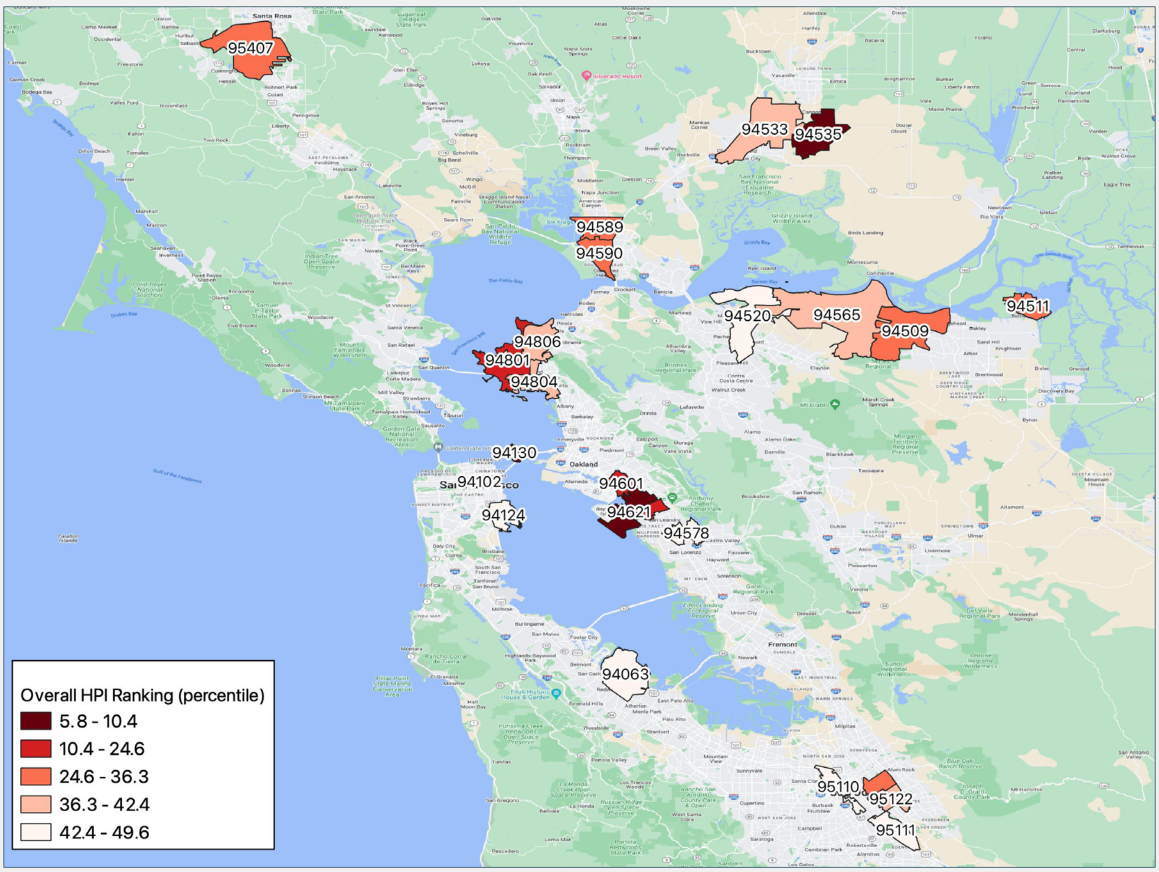
EXHIBIT 3.40 | Basic information about priority ZIP codes

Zip	County	City	Population	HPI Ranking (%)	American Indian or Alaska Native alone	Asian alone	Black or African American alone	Hispanic or Latino of any race	Native Hawaiian or other Pacific Islander alone	White alone	Some other race alone	Two or more races
94130	San Francisco	San Francisco	3,008	5.8	0.8%	10.3%	22.2%	26.0%	2.7%	27.9%	3.5%	6.4%
94535	Solano	Travis Air Force Base	3,842	6.2	0.0%	4.5%	15.9%	16.9%	2.4%	54.0%	0.0%	6.3%
94621	Alameda	Oakland	35,035	10.4	0.1%	2.7%	31.9%	57.5%	1.8%	4.0%	0.3%	1.7%
94603	Alameda	Oakland	35,862	22.6	0.3%	5.8%	29.1%	58.2%	0.5%	3.4%	0.3%	2.4%
94801	Contra Costa	Richmond	31,210	23.9	0.4%	10.5%	14.4%	60.7%	0.0%	12.1%	0.2%	1.7%
94601	Alameda	Oakland	53,039	24.6	0.3%	16.4%	18.3%	51.9%	0.3%	9.8%	0.2%	2.7%
94590	Solano	Vallejo	37,280	29.7	0.1%	10.0%	25.7%	32.8%	0.8%	26.0%	0.3%	4.3%
94509	Contra Costa	Antioch	68,166	31.8	0.3%	7.7%	19.5%	37.1%	0.2%	30.3%	0.2%	4.7%
95116	Santa Clara	San Jose	55,825	33.4	0.1%	23.8%	2.4%	64.3%	0.4%	6.8%	0.2%	1.9%
94511	Contra Costa	Bethel Island	2,161	34.4	0.0%	1.2%	2.3%	29.0%	0.0%	66.5%	0.0%	1.0%
94589	Solano	Vallejo	31,536	35.3	0.1%	24.2%	20.1%	31.9%	1.5%	17.5%	0.3%	4.4%
95407	Sonoma	Santa Rosa	42,026	36.3	1.0%	6.0%	3.1%	55.9%	0.2%	30.7%	0.1%	3.0%
94102	San Francisco	San Francisco	31,392	39.3	1.0%	28.7%	9.8%	20.6%	0.3%	35.0%	0.4%	4.1%
94565	Contra Costa	Pittsburg/ Bay Point	97,671	39.4	0.3%	14.3%	13.5%	48.7%	0.6%	17.6%	0.4%	4.6%
94806	Contra Costa	San Pablo	64,286	39.9	0.2%	17.7%	14.1%	51.6%	0.5%	11.6%	0.9%	3.3%
94533	Solano	Fairfield	75,909	41.6	0.5%	14.5%	16.5%	34.9%	1.4%	26.4%	0.2%	5.7%
95122	Santa Clara	San Jose	56,121	42.0	0.1%	35.4%	1.1%	57.9%	1.1%	3.3%	0.3%	0.9%
94804	Contra Costa	Richmond	40,931	42.4	0.3%	11.6%	25.2%	40.7%	0.4%	16.9%	0.9%	4.0%
94124	San Francisco	San Francisco	35,747	44.9	0.1%	36.3%	26.7%	24.3%	2.0%	7.7%	0.1%	2.7%
95110	Santa Clara	San Jose	19,928	45.3	0.2%	13.7%	2.7%	58.9%	0.1%	20.5%	1.5%	2.5%
94520	Contra Costa	Concord	38,753	46.0	0.1%	12.6%	4.6%	47.3%	1.1%	29.5%	0.1%	4.6%
95111	Santa Clara	San Jose	61,830	46.2	0.2%	35.3%	1.9%	49.7%	0.6%	9.5%	0.1%	2.7%
94063	San Mateo	Redwood City	34,867	48.7	0.2%	7.7%	2.4%	64.8%	1.0%	21.9%	0.5%	1.5%
94578	Alameda	San Leandro	41,865	49.6	0.3%	26.3%	16.9%	35.9%	0.3%	16.2%	0.7%	3.4%

Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org

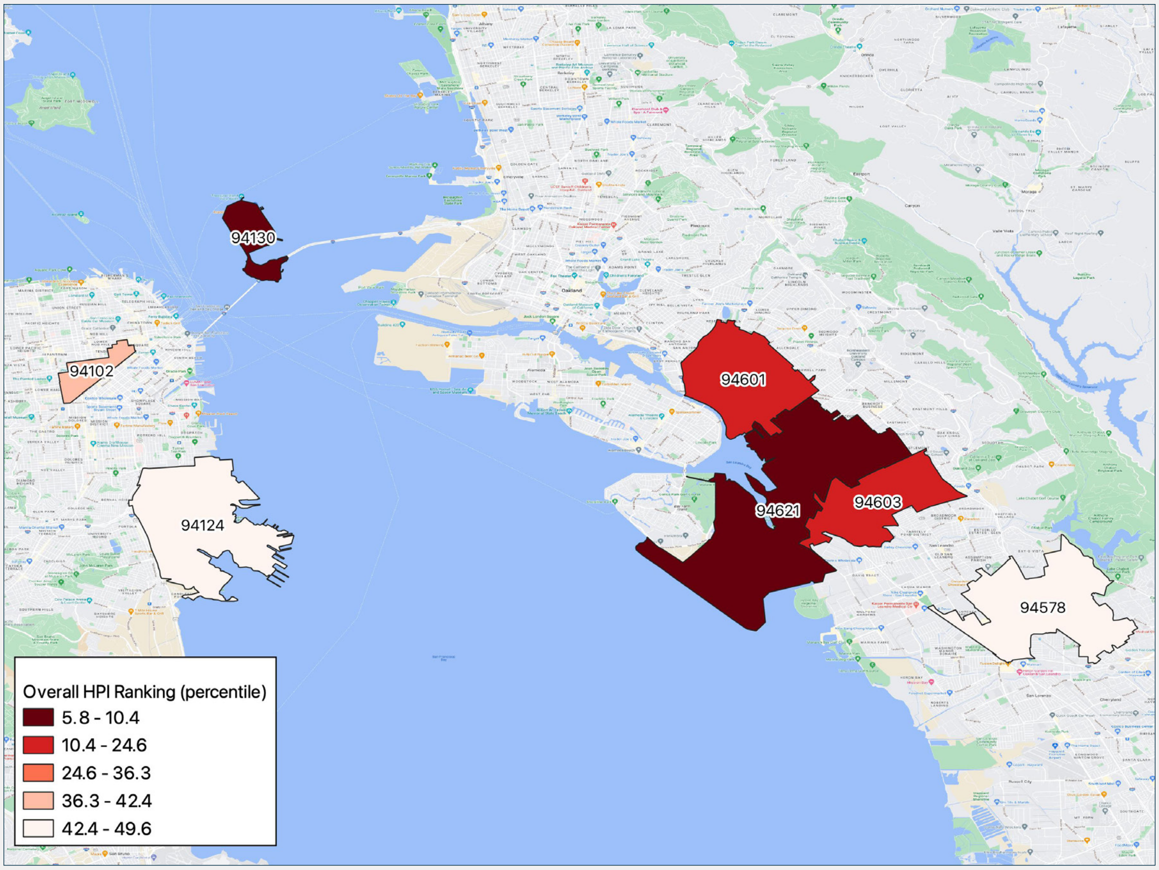
Exhibits 3.41 through **3.45** visualize where these priority ZIP codes are located throughout the Bay Area, first with a map of the entire region, then zoomed in maps of areas where priority ZIP codes are clustered. All data are from the Healthy Places Index, with maps made by the author using QGIS.

EXHIBIT 3.41 | Map of priority ZIP code locations



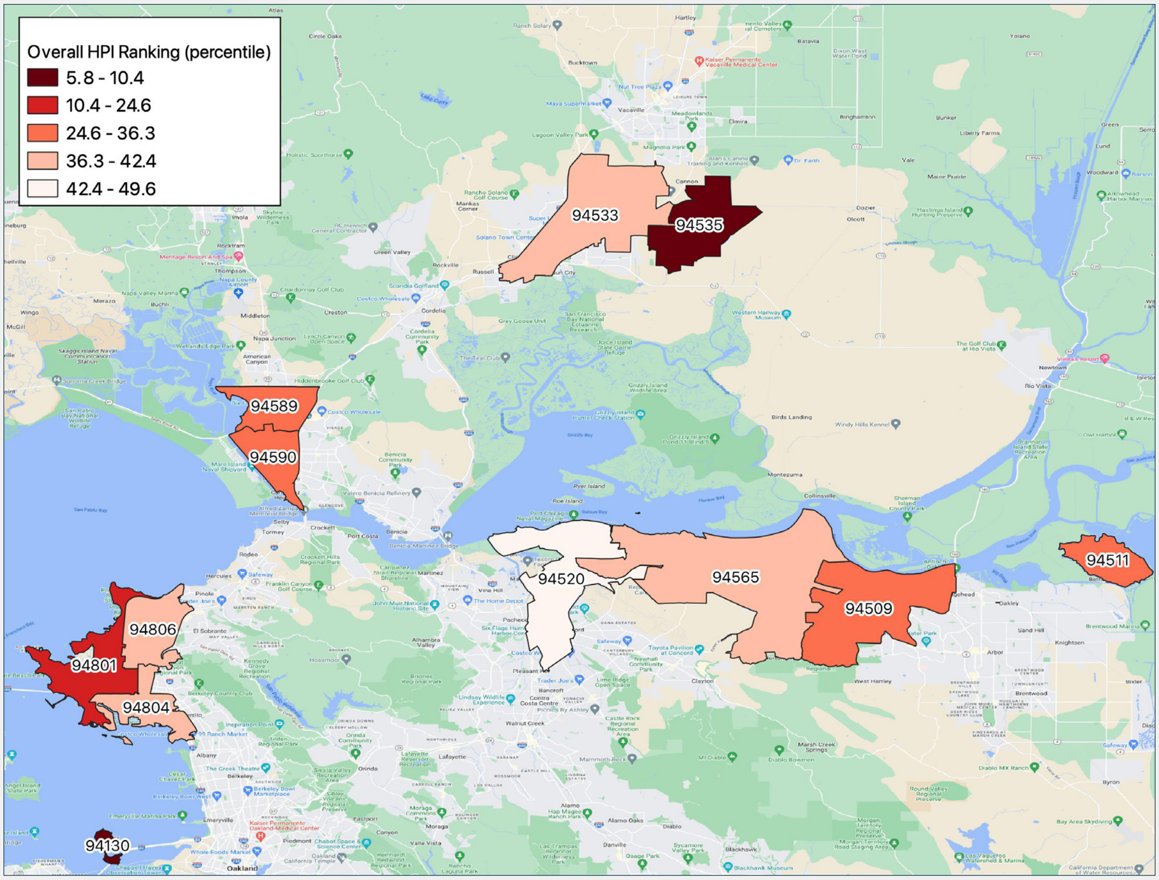
Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

EXHIBIT 3.42 | Map of priority ZIP code locations: Detail map showing areas of San Francisco, Oakland, and San Leandro



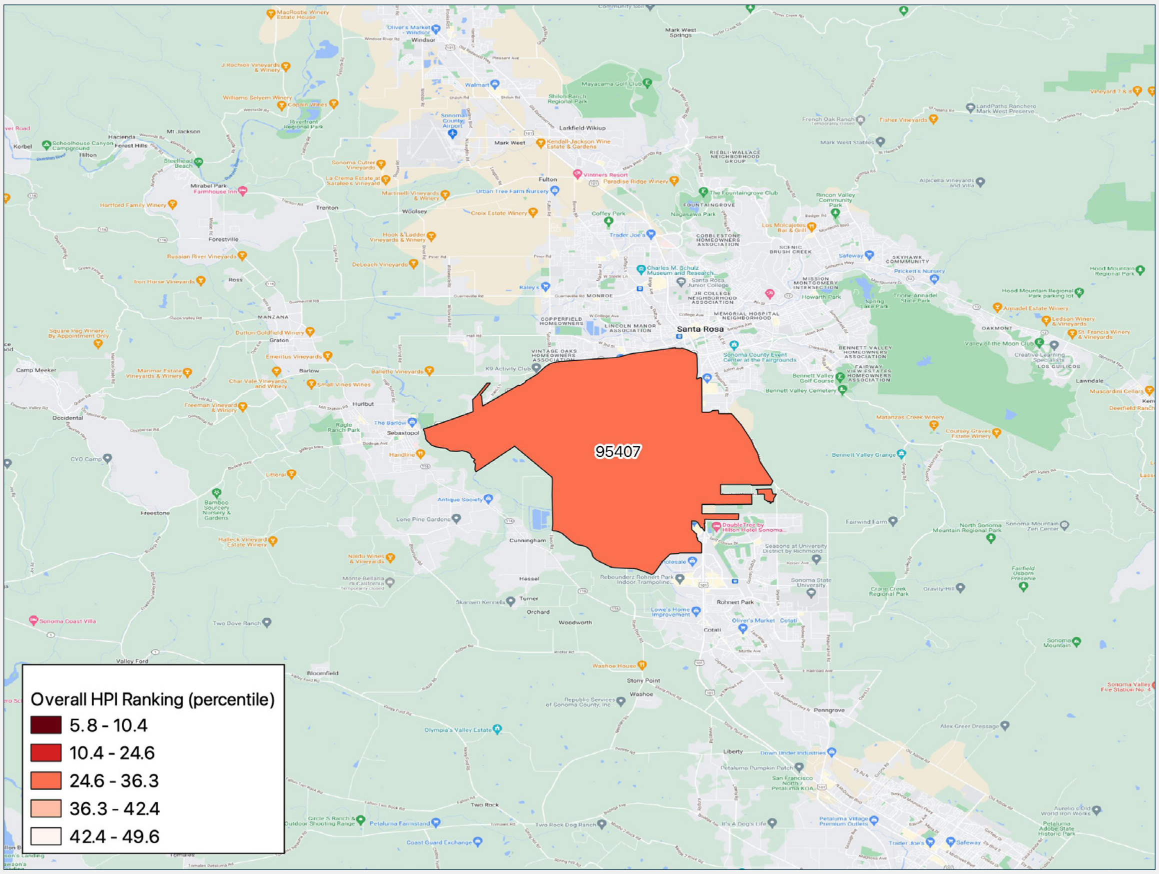
Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

EXHIBIT 3.43 | Map of priority ZIP code locations: Detail map showing areas of Richmond and Solano and Contra Costa Counties



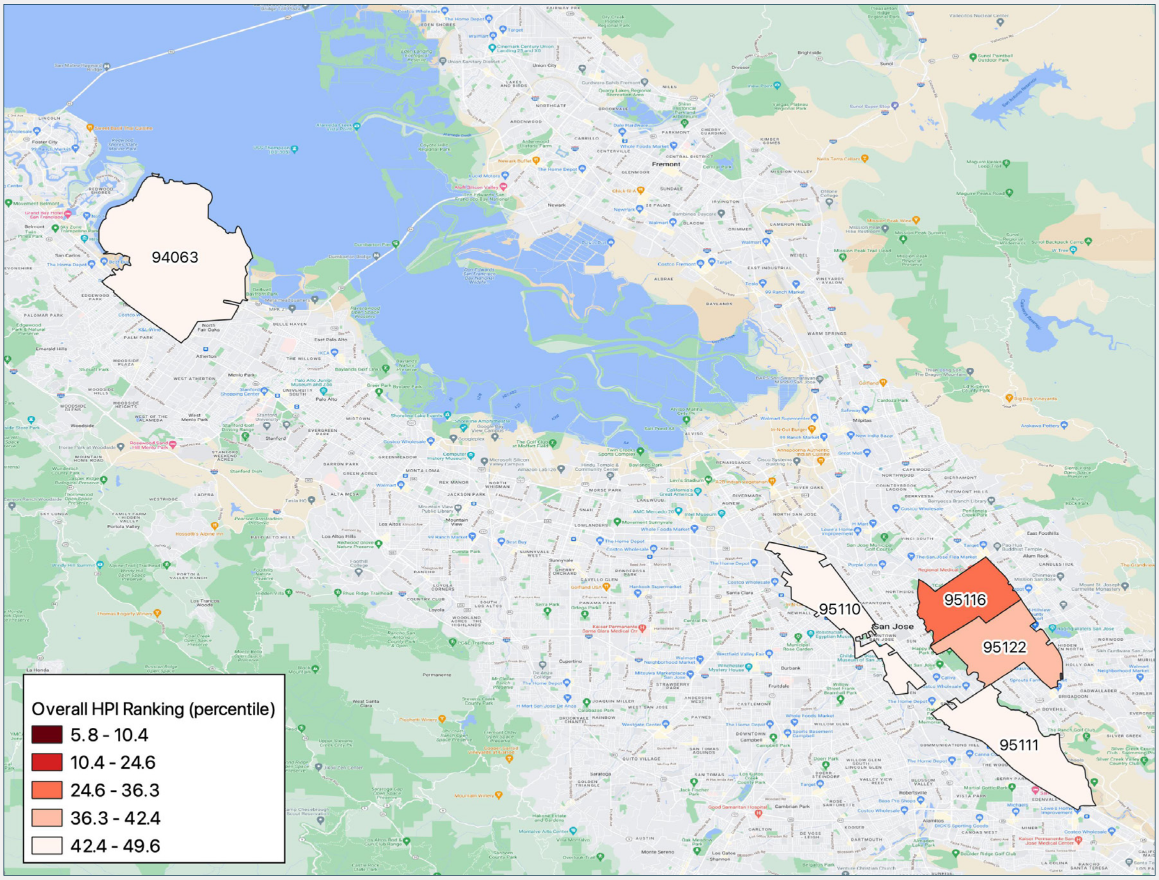
Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

EXHIBIT 3.44 | Map of priority ZIP code locations: Detail map showing areas of Sonoma County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

EXHIBIT 3.45 | Map of priority ZIP code locations: Detail map showing areas of Santa Clara and San Mateo Counties



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

The remainder of this section continues to explore these priority ZIP codes in depth, with a focus on social determinant indicator data related to climate change, economic conditions, and overall racial and economic equity. As referenced in the literature review above, these social determinants are associated with a host of disease outcomes. Because of that, we report health outcomes of interest that capture multiple diseases and chronic conditions: life expectancy at birth; self-rated mental health; and self-rated physical health. Birth outcomes, in particular infant mortality, are other common population health summary measures (Buitendijk et al., 2003; US EPA, 2017). For that reason, we also include low birthweight and preterm birth, which are leading causes of infant mortality (Behrman, et al. 2007). Finally, we include asthma, which is directly related to many environmental factors, including pollution and wildfire smoke.

The following sections present the data grouped by county. As acknowledged earlier, we focus on ZIP codes due to the size of the region and the number of census tracts within. That said, it is important to highlight census tracts with unhealthy conditions. Many of the unhealthiest census tracts overlap priority ZIP codes, but some do not. Each county section begins by presenting a map of priority ZIP codes overlaid with census tracts below the 50th percentile. We discuss where there is overlap and where there is not. We then move on to describe community conditions in each priority ZIP code, using the indicators of interest described above. By including in-depth profiles that discuss specific indicators in each ZIP code, rather than solely reviewing aggregate trends or limiting the discussion to overall HPI score, we hope to enable place-based strategies tailored to specific community conditions. However, geographies and communities that do not overlap with priority ZIP codes are not discussed in as much depth. This is discussed further in the limitations section. For additional geographies and indicators, we encourage decision makers to visit the HPI website and make use of the full mapping tool, which is far more detailed and expansive than can be captured in this report.

All data examined in this analysis were downloaded from the HPI in Spring 2023. Rather than report all data points, we are using a 50th-percentile threshold of inclusion for economic, environmental, climate, and health indicators. By limiting to indicators below the 50th percentile for the state, we narrow our focus to the specific areas of investment opportunity in each ZIP code. Additionally, as mentioned above, we also name indicators associated with life expectancy at birth that are not included in climate, economy, or equity if the data shows a particular action opportunity in that area. For these other indicators, such as transportation or housing, the threshold for inclusion is a value below the 25th percentile for the state. There is no inclusion threshold for the equity indicators (location quotient, racial and ethnic diversity index, and residential segregation); all are discussed regardless of their percentile.

When reviewing ZIP code data on the following pages, some things to remember are:

- All indicators are reported as values, rather than percentiles. Percentiles for reported data may be found in **Appendix C**. Data sources, years, and definitions may be found in **Appendix E**.
- Remember all values reported below meet the threshold criteria described above. In other words, if a value is reported, it is because it is less healthy compared to other ZIP codes. Some values may appear close to optimal health, but are nonetheless a low percentile. For example, some ZIP codes have less than 1% of the population who live in a sea level rise inundation area, yet the percentile is well below 50 because 1% a lot compared to other ZIP codes.
- High values may be less healthy for one indicator and more healthy for another. For example, a poverty rate of 0% suggests economic security, but an employment rate of 0% suggests economic insecurity.

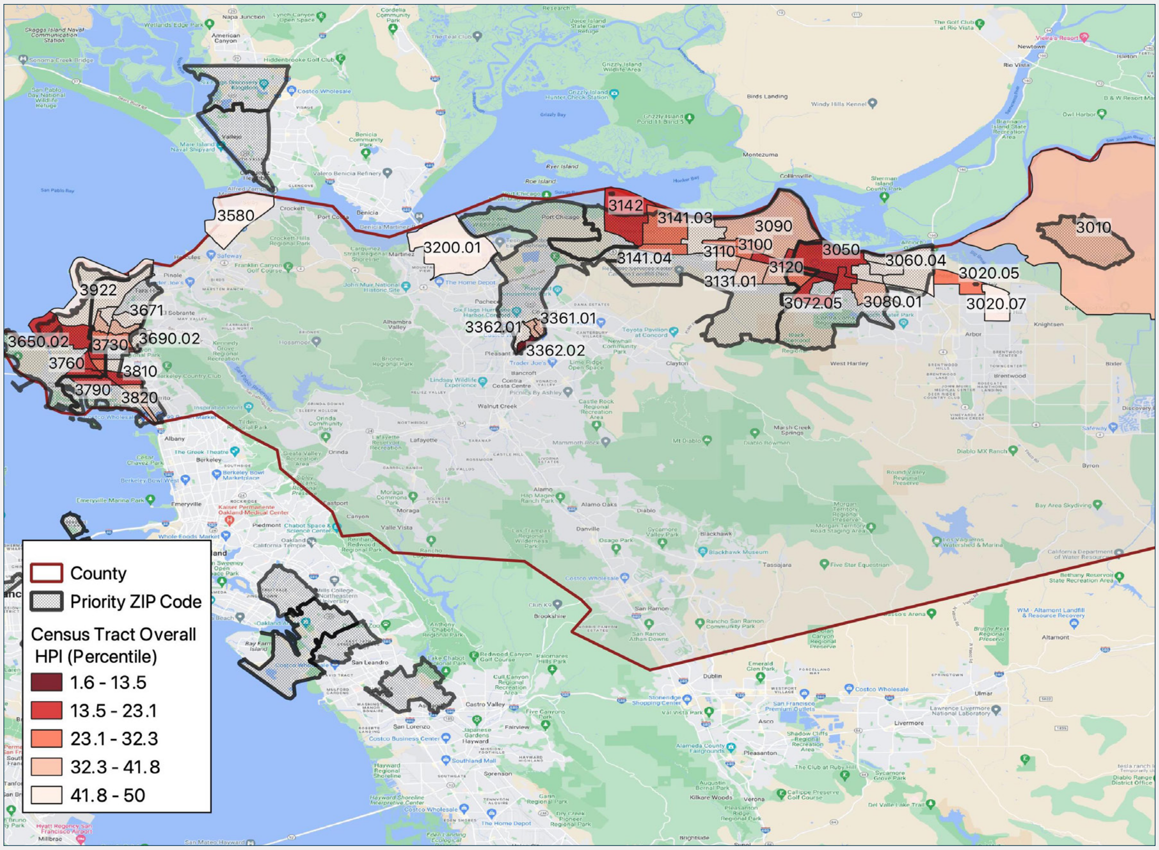
v. Findings: Contra Costa County

Contra Costa County has the most priority ZIP codes of any Bay Area county, which is seven. The following image overlays these priority ZIP codes with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows Contra Costa County. Priority ZIP codes are indicated by the gray overlay shapes. ZIP codes beyond the boundary of Contra Costa County are visible but may be disregarded; they are discussed in their respective county sections. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Contra Costa County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows that priority ZIP codes and priority census tracts cluster in the west (Richmond and San Pablo) and north (Martinez to Bethel Island) of the county. Census tracts with the most unhealthy conditions, as indicated by darker reds, are nearly all contained within priority ZIP codes. The few priority census tracts beyond ZIP code boundaries are instead right next to them, forming a cluster. The exception is census tract 3580 (Crockett/Rodeo), which is in the northwest corner of the county.

The remainder of this section discusses social determinant of health data for priority ZIP codes through in-depth profiles. **Exhibit 3.46** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundaries.

EXHIBIT 3.46 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Contra Costa County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

a. 94801, Richmond, Contra Costa County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 23.9 | Population: 31,210

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 53.2%. Latino residents are the most overrepresented racial or ethnic group, with a location quotient of 2.3. The ZIP code is very segregated, with a non-White residential segregation index of 0.8.

Climate and Economic Indicators (threshold: 50th percentile): Economic conditions in this ZIP code are in the lowest 50% compared to the state. The per capita income is $24,742, the employment rate is 70.9%, and 56.6% of people have incomes above 200% of the federal poverty level. In terms of the environment, the diesel PM level in this ZIP code is very unhealthy compared to the state, at 0.8 kg/day. This ZIP has a high percentage of impervious surface cover, at 61.1%, while tree canopy is low, at 5.1%.

Other Indicators (threshold: 25th percentile): Preschool enrollment is low, at 36.4%. The voting rate is also low, at 66.5%, and only 89.3% of households have access to a car. Homeownership is low, at 43.8%, and the percentage of low-income homeowners who pay more than 50% of their income to housing costs is high, at 16.1%. Finally, only 13.4% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 82.1% of adults are insured. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 76.7 years, 10.7% of the population has asthma, 6.0% of babies are born with low birthweight, 7.7% of babies are born preterm, 15.9% of residents report that their mental health is not good, and 15.4% of residents report that their physical health is not good.

b. 94509, Antioch, Contra Costa County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 31.8 | Population: 68,166

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 68.9% The most overrepresented racial or ethnic group are Black residents, with a location quotient of 2.2, followed by Latino residents, with a location quotient of 1.5. Non-White residential segregation is at the bottom end of the threshold for moderate segregation, at 0.3.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $26,352, 66.9% of the population are employed, and 63.5% of people have incomes above 200% of the federal poverty level. In terms of the environment, the diesel PM level is moderately high, at 0.2 kg/day. This ZIP code has a high percentage of impervious surface cover, at 53.1%. It also has a high urban heat island index, at 6028.5 degrees per hour (see **Appendix E** for definition). Finally, tree canopy is right on the cusp of the 50th percentile, with 6.0% of land having a tree canopy cover.

Other Indicators (threshold: 25th percentile): In terms of education, 16.6% of people over age 25 have a bachelor's degree or higher, and preschool enrollment is low, at 35.2%. The voting rate is low, at 72.4%. Finally, 34.1% of low-income renters pay more than 50% of their income in housing, and 93.5% of households have access to a car.

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 88.8% of adults have health insurance. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 76.8 years, 10.8% of the population has asthma, 5.8% of babies are born with low birthweight, 7.1% of babies are born preterm, 15.8% of residents report that their mental health is not good, and 15.5% of residents report that their physical health is not good.

c. 94511, Bethel Island, Contra Costa County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 34.4 | Population: 2,161

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 55.4%. White residents are the most overrepresented racial or ethnic group, with a location quotient of 1.4. American Indian/Alaska Native and Native Hawaiian/Pacific Islander individuals are underrepresented, both with location quotients of 0. This ZIP code has a moderate amount of non-White residential segregation, at 0.6.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $26,841, 55.3% of residents are employed, and 53.3% of people have incomes above 200% of the federal poverty level. Retail density is low, at 0.1 jobs per acre. In terms of the environment, this ZIP code has a moderately high amount of drinking water contaminants compared to other ZIP codes, with an index of 530.8. The projected number of extreme heat days are high, with different scenarios as follows:

» >100 degrees, 2035-2064: 34.6 days
» >100 degrees, 2070-2099: 58.9 days
» >90 degrees, 2035-2064: 113.8 days
» >90 degrees, 2070-2099: 140.3 days
» >historical baseline 2035-2064: 21.9 days
» >historical baseline 2070-2099: 40.3 days

The historical baseline is defined as the projected number of days above the 98th percentile of daily maximum temperatures (based on data from 1961 to 1990 between April and October). Finally, only 4.4% of land has a tree canopy cover, and 29.5% of residents live within walking distance of a park.

Other Indicators (threshold: 25th percentile): In this ZIP code, 11.0% of adults over age 25 have a bachelor's degree or higher, and preschool enrollment is low, at 28.9%. The 2020 Census Response Rate is low, at 51.8%. In terms of transportation, 90.2% of households have access to a car, and 0.0% of workers 16 or older commute to work by transit, walking, or cycling. The percentage of low-income homeowners who pay more than 50% of their income in housing is high, at 16.2%.

Healthcare and Health Indicators (threshold: 50th percentile): The percentage of insured adults is low, at 80.4%. Most of the health outcomes of interest are in the unhealthiest 50% compared to the state. Namely, life expectancy is 78.3 years, 10% of the population has asthma, 6.1% of babies are born with low birthweight, 6.7% of babies are born preterm, 10% of the population has asthma, and 14.5% of residents report that their physical health is not good.

d. 94565, Pittsburg and Bay Point, Contra Costa County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 39.4 | Population: 97,671

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 64.5% The most overrepresented racial or ethnic groups are Black and Latino residents, each with a location quotient of 1.9. Non-White residential segregation is high, at 0.6.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, the per capita income is $28,103, 65.4% of people have incomes above 200% of the federal poverty level, and 71.6% of the population is employed. Retail density is low in this ZIP code, at 1.8 jobs per acre. In terms of the environment, this ZIP code has a moderately high amount of diesel PM, at 0.2 kg/day. A moderately high percentage of this ZIP code has impervious surface covers, at 52.8%, while only 5.6% of land has a tree canopy. Finally, 2.3% of the population lives in an area with sea level rise inundation risk.

Other indicators (threshold: 25th percentile): Voting rates are low, at 73.0%, and only 10.8% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 88.4% of adults are insured. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 78.3 years, 10.3% of the population has asthma, 5.4% of babies are born with low birthweight, 7.4% of babies are born preterm, 15.0% of residents report that their mental health is not good, and 14.4% of residents report that their physical health is not good.

e. 94806, San Pablo, Contra Costa County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 39.9 | Population: 64,286

Equity analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 63.1%. Latino residents are the most overrepresented group, with a location quotient of 2.0, followed by Black residents with a location quotient of 1.7. Non-White residential segregation is very high, at 0.7.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $26,080, 66.6% of people have incomes above 200% of the federal poverty level, and 72.5% of the population is employed. In terms of the environment, diesel PM is high, at 0.4 kg/day. This ZIP code has a high amount of impervious surface cover, at 57.5%.

Other Indicators (threshold: 25th percentile): High school enrollment and preschool enrollment are both low in this ZIP code: 96.4% of high-school-age residents are enrolled in school, and 29.7% of preschool-age children are enrolled in preschool. Homeownership is low, at 46.1%, and 88.8% of households have one person or fewer per room.

Healthcare and Health indicators (threshold: 50th percentile): In this ZIP code, 85.4% of adults have health insurance. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 79.7 years, 10.0% of the population has asthma, 5.7% of babies are born with low birthweight, 7.7% of babies are born preterm, 14.4% of residents report that their mental health is not good, and 14.4% of residents report that their physical health is not good.

f. 94804, Richmond, Contra Costa County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 42.4 | Population: 40,931

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 64.5%. Black residents are the most overrepresented, with a location quotient of 2.7, followed by Latino residents with a location quotient of 1.6, and American Indian/Alaska Native residents with a location quotient of 1.4. Non-White residential segregation is high, at 0.7.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $28,337, 56.4% of people have incomes above 200% of the federal poverty level, and 72.6% of the population is employed. In terms of the environment, diesel PM is very high, at 0.7 kg/day, 62.0% of surfaces are impervious, and 6.7% of the population lives in a sea level rise inundation area. Tree canopy is also low, at 5.1%.

Other Indicators (threshold: 25th percentile): Automobile access is low in this ZIP code, as 90.0% of households have access to a car. Homeownership is low, at 45.4%, and 15.3% of low-income homeowners pay more than 50% of their income in housing costs.

Healthcare and Health indicators (threshold: 50th percentile): In this ZIP code, 86.1% of adults are insured. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 77.3 years, 10.9% of the population has asthma, 6.5% of babies are born with low birthweight, 7.0% of babies are born preterm, 14.9% of residents report that their mental health is not good, and 15.0% of residents report that their physical health is not good.

g. 94520, Concord, Contra Costa County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 46.0 | Population: 38,753

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 62.6%. Native Hawaiian/Pacific Islander residents are overrepresented in this ZIP code, with a location quotient of 2.3. Latino residents are also overrepresented with a location quotient of 1.7. Non-White residential segregation is high, at 0.5.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, the per capita income is $28,893, and 62.8% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high, at 0.3 kg/day. This ZIP code has a high percentage of impervious surface cover, at 56.7%. It also has a high urban heat island index, at 12696.3 degrees per hour (see **Appendix E** for definition), and only 5.6% of the area has a tree canopy cover.

Other Indicators (threshold: 25th percentile): Automobile access is low in this ZIP code, as 90.9% of households have access to a car. Homeownership is also low, at 35.1%. Among low-income renters, the share who pay more than 50% of their income in housing costs is 30.8%. Finally, only 15.4% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): Only 82.4% of adults have insurance in this ZIP code. Most of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 77.8 years, 9.6% of the population has asthma, 4.7% of babies are born with low birthweight, and 14.5% of residents report that their mental health is not good.

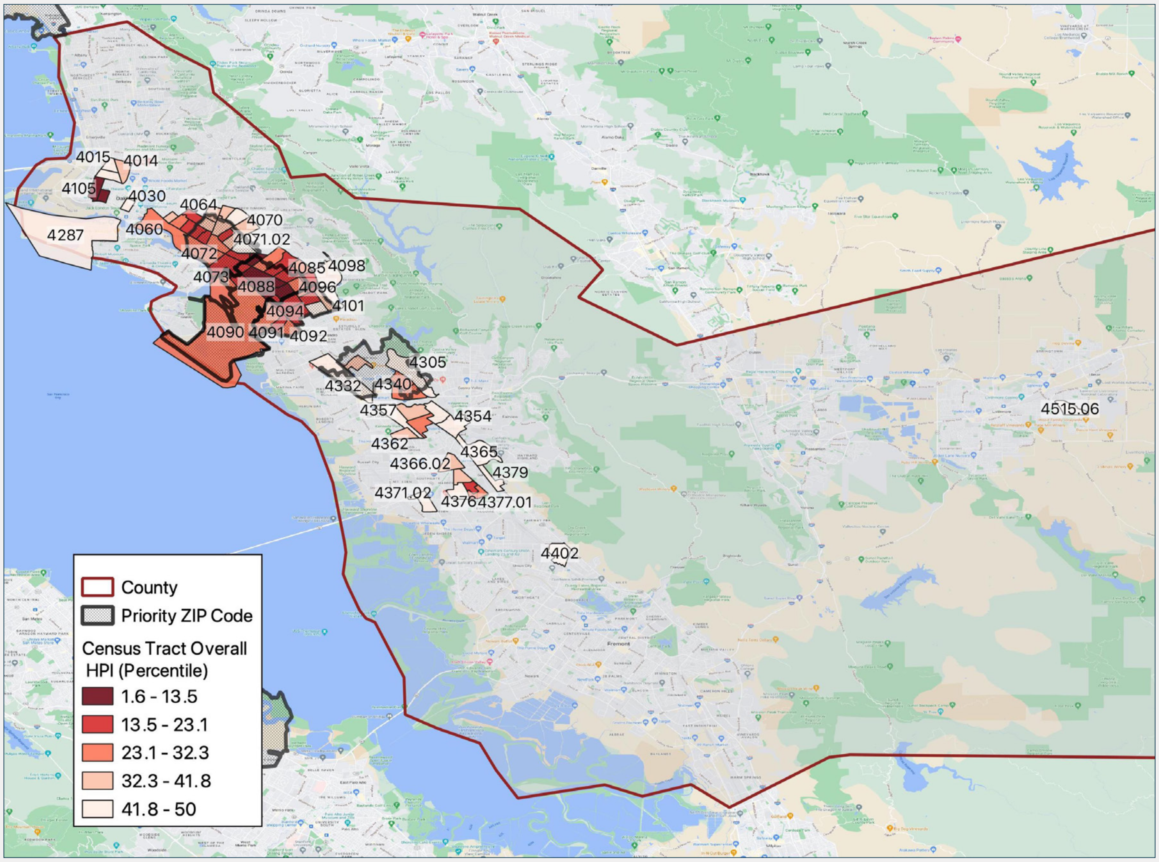
vi. Findings: Alameda County

Alameda County has four priority ZIP codes. The following image overlays these priority ZIP codes with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows Alameda County. Priority ZIP codes are indicated by the gray overlay shapes. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Alameda County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows a large cluster of priority areas in Oakland, where the vast majority of priority ZIP codes and the lowest HPI census tracts are located. A few census tracts are beyond the boundaries of priority ZIP codes but still within the Oakland cluster. Another cluster is slightly south of Oakland, spanning parts of San Leandro to Hayward. Here, there are some census tracts that are not included in the San Leandro priority ZIP code, but clustered near it. These tracts generally have HPIs above the 23rd percentile. Two census tracts are outliers beyond a cluster: 4402 in Union City and 4515.06 in Livermore.

The remainder of this section discusses social determinant of health data for priority ZIP codes through in-depth profiles. **Exhibit 3.47** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundaries.

EXHIBIT 3.47 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Alameda County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

a. 94621, Oakland, Alameda County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 10.4 | Population: 35,035

Equity Analysis: This ZIP code contains at least one census tract that was historically redlined. As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 57.7%. The most overrepresented racial or ethnic groups are Black and Latino residents, with location quotients of 2.9 and 2.5 respectively. The ZIP code is very segregated, with a non-White residential segregation index of 0.7.

Climate and Economic Indicators (threshold: 50th percentile): Economic conditions in this ZIP code are in the lowest 50% compared to the state. The per capita income is $18,047, and only 46.1% of people have incomes above 200% of the federal poverty level. The employment rate is 66.3%. In terms of the environment, this ZIP code is highly polluted with diesel PM, with a value of 0.3 kg/day. This ZIP code has a high degree of impervious surface cover, at 67.2%, while tree canopy is low, at 4.1%. Additionally, 12% of the population lives in a sea level rise inundation area.

Other Indicators (threshold: 25th percentile): This ZIP code has low education rates: 10.5% of adults over age 25 have a bachelor's degree or higher, and 96.1% of high-school-age residents are enrolled in school. The 2020 Census response rate and voting rate are both low, at 59.9% and 61.9%, respectively. Automobile access is low, with 79.9% of residents having access to a car. In terms of housing, the homeownership rate is 30%, and only 19.2% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator). The percentage of low-income homeowners and renters who pay more than 50% of their income to housing costs is 20.9% and 34.4%, respectively.

Healthcare and Health Indicators (threshold: 50th percentile): At 78.3%, the rate of insured adults is very low. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 74.4 years, 11.9% of the population has asthma, 7.4% of babies are born with low birthweight, 7.8% of babies are born preterm, 18.1% of residents report that their mental health is not good, and 18.0% of residents report that their physical health is not good.

b. 94603, Oakland, Alameda County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 22.6 | Population: 35,862

Equity Analysis: This ZIP code contains at least one historically redlined census tract. As per the racial and ethnic diversity index, probability that two people chosen at random will be from different races or ethnicities is 55.2%. The most overrepresented racial or ethnic groups in this ZIP code are Black and Latino residents, with location quotients of 2.9 and 2.5, respectively. The ZIP code is very segregated, with a non-White residential segregation index of 0.7.

Climate and Economic Indicators (threshold: 50th percentile): Economic conditions in this ZIP code are in the lowest 50% compared to the state. The per capita income is $20,201, 68.8% of the population are employed, and 54.7% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high, at 0.3 kg/day. This ZIP code has a high percentage of impervious surface cover, at 64.1%. It also has a high urban heat island index, at 4,961.7 degrees per hour (see **Appendix E** for definition), while tree canopy is low, at 4.1%. Finally, 0.8% of the population lives in a sea level rise inundation area.

Other Indicators (threshold: 25th percentile): In this ZIP code, 13.4% of people over age 25 have a bachelor's degree or higher. The voting rate is low, at 65.3%. Automobile access is also low, with 89.4% of households having access to a car. Homeownership is low, at 45.9%, and only 10.6% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator). The percentage of low-income homeowners and renters who pay more than 50% of their income to housing costs are both high, at 16.9% and 31.5%, respectively.

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 85.8% of adults have health insurance. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 75.7 years, 11.2% of the population has asthma, 6.5% of babies are born with low birthweight, 7.8% of babies are born preterm, 16.5% of residents report that their mental health is not good, and 16.1% of residents report that their physical health is not good.

c. 94601, Oakland, Alameda County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 24.6 | Population: 53,039

Equity Analysis: This ZIP code contains at least one historically redlined census tract. As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 63.3%. Latino residents are the most overrepresented racial or ethnic group, with a location quotient of 2.3, followed by Black residents, with a location quotient of 1.8. The ZIP code is right between moderately segregated and very segregated, with a non-White residential segregation index of 0.6.

Climate and Economic Indicators (threshold: 50th percentile): Economic conditions in this ZIP code are in the lowest 50% compared to the state. The per capita income is $22,267, 69.9% of the population are employed, and 50.9% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high in this ZIP code, at 0.4 kg/day. This ZIP code has a high percentage of impervious surface cover, at 69.9%, and a high urban heat island index, at 5811.7 degrees per hour (see **Appendix E** for definition). Tree canopy is low, at 5.7%. Finally, 1.2% of the population lives in a sea level rise inundation area.

Other Indicators (threshold: 25th percentile): The voting rate is low, at 69.7%. Housing is a strong area of need in this ZIP code, with all indicators falling below the 25th percentile: the homeownership rate is 33.0%, the percentage of households with basic kitchen and plumbing is 97.7%, 17.6% of low-income homeowners pay more than 50% of their income on housing, 29.6% of low-income renters pay more than 50% of their income on housing, and only 20.5% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator). Finally, 83.5% of residents have access to a car.

Healthcare and Health Indicators (threshold: 50th percentile): The adult insurance rate is low, at 82.4%. All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 78.1 years, 10.1% of the population has asthma, 5.1% of babies are born with low birthweight, 7.3% of babies are born preterm, 15.6% of residents report that their mental health is not good, and 15.7% of residents report that their physical health is not good.

d. 94578, San Leandro, Alameda County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 49.6 | Population: 41,865

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 71.9%. With location quotients of 1.5 each, Black and Latino residents are the most overrepresented racial or ethnic groups in this ZIP code. Non-White residential segregation is high, at 0.4.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, the per capita income is $31,265, and 66.0% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high, at 0.7 kg/day. This ZIP code has a high percentage of impervious surface cover, at 63.0%. It also has a high urban heat island index, at 6678.2 degrees per hour (see **Appendix E** for definition). Tree canopy is low in this ZIP code, at 5.0%.

Other Indicators (threshold: 25th percentile): Automobile access is slightly low in this ZIP code, at 92.4%. Homeownership is also low, at 40.2%, and only 13.1% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator). Finally, 34.1% of preschool-age children are enrolled in school.

Healthcare and Health Indicators (threshold: 50th percentile): Some of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 79.9 years, 9.5% of the population has asthma, 5.6% of babies are born with low birthweight, 6.8% of babies are born preterm, and 13.4% of residents report that their mental health is not good.

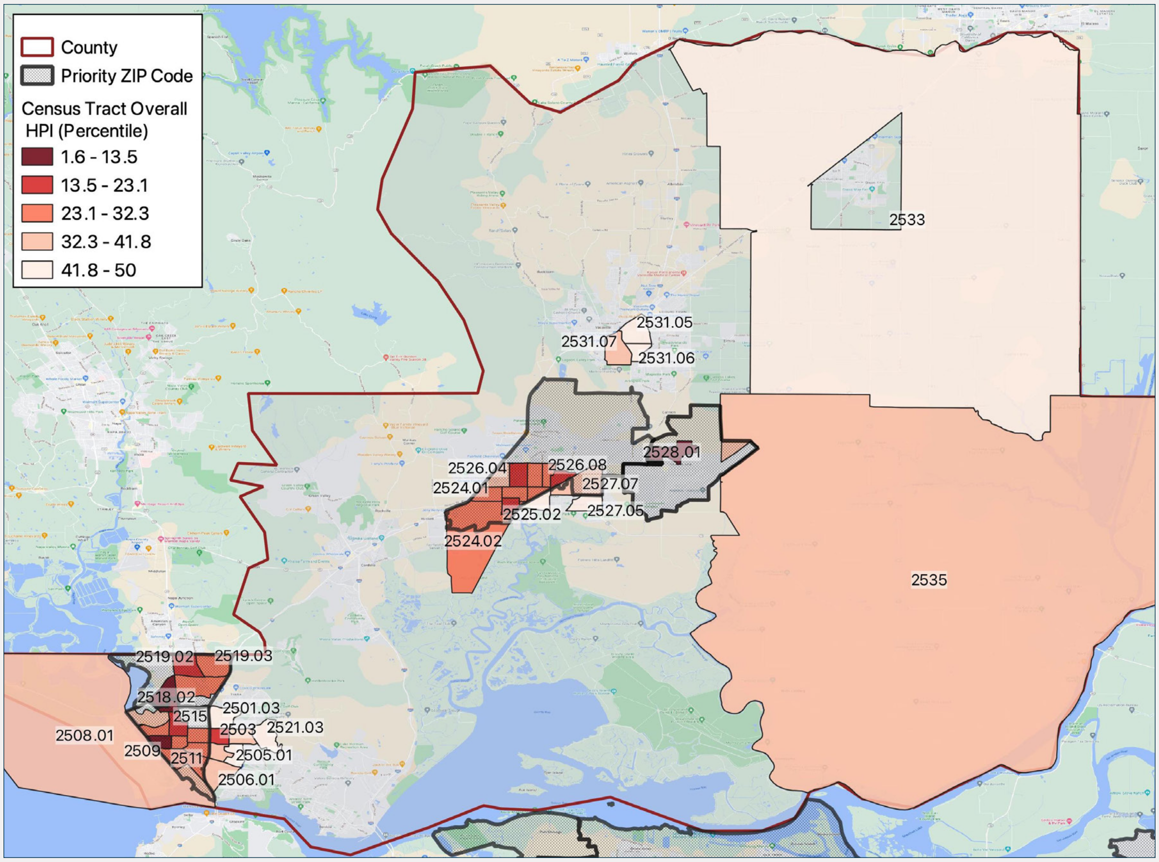
vii. Findings: Solano County

Solano County has four priority ZIP codes. The following image overlays these priority ZIP codes with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows Solano County. Priority ZIP codes are indicated by the gray overlay shapes. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Solano County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows two main clusters where priority ZIP codes and census tracts overlap: one in the southwest corner of the county (around some areas of Vallejo) and another in the center of the county (around some areas of Fairfield). The deepest reds appear in these clusters, suggesting that the least unhealthy conditions in the county are there. There is an adjacent cluster northeast of Fairfield that does not overlap with a priority ZIP code: census tracts 2531.07, 2531.05, and 2531.06 of Vacaville. Finally, two more census tracts along the eastern county border are adjacent to the Fairfield and Vacaville clusters, but do not overlap with a priority ZIP code: 2533, spanning part of Vacaville, Dixon, and Hartley; and 2535, just south of 2533.

The remainder of this section discusses social determinant of health data for priority ZIP codes through in-depth profiles. **Exhibit 3.48** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundaries.

EXHIBIT 3.48 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Solano County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

a. 94535, Travis Air Force Base, Solano County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 6.2% | Population: 3,842

Equity analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 70.3%. Native Hawaiian/Pacific Islander residents are the most overrepresented racial or ethnic group, with a location quotient of 2.2. The ZIP code has moderate non-White residential segregation at 0.3.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income is $23,109, 70% of people have incomes above 200% of the federal poverty level, and 29.2% of the population is employed. Retail density is also low, at 1.2 jobs per acre. In terms of the environment, this ZIP code has unhealthy water conditions, with a water contamination index of 534.5. The projected number of extreme heat days are high, with different scenarios as follows:

- >100 degrees, 2035-2064: 49.0 days
- >100 degrees, 2070-2099: 71.9 days
- >90 degrees, 2035-2064: 122.7 days
- >90 degrees, 2070-2099: 146.8 days
- >historical baseline 2035-2064: 26.2 days
- >historical baseline 2070-2099: 45.7 days

The historical baseline is defined as the projected number of days above the 98th percentile of daily maximum temperatures (based on data from 1961 to 1990 between April and October). Finally, 0.5% of the population lives within walking distance of a park.

Other Indicators (threshold: 25th percentile): Preschool enrollment is low, at 26.6%. The 2020 Census response rate and voting rate are both low, at 54.5% and 65.8%, respectively. Homeownership is low, at 1.5%, and the percentage of low-income homeowners who pay more than 50% of their income to housing costs is 39.8%.

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, birth outcomes are in the unhealthiest 50% of the state: 5.3% of infants have low birthweight, and 7.4% of infants are born preterm.

b. 94590, Vallejo, Solano County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 29.7 | Population: 37,280

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 70.6%. Black and Latino residents are the most overrepresented racial or ethnic groups, at 1.7 and 1.3, respectively. Non-White residential segregation is moderate, at 0.4.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $27,200, 71.0% of residents are employed, and 61.3% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high in this ZIP code, at 0.3 kg/day. This ZIP code has a high percentage of impervious surface cover, at 64.1%. It also has a high urban heat island index, at 7201.3 degrees per hour (see **Appendix E** for definition). Finally, 11.5% of the population lives in a sea level rise inundation area.

Other Indicators (threshold: 25th percentile): Preschool enrollment is low, at 32.3%. The voting rate is also low, at 71.9%. Only 87.6% of households have access to a car. In terms of housing, 38.1% of people own their homes in this ZIP code, and 32.9% of low-income renters pay more than 50% of their income in housing.

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 89.6% of adults have insurance. Most of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 75.7 years, 10.9% of the population has asthma, 7.0% of babies are born with low birthweight, 15.0% of residents report that their mental health is not good, and 15.3% of residents report that their physical health is not good.

c. 94589, Vallejo, Solano County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 35.3 | Population: 31,536

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races/ethnicities is 72.7%. The most overrepresented racial or ethnic groups are: Asian residents, with a location quotient of 1.7; Black residents, with a location quotient of 1.7; and Native Hawaiian or Pacific Islander residents, with a location quotient of 1.6. At 0.6, the amount of non-White residential segregation in this ZIP code is right between moderate and high.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $26,895, and 67.2% of people have incomes above 200% of the federal poverty level. The employment rate is 67.6%, and retail density is low, at 1.3 jobs per acre. In terms of the environment, diesel PM is high in this ZIP code, at 0.2 kg/day. This ZIP code has a high percentage of impervious surface cover, at 61.8%. It also has a high urban heat island index, at 8368.0 degrees per hour (see **Appendix E** for definition), while only 5.8% of land has a tree canopy cover. Finally, 10.9% of the population lives in a sea level rise inundation area.

Other Indicators (threshold: 25th percentile): The percentage of high school-age residents enrolled in high school is low, at 88.0%. The rate of low-income renters who pay more than 50% of their income in housing is high, at 31.0%. Finally, voting rates are low, at 72.5%.

Healthcare and Health Indicators (threshold: 50th percentile): Most of the health outcomes of interest are areas of need compared to the state. Namely, life expectancy is 78.8 years, 7.1% of babies are born with low birthweight, 7.1% of babies are born preterm, 9.8% of the population has asthma, and 13.7% of residents report that their physical health is not good.

d. 94533, Fairfield, Solano County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 41.6 | Population: 75,909

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 71.6%. The most overrepresented racial or ethnic groups are: Native Hawaiian/Pacific Islander residents, with a location quotient of 1.5; American Indian/Alaska Native residents, with a location quotient of 1.4; and Black and Latino residents, each with a location quotient of 1.3. Non-White residential segregation is moderate, at 0.3.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $29,999, 68.8% of people have incomes above 200% of the federal poverty level, and 72.0% of the population is employed. In terms of the environment, there is a slightly high amount of diesel PM pollution, at 0.1 kg/day. In this ZIP code, 2.4% of the population lives in a sea level rise inundation area, and the projected number of extreme heat days for different scenarios are as follows:

» >100 degrees, 2035-2064: 35.0 days
» >100 degrees, 2070-2099: 54.4 days
» >90 degrees, 2035-2064: 103.4 days
» >90 degrees, 2070-2099: 128.5 days
» >historical baseline 2035-2064: 22.5 days
» >historical baseline 2070-2099: 39.0

The historical baseline is defined as the projected number of days above the 98th percentile of daily maximum temperatures (based on data from 1961 to 1990 between April and October). Additionally, 56.8% of surfaces in this ZIP code are impervious surfaces.

Other Indicators (threshold: 25th percentile): The percentage of high-school-age residents enrolled in school is 95.1%. Voting rates are low, at 73%.

Healthcare and Health Indicators (threshold: 50th percentile): Most of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 77.6 years, 10.5% of the population has asthma, 5.5% of babies are born with low birthweight, 14.6% of residents report that their mental health is not good, and 13.8% of residents report that their physical health is not good.

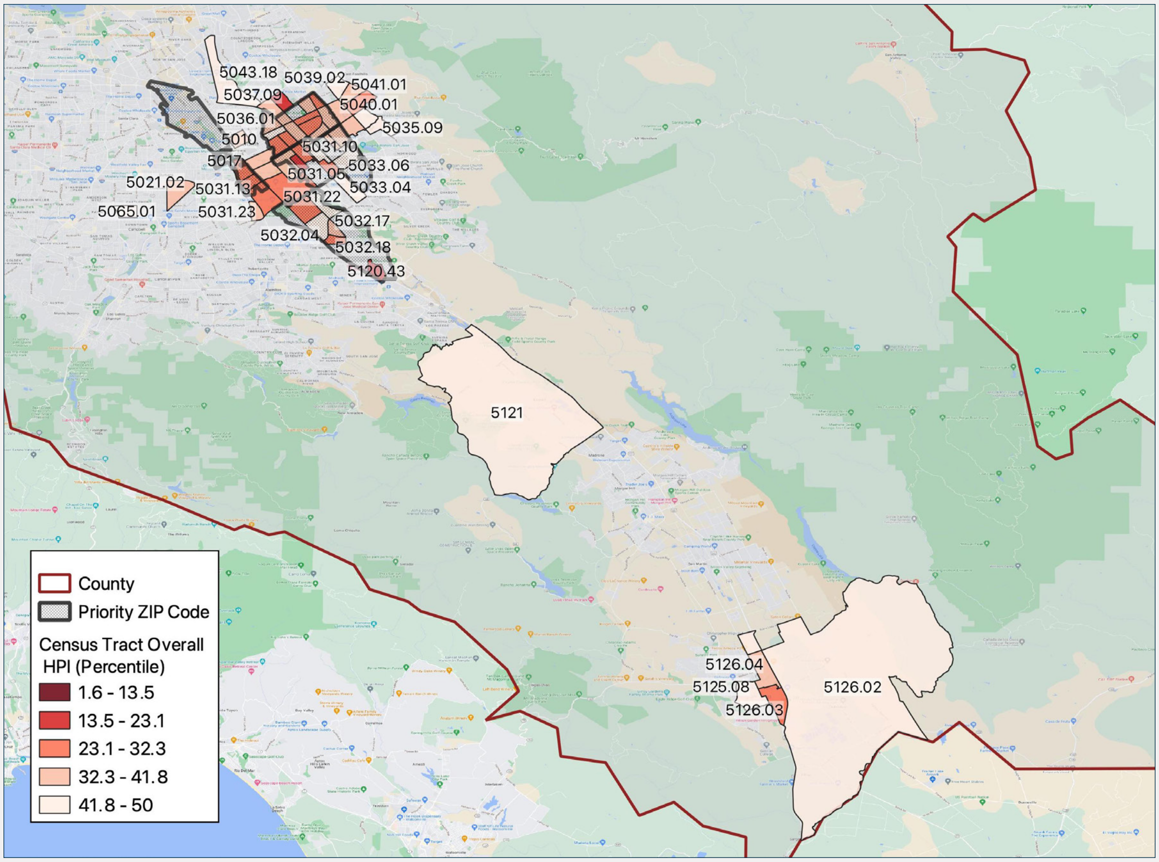
viii. Findings: Santa Clara County

Santa Clara County has four priority ZIP codes. The following image overlays these priority ZIP codes with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows Santa Clara County. Priority ZIP codes are indicated by the gray overlay shapes. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Santa Clara County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows a large cluster in San Jose. In this area, nearly all priority census tracts overlap with the priority ZIP codes. Additionally, nearly all the census tracts in this area are darker shades of red, suggesting more unhealthy conditions compared to elsewhere in the county. There are two areas beyond this cluster that fall below the 50th percentile, but do not overlap with a priority ZIP code. The first is census tract 5121, which is also in San Jose but a bit more south than the main cluster. The second is a cluster in Gilroy, consisting of census tracts 5126.03, 5125.08, 5126.04, and 5126.02, where there are no priority ZIP codes.

The remainder of this section discusses social determinant of health data for priority ZIP codes through in-depth profiles. **Exhibit 3.49** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundaries.

EXHIBIT 3.49 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Santa Clara County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

a. 95116, Santa Jose, Santa Clara County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 33.4 | Population: 55,825

Equity Analysis: This ZIP code contains at least one historically redlined census tract. As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races/ethnicities is 51.2%. The most overrepresented racial or ethnic groups are Latino residents, with a location quotient of 2.5, followed by Native Hawaiian/Pacific Islander residents, with a location quotient of 1.1, and Black residents, with a location quotient of 1.1. Non-White residential segregation is right between moderate and high, at 0.6.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income is $23,061, and 63% of people have incomes above 200% of the federal poverty level. Retail density is also low, at 3.2 jobs per acre. In terms of the environment, diesel PM is high, at 0.5 kg/day. This ZIP code has a high percentage of impervious surfaces, at 63.3%. Tree canopy is low, with 5.2% of land having a tree canopy cover.

Other Indicators (threshold: 25th percentile): In this ZIP code, 16.4% of adults over the age of 25 have a bachelor's degree or higher, and 38% of preschool-age children are enrolled in preschool. The voting rate is low, at 71.4%, and 90.2% of households have access to a car. Housing is an area where many indicators fall below the 25th percentile: 36.7% of people own their home, and 15.6% of low-income homeowners pay more than 50% of their income in housing costs. Finally, only 25.9% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 86.5% of adults have health insurance. Many of the health outcomes of interest are also areas of need compared to the state. Namely, 5.4% of babies are born with low birthweight, 7.5% of babies are born preterm, 13.7% of residents report that their mental health is not good, and 14.3% of residents report that their physical health is not good.

b. 95122, San Jose, Santa Clara County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 42.0 | Population: 56,121

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 50.2%. Native Hawaiian/Pacific Islander residents are the most overrepresented racial or ethnic group, with a location quotient of 3.3, followed by Latino residents, with a location quotient of 2.3. While many other priority ZIP codes have an overrepresentation of Black residents, this ZIP code has underrepresentation at 0.5. This is a very racially segregated ZIP code, with a non-White residential segregation value of 0.7.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $23,830, and 68.0% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high, at 0.3 kg/day. This ZIP code has a high percentage of impervious surface cover, at 61.5%. It also has a high urban heat island index, at 4774.3 degrees per hour (see **Appendix E** for definition), while only 4.8% of land has tree canopy cover.

Other Indicators (threshold: 25th percentile): In this ZIP code, 16.0% of adults over age 25 have a bachelor's degree or higher, and high school enrollment is low, at 96.2%. Voting is also low, at 72.2%. In terms of housing, 14.2% of low-income homeowners and 33.2% of low-income renters pay more than 50% of their income in housing. Additionally, only 22.7% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): 88.7% of adults have health insurance in this ZIP code. Most of the health outcomes of interest are also in the unhealthiest 50% compared to the rest of the state. Namely, 4.8% of babies are born with low birthweight, 7.4% of babies are born preterm, 13.5% of residents report that their mental health is not good, and 13.8% of residents report that their physical health is not good.

c. 95110, San Jose, Santa Clara County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 45.3 | Population: 19,928

Equity Analysis: This ZIP code contains a historically redlined census tract. As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races/ethnicities is 55.6%. Latino residents are overrepresented in this ZIP code, with a location quotient of 2.1, followed by Black residents, with a location quotient of 1.7. Non-White residential segregation is moderate at 0.4.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, 61.5% of people have incomes above 200% of the federal poverty level, and the employment rate is 72.4%. In terms of the environment, diesel PM is high, at 0.5 kg/day. The ZIP code also has a high percentage of impervious surfaces, at 68.2%, and tree canopy cover is low, at 5.5%.

Other Indicators (threshold: 25th percentile): Housing is an area of need in this ZIP code. Homeownership is low, at 38.7%, and 32.9% of low-income renters pay more than 50% of their income in housing. In addition, 2.6% of houses lack basic kitchen and plumbing facilities, and only 13.8% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 88.9% of adults are insured. About one half of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, 4.8% of babies are born with low birthweight, 6.9% of babies are born preterm, and 13.4% of residents report that their mental health is not good.

d. 95111, San Jose, Santa Clara County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 46.2 | Population: 61,830

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races/ethnicities is 56.3%. The most overrepresented racial or ethnic groups in this ZIP code are American Indian/Alaska Native and Latino residents, each with a location quotient of 2.0. Native Hawaiian/Pacific Islander residents are also overrepresented, with a location quotient of 1.8. Non-White residential segregation is very high, at 0.6.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, the per capita income is $26,761, and 67.6% of people have incomes above 200% of the federal poverty level. Retail density is low, at 2.2 jobs per acre. In terms of the environment, this ZIP code has a high percentage of impervious surface cover, at 60.5%. It also has a high urban heat island index, at 5376.4 degrees per hour (see **Appendix E** for definition), while tree canopy is low, at 5.2%.

Other Indicators (threshold: 25th percentile): The percentage of high-school-age students enrolled in school is low, at 96.4%. In terms of housing, 15.5% of low-income homeowners and 30.4% of low-income renters pay more than 50% of their income in housing. Additionally, only 17.3% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 88.9% of adults are insured, and 5.5% of infants are born with low birthweight.

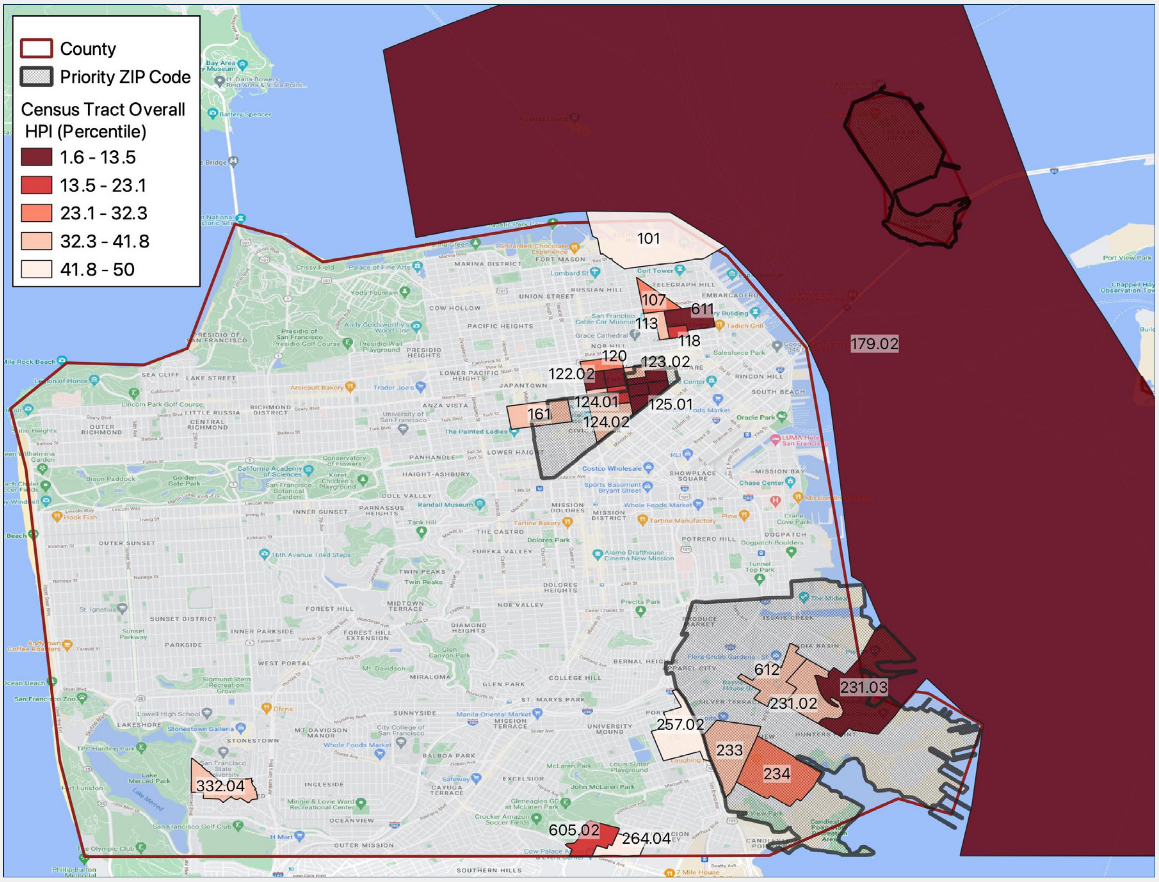
ix. Findings: San Francisco County

San Francisco County has three priority ZIP codes. The following image overlays these priority ZIP codes with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows San Francisco County. Priority ZIP codes are indicated by the gray overlay shapes. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers.

The data shows two main clusters in San Francisco: around Civic Center/Tenderloin and around Bay View/Hunters Point. These areas have overlapping priority ZIP codes and census tracts. Census tracts here are among the deepest reds, suggesting the least-healthy conditions. Adjacent to the Civic Center/Tenderloin cluster is another cluster around Chinatown that does not overlap with any priority ZIP codes. There is another small cluster near Sunnydale, consisting of census tracts 605.02 and 264.04, that does not overlap with priority ZIP codes. Finally, there is one standalone census tract below the 50th percentile, 332.04, which is just south of San Francisco State University. Similar to ZIP code 94704 in Berkeley, this census tract may consist of many students.

The remainder of this section discusses social determinant of health data for priority ZIP codes through in-depth profiles. **Exhibit 3.50** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundaries.

EXHIBIT 3.50 | Overlay map of priority ZIP codes census tracts below the 50th percentile in San Francisco County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

a. 94130, San Francisco City and County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 5.8 | Population: 3,008

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random from this ZIP code will be from different races/ethnicities is 78.8%. This ZIP code has a high overrepresentation of American Indian/Alaskan Native and Native Hawaiian/Pacific Islander residents, as evidenced by location quotients of 4.5 and 8.0, respectively. Black residents are also overrepresented, with a location quotient of 4.4. This ZIP code has moderate non-White residential segregation at 0.4.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, 33.3% of people have incomes above 200% of the federal poverty level, and the per capita income is $21,322. Just over half of adult residents, 62.3%, are employed, and retail density is low, at 0.6 jobs per acre. In terms of environmental indicators, this ZIP code experiences a high level of diesel PM, at 0.5 kg/day. Impervious surface cover is also high, at 49.5%. This ZIP code also has a very high percentage of the population in a sea level rise inundation area, at 85.9%. Although tree canopy is relatively high, 0% of the population in this ZIP code live within walkable distance of a park or open space.

Other Indicators (threshold: 25th percentile): High school enrollment is low, at 79.4%. The 2020 Census response rate and voting rates are both low, at 46.7% and 62.8%, respectively. Automobile access is low, at 66.3%. Homeownership is low, at 0%, and the percentage of low-income homeowners who pay more than 50% of their income to housing costs is high, at 14.3%.

Healthcare and Health Indicators (threshold: 50th percentile): Adult health insurance rates are low, at 81.4%. Compared to other ZIP codes across the state, this ZIP code has particularly high rates of asthma (10.6%), low birthweight (6.0%), and poor self-reported mental health (19.1%).

b. 94102, San Francisco City and County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 39.3 | Population: 31,392

Equity Analysis: This ZIP code contains at least one historically redlined census tract. As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 69.8%. American Indian/Alaska Native residents are the most overrepresented racial or ethnic group, with a location quotient of 4.9. The next most overrepresented groups are Black and Latino residents, with location quotients of 1.8 and 1.3, respectively. Non-White residential segregation is moderate, at 0.3.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, 63.5% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high, at 1.2 kg/day. This ZIP code also has a high percentage of impervious surface cover, at 88.1%, while only 3.8% of land has a tree canopy cover.

Other Indicators (threshold: 25th percentile): The 2020 Census response rate is low, at 57.5%. Automobile access is very low, at 30.8%, but interpretation should consider the availability of public transit in this area of San Francisco. In the housing domain, nearly all indicators are below the 25th percentile: 8.9% of people own homes, 80.4% of households have basic kitchen and plumbing facilities, 31.5% of low-income homeowners pay more than 50% of their income in housing, and only 12.4% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): Only a few of the health outcomes of interest are areas of need compared to the state. Namely: life expectancy is 76.2 years and 5.9% of babies are born with low birthweight.

c. 94124, San Francisco City and County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 44.9 | Population: 35,747

Equity Analysis: This ZIP code contains at least one historically redlined census tract. As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 63.7%. Native Hawaiian/Pacific Islander and Black residents are very overrepresented in this ZIP code, with location quotients of 6.3 and 5.2, respectively. Latino residents are somewhat overrepresented, with a location quotient of 1.6. Non-White residential segregation is very high, at 0.7.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $31,651, 64.0% of people have incomes above 200% of the federal poverty level, and 72.2% of the population is employed. In terms of the environment, diesel PM is very high, at 1.2 kg/day. The amount of impervious surfaces is high, at 69.3%.

Other Indicators (threshold: 25th percentile): Automobile access is low in this ZIP code, as 81.7% of households have access to a car. Interpreting this value must take into consideration whether public transportation is readily available in this area of San Francisco. In terms of housing, 18.2% of low-income homeowners pay more than 50% of their income in housing. Finally, the voting rate is 73.1%.

Healthcare and Health Indicators (threshold: 50th percentile): All of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 76.9 years, 9.6% of the population has asthma, 7.1% of babies are born with low birthweight, 7.1% of babies are born preterm, 14.0% of residents report that their mental health is not good, and 13.8% of residents report that their physical health is not good.

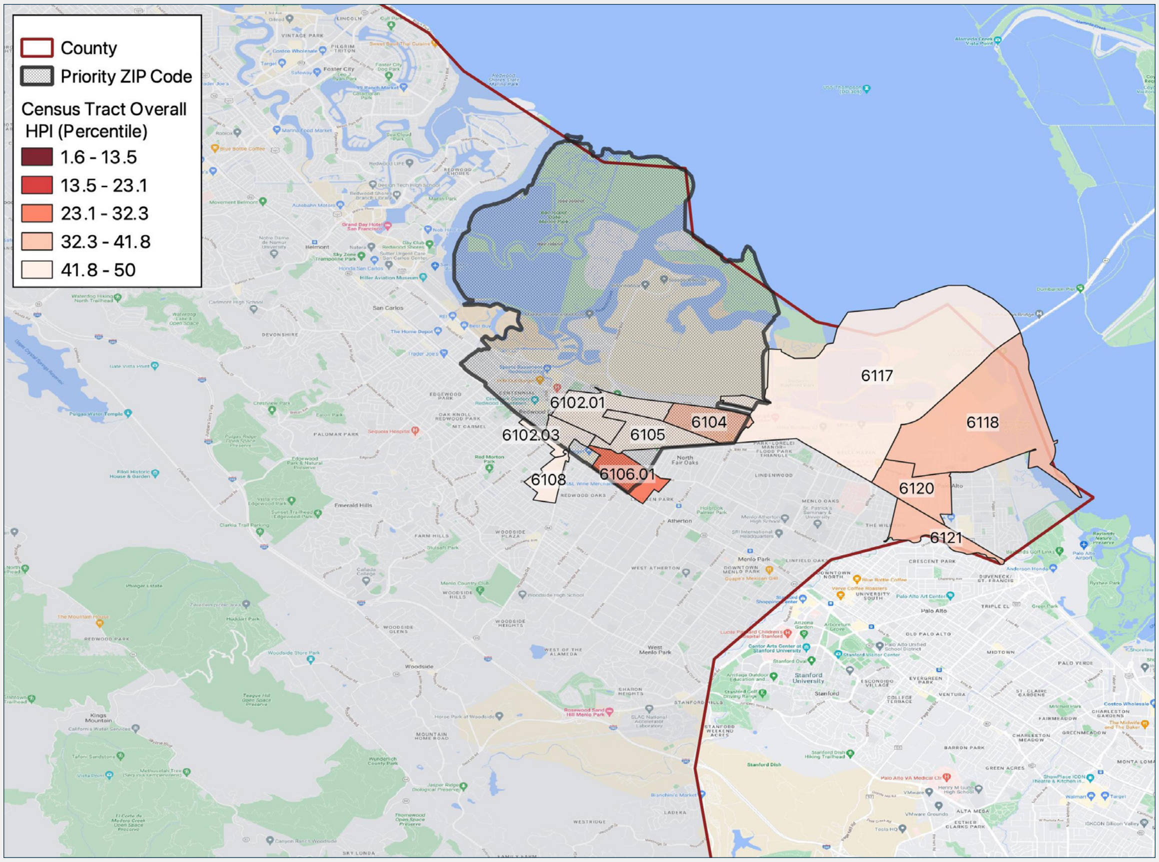
x. Findings: San Mateo County

San Mateo County has one priority ZIP code. The following image overlays this priority ZIP code with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows San Mateo County. Priority ZIP codes are indicated by the gray overlay shapes. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of San Mateo County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows a cluster in the east of the county, spanning from Redwood City to East Palo Alto. The census tracts in Redwood City overlap with a priority ZIP code; the tracts in East Palo Alto do not, but together with the ZIP code and Redwood City census tracts, they make one cluster.

The remainder of this section discusses social determinant of health data for the priority ZIP code through an in-depth profile. **Exhibit 3.51** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundary.

EXHIBIT 3.51 | Overlay map of priority ZIP codes census tracts below the 50th percentile in San Mateo County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

a. 94063, Redwood City, San Mateo County

*Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see **Appendix C** for all values and percentiles discussed below.*

Overall HPI Percentile: 48.7 | Population: 34,867

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 48.1%. Latino residents are the most overrepresented racial or ethnic group, with a location quotient of 2.5. Non-White residential segregation is very high, at 0.6.

Climate and Economic Indicators (threshold: 50th percentile): In this ZIP code, 61.0% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high, at 0.3 kg/day. This ZIP code has a high percentage of impervious surface cover, at 68.0%, and a high urban heat island index of 19341.5 degrees per hour (see **Appendix E** for definition). Park access is somewhat low in this ZIP code: 72.0% of people live within walking distance of a park. Finally, 40.0% of the population lives in a sea level rise inundation risk area.

Other Indicators (threshold: 25th percentile): The percentage of high-school-age residents enrolled in school is low, at 95.1%. In terms of housing, homeownership is low, at 34.4%, and 16.9% of low-income homeowners pay more than 50% of their income in housing. Among renters, 32.6% of low-income renters pay more than 50% of their income in housing. Finally, only 21.5% of households have one or fewer occupants per room (inverse of the uncrowded housing indicator).

Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 85.8% of adults have health insurance. Some of the health outcomes of interest are in the unhealthiest 50% compared to the rest of the state. Namely, life expectancy is 79.7 years, 5.4% of infants are born with low birth weight, and 14.3% of residents report their mental health is not good.

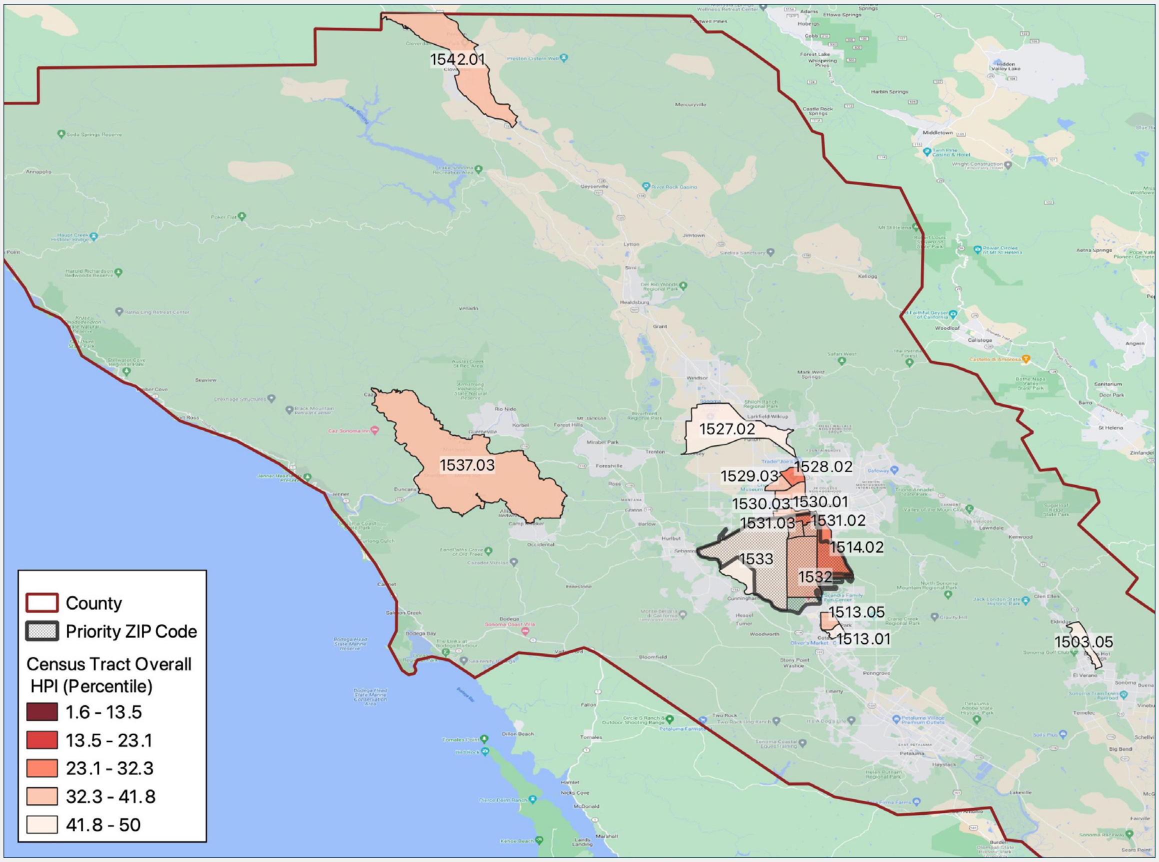
xi. Findings: Sonoma County

Sonoma County has one priority ZIP code. The following image overlays these priority ZIP codes with census tracts that are below the 50th percentile compared to other census tracts in the state. The red boundary shows Sonoma County. Priority ZIP codes are indicated by the gray overlay shapes. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Sonoma County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows a main cluster around Santa Rosa. Here, many priority census tracts overlap with the priority ZIP code. The ones that do not overlap are directly adjacent, together forming one large cluster of less healthy conditions. There are three individual census tracts below the 50th percentile that stand alone: 1542.01 in Cloverdale, 1537.03 near Guerneville, and 1503.05 near Fetters Hot Springs-Agua Caliente.

The remainder of this section discusses social determinant of health data for the priority ZIP code through an in-depth profile. **Exhibit 3.52** and the online HPI tool may be used to review and consider conditions beyond the ZIP code boundary.

EXHIBIT 3.52 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Sonoma County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org. Map made by the author using QGIS.

a. 95407, Santa Rosa, Sonoma County

Remember that high values may be less healthy for one indicator and more healthy for another. Besides the equity analysis, all data reported below meet a threshold of being in the unhealthiest 25% or 50% compared to all ZIP codes in the state. Please see ***Appendix C*** *for all values and percentiles discussed below.*

Overall HPI Percentile: 36.3 | Population: 42,026

Equity Analysis: As per the racial and ethnic diversity index, the probability that two people chosen at random will be from different races or ethnicities is 57.5% The most overrepresented racial or ethnic groups are American Indian/Alaska Native and Latino residents, each with a location quotient of 2.1. The next most overrepresented group is Black residents, with a location quotient of 2.0. Non-White residential segregation is very high, at 0.7.

Climate and Economic Indicators (threshold: 50th percentile): The per capita income in this ZIP code is $24,719 and 62.3% of people have incomes above 200% of the federal poverty level. In terms of the environment, diesel PM is high in this ZIP code, at 0.2 kg/day. The amount of impervious surface cover in this ZIP code is high, at 46.9%. Park access and tree canopy are both low: 64.5% of people live within walking distance of a park, and only 5.5% of the land has tree canopy cover.

Other Indicators (threshold: 25th percentile): In this ZIP code, 13.7% of adults over the age of 25 have a bachelor's degree or higher, and preschool enrollment is low, at 29.2%. A low percentage of households have less than one person per room, at 87.5%.

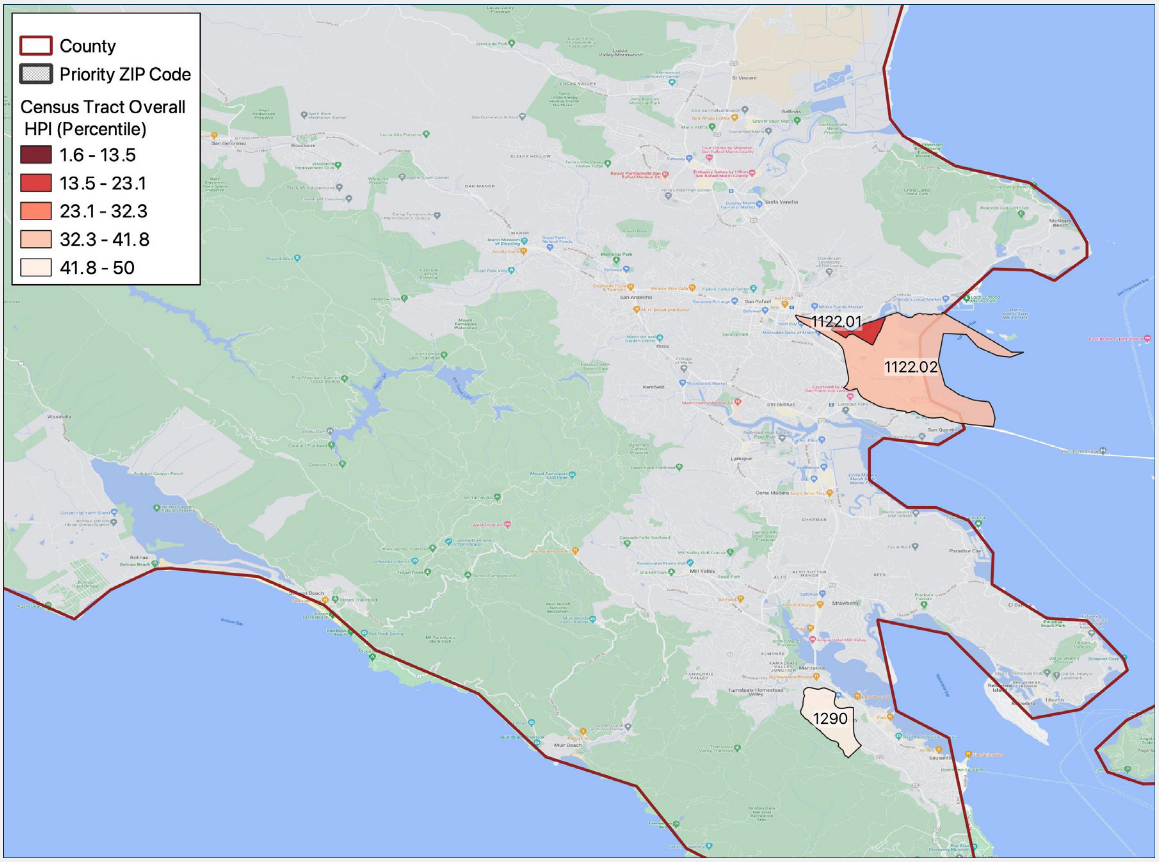
Healthcare and Health Indicators (threshold: 50th percentile): In this ZIP code, 83.1% of adults have insurance. Many of the health outcomes of interest are in the unhealthiest 50% compared to other ZIP codes in the state. Namely, life expectancy is 79.1 years, 9.8% of the population has asthma, 15.5% of residents report that their mental health is not good, and 14.0% of residents report that their physical health is not good.

xii. Findings: Marin County

There are no priority ZIP codes in Marin County. However, some census tracts in Marin County do fall below the 50th percentile. **Exhibit 3.53** shows the location of these census tracts. The red boundary shows Marin County. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Marin County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows a priority cluster in part of San Rafael, consisting of census tracts 1122.01 and 1122.02.

EXHIBIT 3.53 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Marin County



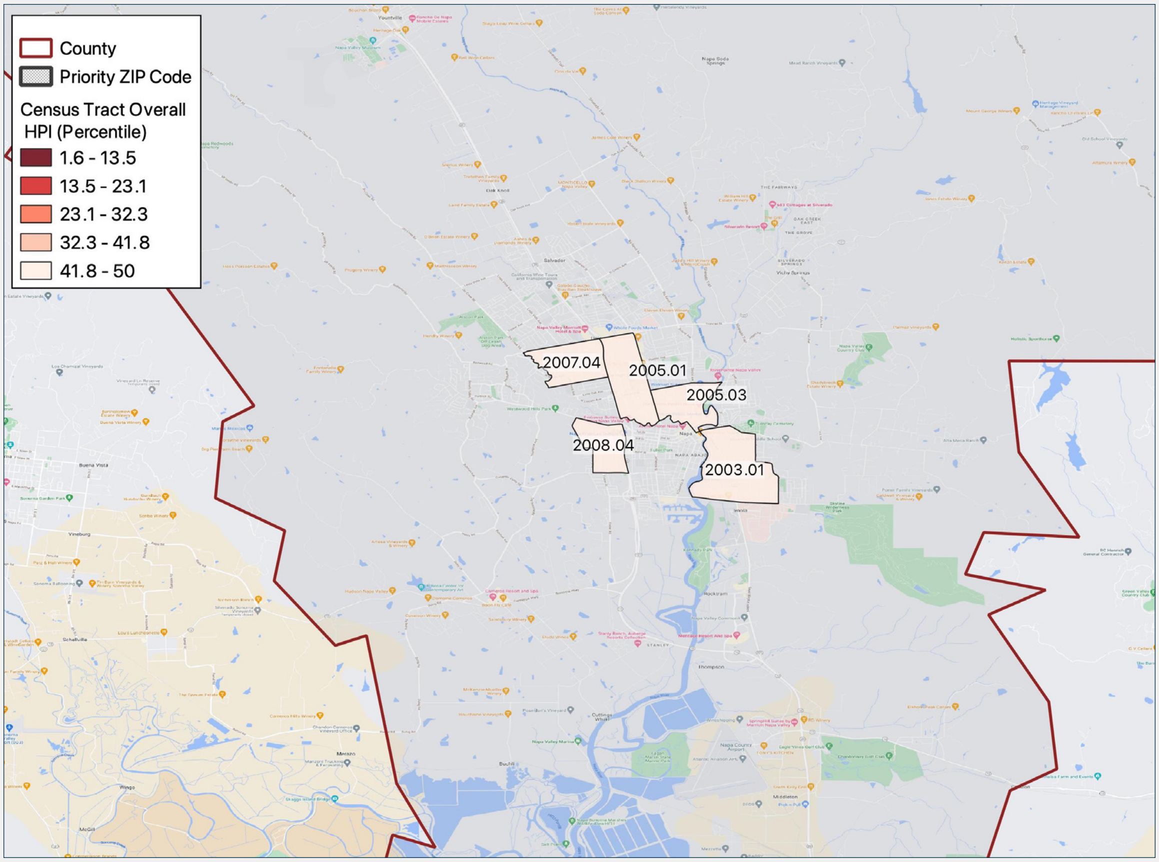
Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

xiii. Findings: Napa County

There are no priority ZIP codes in Napa County. However, some census tracts in Napa County do fall below the 50th percentile. **Exhibit 3.54** shows the location of these census tracts. The red boundary shows Napa County. Census tracts are indicated in shades of red-orange, with darker shades representing lower overall HPI percentiles and therefore more unhealthy conditions. The numbers represent census tract identifiers. Note that the image does not show the entirety of Napa County. There are no census tracts or ZIP codes below the 50th percentile in the area not shown.

The data shows a cluster of priority census tracts in the city of Napa, consisting of census tracts 2007.04, 2005.01, 2008.04, 2005.03, and 2003.01.

EXHIBIT 3.54 | Overlay map of priority ZIP codes census tracts below the 50th percentile in Napa County



Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.
Map made by the author using QGIS.

xiv. Findings: City-level data

Gini coefficients, a measure of income inequality within a geographical area, are only available at the city level within the Healthy Places Index. **Exhibits 3.55** and **3.56** show Gini coefficients for each of the cities that contain priority ZIP codes, as well as for all counties in the region. Typically, values from 0.4 to 0.5 suggest high income inequality, and values above 0.5 suggest severe income inequality. From the data, it is evident that cities and counties within the region experience high to severe levels of income inequality.

EXHIBIT 3.55 | Gini coefficient, by city

City	Focus ZIPs	Gini Coefficient
San Francisco	94130, 94102, 94124	0.5
Oakland	94621, 94603, 94601	0.5
Richmond	94804	0.5
North Richmond	94801	0.5
Vallejo	94590, 94589	0.4
Antioch	94509	0.4
San Jose	95116, 95122, 95110, 95111	0.5
Fairfield	94533	0.4
Bethel Island	94511	0.5
Santa Rosa	95407	0.4
Bay Point	94565	0.4
Pittsburg	94565	0.4
San Pablo	94806	0.4
Concord	94520	0.4
Redwood City	94063	0.5
San Leandro	94578	0.4

Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.

EXHIBIT 3.56 | Gini coefficient, by county

County	Gini Coefficient
Alameda	0.5
Contra Costa	0.5
Marin	0.5
Napa	0.5
San Francisco	0.5
San Mateo	0.5
Santa Clara	0.5
Solano	0.4
Sonoma	0.5

Source: California Healthy Places Index, developed by the Public Health Alliance of Southern California. HealthyPlacesIndex.org.

xv. Findings: Data stratified by race and ethnicity

Stratifying data by race and ethnicity is an important methodology to identify health inequities based on social characteristics such as race and ethnicity. Stratifying allows us to see differences in outcomes by racial groups, which can be explained by racism as a root cause (Malawa et al., 2021). Racism impacts health directly and by way of institutionalization in the policies, systems, and structures that determine health status.

Although stratified data are not available at the ZIP code level for our key climate, economic, and equity indicators of interest, county- or city-level stratified data are available for per capita income (city), health insurance (city and county), and life expectancy at birth (county). **Appendix D** has tables showing this stratified data for Bay Area counties, as well as for the cities that contain priority ZIP codes.

At the city level, income gaps by race and ethnicity are apparent. Across the cities that contain priority ZIP codes, the average White income ($54k) is highest. Within individual cities, White average incomes range from $31k (North Richmond) to $99k (San Francisco). Per capita incomes for non-White racial groups are markedly lower. Even the lowest average White income, $31k in North Richmond, is higher than or about equal to the average income for Latino ($23k), Black ($32k), American Indian/Alaska Native ($28k), Native Hawaiian/Pacific Islander ($29k), and Asian ($39k) residents, as well as for individuals who identified with two or more races ($25k) or another racial group ($21k). As noted in the prior section, all focal cities have a Gini coefficient that indicates high income inequality. The results when stratifying income by race and ethnicity suggest that racism drives race-based income inequities.

Also at the city level, average health insurance coverage is lowest for Latino adults within the cities that contain priority ZIP codes (83.3%) as well as for people who identify as another racial group (80.1%). By comparison, average insurance rates for other racial and ethnic groups are about 10% higher, from 91.5% to 95.0%. Other racial or ethnic groups are outliers within certain cities. Namely, Richmond's coverage rate for American Indian/Alaska Native adults is 70.5%, and North Richmond's coverage rate for White adults is 48.0%. This finding is mirrored at the county level, where average insurance coverage rates are lowest for Latino adults (85.9%) and those who identify as another race (82.7%). At the county level, however, average insurance rates for American Indian/Alaska Native and Native Hawaiian/Pacific Islander adults are also slightly below 90%, at 89.3% and 89.2%, respectively. By contrast, insurance rates for Asian, Black, and White adults are closer to 100%, at 95.6%, 93.0%, and 96.2%, respectively.

Finally, county-level data on life expectancy at birth show inequities by race and ethnicity, in particular for Black and American Indian/Alaska Native individuals living in the region. While life expectancy for White, Latino, and Asian residents typically falls above 80 years and, in some cases, may be as long as 90 years, Black and American Indian/Alaska Native life expectancy in the region is typically less than 70 years. This inequity has endured and persisted across the Bay Area for at least two decades, despite equity efforts. Across Bay Area counties, average life expectancy for Black and American Indian/Alaska Native residents are lowest at 77.6 and 79.6 years, respectively. The other averages fall above 80 years: 86.0 for Latino residents, 88.2 for non-Hispanic Asian residents, and 82.2 for non-Hispanic White residents. Some of the greatest inequities are in San Francisco County, where there is a 10.1-year gap between typical Black and White life expectancies, a 12.8-year gap between Latino and Black life expectancies, and a 14.7-year gap between Asian and Black life expectancies.

These outcomes underscore the importance for California Jobs First investments to address racism and racial inequities within the region. The journal article entitled "Racism as a Root Cause Approach: A New Framework," by Zea Malawa, Jenna Gaarde, and Solaire Spellen, presents a four-principle approach to designing interventions that dismantle racism: precise impact, systems change, long term, and reparations (Malawa et al., 2021). California Jobs First planners may consider reviewing the full article and building the principles into future regional strategies.

xvi. Limitations

One limitation of this research is that stratification is only available for some indicators. When stratification is available, it is limited to race and ethnicity. Where possible, it is important to stratify by other demographics, including gender, immigration status, age, and more. The data stored in the Healthy Places Index are pulled from a variety of state and federal sources, including the Census and the American Community Survey. This lack of stratification reflects common issues with large-scale data collection that is commonly not disaggregated by demographics.

Another limitation is that humans are not a monolith, and each person has a unique intersection of social identities. Even with disaggregation, data alone can never capture and represent all human experiences. This shortcoming points to the importance of intersectional analyses and qualitative methods. By speaking with affected community members directly, qualitative methods create an opportunity to center lived experiences and nuances that cannot be captured from data alone. Future California Jobs First phases should engage in community-led, community-centered research and decision-making processes that uplift and center lived experience and expertise.

In a related concern, while HPI percentiles allow us to identify communities experiencing an overburden of multiple unhealthy conditions associated with life expectancy at birth, this does not mean that people living in areas above the 50th percentile are completely unexposed to unhealthy conditions. For example, systemic racism impacts health regardless of what ZIP code a person lives in, even if the HPI suggests healthy conditions overall. People may also be exposed to unhealthy conditions beyond where they live, including but not limited to places where they spend extended time. Similar to the above, this limitation underscores the importance of additional qualitative methods. This concern also underscores the importance of continued use of the HPI tool, which may be used to explore single indicators that decision makers are interested in addressing across geographies.

Another limitation is the recency of data. **Appendix E** notes the years for all data sources used in this analysis. The present HPI version was launched in 2022, and all indicators use the most recently available data, but there is often a gap between when data are collected and when they are available for use. Future qualitative methods may fill this gap and augment existing data by hearing from community members about current conditions.
A related limitation is that there are many other important economic indicators that are not included in the Healthy Places Index. These are things like labor conditions, unionization rates, pay, and benefits, all of which impact health.

Nonetheless, there is much more public health information stored in the Healthy Places Index than can be captured in this analysis; after all, discussing more 250 census tracts in depth is beyond the scope and timeline of this work. As noted, many census tracts overlap with priority ZIP codes, but some do not. We addressed this limitation by including maps that note the overlay of priority census tracts and priority ZIP codes. We acknowledge that these maps do not communicate the full scope of community conditions within non-overlapped census tracts, since they only present overall HPI score, rather than diving into a discussion of all relevant indicators, as we have done with ZIP codes. To further address this limitation, we encourage decision makers to make use of the full online HPI tool to explore community conditions in more depth and to use that information in planning and decision making.

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SECTION 3.3

Regional Summary:
Climate and Environmental Impacts

CONTRIBUTORS

Hanna Payne
Louise Bedsworth
Ken Alex

The Center for Law, Energy, and the Environment (CLEE) at UC Berkeley School of Law

A. Introduction

This section provides a summary of anticipated climate and environmental impacts on Bay Area industry, economies, and workforces. It synthesizes existing literature on climate impacts within the Bay Area region and establishes a baseline for further assessment of subregional economic vulnerabilities to climate change. It also underscores the urgent need for proactive strategies to address the region's vulnerabilities to climate change. With insights into economic, environmental, and health impacts, this section provides a foundation for informed decision-making to build resilience across the Bay Area. Please see **Appendix A** for an explanation of the methodology.

i. Key takeaways

In addition to the key linkages between climate change and public health, several other themes emerge from the review and analysis of environmental and climate impacts on the Bay Area:

» **Economic Vulnerability:** The Bay Area's economy, supporting millions of jobs, faces direct threats due to climate-induced impacts on natural resources, built environments, and the regional workforce. These impacts are exacerbated by disruptions to global supply chains that underpin the region's economic contributions.

» **Diverse Impacts:** Climate change will affect all sectors of the Bay Area economy. It will influence natural systems, demand for resources, and critical infrastructure such as transportation, water, and energy systems. Worker productivity and health across industries will also be affected, with outdoor and indoor workers alike facing risks from rising temperatures, wildfires, and variable precipitation.

» **Interdependencies and Vulnerability:** The interconnectedness of sectors such as transportation, telecommunications, utilities, and goods movement amplifies vulnerabilities, especially during emergencies. Industries like agriculture, manufacturing, and trade are critical to the region's economy but are exposed to climate-related risks.

» **Land Use and Growth:** Climate change will shape land use decisions, influencing where the region expands housing and business infrastructure. Sea level rise, drought, and wildfires will drive these decisions and impact growth patterns.

» **Climate Equity and Health:** Vulnerabilities to climate impacts and mitigation efforts are unevenly distributed, disproportionately affecting marginalized communities. Health challenges due to rising temperatures, variations in precipitation, and increased wildfire risks pose direct and indirect threats to communities.

» **Complex Vulnerabilities:** Not all climate vulnerabilities are location-based. Some communities will experience overlapping climate and health vulnerabilities that are difficult to capture with the place-based indicators used by the Healthy Places Index and CalAdapt.

EXHIBIT 3.57 | Summary of climate impacts to key Bay Area sectors and industries

Subsector	Sea level rise & groundwater	Variable precipitation: storms & drought	Rising temperatures & extreme heat	Wildfire	General impacts
Agriculture & food systems	Flooding of agricultural lands Saltwater intrusion into water sources Damage to coastal manufacturing and food distribution infrastructure	Flooding agricultural lands Damage to food system infrastructure and distribution networks (i.e., road damage) Damage to agricultural commodities (i.e., reduced production)	Damage to agriculture commodities (i.e., reduced production) Damage to distribution networks (i.e., road damage)	Loss of crops Damage to food manufacturing and distribution infrastructure	Increased health risks to workers and reduced productivity
Information, tech, & telecommunications	Flooding of infrastructure and coastal buildings	Flooding of infrastructure and low-lying buildings & storm damage to infrastructure Increased demand for services during emergency events Interruption of services during power outages	Higher energy costs Interruption of services during power outages	Increased threats to workers health and safety Infrastructure damage Increased demand for services during emergency events	Job growth (e.g., climate tech, repair of telecommunications systems, increased demand for services) Increased cost of labor
Community & emergency services	Infrastructure damage Reduced access to services and/or impacted regions	Infrastructure damage Reduced access to services and/or impacted regions Interruption of services due to power outages or infrastructure damage	Critical infrastructure damage Increased risk to public health (increased demand for services) as well as worker health and safety Higher energy costs Interruption of services due to power outages	Increased risk to public health (increased demand for services) Infrastructure damage and interruption of services	Job growth Increased demand for services Increased risks to healthcare workers and emergency responders

EXHIBIT 3.57 (continued)

Subsector	Sea level rise & groundwater	Variable precipitation: storms & drought	Rising temperatures & extreme heat	Wildfire	General impacts
Transportation & utilities	Critical infrastructure damage Groundwater contamination due to proximity to hazardous sites Shifts in traffic and transportation congestion	Impacts on water resource availability and water quality Increased reliance on groundwater Flooding of critical infrastructure Reduced snowpack	Increased demand for energy Higher energy costs Reduced performance of energy infrastructure Evaporation impacts on water availability and water storage	Critical infrastructure damage Safety risk to utilities workers Impacts on water quality Public safety power shutoffs	Job growth (e.g., increased maintenance and repair needs) Increased demand for resources (water, power, etc.) Shifts in job locations and workforce types that will impact energy usage
Leisure & hospitality	Infrastructure damage (e.g., coastal access infrastructure) Damage to coastal resources that support tourism and recreation Travel-related impacts	Impacts on accessibility of recreation activities Infrastructure damage Travel-related impacts	Safety and health risks to workers and visitors Travel-related impacts	Infrastructure damage Damage to resources and habitats that support tourism and recreation Safety and health risks to workers and visitors	Lengthening and/ or shifts of peak recreation seasons Downstream effect of climate impacts to Food & Agriculture sector
Manufacturing	Infrastructure damage to both production and distribution processes (e.g., ports, airports, roads, etc.)	Infrastructure damage	Safety and health risks to workers; reduced productivity Higher energy costs	Safety and health risks to workers; reduced productivity Infrastructure damage to distribution supply chains	Impacts to national and global supply chains with downstream effects on manufacturing in California
Mining, logging, & construction	Groundwater impacts on construction and building Contaminant mobilization	Infrastructure damage Safety risks to workers Reduced productivity and more limited working hours during extreme events Impacts on forests (e.g., invasive species)	Impacts on forests (e.g., invasive species) Safety and health risks to workers; reduced productivity	Infrastructure damage Impacts on resources key to production processes (e.g., forests) Safety and health risks to workers; reduced productivity	Job growth in construction sector (e.g., increased maintenance/repair and installation of climate-smart building components) Impacts to national and global supply chains with downstream effects on access to construction materials

EXHIBIT 3.57 (continued)

Subsector	Sea level rise & groundwater	Variable precipitation: storms & drought	Rising temperatures & extreme heat	Wildfire	General impacts
Coastal-dependent economies	Critical infrastructure damage Constraints on shipping patterns and timelines Flooding concerns	Critical infrastructure damage Flooding damage and concerns (including public health and safety) Safety and health risks to workers	Impacts on marine ecosystems and fish ecology Warming impacts on ocean circulation patterns Safety and health risks to workers	Damage to coastal infrastructure (e.g., CZU Lightning Complex fires in 2020)	Ocean acidification
Goods movement (trade and logistics)	Critical infrastructure damage	Critical infrastructure damage Shifts in export timelines and capacity	Higher energy costs	Critical infrastructure damage	Interconnected systems increase vulnerability of reliant sectors (food & agriculture, manufacturing, leisure & hospitality) Shifts in fuel-reliance for transportation systems

B. Overview of Bay Area Climate Impacts

Climate change impacts on global and regional weather patterns have been well studied and captured by scientific models; the degree to which there is certainty of future change varies between impacts. The *Statewide Summary Report for the Fourth California Climate Change Assessment* provides a summary of the anticipated direction of impact and scientific confidence for future change across six key climate impact areas, as shown in **Exhibit 3.58**. Importantly, there is medium-high to very-high confidence that all six climate impacts with relevance for California will move in the projected direction (*California's Changing Climate 2018,* 2018).

EXHIBIT 3.58 | Projected direction and associated scientific confidence for future change of key climate impacts

Climate impact		Direction	Scientific confidence for future change
	TEMPERATURES	▲ Warming	Very high
	SEA LEVELS	▲ Rising	Very high
	SNOWPACK	▼ Declining	Very high
	HEAVY PRECIPITATION EVENTS	▲ Increasing	Medium high
	DROUGHT	▲ Increasing	Medium high
	AREA BURNED BY WILDFIRE	▲ Increasing	Medium high

Source: *California's Changing Climate 2018* (California's Fourth Climate Change Assessment). (2018). Governor's Office of Planning and Research. https://climateassessment.ca.gov/

The San Francisco Bay Area, like many regions across the state and the country, is increasingly experiencing the environmental, economic, and health impacts from climate change. In the past year alone, the region experienced record-breaking rainfall as a result of 12 storm systems that battered the West Coast, resulting in significant flooding, evacuations, and power outages for Bay Area communities (*More Heavy Rain, Snow, and Wind Hitting Western U.S.*, 2023). While the unprecedented amount of rainfall alleviated drought conditions across much of the state, summer heat waves remind residents that extreme weather variability is par for the course under a changing climate (Karlamangla, 2023). The Fourth Assessment also included a regional summary report for the Bay Area that summarizes relevant climate impacts for the region.

i. Climate scenarios and downscaled climate data

Future climate projections are informed by greenhouse gas (GHG) emissions scenarios that determine how future emissions trajectories will impact climate outcomes. These emissions scenarios are captured by a set of Representative Concentration Pathways (RCPs) that portray possible future pathways of GHG emissions and atmospheric concentrations, air pollutant emissions, and land use (Pachauri & Meyer, 2014) (**Exhibit 3.59**). The RCPs inform climate projections that account for uncertainty in future concentrations of greenhouse gases and emissions of aerosols, ranging from an aggressive emissions reduction pathway (RCP 2.6) through to a very high emissions pathway (RCP 8.5).

EXHIBIT 3.59 | Description of representative concentration pathway scenarios

Scenarios	Radiative forcing (W/m^2)	CO_2-eq Concentration (ppm)	Description
RCP 2.6	3.0	480–530	A strict reduction scenario that aims to keep global warming likely below 2°C above pre-industrial temperatures.
RCP 4.5	4.5	580–720	A reduction scenario in which a significant GHG mitigation policy is implemented.
RCP 6.0	6.0	720–1,000	A normal reduction scenario in which an ordinary GHG mitigation policy is implemented.
RCP 8.5	8.5	>1,000	Very high GHG emissions. Scenarios without additional efforts to constrain emissions.

Source: Youjeong et al., 2018

The next section draws from and summarizes studies predominantly conducted as part of California's Fourth Climate Change Assessment, which developed downscaled estimates of climate impacts under RCP4.5 and RCP8.5 (Pierce et al. 2018). Under RCP4.5, emissions projected to peak around 2040 and then decline, while emissions under RCP8.5 are expected to continue rising through 2100. There are minimal differences in emissions scenarios and anticipated climate outcomes through mid-century, so it is generally recommended that planners use only RCP8.5 for mid-century impacts (through 2050), and both RCP4.5 and RCP8.5 for end-of-century impacts (through 2100) (*Cal-Adapt: RCP Scenarios,* n.d.).

The Bay Area experiences diverse microclimates, a product of the region's unique topography, oceanic currents, fog exposure, and onshore winds (Ekstrom & Moser, 2012). Therefore, at a subregional level, anticipated impacts range from moderate to severe depending on the climate impact and county.

A recent report by the United Nation's Environment Programme suggests that global GHG emissions reductions are not on target to meet the temperature goal of the Paris Agreement, which would limit warming to 1.5°C by end of century (*Emissions Gap Report 2022: The Closing Window - Climate Crisis Calls for Rapid Transformation of Societies*, 2022). Continuation of current emissions mitigation efforts has a 66% chance of limiting warming to 2.8°C by end of century, a temperature increase consistent with RCP6.0, a stabilizing emissions scenario. However, under the same current policy scenario, the analysis shows a 90% chance of limiting warming to only 3.3°C by end of century. If global efforts to significantly reduce GHG emissions are unsuccessful, a temperature increase closer to that projected under the high-emissions scenario, RCP8.5, is to be expected (*Primer to Climate Scenarios*, n.d.; *San Francisco Bay Plan Climate Change Policy Guidance,* 2021).

Many factors influence the certainty of climate projections and thus introduce a level of uncertainty into anticipated impacts on the Bay Area's industries and workforces. These factors include natural variability in the climate system, the representation of physical phenomena by statistical models, and model resolution (*San Francisco Bay Area Region Report,* 2018). Uncertainty in projections increases as data is downscaled to a finer level of spatial detail. Additionally, downscaling methods used in the Fourth Assessment rely on historical patterns to infer finer scale outcomes and so would not capture future climatic changes or more local phenomenon for which historical data does not yet exist. Importantly, patterns in coastal breeze and fog production are not captured in Global Climate Models, nor in Fourth Assessment downscaling methods, but are likely to have significant impacts on temperature differentials between coastal and inland parts of the Bay Area (*San Francisco Bay Area Region Report,* 2018).

ii. Key climate impact areas

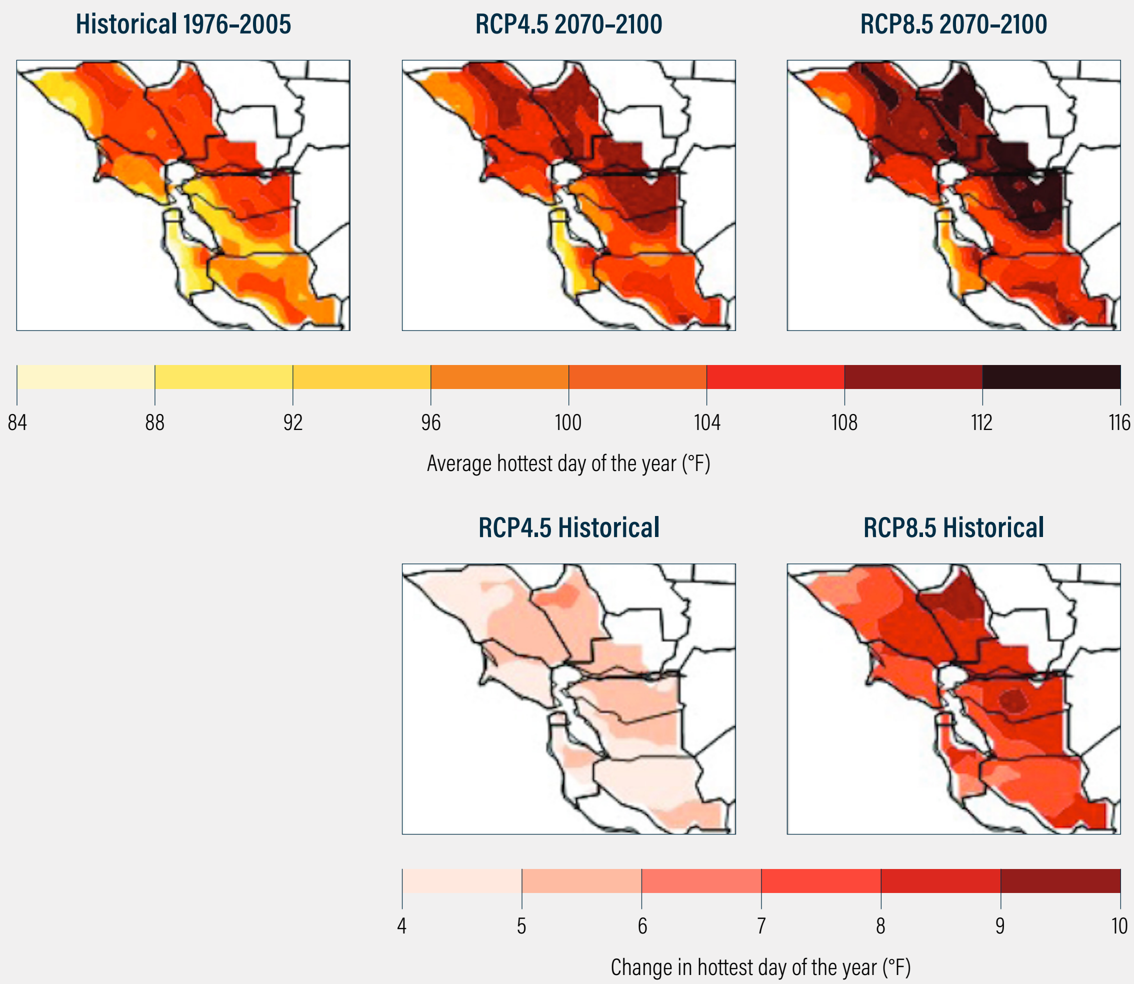
Our analysis focuses on four key climate impact areas with anticipated consequences for Bay Area built and natural environments. These impact areas include: (1) rising temperatures; (2) sea level rise; (3) variable precipitation, storms, and drought; and (4) wildfire. Due to the combination of climate hazards that are likely to impact the San Francisco Bay Area and the vulnerably of the Bay's infrastructure, housing, jobs, and economies, the region is ranked as one of the most vulnerable major metros in the country (Newburger, 2023).

> *"The heat affects your body, and when there's heavy rain, you can't work. [...] The smoke from the forest fires affects the workers' lungs. We get dizzy breathing that in, and most of the time, we get headaches and need rest breaks."*
>
> — **JOSÉ ALVAREZ,** construction worker

a. Rising temperature

Observed changes in the Bay Area indicate a general trend towards warmer temperatures and rising sea levels (San Francisco Bay Area Region Report, 2018). Between 1950 and 2005, the average annual maximum temperature increased by 1.7 degrees Fahrenheit. Mean annual temperatures for the Bay Area are anticipated to continue an upward trend. The region can expect see to an increase of at least 3.3°F by mid-century (2040-2069), regardless of emissions pathways. However, beyond mid-century, global GHG emission pathways have a stronger effect on warming. Under a high-emissions scenario, the Bay Area is projected to see an increase of 7.2°F by end of century (2070-20100), up from 4.2°F under a low-emissions scenario (San Francisco Bay Area Region Report, 2018). See **Exhibit 3.60** for observed and projected annual average maximum temperatures under both RCP4.5 and RCP8.5.

EXHIBIT 3.60 | Average hottest day of the year for the nine-county Bay Area

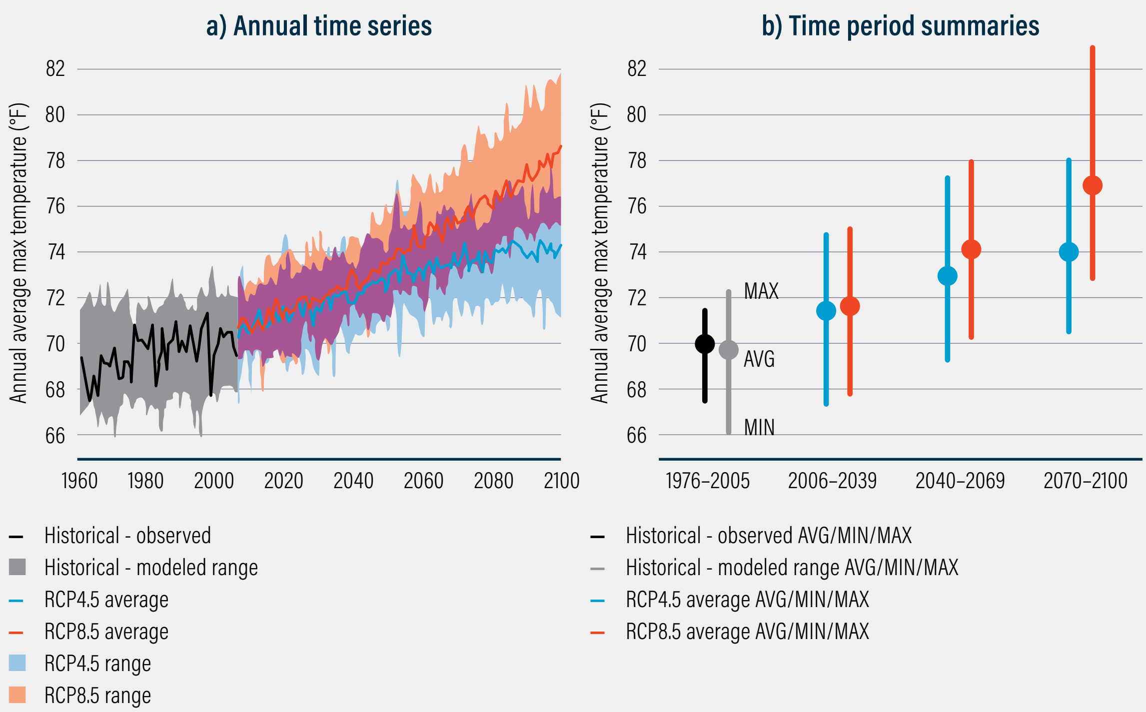


Top row: Average hottest day of the year in the historical (1976-2005) period and in the late-21st century (2070-2100) under RCP4.5 and RCP8.5. Bottom row: change (late-21st century minus historical) in the hottest day of the year under RCP4.5 and RCP8.5. Unit is °F. All data are derived from LOCA.

Source: *San Francisco Bay Area Region Report* (California's Fourth Climate Change Assessment). (2018). [Regional Report]. Governor's Office of Planning and Research. https://climateassessment.ca.gov/regions/

Under a high-emissions scenario for end-of-century projections, the subregional differences in warming will be more pronounced, with much greater differences in warming between coastal areas and inland or bay-inland areas (i.e., Solano, Napa, Alameda, and Contra Costa Counties, as well as parts of Santa Clara County) (Ekstrom & Moser, 2012; *San Francisco Bay Area Region Report*, 2018). Climate change is also anticipated to increase the frequency and magnitude of heat waves; these acute warming events pose a major public health risk, in addition to increasing risk of wildfire, straining energy systems, and worsening air quality (Karlamangla, 2023; Pratt, 2022).

EXHIBIT 3.61 | Observed historical, modeled historical, and projected future annual average maximum temperature over the Bay Area



Observed historical (black), modeled historical (grey), and projected future (RCP4.5 - blue, RCP8.5 - red) annual average maximum temperature over the Bay Area. (a) Annual time series of data (future projections begin in 2006), with solid lines representing observed annual mean in the historical period and model-averages in the future. Shading represents the spread across models. (b) Summary of multi-year average (circles) and spread (vertical lines) across four time periods: 1975-2005 (historical), 2006-2039 (early-21st century), 2040-2069 (mid-21st century), and 2070-2100 (late-21st century). Note that the spread of values in panel b is smaller for the observed historical data compared to both the modeled historical data and modeled future data because the modeled quantities refect model-to-model variability in addition to year-to-year variability, whereas the observed historical data only refects year-to-year variability. Unit is °F.

Source: *San Francisco Bay Area Region Report* (California's Fourth Climate Change Assessment). (2018). [Regional Report]. Governor's Office of Planning and Research. https://climateassessment.ca.gov/regions/

b. Sea level rise

The San Francisco Bay Area is a complex geography of open coast, protected bay, and inland delta ecosystems, all of which are subject to impacts of rising sea levels. These impacts include coastal erosion, inundation, and large-scale flood events. The longest-running tide gauge in North America, located at the Golden Gate Bridge (active since 1855), has recorded 1.94 millimeters per year of sea level rise since 1897, amounting to over 20 cm of sea level rise in the last 100 years alone (*San Francisco Bay Area Region Report*, 2018). Notably, tide gauges across the Bay show significant acceleration since 2011, suggesting some degree of increase in the rate of sea level rise in the Bay Area. This rate increase is likely subject to shift, based on patterns of shorter and longer climate variability that drive circulation patterns in the region (*San Francisco Bay Area Region Report*, 2018).

Regardless of emissions pathway, the world is expected to experience some level of sea level rise due to the current concentration of greenhouse gases in the atmosphere and a substantial lag between increasing global temperatures and rising sea level. Research suggests at least two meters of sea level rise will occur over the next several centuries, even with net-zero future emissions. If emissions continue unabated, we could see more than 15 meters of global sea level rise by 2500, in large part due to loss of Antarctic ice sheets (DeConto & Pollard, 2016).

Local levels of sea level rise are likely to diverge from the global mean. Sea level projections are complicated at a local scale by the highly variable rates of vertical land motion across the Bay Area, as well as sediment compaction, marsh accretion, and groundwater fluctuations. California's coast is also subject to enhanced effects of ice sheet loss, resulting in an additional quarter foot of local sea level rise for every foot of global sea level rise caused by ice loss on West Antarctica.

Because of the factors that complicate projections of sea level rise at a local level, we summarize projections for both the entirety of the state and for the Bay Area. California's Fourth Climate Change Assessment projects 0.74 meters (RCP4.5) to 1.37 meters (RCP8.5) of sea level rise by 2100 for the state (*California's Changing Climate 2018,* 2018). The Ocean Protection Council's (OPC) 2018 report, "Rising Seas in California," projects 0.49 meters (RCP2.6) and 0.76 meters (RCP8.5) for the San Francisco Bay by 2100. However, with extensive ice sheet loss, both the Fourth Assessment and OPC suggest that the Bay could see as much as 2.87 meters of sea level rise under RCP8.5, although the probability of this extreme scenario is very low.

Rising sea levels will compound the physical and economic effects of other shifting weather patterns. The anticipated increase in storm intensity is particularly relevant for coastal regions of the Bay Area; the 2015-2016 El Niño resulted in elevated water levels of 10-20 centimeters, winter wave energy that was 50% larger than typical, and record levels of outer beach erosion. The Bay Area's Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), the region's two regional planning agencies, recently estimated that 75,000 households, 200,000 jobs, 15,000 businesses, and 20,000 acres of vulnerable land are at risk of flooding due to sea level rise. The value of parcels at risk is about $85 billion dollars, while the value of major at-risk roadways exceeds $150 billion (Hartofelis et al., 2023).

Rising sea levels, coupled with more extreme storm events, are also likely to trigger the release of toxic chemicals from hazardous sites (Cushing et al., 2023).

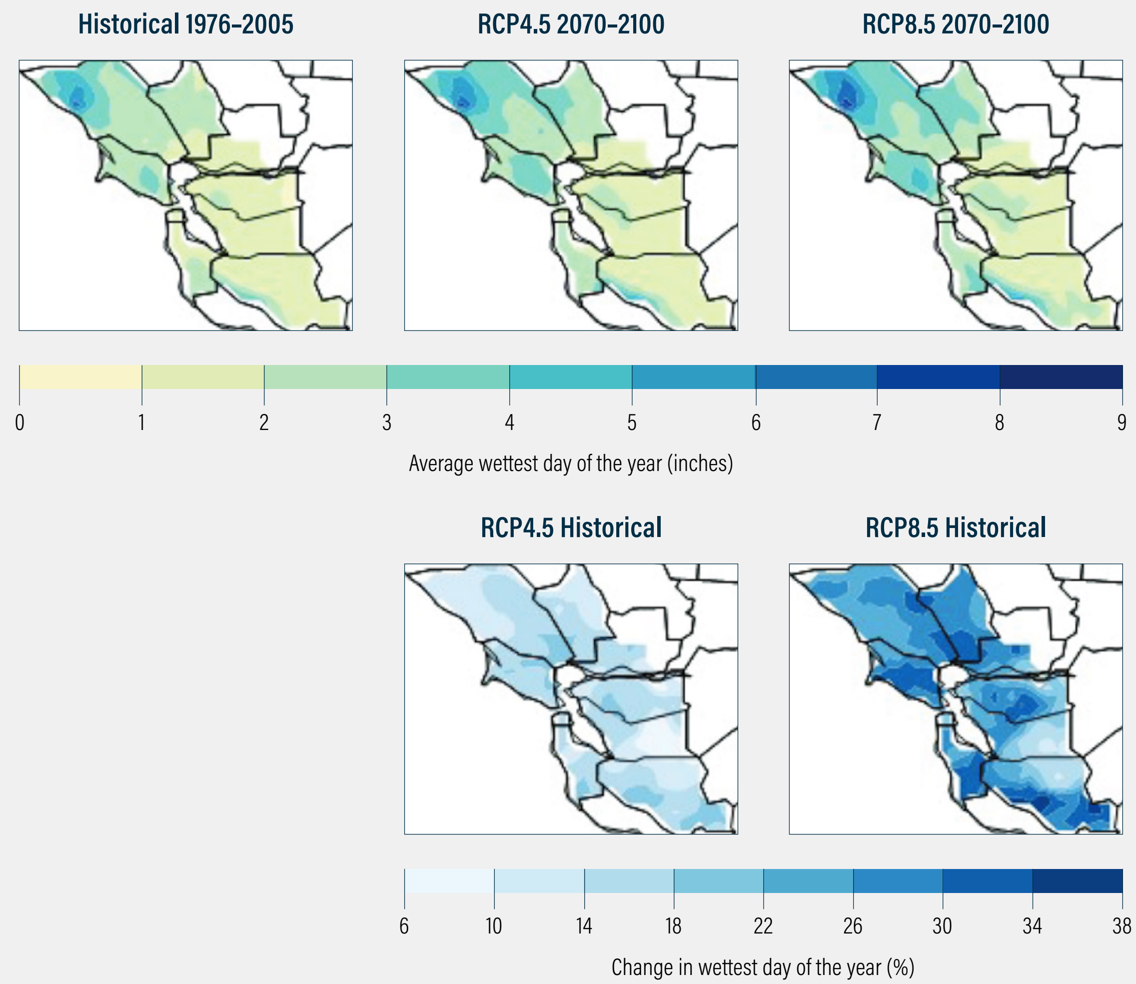
c. Variable precipitation, storms, and drought

California has highly variable precipitation patterns due to unique microclimates and regional weather patterns' interactions with coastal and inland topography. The 2012-2016 drought led to the most severe water deficits observed in the last 1,200 years (Griffin & Anchukaitis, 2014) and resulted in significant declines in snowpack (Belmecheri et al., 2016) and groundwater (*San Francisco Bay Area Region Report,* 2018). 2021 was the third driest year in recorded history for the state (Ehlers, 2022).

Regional projections for climate-induced changes in mean precipitation come with a high level of uncertainty, but generally do not show a strong signal for substantial shifts. Across the state, precipitation is more likely to fall as rain than snow as temperatures rise (*California's Changing Climate 2018*, 2018). The Bay Area is expected to see an increase in extreme precipitation events, with storms likely to become more intense. The Fourth Assessment estimates that under RCP8.5, percent increase in the largest precipitation events (inches of rain per day) could be as high as 37% by end of century.

Local and statewide precipitation events and storms are important for the Bay Area's natural and built systems. At the local scale, the Bay's 1,000-mile shoreline is subject to erosion, flooding, and other storm impacts. California's largest storms, called "atmospheric rivers" because of the immense amount of water they carry and their river-like movement, can increase likelihood of local flooding due to the high amounts of rainfall that fall over a short period of time, particularly for the Sierras and the Russian River in Sonoma County (Gorman et al., 2023; *Precipitation Piles on in California,* 2023). Between December 2022 and March 2023, more than a dozen atmospheric rivers brought serious flooding and landslides to California, resulting in an emergency declaration in 43 of 58 counties (Fawcett, 2023).

EXHIBIT 3.62 | Average wettest day of the year for the nine-county Bay Area



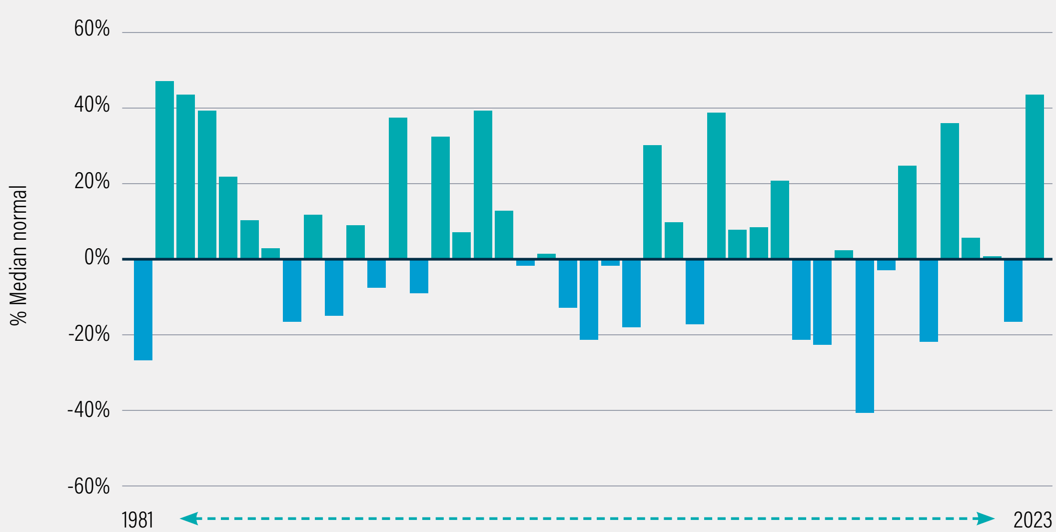
Top row: Average wettest day of the year in the historical (1976-2005) period and in the late-21st century (2070-2100) under RCP4.5 and RCP8.5. Unit is inches. Bottom row: Change (late-21st century minus historical) in the wettest day of the year under RCP4.5 and RCP8.5. Unit is percent. All data are derived from LOCA.

Source: *San Francisco Bay Area Region Report* (California's Fourth Climate Change Assessment). (2018). [Regional Report]. Governor's Office of Planning and Research. https://climateassessment.ca.gov/regions/

Although dangerous to both infrastructure and people (Gorman et al., 2023), atmospheric rivers and related precipitation patterns are important to the economy and water supply of the Bay Area. Atmospheric rivers contribute about 40% of the Sierra's annual snowpack and have the potential to alleviate drought conditions across the state, at least in the short term (Precipitation Piles on in California, 2023). Sierra Nevada watersheds account for about 60% of the Bay Area's water supply, meaning that multi-year snow deficits can have catastrophic impacts on water accessibility for communities and water-dependent industries around the Bay. During the 2012-2016 drought, the Sierra Nevada snowpack was at 5% of its normal capacity, contributing to major economic and job losses in both the agricultural and recreation sectors (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022; *San Francisco Bay Area Region Report*, 2018).

However, extremes in the other direction can also have damaging public health and economic impacts; the 2022-2023 rainy season that brought more than a dozen atmospheric rivers to California contributed to over 55 feet of snow at a station located at Donner Pass in Nevada County, the third-highest accumulation since the station opened in 1946. Residents were trapped and businesses shut down in the weeks following a series of storms that hit the Sierras (Precipitation Piles on in California, 2023).

EXHIBIT 3.63 | Annual snow water equivalent from median normal for western snowpack (1981-2023)



Source: Climate Central.

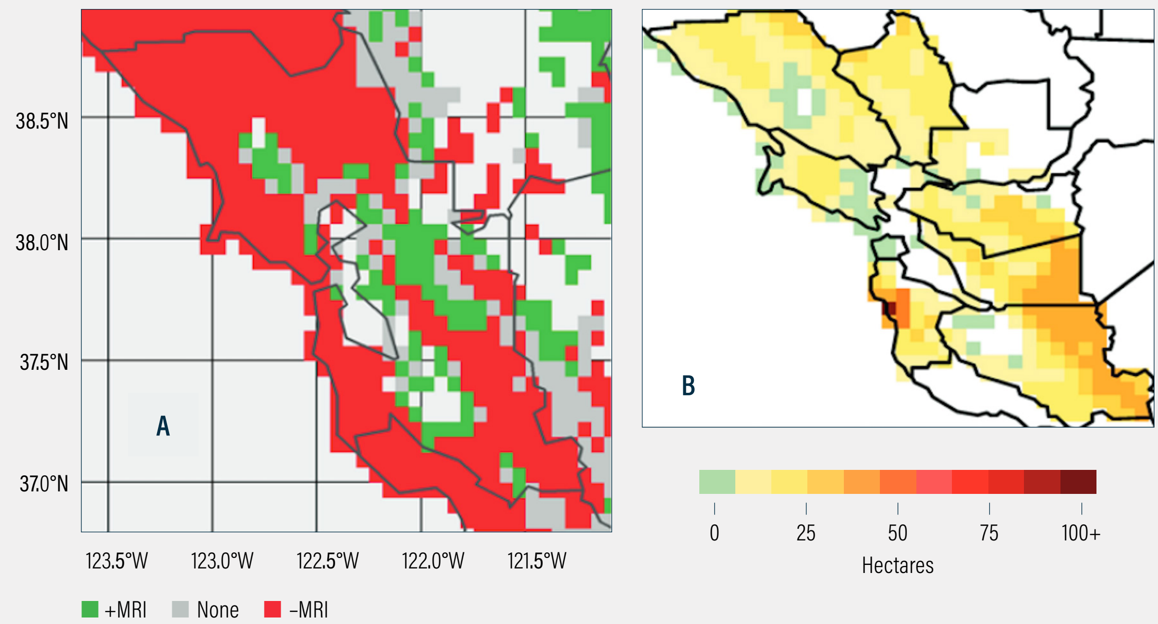
d. Wildfire

The Bay Area is naturally fire-prone due to the region's Mediterranean climate. Two of the state's top three most destructive wildfires (in terms of property damage) have occurred in the Bay Area; these are also two of the top three deadliest fires in the state (*Incidents | CAL FIRE,* n.d.). Historically, the most at-risk counties in the Bay Area were southern Santa Clara County and northern Sonoma and Napa County (Ekstrom & Moser, 2012), which have been impacted by 10 of the region's 15 largest wildfires, all of which have occurred in the last decade (*Incidents | CAL FIRE*, n.d.).

Understanding wildfire risk requires acknowledging the interplay of physical climate risk and development patterns. Increasing temperatures and frequency of extended drought periods are expected to increase the number of acres burned in the Western United States (*San Francisco Bay Area Region Report,* 2018). Shifts in vegetation structure and abundance, as well as changes in spatial and temporal patterns of lightning may increase or decrease fire risk (Ekstrom & Moser, 2012). However, land use and development patterns, particularly in the Bay Area, are frequently the largest drivers of future wildfire risk. A high-growth and high-sprawl development scenario under either emissions pathway (RCP4.5 and RCP8.5) is likely to result in increased fire risk (Ekstrom & Moser, 2012).

Statewide estimates currently put close to one quarter of California, more than 25 million acres, under very high or extreme fire threat (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022). Projections for the Bay Area show increased fire activity under future climate conditions, in large part because fire is not fuel-limited in the region. Coupled with a rapid population growth and the state's need to build more housing, this projected increase in fire activity is expected to lead to increased risk for communities at the wildland-urban interface across most of the Bay Area (Ekstrom & Moser, 2012). Research suggests that the Bay Area could be at risk of enduring some of the highest property damage from wildfire in the state (Ekstrom & Moser, 2012). The only regions in the Bay Area that may see a reduction in wildfire risk are western Contra Costa County and a small portion of San Mateo County, though future development patterns have a substantial influence on how risk pans out in these locations, as well.

EXHIBIT 3.64 | Projections for future changes in wildfire in terms of fire frequency and average annual area burned



Projections for future changes in wildfire. A) Predictions for increase (red) or decrease (green) in fire frequency (2026-2050, compared to baseline of 1976-2000), showing areas of agreement across an ensemble of climate models (Mann et al., 2016). B) Composite projections from Westerling (2018) for mid-century (2035-2064) average annual area burned under RCP 4.5 (results for RCP 8.5 are very similar).

Source: *San Francisco Bay Area Region Repor*t (California's Fourth Climate Change Assessment). (2018). [Regional Report]. Governor's Office of Planning and Research. https://climateassessment.ca.gov/regions/

e. Other climate patterns of concern for the Bay Area

Coastal Fog: Coastal fog is an important aspect of Bay Area climate. Summertime fog and low clouds move through northwest-oriented valleys, like those in the northern parts of Napa and Sonoma County and permeate inland throughout the Bay Area. Coastal fog and associated breezes keep average summer temperatures on the Peninsula lower than in other parts of the state and contribute significantly to the success of inland agricultural lands. In particular, fog protects lettuce and strawberries from sunburn and creates an ideal growing environmental for wine-producing grape varieties in the North Bay. Summertime fog also protects the region against the growing climatic water deficit, helping manage fire-ready tinder conditions and reducing electrical demand for air conditioning (*San Francisco Bay Area Region Report*, 2018).

The impacts of a changing climate on coastal fog are not well understood, in large part because fog formation is a complicated mix of many factors, including pollution, temperature, and even development patterns. Research on the climate change impacts to fog formation is a growing area of study, one that will help inform future planning for Bay Area climate conditions (*San Francisco Bay Area Region Report*, 2018).

Groundwater Rise: The relationship between groundwater and sea level rise is likely to lead to enhanced flooding throughout the Bay, resulting in extended damages to infrastructure and public health impacts. This issue has been a topic of recent research; studies suggest that flooding from emergent groundwater could impact a larger area across the region than wave-induced flooding from sea level rise alone (*Sea Level Rise: Climate Adaptation Policies and Strategies in the San Francisco Bay Area*, 2022).

f. Subregional variation in impacts

As will be addressed later, because of the Bay Area's diverse microclimates, climate impacts may vary location to location at as fine as a neighborhood level. Effective climate planning will need to address these nuances to see positive and equitable outcomes for communities. Here, we provide a brief summary of expected impacts to five Bay Area jurisdictions that highlight the range of changes that locations could see by 2050 under a high-emissions scenario, using Cal-Adapt's suite of climate change tools.

Heat and Wildfire—Alamo, Contra Costa County: Alamo is expected to see higher than average maximum and minimum temperatures, with substantially warmer summers. Residents can also expect to experience a greater number of extreme heat days and warmer nights, both of which may cause increased use of or reliance on air conditioning. Alamo is unlikely to see any major changes in average annual or average 1-day precipitation by 2050, but could likely see both extended periods of dry spells and extended periods of heavy rain, with the variation in both year-to-year increasing significantly. Due in part to the expected increase in duration of periods of drought, followed by heavy rains, and vice versa, Alamo is expected to see an increase in wildfire conditions by 2050.

Warmer Nights and Coastal Hazards—Half Moon Bay, San Mateo County: Half Moon Bay is expected to see higher than average maximum and minimum temperatures by 2050, though not on the scale of more inland jurisdictions. Similarly, the area is likely to see only a slight increase in extreme heat days. However, the more substantial impacts will come from an increase in warmer nights, which suggests that residents may be less likely to rely on evenings to both cool homes and maintain temperature-sensitive crop productivity. Half Moon Bay is likely to experience longer dry spells and drought period in greater duration, as well as more intense winter storms. As a coastal jurisdiction, Half Moon Bay could see increased intensity in winter wave activity associated with stronger storms, leading to damage to coastal ecosystems and infrastructure. Finally, by mid-century, many of the area's beaches will see impacts from sea level rise, resulting in more frequent flooding, especially during winter storms and extreme precipitation events.

Heavy Precipitation and Flooding—Healdsburg, Sonoma County: Healdsburg is expected to see higher than average maximum and minimum temperatures by 2050, including substantially more warmer nights. The area will also see a greater number of extreme heat days. However, one of the greatest climate risks for Healdsburg is the potential for an increase in annual precipitation. The region already gets 42 inches of rain annually on average, significantly higher than most of the Bay Area. By 2050, Healdsburg is projected to see an increase of only about 1.5 inches, though the annual range could go as high as 62 inches. Like most of the Bay Area, Healdsburg could see more intense winter storms and stronger precipitation events. Because of this, Healdsburg residents are likely to see an increase in flooding, a hazard that already impacts the southeastern part of the city, where the Russian River and Foss Creek contribute to localized flooding. Finally, Healdsburg could see a slight increase in wildfire activity, depending on the length of dry spells and the intensity of annual precipitation events.

Drought and Wildfire—Morgan Hill, Santa Clara County: Morgan Hill is expected to see major impacts from higher temperatures across all indicators, especially average maximum temperatures, and warmer nights, particularly in summer months. The area is unlikely to see major changes in precipitation, beyond the expected increased winter storm intensity, but residents will see increased lengths of dry spells and more severe droughts. A particular concern for Morgan Hill is wildfire risk. The area is already located in the very high fire hazard severity zone and is projected to see an increase in fire activity due to extreme drought conditions.

Sea Level Rise and Flooding—Sausalito, Marin County: Sausalito is expected to see moderate increases in average maximum and minimum temperatures by 2050, though the main temperatures impacts are likely to come from warmer nights. Precipitation projections are on track with much of the rest of the Bay Area, but Sausalito is expected to feel the impacts of more consistent and extreme droughts. Notably, Sausalito is exposed to coastal flooding hazards and frequently experiences flooding during King Tide events. By 2050, it is likely that Sausalito residents will see more frequent and extreme flooding due to sea level rise, including levee overtopping. Many businesses and residences along the waterfront will be impacted by coastal flooding and extreme precipitation events in 2050.

C. Climate Change and Economic Development

Climate change poses a threat to local and regional economies through direct impacts on natural resources, built environments, and industry workforces. These impacts are further exacerbated by disruptions to the global supply chains that sustain the Bay Area's international and domestic economic contributions. At the same time, global and local mitigation actions will reduce the dependence on fossil fuels, resulting in shifts to supply chains and workforces. The concept of a "just transition" refers to this phase-out of polluting industries that harm workers, community health, and natural systems, while also ensuring that any industry transition provides pathways for the equitable and just redistribution of jobs to impacted workers (*Just Transition Principles*, n.d.).

Strategies for a just transition are deeply aligned with strategies for achieving green economies and, if managed well, can create new opportunities for meaningful, decent work in addition to supporting climate goals. These include gains in total employment through the development of renewable energy industries; improvements in job quality, income, and safety through investment in emerging technologies; and increased social inclusion and equity through expanded access to affordable resources, including housing, energy, and water (*Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All*, 2016).

> *"Employers need to have meetings to let us know how to work under these heat situations and forest fires, as well as what measures to take. Whether that means taking more rest breaks or using face masks, they need to inform workers about the environmental issues."*
>
> — **JOSÉ ALVAREZ,** construction worker

In this section, we first address a growing challenge for the Bay Area, the jobs-to-housing imbalance, which results in a mismatch between housing and jobs across Bay Area counties, leading to increased traffic congestion, longer commutes, and reduced quality of life. We then discuss the anticipated impacts of climate change on key Bay Area economic sectors, vulnerable workforces, critical infrastructure systems, and transitioning industry. In alignment with the principles of a just transition, this subsection aims to provide an overview of potential job opportunities created by transitioning industry and the growing investments in adaptation planning.

EXHIBIT 3.65 | Climate vulnerabilities of key industry sectors, by Bay Area Jobs First counties

Bay Area Jobs First County	Key Job-Producing Industry Sectors	Key Climate Impacts
Alameda	Community and Emergency Services (education and healthcare); Information, Technology, & Telecommunications; Professional & Business Services; Trade & Utilities (logistics and goods movements, as well as transportation)	Rising temperatures, extreme heat, sea level rise, wildfire (in eastern parts of the county)
Contra Costa	Community & Emergency Services (education and healthcare); Professional & Business Services; Trade & Utilities (logistics and goods movements, as well as transportation)	Rising temperatures, extreme heat, sea level rise, wildfire (in eastern parts of the county)
Marin	Food & Agriculture (grapes and wine in Sonoma County, and small farms and cattle in Marin County); Leisure & Hospitality; Trade & Utilities	Rising temperatures, variable precipitation, wildfire
Napa	Food & Agriculture (grapes and wine); Leisure & Hospitality; Mining; Manufacturing (including retail sales), Trade & Utilities (logistics and goods movement)	Rising temperatures, extreme heat, variable precipitation (drought), wildfire
San Francisco	Community & Emergency Services (education and healthcare); Professional & Business Services; Leisure & Hospitality; Information, Technology, & Telecommunications	Variable precipitation (more intense storms), sea level rise
San Mateo	Food & Agriculture (floral and nursey crops in particular); Manufacturing; Information, Technology, & Telecommunications; Professional & Business Services, Community & Emergency Services (education and healthcare)	Rising temperatures, sea level rise, wildfire
Santa Clara	Food & Agriculture (floral and nursey crops in particular); Manufacturing; Information, Technology, & Telecommunications; Professional & Business Services, Community & Emergency Services (education and healthcare)	Rising temperatures, sea level rise, wildfire
Solano	Food & Agriculture (grapes and wine); Leisure & Hospitality; Mining; Manufacturing (including retail sales), Trade & Utilities (logistics and goods movement)	Rising temperatures, extreme heat, variable precipitation (drought), wildfire
Sonoma	Food & Agriculture (grapes and wine in Sonoma County, and small farms and cattle in Marin County); Leisure & Hospitality; Trade & Utilities	Rising temperatures, variable precipitation, wildfire

Source for industry sectors: The Metropolitan Transportation Commission's Vital Signs data dashboard.
Source for climate impacts: Cal-Adapt and literature review.

i. Addressing the jobs-to-housing imbalance and anticipated growth

A significant feature of the Bay Area's economic landscape is the unbalanced spatial distribution of jobs and housing (Plan Bay Area 2050: A Vision for the Future, 2021). Generally, the East Bay and northeast counties (Sonoma and Solano) offer more housing than jobs, while the North Bay (Napa and Marin), the Peninsula, and the South Bay support more jobs than there is housing. Decades in the making, this pattern has resulted in extended commutes for almost half of Bay Area residents.[1]

The Bay Area is projected to add 1.4 million new jobs and almost as many households by 2050 (*Plan Bay Area 2050: A Vision for the Future,* 2021). Regional-scale planning efforts are underway to ensure that the region can support a high level of residential and job growth, with a focus on shifting the latter towards "Growth Areas" as defined in Plan Bay Area 2050. The plan expects that 35% of new jobs will be located in Santa Clara County as a result of the rapidly growing technology and information sectors, as well as the anticipated growth in healthcare and education sectors needed to meet the demands of an expanding population (*Plan Bay Area 2050: A Vision for the Future,* 2021). The East Bay is anticipated to take on one third of new housing and one third of new job growth; this provides an opportunity for strategic planning to alleviate existing commute stress on transit systems, a product of the jobs-to-housing imbalance in East Bay counties.

On the other hand, Plan Bay Area projects only minor growth in both housing and jobs in San Francisco County and San Mateo County and little-to-no growth in the North Bay (Napa and Sonoma). The Plan anticipates that Marin County could even see a net loss in jobs as an older resident workforce retires without much anticipated residential growth (*Plan Bay Area 2050: A Vision for the Future,* 2021).

The jobs-to-housing imbalance is a critically important challenge to achieving climate-smart growth in the Bay Area. Misalignment in the location of jobs and housing results in traffic congestion and longer commutes that, in addition to contributing to the region's GHG emissions, put stress on already aging and vulnerable transportation infrastructure (see the section below on Critical Infrastructure). Longer commutes also put a strain on worker health and well-being and make it harder for employers to retain skilled employees. Additionally, the Bay Area's jobs-to-housing imbalance exacerbates existing inequities in land use patterns of development, where communities with more limited employment opportunities are incentivized to travel outside of their neighborhoods, counties, and sometimes even the region overall to reach work. Without intervention, this can reinforce existing patterns of displacement as land values and rents spike (*Plan Bay Area 2050: A Vision for the Future,* 2021).

Plan Bay Area 2050 suggests a suite of strategies to address the impacts of the Bay Area's jobs-to-housing imbalance and ensure future growth helps alleviate the current challenge. These strategies include efforts to promote jobs in locations that will support healthier, walkable, and more economically prosperous communities, consistent with climate-smart growth strategies.

ii. Bay Area industries and associated climate impacts

In the following section, we summarize the likely climate impacts on key Bay Area economic sectors. For each sector, we discuss climate impacts on both the built and natural systems (i.e., infrastructure, natural resources, materials, etc.) that sustain sector productivity. The next section on "Impacts to Workforces" looks at workers with heightened exposure to climate hazards. Key climate impacts on industry include sea level rise and groundwater, variable precipitation, rising temperatures and extreme heat, and wildfire. Then, "Climate Impacts to Critical Infrastructure Systems," addresses water, energy, and transportation systems. Finally, "Climate Mitigation and Adaptation Efforts" outlines some of the potential impacts of such efforts on industry.

a. Agriculture and food systems

The Bay Area's unique food-economy systems, a $113 billion industry, are exposed to impacts from all four key climate areas. Collectively, the food economy—farms, food-producing sectors, food businesses, restaurants, and grocery stores—employs close to half a million people, or about 13% of the region's workforce (*The Bay Area Food Economy: Existing Conditions and Strategies for Resilience,* 2017).

Most of the Bay Area's key agricultural commodities are specialty crops, which include fruits, nuts, vegetables, nursey crops, and flowers (*County Crop Reports*, n.d.). Other important food-producing systems are range livestock and poultry as well as fish and shellfish. In general, rising temperatures in the Bay Area will increase risk to agriculture due to prolonged droughts, dryer soils, and extended periods of extreme heat. Warmer winters pose a unique threat to crop productivity in the Bay Area due to the reliance of many specialty crops on chill hours for blooms and high yields and on freezes for keeping pests and pathogens in check (Cornwall et al., 2014). Drought poses a risk to vital water supplies; more than 90% of the state's agricultural land is irrigated, and reduction in flows for critical river basins, like the Russian River Basin for Sonoma County, can result in staggering economic losses across a wide range of agricultural sub-industries (Medellín-Azuara et al., n.d.). Sea level and groundwater rise pose risk to coastal agriculture because of the potential for saltwater intrusion into groundwater sources and the risk of saltwater degradation to low-lying working lands (Cornwall et al., 2014). Finally, some of the Bay

Area's most productive agricultural regions, including grape-growing areas of Napa and Sonoma Counties, benefit from coastal fog. As mentioned previously, there is a large amount of uncertainty around how climate change will impact fog formation. Reductions in summer fog could impact growing seasons for fog-protected crops (*San Francisco Bay Area Region Report*, 2018).

> *"Most of my flowers come from Ecuador and Colombia. I thought it would be more expensive to buy flowers from South America, but it's more expensive to buy flowers grown here [because of fluctuations in temperature]."*
>
> — **IRIS DE LEON,** runs a flower shop out of her Bay Area basement

In addition to the direct impacts of climate change on agriculture and food systems in the Bay Area, rapid urbanization is anticipated to significantly alter land use patterns, potentially resulting in the conversion of prime agricultural land to housing and other urban development uses (Ekstrom & Moser, 2012). This risk is most notable for Santa Clara County, Alameda County, and Contra Costa County.

b. Information, technology and telecommunications

The Information, Technology, and Telecommunication sectors are closely linked and provide residents, businesses, and organizations with essential resources and access to knowledge. These sectors also connect the Bay Area with regional, nationwide, and global economic and social networks. Efficient and reliable information, tech, and telecommunications systems are an integral part of ensuring that the Bay Area is prepared for expected population and business growth, especially under a changing climate.

Maintaining telecommunications services during extreme events (e.g., flying generators to remote areas, bringing portable cell towers, predicting wildfire patterns so that retardant can be applied to telecom equipment at the right time) is already extremely costly and likely to become more so with climate change (Posadzki, 2023). As telecommunication infrastructure continues to age and the intensity of climate-induced events becomes more extreme, these sectors are likely to see increased costs for maintenance and operation of critical systems (Posadzki, 2023). Wildfire, rising temperatures, more intense storms, and sea level rise all pose a threat to Information, Technology, and Telecommunications industries; a study out of the University of Oregon and University of Wisconsin-Madison found that 4,067 miles of fiber-optic conduit in the United States could be under water in the next 15 years (Posadzki, 2023).

Silicon Valley is also home to a growing number of major tech headquarters, office campuses, and data centers, drawing workers from other parts of the Bay Area to Santa Clara and San Mateo Counties' coastal doorstep. Many of these campuses and facilities, sometimes worth more than $2 billion, are exposed to flooding from rising sea levels. Technology companies in the Bay Area with facilities exposed to sea level rise by the end of the century include Facebook, Google, Yahoo, LinkedIn, Cisco, and eBay (Berke, 2018; Staff, 2019).

Several tech campuses in the region are particularly vulnerable to flooding because they were built on former salt flats separated from the bay by dirt mounds that serve as levees (Sommer, 2021). However, these mounds were never designed to protect coastal infrastructure from flooding, but rather to create the ponds used for salt extraction. Today, homes, businesses, roads, and public recreation sites in Menlo Park and East Palo Alto, where Facebook is headquartered, are protected by these make-shift levees that fail to meet safety standards set by the Federal Emergency Management Agency (FEMA). Local agencies have continued to maintain the levees but are increasingly aware of the need for a systematic approach to flood control for the South Bay, an undertaking that is likely to cost hundreds of millions of dollars (Sommer, 2021).

Technology companies may also feel the impacts of more-regional climate hazards, like wildfires and extreme heat waves. These hazards can damage critical energy and communications infrastructure that are pivotal for the continued operation of major technology companies. Data centers in the Bay Area frequently install backup generators to maintain power during outages and currently use at least 1.2 GW of diesel backup power ("Peak Load Could Double in Silicon Valley Due to Data Centers," 2021). The California Energy Commission predicts that growth in data centers in the region could lead to a doubling of peak electricity load by 2026 (Paulson, 2022). Rolling blackouts, like those during the summer of 2021, threaten operation of these centers, and while backup generators do allow for continued operation during an outage, they are highlighted as an unreliable long-term solution to more frequent heat-induced power outages ("Peak Load Could Double in Silicon Valley Due to Data Centers," 2021). Diesel backup generators also present an environmental justice concern for nearby communities; data on South Coast generators reveal that 47% of units are located in the region's most vulnerable communities, those classified in the 80th to 100th CalEnviroScreen percentile (see the section on "Pollution and Public Health," below).

The Information, Technology, and Telecommunications sectors support numerous other industries throughout the Bay Area, from logistics, manufacturing, trade, and banking to small businesses, hospitality, and recreation. Impacts to any one of these three sectors will have wide-reaching impacts on the economy and workforces of other industry areas, and vice versa, requiring decision makers to account for system interconnections when planning for the impacts of climate change (Adams & Steeves, 2014).

c. Community and emergency services

Community and Emergency Services include schools, childcare centers, community centers, shelters, urgent care centers, healthcare centers, and hospitals. These subsectors provide Bay Area residents with services that support daily life, as well as those that become essential during emergencies of various scales. Climate change will both increase demand for these services and make it harder for them to operate at current levels of capacity, in large part due to infrastructure damage, workforce challenges, and competing demand for resources like energy and water.

Under a changing climate, schools and childcare services will be more limited in their ability to provide in-person education and care. Wildfire and flooding, from either extreme precipitation events or sea level rise, will cause disruptions to education by damaging buildings where these services take place or making it difficult for both employees and clients to access them. Beyond education, schools and childcare facilities provide food security and ensure that younger children are looked after when away from their legal guardians. These services are particularly important for single parents, families in which both parents work, low-income families, and families without support networks (i.e., those lacking friends or extended family that can provide child care, families that are culturally or linguistically isolated, etc.). Loss of these services can lead to a greater risk of food insecurity and poor academic outcomes for children and loss of work for parents (Ehlers, 2022). California has already experienced decreased community services due to climate hazards. During the 2017-18 and 2019-20 school years, more than 1,600 schools closed due to wildfire, affecting an average of 950,000 students per year (Ehlers, 2022). Between 2008 and 2017, the state averaged only 70 school closures a year. Thirty-four schools in the Bay Area are exposed to flood hazards, and that number could rise to 81 with 1.4 meters of sea level rise over the next century (Heberger et al., 2012).

Sea level rise, in particular, poses a threat to the operation of Community and Emergency Services and access to the services they provide. A 2012 study found that 11 fire stations, 42 healthcare facilities, and 9 police stations would become inaccessible during flooding events (Ekstrom & Moser, 2012). Fire stations and law enforcement facilities are uniquely vulnerable to flooding because these buildings frequently have at-grade openings (*Adapting to Rising Tides Bay Area,* 2020). Flooding of these facilities and potential damage to critical equipment will reduce the capacity of services to operate during an emergency. Sea level rise will also impact non-emergency facilities that take on the provision of during- and post-disaster services, such as libraries, community centers, youth centers, schools, and places of worship (*Adapting to Rising Tides Bay Area*, 2020). These buildings can provide a central location for residents to access resources and reconnect with family and friends following an emergency, in addition to serving as temporary shelter in the event that homes are inaccessible. Sea level rise and flooding will reduce the capacity of facilities like these to support residents in the event of climate-induced events and other natural disasters. Finally, hospitals, residential care facilities, youth-care facilities, elder-care facilities, and shelters are very difficult to evacuate in the event of an emergency, making them uniquely vulnerable to potential flooding from sea level rise, groundwater rise, and extreme precipitation (*Adapting to Rising Tides Bay Area, 2020*).

Rising temperatures and extreme heat are likely to lead to increased demand for emergency services, increasing stress on healthcare systems (Cornwall et al., 2014). The Bay Area's historically mild climate means that even moderate temperature increases could lead to heat stress in residents who have not acclimated to warmer temperatures or who do not have access to sufficient cooling systems in homes and work locations. Increased demand could lead to longer hours, fewer breaks, and more physically and emotionally draining situations for healthcare staff. Conversely, patients may experience longer wait times and reduced access to both healthcare services and products, especially if the import of medicine and equipment is limited by climate impacts on the Goods Movement sector.

In addition to climate-driven increases in demand for healthcare services, this sector is likely to see closures of key facilities and service centers, which will not only result in direct negative health impacts on residents, but also further drive demand due to a decrease in diagnosis and treatments of non-climate-related health conditions. For example, in 2020, during a peak in the COVID-19 pandemic, COVID testing centers were forced to close due to poor air quality as a result of wildfire smoke (Bay Area Schools, COVID-19 Testing Sites, Beaches Closed Due to Wildfires, Poor Air Quality, 2020). Closure of financially accessible services for diagnosing contagious diseases, like COVID-19, could lead to increased exposure and spread in lower-income communities, resulting in negative health outcomes and subsequent strain on hospitals and emergency healthcare facilities.

Emergency and first responders, which include firefighters and police, rely heavily on critical infrastructure to continue providing communities with essential services. Impacts to transportation networks will greatly reduce the ability of emergency responders to reach impacted neighborhoods to provide supplies and assist with evacuations. Damage to energy and fuel transportation infrastructure, assuming some continued reliance on gas-powered vehicles, will also make it more challenging for emergency systems to operate effectively.

d. Transportation and utilities

Transportation and Utilities sectors are likely to see a combination of impacts resulting from increased demand for energy and water resources, as well as shifts in transportation network use across the Bay Area. Climate change is likely to drive increased demand for energy and water resources in the Bay Area during the summer, during periods of extreme heat, and in years following reduced snowpack. Sea level rise may also pose a threat to water sources due to saltwater intrusion into groundwater.

Climate change is likely to result in system-wide vulnerabilities for these sectors, which extend beyond the nine-county Bay Area. Transportation and Utilities sectors are underpinned by complex infrastructure systems. In addition to impacts on system use, climate change will also directly impact the efficiency and effectiveness of critical Transportation and Utilities infrastructure.

Energy: Climate change is likely to impact energy utilities at all stages of production, consumption, transmission, and distribution. Rising temperatures and increased periods of extreme heat will drive spikes in demand, while also reducing the performance of electric transformers and substations (Ziaja & Chhabra, 2021). Hotter temperatures can also drive greater losses from transmission and distribution cables and reduce solar panel efficiency (Ziaja & Chhabra, 2021).

Energy systems are expected to see some constant increases in demand and periodic spikes in demand due to rising temperatures and more frequent extreme heat days. Peak energy demand across the state is expected to increase at a rate of 700 MW (megawatts) per 1°F for temperatures above 82°F; this pattern is likely to result in peak demand increases of less than 5% by mid-century but as high as 20% by end of century (Zamuda et al., 2013). Multiple parts of the state experienced overburdened energy systems during the September 2022 heat wave, including Sacramento, San Jose, Santa Rosa, and Fairfield (2022 Scoping Plan for Achieving Carbon Neutrality, 2022). It is likely that Santa Clara, Contra Costa, and Alameda Counties will see the highest increases in air conditioning use, contributing to high demand (Ekstrom & Moser, 2012). Because of the substantial differences in projected warming among subregions within the Bay Area, and due in part to the coastal cooling effect of sea breeze and coastal fog, demand on the region's energy systems will likely vary at a local scale, necessitating proactive management and planning (Ekstrom & Moser, 2012).

When planning for the region's energy future, it will be important to account for anticipated shifts in job locations and workforce type. Remote and hybrid workers will increasingly rely on electricity at residential and co-working locations. Electricity providers will need to maintain reliable and efficient energy systems to support the ongoing growth of remote and hybrid workplaces and to ensure that any outages due to demand do not disproportionately impact workers in lower-income communities (*Plan Bay Area 2050: A Vision for the Future,* 2021). This topic, particularly as it relates to affordable and reliable internet access, is a key focus of Plan Bay Area 2050 (*Plan Bay Area 2050: A Vision for the Future,* 2021).

Energy systems also rely on water availability at multiple points along the production and distribution process. Decreases in water availability will make it more challenging for the Energy sector to engage in oil and gas exploration, refining, storage, and transport via both pipelines and barges. Furthermore, the reduced capacity of energy systems to effectively and safely produce and transport oil and gas resources because of climate change poses a threat to water quality (Zamuda et al., 2013). Hydropower production requires adequate river flows, and in the Bay Area and Sierra Nevada regions, the sector is reliant on snowmelt. Warming as a result of climate change is likely to result in earlier snowmelt during the year, around two weeks earlier (Zamuda et al., 2013), which could reduce summer hydropower potential by as much as 25% (Rogers et al., 2015). During the summer of 2012, statewide hydroelectric power generation saw a reduction of 38% from the previous year as a result of earlier and lower snowmelt (Rogers et al., 2015). Regular low-snowmelt years could lead to added costs for energy customers because of the need for utilities to shift back to gas-powered electricity generation, which is generally more expensive than hydroelectric power (Rogers et al., 2015).

Water: The Bay Area receives water from a number of different sources, and climate impacts on water utility companies and water supply will differ depending on the source. Four Bay Area counties receive water as part of the Regional Water System (RWS), owned and operated by San Francisco Public Utilities Commission (SFPUC), which is composed of two independently developed water systems that today are operated as a single system (Boozarpour et al., 2020). Together, these two systems serve about 2.7 million residential, commercial, and industrial customers in San Francisco, Santa Clara, Alameda, San Mateo, and Tuolumne Counties. Most of the RWS water comes from Sierra Nevada snowmelt and precipitation into Tuolumne River, but about 15% comes from runoff in the Alameda and Peninsula watersheds (Boozarpour et al., 2020).

The RWS's reliance on Sierra Nevada snowmelt makes water users of that system vulnerable to changes in snowpack, a result of shifting winter precipitation in the eastern part of the state (Ekstrom & Moser, 2012). On the other hand, Marin County's water comes predominantly from local reservoirs within the county, which are sensitive to shifts in local annual precipitation. The San Joaquin Delta is also important for some East Bay water systems. Changes in runoff from the Sierra Nevada and rising sea levels both pose a threat to Delta water supply (Ekstrom & Moser, 2012). Most all of these water supply chains will be impacted by rising temperatures, which result in increased evaporation and increase retention of water vapor in cloud systems. Higher temperatures also lead to drier, and thus thirstier soils, which result in less runoff. Finally, increased use of groundwater to supplement water supplies will require that more water be redirected into the ground to recharge water tables (*California's Water Supply Strategy: Adapting to a Hotter, Drier Future,* 2022). Many of these impacts will be the most intense in the summer and fall.

During drought, the RWS uses an alternative water source that is diverted from two reservoirs in the Tuolumne River Basin (Boozarpour et al., 2020). Unlike water from the Hetch Hetchy Reservoir, which maintains such high water quality that SFPUC is not required to conduct filtration, this alternative water source does require filtration, resulting in the need for all diversion from the Tuolumne River to be filtered (Boozarpour et al., 2020). With increasing occurrences of extended drought, it is expected that SFPUC will need to filter diversions more frequently than in the past, resulting in increased maintenance costs. Drought also poses a threat to water quality in the San Joaquin Delta, where flows below the minimum required to maintain environmental services can result in over-accumulation of pollutants, algal blooms, and saltwater intrusion. To mitigate the negative impacts of poor water quality, water providers will need to increase drinking water treatment and develop disinfection by-products, resulting in increased costs of operation (Chang & Bonnette, 2016). The cumulative economic cost of climate change-related water shortages for the Bay Area are projected to be as high as $200 million per year under extreme climatic-induced drought conditions (*San Francisco Bay Area Region Report,* 2018).

More than 300 community water systems supply water to Bay Area residents, and these systems acquire water from several different suppliers, including the sources mentioned above. However, two thirds of these 300-plus community water system are small self-sufficient systems that are not connected to larger state or federal water projects and thus more likely experience reliability issues under a changing climate (*San Francisco Bay Area Region Report,* 2018).

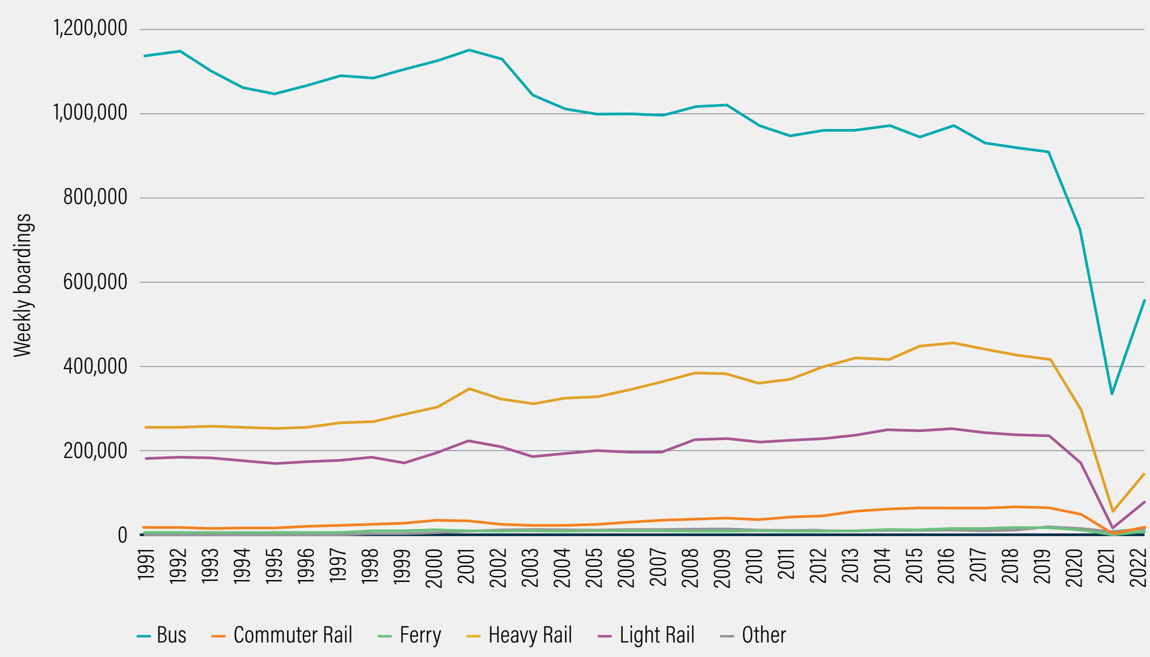
SFPUC has historically and will continue to experience shifts in operation due to climate-induced heat waves and wildfires, which can frequently result in public safety power shutoffs (PSPSs). PSPSs aim to prevent wildfires from being started by transmission and distribution power lines during high fire-hazard conditions. SFPUC operates backup power generators at critical facilities, which enables the operator to continue providing residents and businesses with water, even during PSPSs (Boozarpour et al., 2020). However, as noted previously in the section on the Information, Technology, and Telecommunications Sectors, backup generators operate within a broader energy system that increases costs to operators, is dependent on fuel supplies, and contributes to local pollution.

Water, like energy, is integral to several other key Bay Area sectors. Agriculture, Community Services, and Manufacturing all rely heavily on a stable and high-quality water supply. Impacts to water supply and water utilities operations are likely to have downstream effects on these sectors, in addition to residential and business drinking water needs.

Transportation: The Transportation sector is an integral part of climate mitigation and adaptation planning for the state. Impacts to this sector will expose key vulnerabilities in other interconnected Bay Area sectors, including Energy, Goods Movement, and Tourism and Hospitality, as well as contribute to the vulnerability of the commuting workforce. Climate change impacts to the Transportation sector are focused predominantly on infrastructure impacts. This subsection will focus on the projected climate impacts to the Transportation sector as they relate to the movement of people and of a specific good: fuel.

Notably, climate change impacts on the Transportation sector will likely reduce workforce capacity for several industries. Employees who commute to work for any sector will be impacted by both acute and chronic climate hazards. The Bay Area's commute and transportation patterns suggest a reliance on vehicle transportation networks. In 2021, 58% of commuters drove (alone or in a carpool), 33% worked from home, and only 4% used public transportation (*Plan Bay Area 2050: A Vision for the Future*, 2021). Transit ridership dropped significantly in late 2020 and through 2021 as a result of the COVID-19 pandemic (see **Exhibit 3.66**). As of 2022, public transportation ridership has not recovered to pre-pandemic levels (about 10% of commuters), and the share of commuters who drive alone is currently slightly below pre-pandemic levels (down from about 75% to 58%), indicative of the share of Bay Area companies that have moved into fully remote or hybrid workplaces (Bay Area Vital Signs: Explore Trends, Visualize Data, n.d.). Climate change—specifically, more frequent extreme heat events and storms—will introduce challenges to airplane travel, as well, which is key for Tourism sectors and sectors that rely on domestic and international business travel (Schlangenstein, 2023).

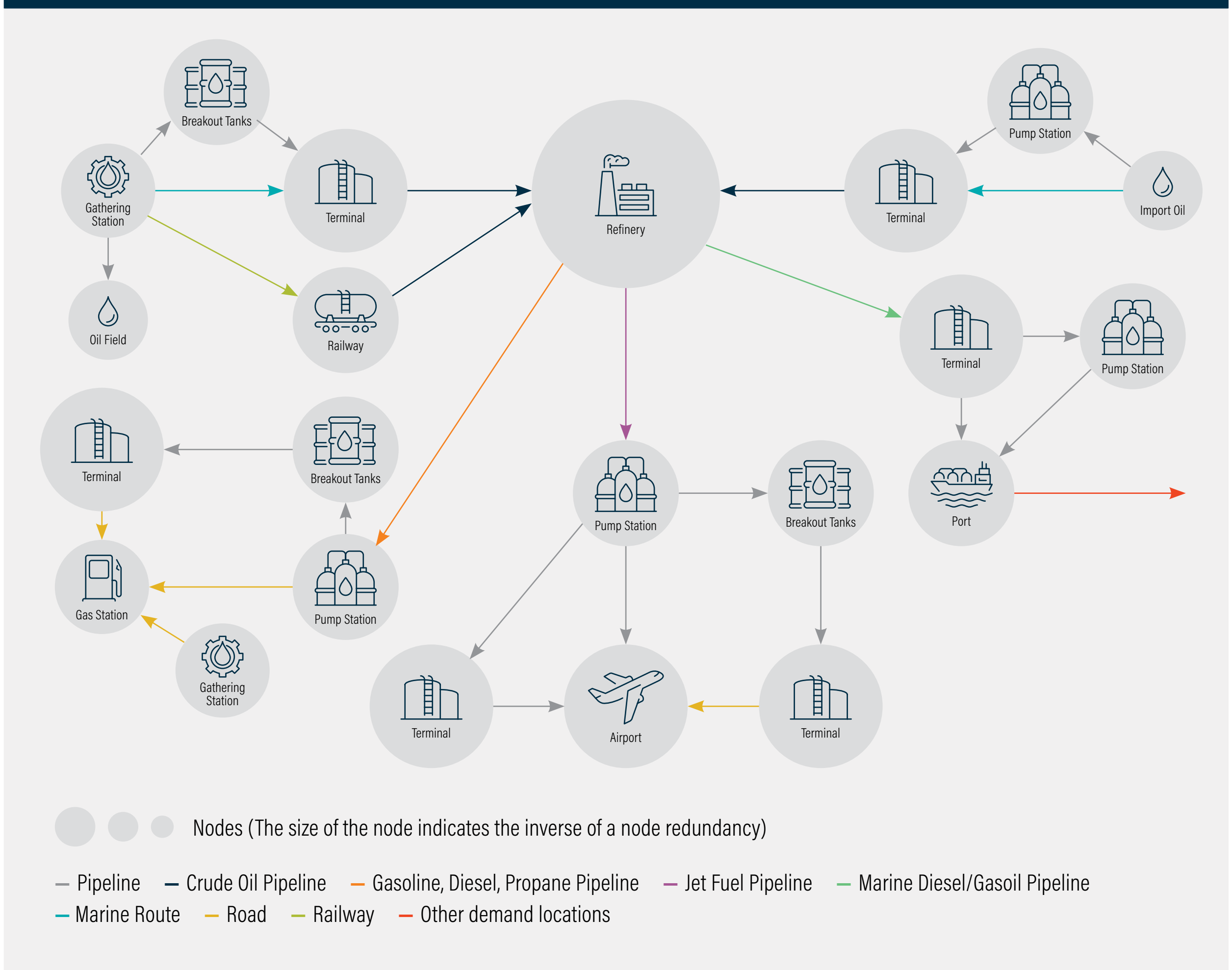
EXHIBIT 3.66 | Historical trend for transit ridership in the Bay Area by transit mode



Source: Vital Signs Data Dashboard, MTC.

Of particular concern are the impacts of climate change on the Bay Area's fuel transportation network. The Bay's Transportation sector is critical to the movement of fuel throughout the region and across the state. However, the interconnected nature of transportation networks, including roads, ports, airports, and service nodes, contributes significantly to the vulnerability of the fuel transportation and distribution sector (*Adapting to Rising Tides Bay Area*, 2020) (see **Exhibit 3.67**) Reduced transportation capacity due to sea level rise, wildfires, and flooding has the potential to impact the region's ability to distribute fuel to other necessary sectors. Sea level rise and wildfire in particular pose a risk to key fuel transportation infrastructure; 28% of refineries will be exposed to wildfires in a five-year period and low-lying coastal infrastructure, including docks and terminals, will be at increasing risk of flooding under future climate scenarios.

EXHIBIT 3.67 | Conceptual visualization of the fuel transportation network in the Bay Area



Source: He et al. 2021.

The reliance on regional transportation systems for fuel distribution highlights a key feedback loop present in sector relationships in the Bay Area: climate impacts on the ability of the transportation system to distribute fuel across the region will further reduce the capacity of transportation systems that rely on that fuel *(San Francisco Bay Area Region Report,* 2018). Fuel transportation infrastructure is also prone to inducing "ripple" effects throughout the system and across industries (He et al., 2021). If one component of the system were to fail or be damaged as a result of climate change, the capacity of adjacent components to operate at peak efficiency is likely to decrease. Individual components of the fuel transportation sector will be increasingly exposed to coastal flooding from climate change over the next 80 years, increasing risk to the entire system and reliant industry sectors (He et al., 2021).

The vulnerability of the transportation systems also introduces public health concerns. Damaged infrastructure increases the likelihood of crashes and collisions, while a system with lower capacity reduces the ability of residents to access other life-saving resources. Additionally, Bay Area fuel transportation relies on heavy rail, pipelines, and freeways, systems that if compromised, could result in hazardous material spills. It is also likely that as key transportation nodes (like the region's extensive freeway system) experience damage from climate impacts, cars and trucks may seek alternative routes through neighborhoods and residential areas, increasing air and noise pollution for these communities and raising the risk of spills in residential areas (*San Francisco Bay Area Region Report,* 2018).

e. Leisure and hospitality

In the Bay Area, travel spending exceeds $34 billion and supports more than 200,000 direct jobs (*The Economic Impact of Travel in California 2022*, 2023). Visitors to the region come from other parts of California, as well as domestic and international locations, drawn to the Bay Area because of its unique history, food, cultural and art attractions, and diverse natural systems. The majority of spending, wage earnings, and employment (in jobs) related to travel come from the Accommodation and Food Services sub-industry (*The Economic Impact of Travel in California 2022*, 2023). This highlights another important industry cluster: Food-Producing Systems, Goods Movement, and Tourism. Visitor-serving businesses in the Bay Area rely heavily on food-producing, distribution, and transport systems to support the millions of people who visit the region annually. Climate impacts to any of these sectors will have far reaching effects on the Leisure and Hospitality industry, in which recovery continues to be a challenge following the COVID-19 pandemic.

The Leisure and Hospitality sector is also closely tied to California's recreation industry, which brings $46 billion to the state annually and supports more than 400,000 jobs (Ackerly et al., 2012). Climate change is anticipated to result in lengthening of peak recreation seasons across the country, with an extension of demand into the off season as temperatures warm. It is likely that this will result in a decrease in demand during summer months and an increase in demand during winter months (Wilkins et al., 2021).

In California, climate change will impact the recreation industry in numerous ways, but the state is likely to see differences in impact type and severity by region and sub-industry. For example, a recent study found that land cover plays a large role in how climate change may shift recreation-based visitation across the state (Manley & Egoh, 2022). Coastal regions, mountainous regions, and areas of Northern California—which are already more suitable to visitation during the peak travel season—may see increased visitation under both future climate scenarios. On the other hand, Southern California, the Central Valley, and desert regions are likely to see reduced visitation as a result of rising summer temperatures and extreme heat days. Forested regions of the state (like the Sierras) and coastal regions (like Marin and San Mateo Counties) may provide a reprieve from warming temperatures through shade and coastal breeze, drawing visitors with outdoor interests to these regions. Importantly, this study only looked at the impacts of temperature, precipitation, and wind on visitation, excluding projections related to wildfire and sea level rise, two key climate hazards for the Bay Area. A related study showed that temperature and air quality are good predictors of recreation, suggesting that climate change is likely to threaten recreation-based industries as temperatures rise and wildfire risk increases (Zajchowski et al., 2022).

California boasts expansive and world-renowned state parks and beaches that draw tourists to the region for camping, hiking, beach-going, kayaking, fishing, and other outdoor activities. A number of well-known parks are located in the Bay Area, including Muir Woods National Monument, Mount Tamalpais State Park, Golden Gate National Recreational Area, Tomales Bay State Park, Portola Redwoods State Park, and Point Reyes National Seashore. The California Department of Parks and Recreation employs more than 2,000 people statewide and brings more than $4 million to the Bay Area's economy in concessions alone (Annual Reports, n.d.). Climate change will impact tourists' and residents' ability to access these parks and other open space and recreation areas, as well as the natural and built infrastructure systems that support recreation and visitor-serving businesses.

California, including the Bay Area, has already seen the impacts of wildfire on recreation-serving parks and natural lands. Big Basin Redwoods State Park, the oldest state park in California, was severely damaged by the CZU Lightning Complex Fire in August 2020, when more than 97% of the park was charred by wildfire (Cart, 2021). Big Basin may predominantly reside in the Bay-adjacent Santa Cruz County, but the CZU complex extended north into San Mateo County, burning a significant portion of Butano State Park. As of 2023, both parks are still partially closed (Significant Incidents Updates, n.d.).

Future efforts to increase fire resistance in many of these parks is likely to require visitors to shift how they envision these ecosystems, an accommodation that park managers will need to make with the visitor economy in mind (Cart, 2021).

The Bay Area is also likely to see disruption of recreational industries that rely on coastal, ocean, and watershed resources (Cornwall et al., 2014). California's beaches and coastal ecosystems—marshes, tidepools, and bluffs—support a wide range of flora and fauna and draw visitors interested in swimming, beach-going, hiking, kayaking, fishing, and other ocean-related activities. However, 60% of the state's beaches are highly vulnerable to 5 feet of sea level rise (Ehlers, 2022). Rising sea levels pose a threat to coastal recreation by making access more challenging and increasing the risk of coastal hazards. Sea level rise can damage access infrastructure, like coastal staircases and parking lots, the latter of which is a common source of revenue for the Department of Parks and Recreation (Cart, 2021). It is also likely to become much more expensive for park managers to maintain beach recreation areas as hazards like beach erosion and bluff collapse make these spots more dangerous for tourists to visit. Additionally, inland river-dependent tourism industries could see a reduction in visitors and revenue due to unreliable stream flows as a result of variable precipitation (e.g., Russian River in Sonoma County) (Cornwall et al., 2014).

Finally, wine tourism accounts for a substantial portion of Napa and Sonoma Counties' tourism economy; collectively, viticulture and wine tourism amount to $1.3 billion per year in the Bay Area (Ackerly et al., 2012). Napa Valley vineyards see more than 4.7 million visitors annually, supporting more than $500 million in local wages. As climate change impacts continue to affect grape-growing in the North Bay, these counties are likely to see reductions in wine tourism and shifts in the peak tourist season, requiring changes to workforce employment and product import to support visitor-serving businesses.

f. Manufacturing

Manufacturing is closely related to the Goods Movement sector and is likely to experience many of the same vulnerabilities under a changing climate. Manufacturing relies heavily on goods imported via the Bay Area's extensive highways system and both air and water ports, all of which are at risk of inundation due to sea level rise. Many manufacturing facilities are located in the South Bay, predominantly in Santa Clara County, where climate risks to both infrastructure and workforces include sea level rise, wildfire and reduced air quality, and extreme heat.

However, the manufacturing sector is likely to experience some impacts differing from the Goods Movement sector, especially related to worker health. Recent research shows that heat stress in manufacturing facilities can contribute to headaches and fatigue (Pogačar et al., 2018). Manufacturing workers, both in outdoor and indoor working conditions, who operate on shifts and frequently work long hours, are at greater risk of heat-related losses in productivity (Amoadu et al., 2023).

An additional concern for the Manufacturing sector will be the rising energy demand and cost under a changing climate. During extreme heat events, and even with the projected increase in annual average temperatures, manufacturing facilities are likely to see increased use of energy to power air conditioning. During days with poor air quality due to wildfire smoke, facilities may need to direct more energy towards air purifiers or filters, as well as air conditioning units, to maintain circulation. There will be increased demand for energy across all sectors and residential systems during extreme heat days and wildfire, so it is anticipated that costs will increase, regardless of whether use in a specific facility does. Without investment in air conditioning units and air purifiers, manufacturing facilities are likely to see increased health problems for workers and reduced productivity, which can amount to heavy economic losses.

g. Mining, logging, and construction

Industries that rely on Mining, Logging, and Construction are likely to see some direct and some indirect impacts of climate changes. These sectors are particularly vulnerable to impacts on their workforces, given that most activities are outdoors (as explored in the later section, "Impacts to workforces"). Climate change can make accessing work sites more challenging and increase workplace hazards, like floods, poor air quality, and fire exposure. Mining, logging, and construction industries also rely heavily on natural resources systems for extraction and production of goods, meaning that climate-induced wildfire and changes in precipitation can lead to over- or underproduction.

Groundwater rise poses an additional threat to construction and building sectors. The mobilization of contaminants in soil under construction sites that cannot be addressed via in situ management efforts may require the removal of contaminated soil, which can lead to high site preparation costs for the developer or landowner (Hill et al., 2023).

Logging and Forestry are particularly susceptible to the impacts of drought, wildfire, and rising temperatures (Cornwall et al., 2014). Sonoma County boasts the Bay Area's largest forestry sector and is also likely to see an increase in wildfire risk under future climate scenarios. Wildfire can place limitation on when work can be completed, in addition to exposing lands to invasive species by acting as a catalyst for vegetation change on a landscape. Other risks include temperature and precipitation change making the region more hospitable for invasive weeds and pests, drought leading to decreased forest productivity and tree mortality, changes in rainfall and snowmelt leading to shifts in productivity periods, and a myriad of impacts from extreme heat and chill days (Cornwall et al., 2014).

h. Other key economies

Coastal- and Ocean-Dependent Industries: Coastal and ocean economies are frequently categorized into market-based and nonmarket-based economies. Market-based ocean economies are those that are traded on a global market and have market value, such as wild capture fisheries, marine aquaculture, fossil fuel extractions, renewable energy, shipping, and ocean or coastal tourism. Nonmarket-based economies cover a wide range of ecosystem, cultural, and regulating services provided by coastal and ocean habitats and resources, including swimming, recreational fishing, value to global Indigenous and small-island communities, climate regulation, and carbon dioxide uptake (Lubchenco & Haugan, 2023). Globally, the industries that make up the largest share of ocean-related employment are fisheries, marine aquaculture and fish processing (49%) and marine and coastal tourism (22%) (Lubchenco & Haugan, 2023).

With a significant coastline spanning three counties, the Bay Area also boasts a coastal and ocean economy. Tourism, recreation, commercial fishing, and the Goods Movement sector all rely on coastal and ocean resources. Ocean warming and sea level rise are expected to impact these resources, requiring dependent industries to shift their operations and potentially move out of the region.

The ocean is expected to experience significant warming by 2100; under RCP4.5, we could see two to four times as much warming as observed since 1970, and under RCP8.5, as much as five to seven times as much warming (Lubchenco & Haugan, 2023). Warmer air and ocean temperatures impact coastal-dependent economies in several ways. Warming has the potential to weaken upwelling, which is the process that brings nutrient-rich waters to coastal California and supports biodiverse ocean ecosystems, thereby supporting ocean tourism, recreation, fishing, and aquaculture (Ekstrom & Moser, 2012). Additionally, warming drives changes in ocean circulation, which can influence the path and severity of tropical cyclones, exacerbate flooding from sea level rise and storm surge, and result in more variable and intense precipitation events (Lubchenco & Haugan, 2023). All of these changes will have impacts on fishing, aquaculture, and tourist operations. Finally, ocean acidification reduces the ability of marine organisms to build protective outer shells, which could be devasting for shellfish production along the coast (Ekstrom & Moser, 2012).

Outer-coast counties in the Bay Area face risks related to shoreline erosion and cliff failure, as mentioned in the section on the Leisure and Hospitality industry. These regions are likely to experience rising sea levels, coastal storms, and great wave intensity in the coming decade, resulting in damage to coastal infrastructure, homes, businesses, and tourism (Ekstrom & Moser, 2012). Bayfront counties are also at risk of flooding, inundation, and damage due to sea level rise and will see impacts of more intense storms and high tides. These climate impacts could be some of the costliest for the region, due to expected damage to critical shoreline infrastructure such as ports, roads and aquaculture, as well as imposing constraints on shipping and other ocean-dependent economic activities (Lubchenco & Haugan, 2023).

iii. Impacts to workforces

Climate change will have substantial impacts on the natural and built systems that support the Bay Area's economy. However, climate impacts also extend to the workforces that sustain the region's diverse sectors. Rising temperatures, wildfires, sea level rise, and more-variable precipitation all impact worker productivity and health, generating a real economic risk for businesses that rely on both regional and statewide workforces. Impacts include increased occupational hazards, decreased productivity, and a greater likelihood of work disruptions, including those that lead to work instability (Ehlers, 2022).

EXHIBIT 3.73 | Occupation groups, by climate-related health risks

At-Risk Occupations	Less At-Risk Occupations
Community & social service	Management
Healthcare practitioner & technical	Business & financial operations
Health care support	Computer & mathematical science
Protective service	Architecture & engineering
Food preparation & serving related	Life, physical, & social science
Building & grounds cleaning & maintenance	Legal
Farming, fishing, & forestry	Education, training, & library
Construction & extraction	Arts, design, entertainment, sports, & media
Installation, maintenance, & repair	Personal care & service
Production	Sales & related
Transportation & material moving	Office & administrative support

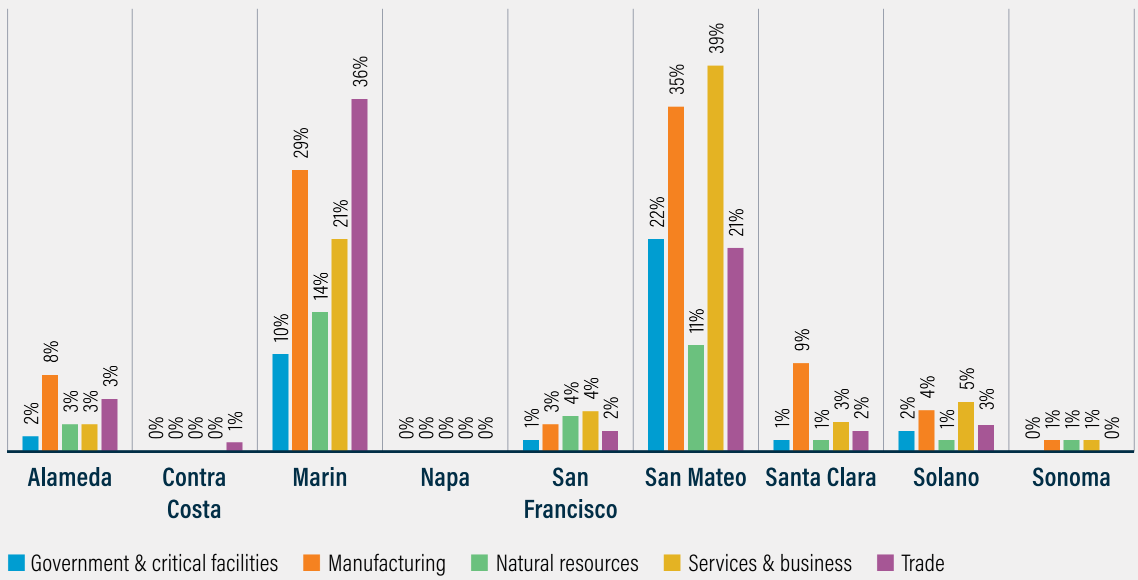
Source: KFF (Ndugga et al., 2023).

Workers in outdoor industries experience high vulnerability to climate impacts, including extreme heat, storm events, wildfires, poor air quality, and drought. The Bay Area does maintain substantial workforces in some outdoor industries, including agriculture, recreation, logistics, and manufacturing (Stone, 2019). These workers are likely to experience productivity and health-related impacts from rising temperatures, increased risk of dangerous working conditions due to wildfires, and more sporadic opportunities for work. While the Bay Area's mild climate reduces some heat-related risks, it also presents additional systemic vulnerability due to under-preparedness and a lack of experience with high temperatures (*San Francisco Bay Area Region Report*, 2018).

Compared to other parts of the state, the San Francisco Bay Area has a higher share of workers in predominantly indoor-based industries, such as Technology, Information, Professional Services, and Health and Education (Ehlers, 2022). Workforces in these sectors experience lower and more indirect levels of exposure to climate hazards than those that are based predominantly outdoors, such as Agriculture, Mining and Logging, Construction, and Recreation. However, indoor workers—especially those working in manufacturing, commercial trucking, and warehouses and distribution—also experience climate risk (Stone, 2019). Heat can be a significant threat to indoor workers in warehouses, distribution centers, and manufacturing facilities, particularly if these locations do not have adequate cooling and air conditioning, a common occurrence in the Bay Area (Ehlers, 2022). Commercial truck drivers are also likely to be exposed to the negative health and productivity impacts of rising temperatures and extreme heat, in addition to poor air quality created by wildfire smoke.

Sea level rise will likely impact work productivity in the Bay Area and result in substantial shifts in office locations and industrial facilities to inland regions *(Sea Level Rise: Climate Adaptation Policies and Strategies in the San Francisco Bay Area*, 2022). Currently, 140,000 employees work in the 100-year flood zone in the Bay Area, half of which work in San Mateo County (Heberger et al., 2012). An additional 110,000 employees would be at risk of experiencing inundation and flooding with 1 meter of sea level rise, and another 90,000 (for a total of 320,000) would experience risk with 1.4 meters of sea level rise (Heberger et al., 2012). San Mateo, Alameda, Marin, and Santa Clara Counties are projected to experience the greatest worker-related sea level rise risk due to the high number of workers located in flood zones in these counties. The study that assessed worker risk to sea level rise did not account for the impacts of damage to critical infrastructure on workers' productivity, work capacity, and health. Given the extreme risk that sea level rise poses to critical transportation infrastructure in the Bay Area, it is likely that more than 320,000 employees will experience work disruption as a result of 1.4 meters of sea level rise. This includes disruption to the Bay Area's substantial ocean-based Good Movements industry; future impacts of high-tide flooding exacerbated by sea level rise have a high potential to impact port-based commerce and goods movement along the coast, limiting works' ability to perform jobs (Asariotis, 2021; Ehlers, 2022).

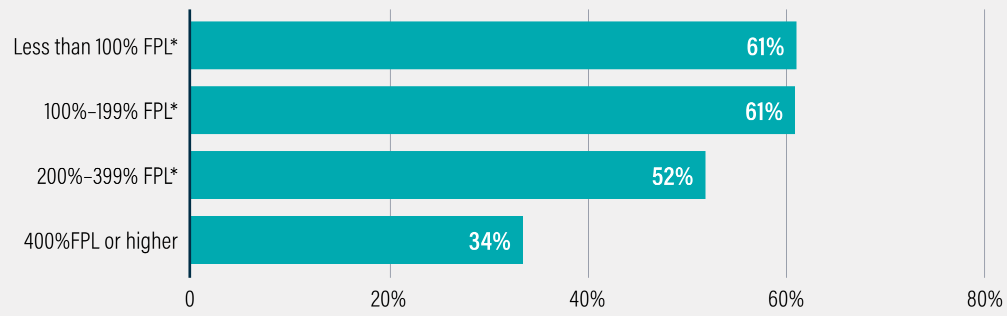
EXHIBIT 3.69 | Percent of total employees within each county that will be vulnerable to 4.9 feet of sea level rise with annual storm frequency, by sector



Source: USGS HERA Coastal Flooding Tool.

Highest risk industries are also the lowest paid, with workers regularly reporting median wages below the statewide median hourly rate (Ehlers, 2022) (see **Exhibit 3.70**). These include agriculture, forestry, construction, utilities, landscaping, outdoor hospitality and recreation, warehouse jobs, manufacturing, and commercial trucking, making up at least 10% of the state's workforce. Low wages contribute to economic instability, which may exacerbate other climate vulnerabilities and lead to reduced adaptative capacity. Job losses in these sectors due to climate change will disproportionately impact low-income communities, as well as Latino workers, who only make up 38% of the state's overall workforce but 60% of outdoor-based jobs (Ehlers, 2022; *San Francisco Bay Area Region Report*, 2018).

EXHIBIT 3.70 | Share of nonelderly U.S. labor force workers in occupations at increased risk for climate-related health impacts, by income



Source: KFF (Ndugga et al., 2023).

*Denotes statistically significant difference from those with incomes of 400% FPL or above at p<0.05. Includes nonelderly adults ages 19–64 years who are employed in the U.S. labor force. FPL refers to federal poverty level. 200% of FPL was $43,920 for a family of three in 2021

a. Agricultural workers

Agricultural workers may experience acute and prolonged vulnerabilities to extreme heat, rising temperatures, and wildfires. The health and productivity impacts of heat stress disproportionately affect low-wage, seasonal, and migrant workers in agricultural and construction sectors, who frequently work long days with little control over their schedules (Amoadu et al., 2023). Due to certain federal, state, and local institutions and policies, these workers are less likely to ask for breaks or stop working when overheated (for example, payment systems are based on the amount of produce harvested) and less likely to have access to heat-safety training (due to linguistic barriers) (Amoadu et al., 2023). Estimates show that productivity loss (in working hours) due to heat stress in the United States is expected to equate 389,000 full-time jobs in 2030 under RCP2.6 (Kjellstrom et al., 2019). Additionally, the presence of pesticides and agro-chemicals in the workplace, of note for agricultural and food system workers, has also been linked to increases in occupational heat stress and related health issues (Amoadu et al., 2023).

Air pollution due to smoke (PM2.5) from wildfires also has the capacity to greatly impact the health, and subsequently productivity, of workers in the agricultural and food system sectors (Marlier et al., 2022). Studies have found that wildfire smoke exposure is linked to emergency department visits for primary headache disorders (Elser et al., 2023) and increased risk of cardiovascular and respiratory events (Morello-Frosch & Obasogie, 2023). The co-occurrence of extreme heat and wildfire smoke in many Bay Area counties means that workers may be less likely to use protective equipment, such as N-95 respirators, to mitigate the health impacts of wildfire-induced air pollution because of heat discomfort (Marlier et al., 2022). Sonoma County, which supports about 6,500 agricultural workers, has historically ranked first in the state for poor air quality due to wildfires (Marlier et al., 2022).

Although they do not make up the majority of agricultural jobs in the Bay Area, ranchers are also exposed to a wide variety of climate hazards, from fire to extreme heat and precipitation events. Ranchers in California are also on average 60 years old, with a quarter of cattle ranchers and a fifth of sheep and goat ranchers being over 70 years old (Balachowski et al., 2018). Age frequently presents additional climate vulnerabilities due to the increase in age-related health concerns.

b. Mining, logging, and construction workers

Workers in the Mining, Logging, and Construction sectors experience similar vulnerabilities to climate hazards as agricultural workers, in large part due to physically demanding labor in outdoor environments (Amoadu et al., 2023). These workforces also tend to participate in shift work and long working hours in hot environments, which are frequently connected to slowed work pace due to insufficient rest and short recovery period (Amoadu et al., 2023). These impacts are exacerbated in places with long commutes between construction sites and workers' homes. In a region like the Bay Area, where affordable neighborhoods have historically been located far from new development sites, long commutes are fairly common and could increase as climate change puts more constraints on accessible transportation systems.

Timber production is highest in Sonoma County, followed by San Mateo and Santa Clara Counties (*California Agricultural Statistics Review: 2021-2022*, 2022). Workers in the timber industry in these counties are likely to experience an increase in extreme heat days and average annual temperatures. Sea level rise and variable precipitation are less likely to impact workers in these counties but could present challenges for the transportation of timber goods, indirectly impacting workers' hours and work timelines due to larger supply chain shifts.

c. Emergency responders and healthcare workers

The Emergency Response and Healthcare sectors constitute a diverse workforce, with workers exposed to both key indoor and outdoor climate impacts. Notably, emergency responders, including fire fighters and EMTs, will be directly exposed to climate impacts like wildfires and flooding during extreme weather events and in the case of evacuations. This exposure has a direct negative impact on worker health, whether through exposure to poor air quality from wildfire smoke or exposure to diseases spread by floodwaters. Healthcare workers, too, will be exposed to increasingly poor air quality, as well as contagious illnesses that could be spread more easily during extreme events or under a warming climate (Ndugga et al., 2023).

d. Remote and hybrid workers

Remote and hybrid eligible workers are those who could theoretically conduct their work from a location other than a central office, most commonly, a home location. These occupations are mostly in the Professional Services sector, including jobs related to office and administrative support, computer and mathematical tasks, financial operations, management, education and training, and architecture and engineering (Remote Work in the Bay Area, 2020). Santa Clara and San Francisco Counties have the highest number of total remote eligible jobs, in addition to the highest share of remote eligible jobs out of all countywide jobs (51%). In total, about 1,788,672 jobs across all nine Bay Area counties are eligible for remote work, or 45% of the region's jobs.

The transition to hybrid and remote work may have been initiated by the COVID-19 pandemic, but climate change is likely to increase the prevalence of remote and hybrid options for eligible workforces. With increasingly common and severe extreme weather events, workers may be asked or required to work from home in order to avoid unsafe travel conditions or because the work location itself is either not safe (e.g., flooding, building damage, etc.) or not usable (e.g., lack of electricity). Climate change-induced air quality concerns may also cause local and regional governments to ask workers eligible for remote work to work from home on poor air quality days, in order to reduce the number of cars operating (Oliverson, 2021). However, the transition to remote occupations for worker health and safety reasons disproportionately benefits and protects higher income workers and White workers. Only 6% of people in the Bay Area with an average annual income below $40,000 are employed in a remote work eligible job, as opposed to 76% of workers with an average annual income over $150,000, and 51% of the White workforce is employed in remote eligible occupations, compared to 33% of the Black workforce and 30% of the Latino workforce (*Remote Work in the Bay Area*, 2020).

Remote work has also been proposed as a climate mitigation strategy by nature of its ability to reduce GHG emissions from single-passenger vehicles (*Remote Work in the Bay Area,* 2020). A review of studies on the environmental and energy savings impacts of teleworking found that the majority of studies suggest teleworking does lead to reduced energy consumption and associated emissions from both commuter travel and office-related energy consumption (Hook et al., 2020). However, these studies apply different sets of conditions to their scenarios and models, making it challenging to establish whether teleworking does lead to reduction in energy use when considered in the context of rebound effects from teleworking (Hook et al., 2020). Further research is needed to better understand the GHG emissions reduction potential of remote and hybrid work models.

The transition to hybrid and remote work could have an impact on the jobs and businesses that predominantly serve office workers, meaning that the goods and services they provide are sold mainly to daytime workers who travel to downtown or business centers for their in-person jobs (*Remote Work in the Bay Area,* 2020). A decrease in the number of daytime office workers is likely to lead to reduced business for these sectors, which include Food Preparation and Serving, Office and Administration Support, Building and Grounds Cleaning and Maintenance, Personal Care and Service, and Protective Services. These industries could see job losses as spending by daytime workers decreases, or they could see shifts in jobs to more suburban locations. Since non-remote eligible jobs are disproportionately filled by people of color and lower-income workers, loss of employment due to remote work-induced economic changes could be a burden on communities that already experience higher rates of job instability.

iv. Impacts to critical infrastructure

Economic sectors are frequently supported by critical infrastructure systems that enable the production of goods and provision of services, support access to business centers for employees and customers, and provide necessary supplies (power, water, etc.) for continued operation. In the Bay Area, critical infrastructure systems include transportation, energy, water, and buildings, including housing. Climate change will result in a range of impacts to the infrastructure systems, in addition to driving increased demand for low- and middle-wage specialized workforces to support both adaptation and repair efforts.

In addition to the key climate topics covered in this climate-impact analysis, Bay Area infrastructure experiences risks related to other natural hazards, such as seismic activity. Climate change impacts can make aging infrastructure weaker and more prone to damage, which in turn increases risk of system failure during seismic events.

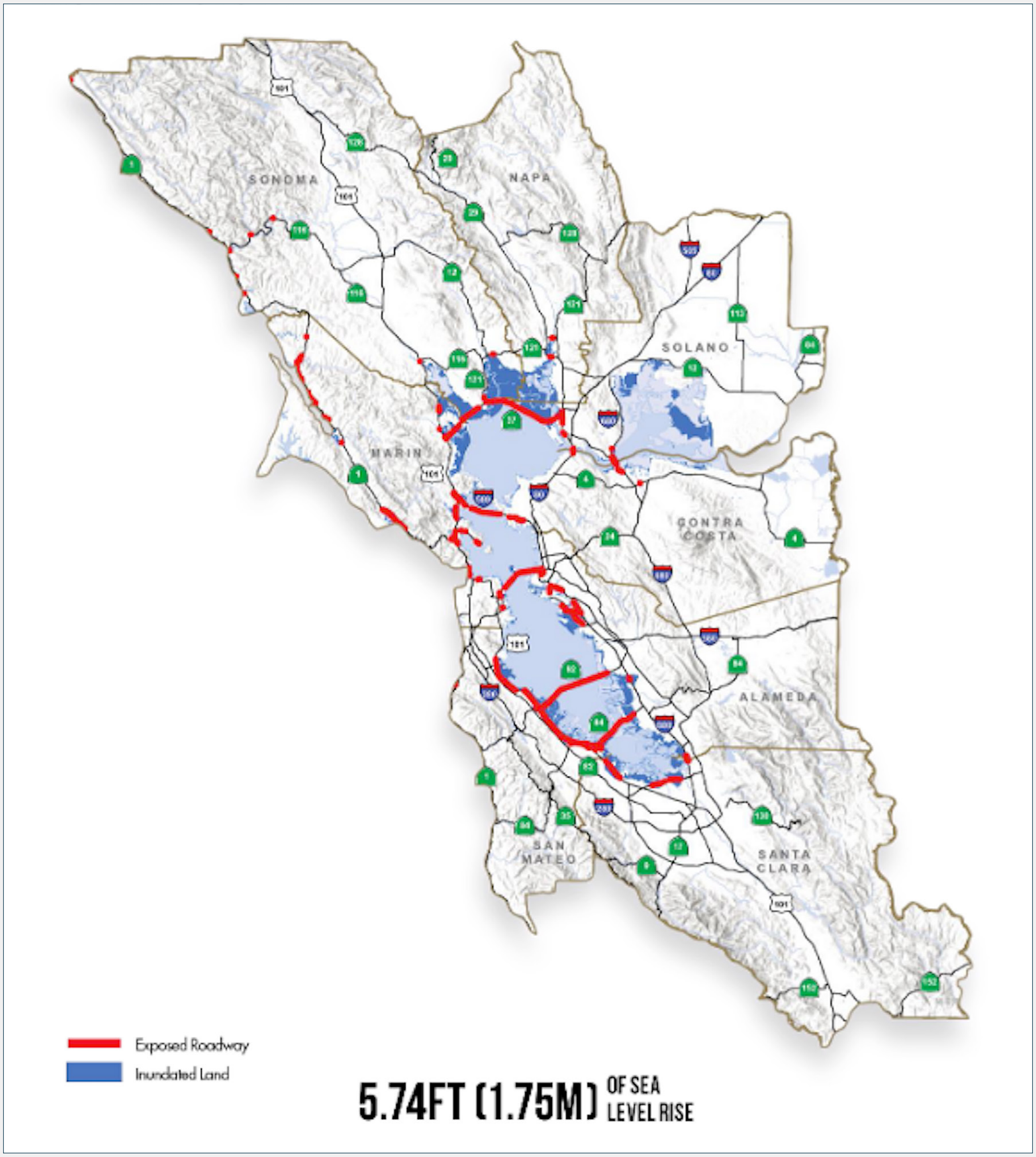
a. Transportation infrastructure

The Bay Area's complex system of roadways, railways, bridges, airports, and ports support its regional economy, thriving international economy, and 7.7 million residents, in addition to a significant number of visitors (*Bay Area Vital Signs: Explore Trends, Visualize Data*, n.d.). Climate change is likely to impact some of the region's most-used transportation systems, causing direct damage to infrastructure, in addition to driving increased demand for and pressure on transportation services. Nearly all economic sectors rely on transportation infrastructure at some point along the supply chain, but the industries most likely to experience challenges from damage to transportation infrastructure include Agriculture and Food Systems, Emergency and Community Services, and Trade, Transportation, and Utilities (including the Goods Movement sector).

In addition to direct impacts on sector productivity, climate change impacts on transportation infrastructure will likely reduce workforce capacity for several industries. Employees who commute to work for any sector will be impacted by both acute and chronic climate hazards. The Bay Area's commute and transportation patterns suggest a reliance on vehicle transportation networks. Transit ridership was relatively high pre-2020 but dropped significantly in late 2020 and through 2021 as a result of the COVID-19 pandemic. In 2021, 58% of commuters drove (alone or in a carpool), 33% worked from home, and only 4% used public transportation (*Plan Bay Area 2050: A Vision for the Future,* 2021). As of 2022, public transportation ridership has not recovered to pre-pandemic levels (about 10% of commuters), and the share of commuters who drive alone is currently slightly below pre-pandemic levels (down from about 75% to 58%), indicative of the share of Bay Area companies that have moved into fully remote or hybrid workplaces (*Bay Area Vital Signs: Explore Trends, Visualize Data*, n.d.).

Sea level rise is anticipated to be one of the greatest threats to Bay Area transportation infrastructure (see **Exhibit 3.71**). Flooding will have significant impacts on regional and state-monitored infrastructure (Ekstrom & Moser, 2012), with more than 800 miles of roadway already at risk of impact due to rising sea levels, tides, and storm surge. In addition to direct flooding from sea level rise and storm surge, coastal and bayfront transportation infrastructure is at risk of degradation due to rising groundwater levels (Hill et al., 2023).

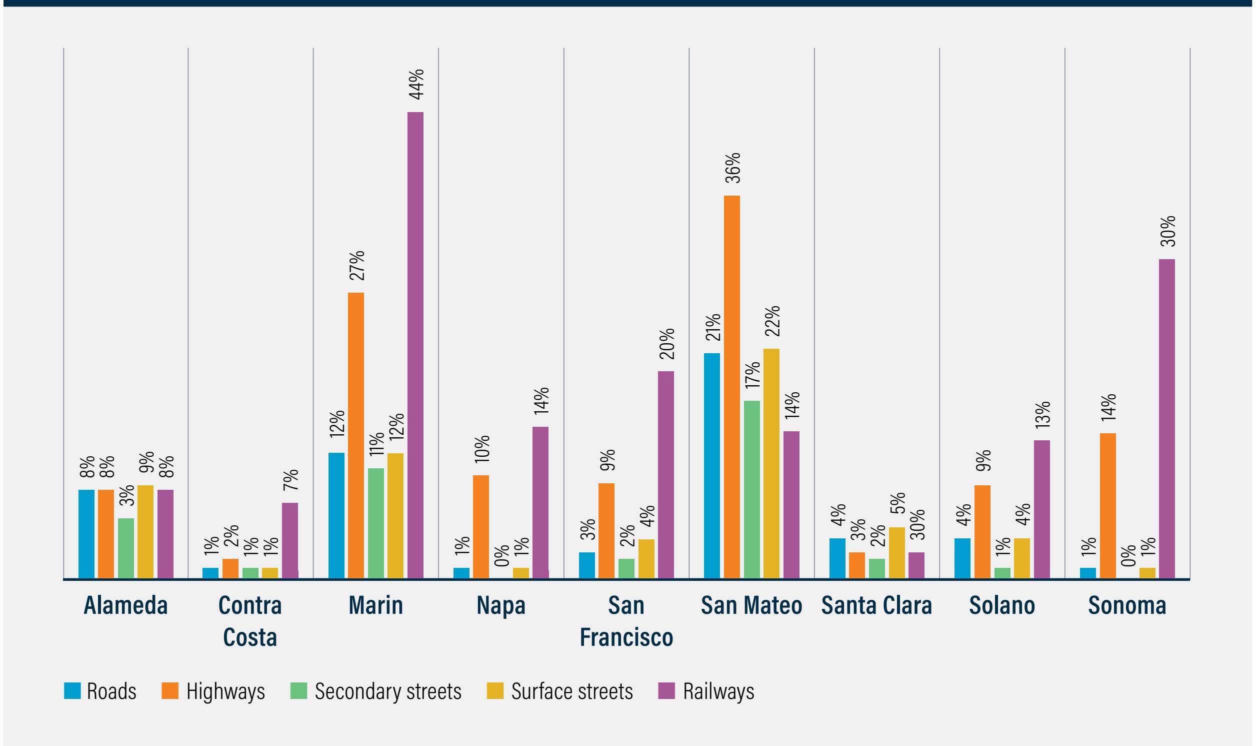
EXHIBIT 3.71 | Sea level rise impacts to the Caltrans state highway system with 5.74 feet of SLR



Caltrans Transportation Asset Vulnerability Study, District 4, Caltrans No. 74A0737. Sea level rise and storm surge data provided by the U.S. Geological Survey from the Coastal Storm Modeling System (CoSMoS). GIS data from CoSMoS can be viewed and downloaded from the Our Coast Our Future interactive map available here: http://data.pointblue.org/apps/ocof/cms

Source: Caltrans Vulnerability Assessment for District 4 (Caltrans, 2018).

EXHIBIT 3.72 | Percent of total length of infrastructure that would be vulnerable to 4.9 feet of sea level rise with annual storm frequency, by type and county



Source: USGS HERA Coastal Flooding Tool.

One study found that with a 100-year flood event and 1.4 meters of sea level rise, nearly 1,700 miles of roadway are at risk of flooding, 169.5 miles of which are major highways (Biging et al., 2012). The greatest total highway vulnerability to sea level rise is in San Mateo County, followed by Marin, San Francisco and Alameda Counties (*Caltrans Climate Change Vulnerability Assessments | District 4: Technical Report,* 2018) (see **Exhibit 3.73**). Ports and airports, as well as the transportation infrastructure that connect them to other transportation nodes, are another subregional vulnerability for certain counties in the Bay Area. San Francisco International Airport in San Mateo County and Oakland International Airport in Alameda County are both located on bayfront property and exposed to multiple sea level rise hazards. The same study that showed risk to roadways and highways found that runways at both SFO and Oakland International would flood under similar conditions, totaling 4,670 acres, in addition to resulting in inundation of the region's ports, totaling 780 acres (*Sea Level Rise: Climate Adaptation Policies and Strategies in the San Francisco Bay Area,* 2022); about 80% of the Port of San Francisco, 60% of the Port of Oakland, and 50% of the Port of Richmond would be inundated with a 100-year flood event and 1.4 meters of sea level rise (Biging et al., 2012). Ports are further impacted by sea level rise due to reduced bridge clearance and reduced operations when higher seas cause ships to sit higher in the water (Heberger et al., 2012). Other infrastructure vulnerabilities include the 11 acres of ferry terminals that are at risk of flooding due to sea level rise, the majority of which are located in San Francisco and Alameda Counties (*Sea Level Rise: Climate Adaptation Policies and Strategies in the San Francisco Bay Area,* 2022).

Railways in the Bay Area play an important role in both the Goods Movement industry and the Transportation industry, in addition to supporting various other sector workforces' commutes. In 2023, about 150,000 people use Bay Area Rapid Transit (BART), down from 400,000 per day pre-pandemic. Despite this reduction in ridership, a significant number of people in San Mateo, San Francisco, Alameda, and Contra Costa Counties rely on BART for commutes and everyday transportation. With 1.4 meters of sea level rise, upwards of 170 miles of railways in the Bay Area are at risk of flooding (Biging et al., 2012; Heberger et al., 2012).

EXHIBIT 3.73 | District 4 (San Francisco Bay Area) roadways' highway centerline miles exposed to sea level rise and annual storms

	Sea Level Rise		
County	**1.64 ft (0.50 m)**	**3.28 ft (1.00 m)**	**5.74 ft (1.75 m)**
Alameda	4.9	7.4	19.0
Contra Costa	2.1	2.3	3.6
Marin	5.9	11.8	17.2
Napa	0.1	0.1	0.4
San Francisco	5.0	5.1	5.7
San Mateo	7.7	17.4	27.3
Santa Clara	2.1	2.5	4.9
Solano	2.5	2.8	11.0
Sonoma	3.6	4.8	5.2

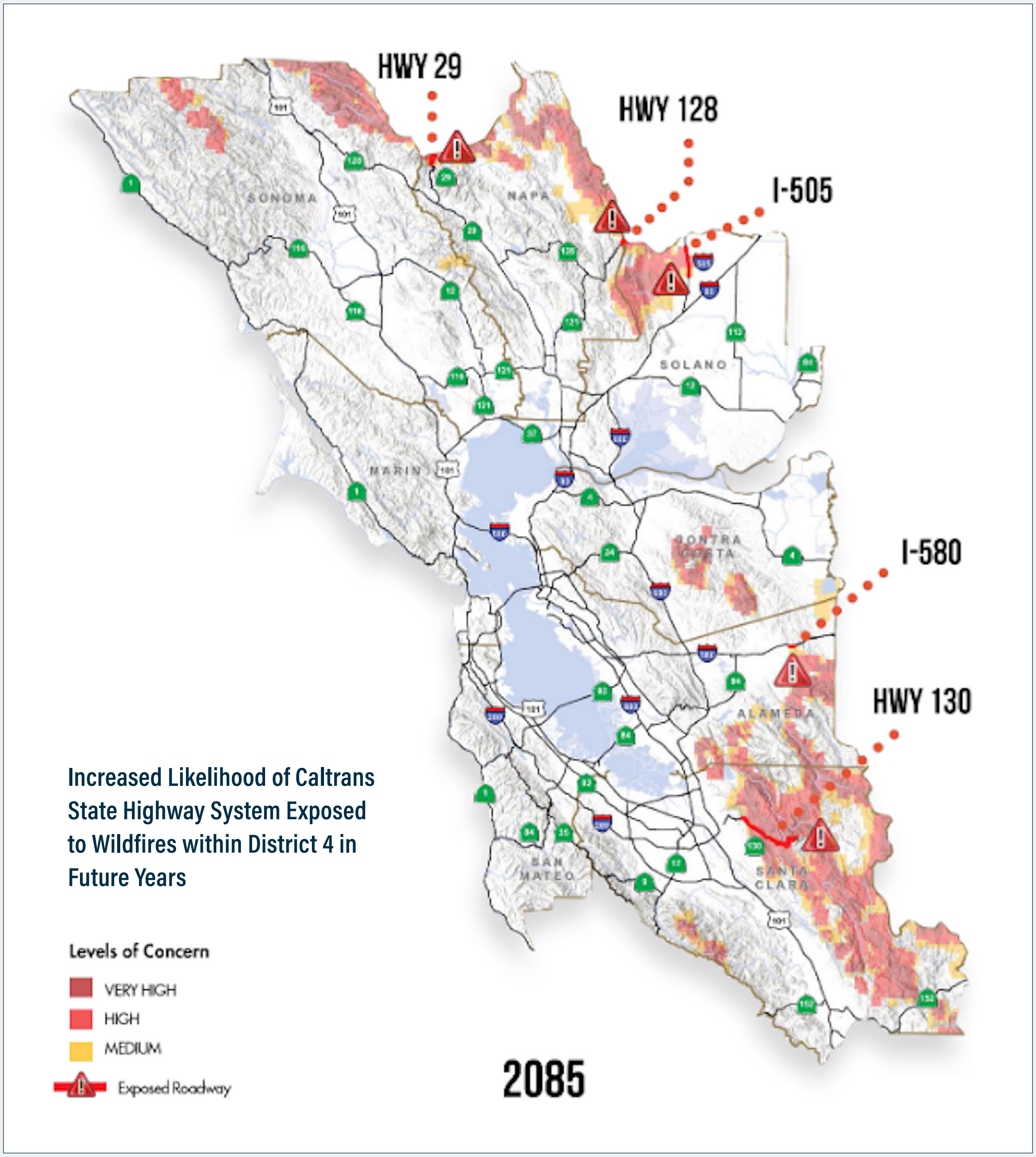
Source: Caltrans Vulnerability Assessment for District 4 (Caltrans, 2018).

Rising temperatures, increasing storm intensity, and wildfires also pose a risk to transportation infrastructure. Higher temperatures can cause damage to pavement if not appropriately planned for, and extreme heat waves can result in buckling pavement and blackouts. The Bay Area's milder climate may protect pavement from the impacts of regularly high temperatures, but extreme heat events will impact operation of transportation during blackouts and make maintenance work more challenging due to increased damage to infrastructure and shifting workers' schedules to protect against heat-related health issues (*Caltrans Climate Change Vulnerability Assessments*| *District 4: Technical Report,* 2018, p. 4). Increases in extreme precipitation events will also impact transportation infrastructure via flash floods, mudslides, and creek overflow. Winter storms during 2016-2017 resulted in heavy rain and mudslides that led to the collapse of a 200-foot-long section of Highway 35 in Santa Clara County, resulting in the most expensive repair project of the year, totaling almost $30 million (Serna, 2017). Statewide, repairs to transportation infrastructure following the 2017 winter storm season amounted to more than $860 million (*Caltrans Climate Change Vulnerability Assessments* | *District 4: Technical Report,* 2018, p. 4).

The region's inland counties are the most at risk of an increase in wildfires because of variable precipitation, drought, high temperatures, and more extreme storms winds (see **Exhibit 3.74**). Wildfires can exacerbate damage to transportation infrastructure systems, contributing to downed trees and road hazards, as well as causing traffic congestion, roadblocks, and detours (*Caltrans Climate Change Vulnerability Assessments* | *District 4: Technical Repor*t, 2018, p. 4). Wildfire can also impact soil permeability, which reduces capacity for rainfall absorption, thus contributing to shifts in flooding patterns that transportation infrastructure was not designed to sustain. In addition, reduction in vegetation from wildfires has created land surfaces that are more susceptible to landslides during precipitation events (*Caltrans Climate Change Vulnerability Assessments* | *District 4: Technical Report,* 2018). This is a key concern for some of the more coastal and mountainous counties in the region, like San Mateo.

A key feature of transportation infrastructure systems that contributes to overall system vulnerability is the co-location and connection of multiple system components. For example, Richmond, in Contra Costa County, contains multiple vulnerable systems that are critical to the operation of the Goods Movement sector. Marine Port and Oil Tanker Terminals are located in the city and are connected to multiple rail systems with different owners. Richmond is also centrally located on I-580, connecting the East Bay to Marin County, and on I-80, connecting the city to Oakland and other municipalities further south. Finally, Richmond serves as a key access point for goods, services, and people traveling to and from Solano County and Sacramento (*Adapting to Rising Tides Bay Area,* 2020).

EXHIBIT 3.74 | Increased likelihood of Caltrans state highway system exposed to wildfires in 2085



Caltrans Transportation Asset Vulnerability Study, District 4. Caltrans No. 74A0737. Fire projections developed using the MC1 fire model by John B. Kim and Bear [G. Stephen] Pitts of the USDA Forest Service Pacific Northwest Research Station.

Source: Caltrans Vulnerability Assessment for District 4 (Caltrans, 2018).

The complexity of the Bay Area transportation system necessitates that infrastructure vulnerability assessments consider the coping capacity of residents and emergency services that rely on system components. North Bay residents and business are typically more isolated and rely on a small number of key roadways, which lack redundant or alternative routes, to access the region's job centers, community services, and domestic and international transportation nodes (*Adapting to Rising Tides Bay Area,* 2020) Research found that under a 100-year flood event and 4.6 feet of sea level rise, access to hinterland in the North Bay is extremely reduced by inundation. Regions of the South Bay and Peninsula, like northern San Mateo County, would see major reduction in access due to road closures (Biging et al., 2012).

b. Energy infrastructure

Energy infrastructure throughout the Bay Area is also at risk of damage and reduced operation capacity because of climate change. Power-generating infrastructure, transmission infrastructure, and other intake and peripheral structures are vulnerable to impacts from sea level rise (Heberger et al., 2012), increasingly strong and variable storms (Ekstrom & Moser, 2012; Sathaye et al., 2012), rising temperatures (Sathaye et al., 2012), and wildfires (Rogers et al., 2015). Damage and reduced operating capacity to energy infrastructure will impact residential and businesses operations, in addition to most all economic sectors; furthermore, energy infrastructure is expensive to maintain and repair, and climate impacts on infrastructure are anticipated to result in high costs to governments and private operators (Fant et al., 2020).

EXHIBIT 3.75 | Summary of climate change variables and impacts on energy infrastructure

Climate Change Variable	Assets/Services Affected	Nature of Impact
Changes in precipitation patterns	» Hydro-electric generation » Cooling of natural gas-fired power plants and generating stations	» Potential losses in hydroelectric power generation due to reduced snowpack in the Sierra Nevada region » Efficiency loss during droughts due to lower water availability » Economic losses due to the need for new cooling technology
Rising temperatures; extreme and frequent heat events	» Overall electricity supply » Electric transmission and distribution lines	» Increased average electricity demand due to air conditioning load » Power outages due to excessive peak load » Reduced efficiency and reliability of equipment
Sea level rise and storm surge	» Sub-stations, electric transmission and distribution lines, power generation facilities	» Permanent inundation of coastal and low-elevation infrastructure » Loss of function of coastal and low elevation infrastructure due to temporary inundation and/or physical damage, resulting in power outage
Wildfires	» Electric transmission and distribution lines	» Low of function of electric transmission and distribution lines due to physical damage, resulting in power outage

Source: Adapted from Santa Clara County's 2015 Climate Preparedness Gap Analysis.

Rising temperatures will impact peak load capacity of both natural gas-fired power plants and substations and transformers, in addition to reducing transmission line carrying capacity (Fant et al., 2020; Sathaye et al., 2012). A 2012 study on climate impacts to energy infrastructure in California found that natural gas-fired power plants could lose between 1.7% and 2.7% peak capacity by end of century under a low-emissions scenario and up to 4.5% under a high-emissions scenario. Peak load capacity for substations and transformers is expected to be reduced by similar percentages, though the coastal Bay Area will see a smaller reduction than more inland regions of the state (Sathaye et al., 2012). High temperatures also reduce transmission line carry capacity, requiring additional generation to offset the increased resistance of the conductor that occurs along the line; the same 2012 study found that losses could be as high as 7-8% when air temperature increases by 9°F. Transmission line capacity reduction may be of particular concern during extreme heat waves, when peak electricity demand will also be highest (Sathaye et al., 2012).

Drought also poses a risk to energy infrastructure due to more limited water availability for cooling natural gas-fired power plants and generating stations (*Climate Change: Energy Infrastructure Risks and Adaptation Efforts*, 2014). Utility companies will need to adapt to reduced water supply for cooling purposes, as well as maintain and alter infrastructure to account for reduced and more variable winter water flows into hydroelectric power generating systems.

As with transportation infrastructure, it is important to consider potential climate impacts on energy infrastructure beyond the nine-county Bay Area. For example, the greatest wildfire risk to energy infrastructure that supports the Bay Area is in more fire-prone inland regions of the state, where transmission lines are exposed to fires. Damage to transmission infrastructure can disrupt critical energy distribution pipelines, both through reduction in transmission efficiency and the downing of wooden infrastructure during fires (Ekstrom & Moser, 2012; Sathaye et al., 2012). Hetch Hetchy Reservoir, located in Tuolumne County, is both a source of water and power for the Bay Area; the 2013 Yosemite Rim Fire resulted in a State of Emergency for San Francisco due to risks to water and power infrastructure at Hetch Hetchy (Rogers et al., 2015). Warmer and drier conditions across the state could result in wildfire exposure to transmission lines increasing by 40% by the end of the century (Rogers et al., 2015). Within the Bay Area, wildfire is a concern predominantly for noncoastal counties like Santa Clara, Alameda, Contra Costa, Solano, and Sonoma. However, major lightning-initiated wildfires in coastal San Mateo and Santa Cruz Counties in the past five years suggest that wildfire adaptation for energy infrastructure be a priority for most parts of the Bay Area.

Sea level rise and increasing precipitation along the Sacramento River will impact the Sacramento-San Joaquin River Delta, including energy infrastructure located in the region (Ekstrom & Moser, 2012; Sathaye et al., 2012). Increased winter water flow as a result of early snowmelt could lead to levee failures along the Delta, which protect adjacent energy infrastructure and power plants from inundation (Sathaye et al., 2012). Groundwater rise and saltwater intrusion pose a further risk to underground natural gas storage facilities and transmission lines in the region, as well (Ekstrom & Moser, 2012). In addition, assuming higher-range projections for sea level rise, combined with future 100-year floods in California, up to 25 power plants could be flooded by the end of the century, 13 of which are in the San Francisco Bay Area, as well as scores of electricity substations and natural gas storage facilities (Sathaye et al., 2012; Zamuda et al., 2013). Of the 86 substations at risk of inundation during a 100-year flood event with 1.4 meters of sea level rise, 49 are located in the Bay Area. The studies locating energy infrastructure in the Bay Area vulnerable to sea level rise were completed in 2009 and 2012 and stress that more site-specific vulnerability assessments will give the most accurate information on sea level rise and storm surge threats to infrastructure.

c. Water infrastructure

The Bay Area's water infrastructure systems are vulnerable to impacts from sea level and groundwater rise, wildfires, and variations in storms and drought. Agriculture, Emergency and Community Services, and Utility sectors are particularly at risk of decreased productivity if water infrastructure systems were to fail. Water infrastructure can include: water distribution infrastructure, such as culverts, irrigation systems, and pipelines; water treatment infrastructure such as wastewater treatment plants; and water storage infrastructure, including water towers and reservoirs.

As with transportation and energy infrastructure, many of the Bay Area's most important water infrastructure networks are not constrained to the nine-county region, making them vulnerable to statewide climate impacts. For example, the Hetch Hetchy Regional Water System (RWS), owned and operated by the San Francisco Public Utilities Commission, delivers water from the foothills of the Sierras to more than 1.8 million households across four Bay Area counties (Boozarpour et al., 2020). The Sacramento-San Joaquin Bay Delta system supplies more than half of California with water in one way or another (Ackerly et al., 2012), and this water is constrained to 10% of the Delta's total land area by a series of 100-year-old levees. As mentioned earlier, major risks to levee infrastructure include sea level rise, extreme precipitation events, and subsequent flooding (Fawcett, 2023). Downstream impacts of levee failure include decreased operating capacity for Bay Area agricultural businesses and lower water availability for domestic water supply. Additionally, as the Delta becomes more saline due to sea level rise, importing water to agricultural areas in the Bay will become more expensive and require increased maintenance of distribution infrastructure.

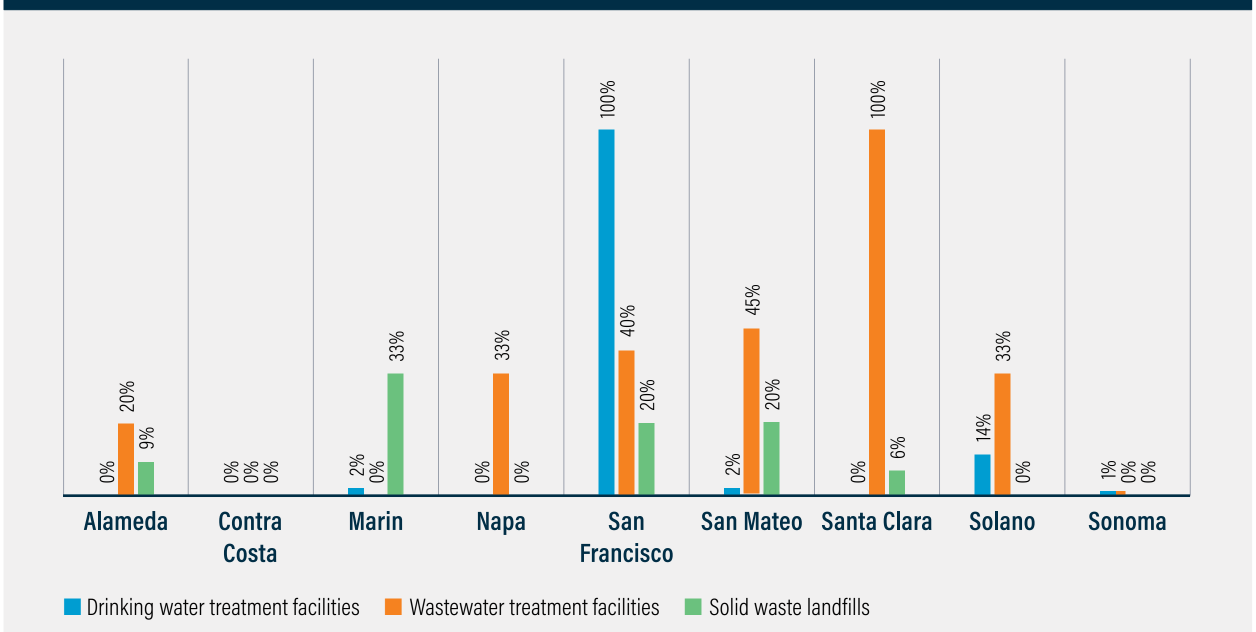
Water infrastructure is also vulnerable to the impacts of wildfires. Intense heat caused by wildfires can melt underground distribution pipes and contribute to contamination of drinking water (*Fire and Water: How Wildfires Impact Water Quality, Quantity and Infrastructure | TWRI, 2022*; Landers, n.d.). Wildfires can also cause damage to wooden infrastructure, such as flumes and other conveyance structures (He et al., 2021). Early research into the impacts of wildfires on watershed hydrological process further suggests that fire may have downstream impacts for water bodies that serve as key sources of drinking water, but additional work is needed to better understand these relationships.

Wastewater systems constitute another group of water infrastructure that, if damaged by climate hazards, could result in major economic and public health concerns, in addition to impacts on specific sectors like transportation. These systems are particularly vulnerable due to the interconnected nature of wastewater management systems: many individual components help avoid cascading failures, but damage to one single component in combination with some of the unexpected hazards of climate change could overwhelm system redundancies, leading to extreme harms (*Critical Infrastructure at Risk: Sea Level*

Rise Planning Guidance for California's Coastal Zone, 2021). The combined effects of sea level rise, tidal extremes, and extreme runoff from precipitation can affect the path and treatment of wastewater (Ekstrom & Moser, 2012). Impacts include those to direct infrastructure, operations of wastewater plants, interruptions of service, street flooding, and the potential risk of untreated water reaching the bay, which could lead to eutrophication, declining water quality, and the reintroduction of pollutants to coastal communities during flooding and high tide events. Many treatment plants are already projected to experience flooding due to inundation from sea level rise and groundwater rise, exacerbated by aging infrastructure.

Studies found that 15 wastewater treatment plants in the Bay Area are vulnerable to 3 feet of sea level and groundwater rise; that number grows to 36 with 6 feet of sea level rise (Hummel et al., 2018). Damage to these plants could impact five times as many people as residential flooding from sea level rise, due in large part to the tendency for wastewater system to be connected to other water systems. These frequently include water recycling facilities, which in turn direct water towards a variety of important uses like irrigation, groundwater recharge, seawater barriers, and others (*Critical Infrastructure at Risk*, 2021). Each of these individual system components may have specific climate vulnerabilities, beyond sea level rise, which can lead to risk for the entire system.

EXHIBIT 3.76 | Percent of facilities that would be vulnerable to 4.9 feet of sea level rise with annual storm frequency, by type and county



Source: USGS HERA Coastal Flooding Tool.

Two final concerns for water and wastewater systems in the Bay Area include the risk to coastal outfalls, where high water levels along the coast can interfere with discharge (Heberger et al., 2012), and the risk that the age of the state's water infrastructure and the prevalence of seismic activity may contribute to infrastructure damage that is not yet known. For example, cracks in pipes can increase exposure of either treated or untreated flow to saltwater infiltration, leading to overload in the pipes, reduced water quality, and untreated overflows (*Critical Infrastructure at Risk*, 2021).

d. Buildings and housing

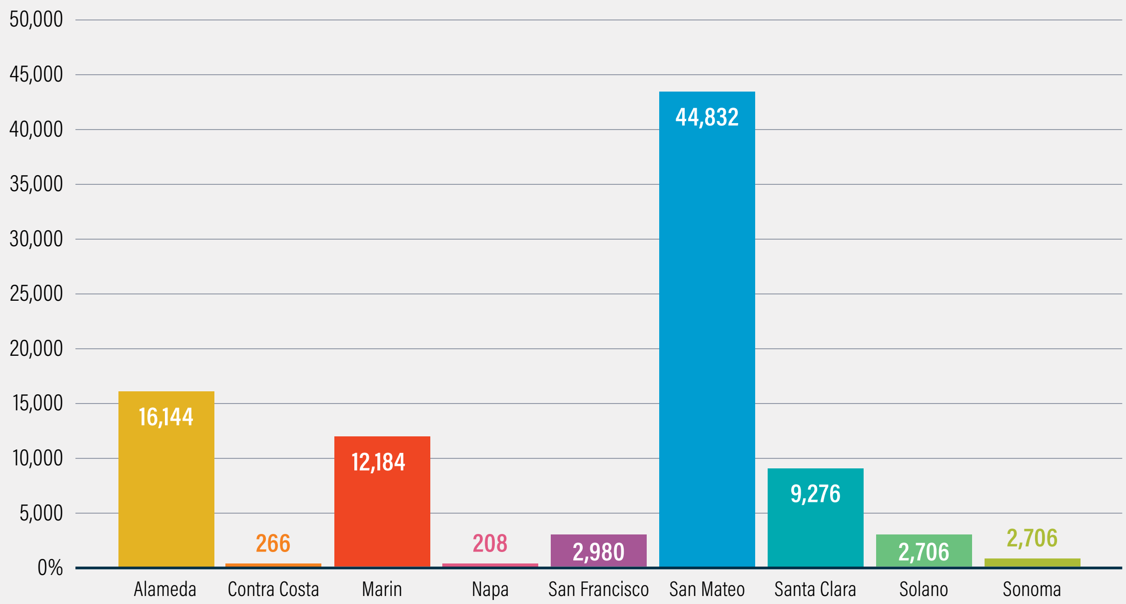
Buildings and housing are infrastructure types critical to the Bay Area's economy because they not only sustain primarily indoor businesses and industries, but also allow for workers to live closer to their jobs, thereby reducing commute time and costs. Climate impacts to building infrastructure in the Bay Area include sea level rise, extreme precipitation events, and wildfires.

Housing, in particular, is critical to physical health, mental health, and social resilience (Buchanan et al., 2020). It is the first line of defense against many climate hazards, and poor quality or lacking housing can have damaging impacts on regional workforces as a result of climate displacement leading to loss of jobs or poor-quality work due to long commutes. Key climate risks to housing include flooding (from sea level rise and groundwater rise) and wildfires. Currently, 1 million structures statewide are located in areas flagged for very high wildfire risk (Ehlers, 2022), and 30,435 homes located in coastal and Bay Area counties are at risk of inundation during a 100-year storm event (Wood et al., 2020). Climate change and land use planning decision making will determine future risk to California's building and housing infrastructure.

Sea level rise poses one of the greatest threats to building infrastructure in the Bay Area due to the potential for flood inundation and the coupled risk of rising groundwater levels. In 2012, about $29 billion in property value was at risk of a 100-year flood in the San Francisco Bay Area (Heberger et al., 2012). With 1.4 meters of sea level rise, the same study projected that $62 billion in property value would be at risk, predominantly in Alameda and San Mateo Counties. Residential buildings make up most of these assets, but commercial and industrial buildings also exhibited high risk of flooding. Building infrastructure that supports the agricultural, government, and education sectors exhibited low risk, each accounting for about 1% of assets (Heberger et al., 2012).

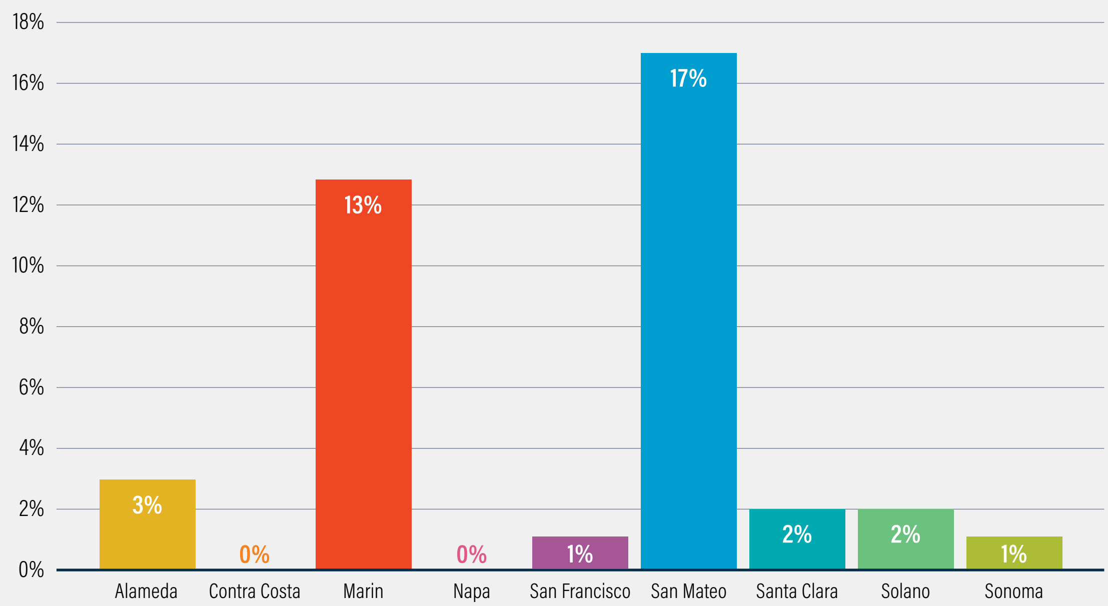
Herberger and colleagues' 2012 study found that 51% of the assets at risk of a 100-year flood with 1.4 meters of sea level rise were residential (Heberger et al., 2012). More recent assessments of the value of building and housing assets at risk from sea level rise come from MTC, ABAG, and the San Francisco Bay Conservation and Development Commission's ART Bay Area Investment Framework, which estimates that 75,000 total households, including 12,000 in the most vulnerable communities, are at risk of flooding from 4.9 feet of sea level rise, contributing to $85 billion in parcel value at risk (Hartofelis et al., 2023).

EXHIBIT 3.77 | Total number of housing units that would be vulnerable to 4.9 feet of sea level rise with annual storm frequency, by county



Source: USGS HERA Coastal Flooding Tool.

EXHIBIT 3.78 | Percent of housing units that would be vulnerable to 4.9 feet of sea level rise with annual storm frequency, by county



Source: USGS HERA Coastal Flooding Tool.

In addition to threats to existing housing, climate change makes building new housing more challenging. Climate impacts affect how and where new housing is built, challenging the region to think strategically and carefully about how to meet the housing needs of a growing population, in addition to how to address the housing affordability crisis (Ehlers, 2022). If communities are built in high-risk areas, such as those prone to wildfires, the design of these houses and associated transportation networks will need to include adequate evacuation routes and include home hardening, defensible space, and natural fuel breaks (Ehlers, 2022). An additional concern for home building in high wildfire risk areas will be impacts on insurance markets; the 2017, 2018, 2020 and 2021 fire seasons saw historic losses for insurance companies, resulting in companies increasing rates and dropping homeowners in fire-prone regions (Ekstrom & Moser, 2012).

Beyond the direct physical impacts of climate change on housing infrastructure, there will also be an anticipated increase in the cost of homeownership associated with climate adaptation needs (Ehlers, 2022). These include the cost of maintenance and repairs; the costs to replace aging infrastructure and upgrade homes to be fire-safe, hardened against flooding, have more energy efficient appliances, and other home updates; and the cost of higher insurance premiums.

v. Climate mitigation and adaptation efforts

Climate mitigation and adaptation efforts are key components of a just transition and will require that key sectors take action to reduce GHG emissions and adapt aging infrastructure to be more resilient to anticipated impacts. In this section, we summarize key sectors in the Bay Area that will need to undergo a transition away from a primary reliance on fossil fuels in order to meet state and regional emissions reduction targets. We also provide a summary of key adaptation actions in Bay Area sectors that provide an opportunity to implement just transition principles, while recognizing the large upfront economic costs of this transition.

a. Sector transition

Key sectors where climate mitigation activities are focused on transitioning away from a reliance on fossil fuels include the Transportation, Fuel Production, and Energy sectors. There is also growing advocacy for the use of innovative strategies for meeting emissions reductions targets through sector-specific retrofits to accommodate tools like carbon capture and sequestration, as well as industry actions that can promote biological carbon sequestration.

Transportation and Fuels: The light-duty passenger vehicles group consumes the majority of the state's gasoline—about 12.9 billion gallons in 2019—and contributes heavily to GHG emissions (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022). There is high capacity for this vehicle group to transition to all-electric, which could result in substantial decreases in gasoline consumption and major health benefits for California's residents. There is also a major push at the state level to drive the Transportation sector transition. Executive Order N-79-20 established target dates for California's auto sales to reflect a 100% commitment to zero-emission vehicles; by 2035, all new sales of light-duty passenger vehicles must be electric vehicles, and by 2045, the state's medium- and heavy-duty truck fleet must also transition to zero emissions (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022). Finally, the state has called for a transition of all off-road vehicles, including locomotives, forklifts, ocean-going vessels at berth, and commercial harbor craft, to transition to zero-emission alternatives by 2035, when feasible.

The development of zero-emission vehicles and refueling and charging infrastructure is a key piece in the transition of the Transportation sector. State and local policy mechanisms and funding programs support the accelerated deployment of zero-emission vehicle infrastructure, which also has the potential to help grow green jobs in the Bay Area.

The Fuel sector transition, from a primary reliance on liquid petroleum fuel to electricity, hydrogen, and biofuels, will require a multi-step process involving both the development of low-carbon fuel alternatives and the construction of both production and distribution facilities (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022). Currently, with California's demand for liquid petroleum dropping, the oil industry is exporting gasoline from California refineries, a practice that will need to change in order for the state to meet its GHG emissions reduction targets. The Bay Area will also need to see the repurposing of existing refineries and other natural gas infrastructure for the production and distribution of alternative fuels (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022). The transition of these key facilities provides an opportunity for the state to support healthier, safer jobs, in addition to reinvesting in and protecting refinery-adjacent communities that have historically been disproportionately exposed to dangerous pollutants from the natural gas and oil industries.

Energy: The 2022 Scoping Plan covers sector-specific transition actions that will aid California in meeting emissions reduction goals. Electricity generation and energy usage in residential and commercial buildings is a growing focus for statewide climate mitigation efforts. SB 350 and SB 100 direct state efforts to reduce GHG emissions and improve air quality, while AB 197 directs emissions reductions for sources covered by the AB 32 inventory. Specific mitigation and transition actions in the energy sector include building and appliance electrification, as well as increased energy production capacity of offshore wind facilities (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022), terrestrial solar facilities, and geothermal and hydroelectric power.

Regionally, the Bay Area is actively undergoing a transition away from gas-powered appliances and technology in order to reduce emissions associated with utilities such as energy and water. In 2023, the Bay Area adopted a set of rules phasing out gas-powered furnaces and water heaters ("Bay Area Making Climate Change History," 2023). The adopted rules require a phaseout of gas-powered water heaters in single-family homes by 2024, of gas-powered furnaces in single-family homes by 2027, and of both heaters and furnaces in multi-family complexes by 2031 (*Building Appliances*, n.d.). This step initiates a required transition to electrical heating equipment types such as heat pumps, addressing one of the largest residential consumers of natural gas, the heating furnace (Auffhammer, 2022). However, critics of the newly adopted rules question whether the phaseout is feasible. Businesses, manufacturers, and the construction industry, in particular, are concerned about the limited availability of heat pumps, complications associated with wiring, and strict air flow requirements that will make installation of non-gas-powered technology in older homes more challenging ("Bay Area Making Climate Change History," 2023).

At the same time, there is a growing cohort of Bay Area-based companies that have adopted carbon neutrality pledges and are acting to reduce emissions through a transition to renewable energy sources. Transition of the Communications, Information, and Tech Industry sector could have a large impact on regional fossil fuel consumption for energy. For example, several technology companies in Silicon Valley have entered into agreements with Silicon Valley Clean Energy (SVCE) to acquire renewable energy for offices located in the Bay Area (Paulson, 2022).

Carbon Capture and Sequestration: Carbon capture and sequestration (CCS) techniques, when applied to target industries and sectors, will play an important role in meeting statewide goals for GHG emissions reductions and climate mitigation efforts. The 2022 Scoping Plan identifies key sectors where CCS projects could help achieve these goals, including energy, manufacturing, and fuel production (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022). CCS projects are typically paired with large GHG-emitting facilities, such as cement plants and refineries. Carbon sequestration could play a particularly important role in cement plants, where there is currently no alternative to combustion, which accounts for about 40% of total facility emissions. However, there are only seven cement plants operational across the state; the last cement plant in the Bay Area, located in unincorporated Santa Clara County, was confirmed for permanent closure in August 2023 ("Editorial: Finally, Polluting Bay Area Cement Plant Will Be Closed," 2023). Refineries, of which there are five in the Bay Area, are also a common focus of CCS projects, due to the variety of carbon dioxide (CO_2) point sources well suited for carbon capture.

The use of CCS as a tool for meeting emissions reduction goals and mitigating climate impacts does not come without challenges. From the perspective of adhering to the principles of a just transition, equity and environmental justice groups have flagged concerns related to the potential negative health and air quality impacts on communities where facilities that operate CCS are sited, namely because these facilities will continue to emit other harmful pollutants. Concerns related to potential emissions leaks and the safety of retrofit and CCS technologies are also common (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022).

Direct air capture (DAC) is another mechanical CO_2-removal process that, unlike CCS, involves the direct capture of CO_2 from the atmosphere, rather than from a specific point source. The technology for direct air capture involves a chemical scrubbing process that results in either storage or use of captured CO_2. In addition to engaging in carbon removal independent of a point source, which allows for more flexibility in site selection, DAC also offers an opportunity for the state to achieve net-negative emissions through the capture of legacy GHG emissions (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022). There are 27 DAC facilities worldwide and plans for over 100 more in development (*Direct Air Capture - Energy System*, n.d.). However, the wider deployment of direct air capture technologies will encounter a number of challenges, including funding (the cost for development and operation is high), permitting at the local, state, and federal levels, and energy availability for facilities located in more remote areas.

Finally, biological sequestration is an independent carbon capture process that occurs predominantly on natural and working lands (NWLs) through nature-based approaches. Biological carbon capture and carbon storage is an important ecosystems service in the San Francisco Bay Area (Ackerly et al., 2012; Duggan, 2023).

Sectors such as Agriculture, Construction, Mining, and Logging play a large role in the future potential of Bay Area lands to sequester carbon, therefore aiding statewide effort to mitigate climate change. Farmland, grazing land, freshwater and tidal wetlands, and redwood forest ecosystem all have high carbon sequestration potential, but are vulnerable to both direct climate hazards, like sea level rise and wildfires, and indirect human-induced climate hazards, such as land conversion and urban sprawl (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022). For example, about 55% of California's existing coastal habitats, many of which are prime sites for carbon sequestration, are highly vulnerable to 4.9 feet of sea level rise, including 58% of the state's marshes (*Sea Level Rise: Climate Adaptation Policies and Strategies in the San Francisco Bay Area*, 2022). Climate impacts that may reduce the capacity of regional habitats to sequester carbon include precipitation decreases and temperatures increases, particularly for forest ecosystems. Warmer, dryer conditions as a result of climate change will likely reduce carbon storage potential, resulting in net loss of carbon from ecosystems (Balachowski et al., 2018).

b. Climate adaptation and response

Adapting to a changing climate will require industry sectors to absorb some costs, while also planning for future growth opportunities. The costs to industry of climate adaptation are sector-specific, but in this section, we give a broad overview of some of the most likely costs with specific examples from recent studies on climate adaptation efforts. We also summarize work by the Bay Area Council Economic Institute regarding anticipated workforce growth from climate adaptation efforts.

Costs: The costs associated with climate adaptation will emerge in several different ways. First, it will be costly to adapt existing infrastructure to include new, carbon neutral, or climate-resilient materials, to address the more frequent maintenance needs of aging infrastructure, to modify existing systems and system subcomponents, and to relocate existing infrastructure (Ehlers, 2022). Additionally, new infrastructure that relies on climate-vulnerable materials, such as road asphalt, will have short lifespans as the frequency and severity of extreme events increases with climate change (Chen et al., 2021). A recent example of the estimated costs associated with climate change adaptation is Plan Bay Area's estimate of costs associated with properly adapting Bay Area infrastructure and communities to 2 feet of sea level rise in the next 30 years (*Plan Bay Area 2050 and Sea Level Rise Adaptation, 2020; Sea Level Rise: Climate Adaptation Policies and Strategies in the San Francisco Bay Area,* 2022). MTC estimates that it will cost the region about $19 billion to adapt to sea level rise, with road elevation and marsh restoration flagged as the highest-cost activities (*Plan Bay Area 2050 and Sea Level Rise Adaptation*, 2020). MTC has identified $11 billion in funding for sea level rise adaption that will come from revenue sources; $3 billion will come from existing sea level rise shoreline flood protection funding sources and $8 billion will come from existing transportation revenue. This funding leaves an $8 billion gap that has yet to be filled.

There will also be the cost of supporting an expanded workforce. Additional labor will be needed to respond to climate-induced public health and safety emergencies, as well as conduct extensive repair and maintenance projects following damage to infrastructure from climate impacts (Ehlers, 2022). At the same time, the region needs to account for the increasing limits on the time that workers can operate due to rising temperatures, wildfires, and more variable or extreme storms, all of which pose a safety risk to workers in the field. The region will also need to expand the number of people working on assessments of climate vulnerabilities by conducting more extensive and holistic planning for regional and subregional climate-smart growth, processes that are incredibly costly. Beyond planning, the state and the region will need additional labor to implement proposed climate solutions.

There will be costs to industry sectors and individual businesses associated with necessary adaptive response to climate hazards (Ehlers, 2022). As mentioned above, industries and businesses will need to take adaptation measures to ensure worker safety and health under a changing climate, in addition to minimizing losses in labor productively. These measures may include providing masks to mitigate the health impacts of poor air quality; installing cooling systems (such as fans), shifting work hours, implementing more breaks, and providing more water to support workers exposed to high or prolonged heat; and moving or modifying work sites to accommodate flooding from sea level rise, groundwater rise, or runoff from extreme precipitation. Employers may also need to invest in tools, resources, or trainings to educate workers on climate-adaptive measures in order to ensure that workers know how to protect themselves from climate-induced health risks.

Job Opportunities: Climate adaptation and mitigation efforts have the ability to produce local and regional jobs that can help address the Bay Area's imbalance in jobs and housing between different subregions, as well as provide for increased job mobility. The most recent study on job production from climate actions comes from the Bay Area Council Economic Institute, which modeled the job potential of climate resilience investments (Bellisario, 2020). The study found that climate resilience investments can provide significant employment and economic stimulus, including through the creation of full-time and part-time jobs across a wide range of sectors and wages, including construction, transportation, land use and development, environmental consulting, and engineering. Specifically, an $8 billion spending program could create nearly 120,000 full-time equivalent jobs across the state.

Job creation from this study was subdivided by resilience spending categories to capture the distribution of jobs coming from resilience strategies with different focus areas: wildfire and forest health; water; coastal resilience and sea level rise; and heat and community resilience. In each category, between 12.54 and 16.26 full-time jobs are produced from each $1 million in spending (see **Exhibit 3.79**).

It is important to note that a high proportion of jobs created by resilience projects are in outdoor industries such as Construction, Agriculture, Landscaping, and other sectors that increase workers' exposure to heat and extreme weather climate hazards. In assessing the impacts of resilience spending on job creation, such efforts should take into account potential increased risks to workers and incorporate health-informed planning practices and spending for practices to mitigate potential climate-induced health hazards for workers (Ehlers, 2022).

EXHIBIT 3.79 | Economic impact results from BACEI's study of potential job creation from climate resilience investments in California

Spending category	$5 billion total spending employment impact	$8 billion total spending employment impact	Jobs per $1 million
Wildfire / forest health	28,456	45,530	16.26
Water	21,346	34,153	13.77
Coastal resilience / sea level rise	15,919	25,471	15.92
Heat / community resilience	8,776	14,042	12.54
TOTAL IMPACT	**27,239**	**8.4%**	**1.41**

Source: Bay Area Council Economic Institute (Bellisario, 2020).

D. Environmental Justice, Climate Equity, and Public Health

The social, economic, and public health impacts of climate change are not felt equally by all communities. In the United States, climate change and associated environmental hazards, including air and land pollution, disproportionately harm people of color and low-income communities (Morello-Frosch & Obasogie, 2023). These communities frequently lack access to environmental benefits and also experience higher exposure to environmental burdens. As a result, socially vulnerable and sensitive populations will be disproportionately impacted by the economic and health challenges from climate change that arise from higher temperatures, variations in precipitation, wildfires and wildfire smoke, and coastal and groundwater flooding.

Without strategic and equity-focused policy, both climate adaptation and mitigation efforts also run the risk of further disenfranchising communities, including through inequitable distribution of planning and recovery funds. The California Jobs First planning process "seeks to center disadvantaged communities as part of California's transition to a clean energy, carbon neutral economy, creating good-paying jobs and prosperous communities for all" (*Community Economic Resilience Fund: Charting California's Economic Future in Partnership with Communities*, n.d.).

This section discusses how climate vulnerability can make some communities more susceptible to the impacts of climate change, including those that drive economic outcomes. Furthermore, this section discusses how climate change can drive inequities in the public health landscape, by providing an overview of the main sources of air, water, and land pollution in the Bay Area, with a summary of how these pollutants impact disinvested communities,[2] including those identified as priority ZIP codes by the Public Health Analysis (see "Impacts on Public Health," below). Finally, this section discusses how climate change will impact those priority ZIP codes to better understand how to tailor strategic investment to support the most equitable public health outcomes.

i. Climate change exacerbates environmental justice concerns

Environmental justice and climate equity broadly address a wide range of the disproportionate burdens experienced by disadvantaged communities (Ehlers, 2022). These inequities are frequently driven by historical policy practices that co-locate polluting facilities and toxic sites near disinvested and disadvantaged communities, thus increasing pollution exposure. Coupled with the lack of investment in these communities, which often contributes to more sensitive population characteristics and socioeconomic factors, disinvested communities have a higher chance of seeing negative health, social, and economic outcomes because of unhealthy environmental conditions.

Historical and current government or private industry practices also contribute to both community and individual vulnerability to climate change and environmental hazards. Climate vulnerability is a combination of exposure to climate hazards, adaptive capacity, and socioeconomic and health vulnerability. It is, in part, determined by the ability of communities and households to anticipate, avoid, mitigate, and recover from the direct and indirect effects of climate change (Morello-Frosch & Obasogie, 2023). Communities that experience high vulnerability to climate and environmental hazards typically have low adaptive capacity, in that their ability to adapt to changes, whether environmental or economic, resulting from climate change is more limited. As mentioned earlier, disadvantaged and disinvested communities also have reduced access to environmental benefits, some of which (like tree canopy in neighborhoods) can reduce exposure to environmental harms (e.g., urban heat and poor air quality) (Morello-Frosch & Obasogie, 2023).

Climate change will exacerbate existing environmental burdens on disadvantaged and disinvested communities. A recent effort to quantify and map disparities in the co-occurring impacts of environmental injustices and climate change characterized regions of the United States by types of vulnerability, creating a Climate Vulnerability Index (CVI) (Tee Lewis et al., 2023). The CVI generally aligns with other common indices for environmental health, like the California Office of Environmental Health Hazard Assessment's (OHHEA) CalEnviroScreen tool and the Healthy Places Index. In addition to identifying areas in California that are likely to experience some of the greatest challenges, the CVI provides four categories of vulnerability types that are present in the Bay Area:

» Traditional Urban or Polluted Environmental Justice Areas with Heightened Climate Risks;

» Areas of Average Baseline Vulnerability with Heightened Social, Economic, and Extreme Event Climate Risk;

» More Affluent Urban or Polluted Areas without Heightened Climate Risks, But Some Baseline Environmental Risks (e.g., earthquakes); and

» Areas with Below Average Baseline Vulnerability, But Heightened Social, Economic, and Extreme Event Climate Risks.

Understanding how climate vulnerability is likely to impact the Bay Area's communities is essential to the design and implementation of equitable climate planning efforts.

a. Vulnerability to climate change impacts

Several key climate impact areas addressed in this climate impact analysis will disproportionately impact communities in the Bay Area that have experienced historic and continued disinvestment. These impacts include rising temperatures, extreme heat, sea level rise, and extreme weather events.

Disadvantaged and lower-income communities, as well as communities of color, are more vulnerable to the impacts of rising temperatures, as they face greater exposure to heat-related climate hazards and heat waves (Ehlers, 2022) and have lower adaptive capacity due to socioeconomic disenfranchisement. Lower-income communities are also less likely to have resources for purchasing and operating air conditioning units during extreme events or have access to backup electricity during heat- or wildfire-induced power outages, contributing to a variety of health and safety concerns. These communities are also more likely to live in older housing that may lack air conditioning, particularly in the Bay Area, and are more likely to live in rental homes, where they are reliant on landlords for climate modifications. In the context of heat-related hazards, this reliance creates additional vulnerabilities, as California does not require landlords to provide any cooling mechanisms in tenant-occupied housing (Ehlers, 2022).

Disadvantaged communities are also more vulnerable to the impacts of sea level rise. A 2012 study of flood risk at that time found that people of color made up 50% of the population in the Bay Area at risk of flooding. The number of individuals at risk was projected to grow from 66,600 to 91,400 with 1.4 meters of sea level rise (Heberger et al., 2012). Additionally, four feet of higher water levels would cause daily flooding for nearly 28,000 socioeconomically vulnerable residents in the Bay Area (Petek, 2020). Another study found that property values are lower in sea level rise hazard zones in the Bay Area (Wang & Chen, 2022). The same research shows fewer jobs in these neighborhoods, in addition to fewer public services and associated facilities, such as hospitals, schools, and police stations. While this finding may indicate a reduced risk to these sectors, it also suggests more limited access to public health and safety services for already vulnerable communities. In the long term, this will contribute to ongoing increase in vulnerability, while in the short term, it creates the potential for disparities in access to life-saving services during natural hazards and extreme events.

Climate vulnerability and exposure differs subregionally across the Bay Area (Wang & Chen, 2022). High-intensity development and large portions of socioeconomically disadvantaged communities are located in the sea level rise hazard zone of the Peninsula and the East Bay, while fewer services and high-development zones in the North Bay (Solano, Marin, and Sonoma Counties), including housing with low-income communities, are exposed before 2060.

b. Housing and transportation access as drivers of climate resilience

Access to safe, affordable, and stable housing and transportation options plays a critical role in individuals' exposure to climate hazards, as well as their ability to adapt and respond to climate change and natural disasters (Gabbe & Pierce, 2020; Li et al., 2023). Because specific communities in the Bay Area have more limited access to stable housing and transportation options, these communities are disproportionately vulnerable to some climate hazards, including sea level rise and extreme heat (Gabbe & Pierce, 2020). Furthermore, housing inequities and the associated climate vulnerabilities are exacerbated by a long history of systemic racism in housing policy—including redlining, discriminatory lending, and violent intimidation tactics—that influenced where communities of color, specifically Black communities, could purchase homes (Ehlers, 2022; Morello-Frosch & Obasogie, 2023). This history plays a large part in the fact that today, communities of color are more likely to live closer to hazardous waste sites and industrial land uses, in addition to experiencing hotter temperatures and greater flood risk (Ehlers, 2022; Morello-Frosch & Obasogie, 2023).

Inequities in housing and transportation access enhance vulnerability to climate impacts. This is especially true for sea level rise (Heberger et al., 2012). About 7,200 people in the Bay Area without access to a vehicle were at risk of 100-year flood event in 2012, and with 1.4 meters of sea level rise, that number grows to about 10,700. Households without access to a car have more limited options for evacuation during extreme events, when public transportation systems are likely to be inoperable. Surveys conducted in New Orleans after Hurricane Katrina found that 55% of respondents who did not evacuate said one of the main reasons was their lack of a car or other means of transportation (Heberger et al., 2012). Renter-occupied households are also vulnerable to the risks associated with sea level rise; renters are less likely to invest in house upgrades or reinforcement against flooding and other hazards. They are less likely purchase home or rental insurance and have far less control over home improvements that could allow them to better adapt to the impacts of sea level rise. Additionally, disaster recovery services often benefit homeowners rather than renters. Thirty-nine percent of the Bay Area population at risk of flooding in 2012 were renter-occupied households. With 1.4 meters of sea level rise, that proportion is expected to drop, but will still account for a quarter of all households at risk of flooding, or about 72,000 people.

Across the United States, affordable housing units are disproportionately exposed to flooding hazards from sea level rise; cities where this is the case are frequently smaller and less wealthy, with fewer resources to support residents (Buchanan et al., 2020; *Report*, n.d.). In the Bay Area, Foster City, Suisun City, and Corte Madera are all ranked in the top 20 cities in the country by housing exposure to current flood risk. Suisun City and Corte Madero see some of the greatest disparities of any cities in the United States between affordable housing stock and general housing stock exposed to sea level rise. While a 2020 study found that almost 100% of all affordable housing in Foster City is expected to be exposed to flooding from sea level rise by 2050, recently constructed levees were not included in the infrastructure database, suggesting that some housing stock could see protection beyond that timeframe (Buchanan et al., 2020). This highlights the need for better data on shoreline armoring and sea level rise barriers, which can be used to estimate exposure of coastal housing and other critical infrastructure more accurately. In addition to the risks associated with direct exposure, affordable housing is also frequently older and in poor maintenance, making it vulnerable to flood damage and resulting in increased repair costs following flooding events.

Residents who live in affordable housing frequently experience other co-vulnerabilities associated with socioeconomic status and health predispositions. In addition to lower incomes, residents are more likely to be single parents, older adults, people of color, living with a disability, or lacking stable employment. These communities tend to have fewer financial resources, less political influence, and receive less information about financial aid to support recovery and to prepare for climate and other natural hazard events (Buchanan et al., 2020). Individuals who live in public housing experience similar vulnerabilities to sea level rise, extreme heat, and poor air quality concerns (Boshart, 2023). Communities in low-income, affordable, and public housing are also at risk of experiencing displacement, both from damage to homes during extreme weather events and from the displacement pressures that can come with infrastructure investments. For example, improvements to infrastructure—both housing and transportation—intended to protect affordable housing from flooding and sea level rise can result in new amenities that attract wealthier households and increase property values and rent, thereby leading to displacement of lower-income communities. Local and regional governments must find ways to improve the condition of affordable housing without decreasing its affordability.

The ripple effects of reduced affordable housing stock—either due to increasing housing prices or due to damage resulting from climate change—will be felt across the region. Fewer housing options can affect equitable access to public services like grocery stores (contributing to food deserts), transportation, and healthcare services. Housing reduction can also have impacts on local and regional economies by reducing the available workforce, in addition to driving up costs in adjacent communities as competition for low-cost housing intensifies (Buchanan et al., 2020).

ii. Impacts on public health

Vulnerability to climate change and environmental hazards can increase negative public health outcomes, particularly for disinvested or disadvantaged communities. Public health impacts from climate change are sometimes direct, such as increases in hospitalizations (Knowlton et al., 2009) and mortality rates (Ostro et al., 2009) during heat waves, while others are indirect, such as exposure to toxins as a result of groundwater mobilization of contaminated soil (Hill et al., 2023).

In the Bay Area, health-related climate impacts can result from extreme heat events (to which the region is not accustomed), increased air pollution, reduced or shifting timing in precipitation, and flooding aggravated by sea level rise and runoff events (Ekstrom & Moser, 2012). Specifically, rising temperatures can compound existing public health concerns around pollution exposure due to increases in ozone and other pollutant concentrations, which is worrisome for more vulnerable populations and marginalized groups living in high-population areas with co-located pollution sources (*2022 Scoping Plan for Achieving Carbon Neutrality*, 2022). Rising temperatures can also lead to expanded ranges for vector-borne diseases, made worse by reduced vector die-off as a result of less extreme winters.

Climate change also has a significant impact on mental health outcomes. In addition to contributing to general anxiety and economic anxiety in the general population, studies show that between 20% and 65% of survivors of extreme weather events experience some degree of mental health challenges following the event (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022). More frequent wildfires, floods, and storms events as a result of climate change could contribute to poor mental health outcomes for survivors.

a. Priority ZIP codes

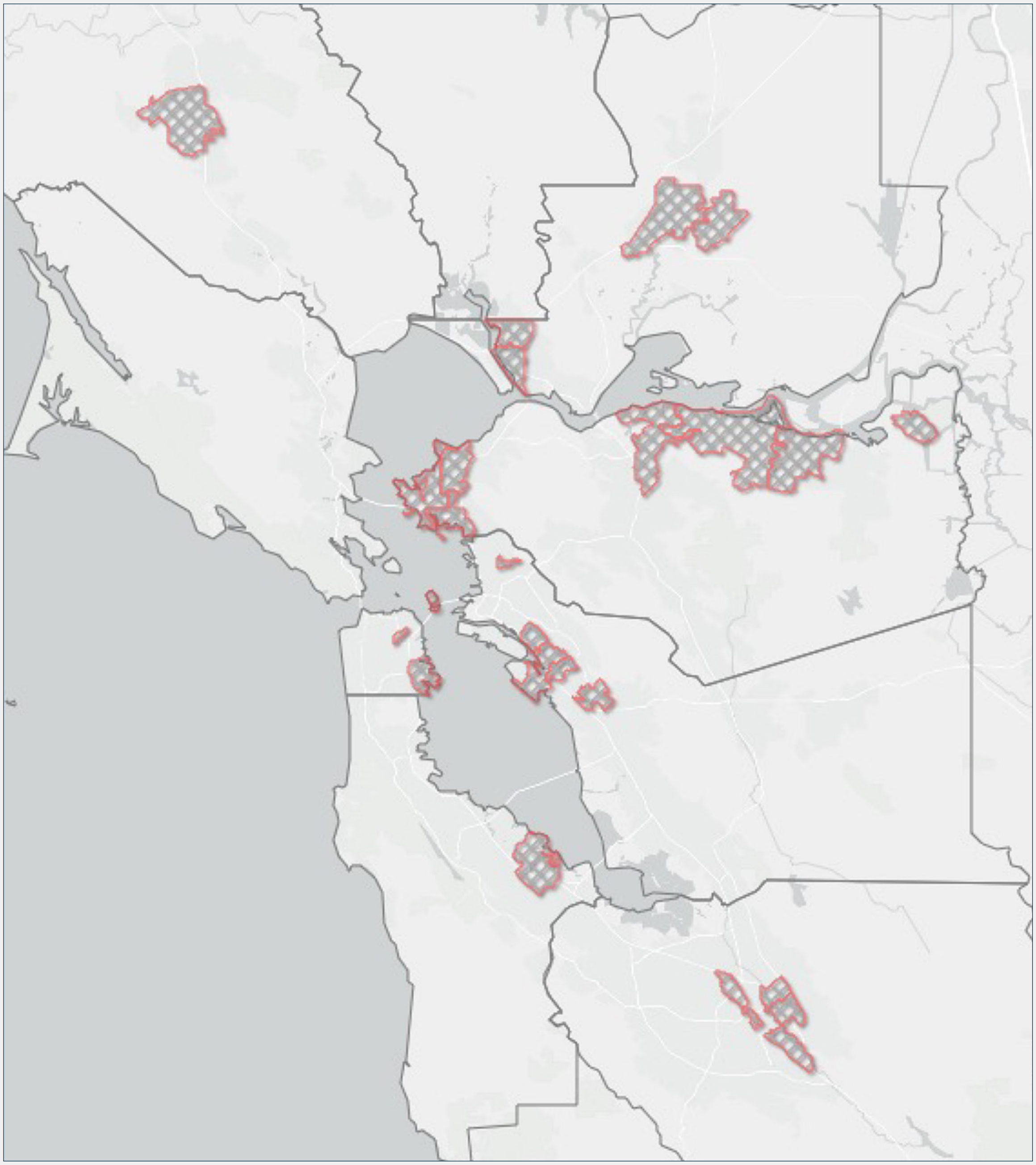
The Public Health analysis of this Regional Summary identifies priority ZIP codes that reflect the health disparities present at a community level across the Bay Area. These ZIP codes represent communities that are overburdened by and have been denied resources to adapt to climate, economic, and health inequities. For the purposes of this analysis, priority ZIP codes have been defined as those in the bottom 50th percentile of Healthy Places Index (HPI) scores for the state, a good proxy for climate vulnerability (Ravel et al., 2019). Twenty-five ZIP codes spread across seven counties in the Bay Area qualify as priority ZIP codes using this definition.[3] **Exhibit 3.80** provides a list of the 25 priority ZIP codes, also shown on maps in **Exhibits 3.81** and **3.82**.

EXHIBIT 3.80 | Priority ZIP Codes in the Bay Area region

ZIP	HPI Percentile	County
94130	5.79%	San Francisco
94535	6.25%	Solano
94621	10.36%	Alameda
94603	22.62%	Alameda
94801	23.91%	Contra Costa
94601	24.60%	Alameda
94590	29.70%	Solano
94509	31.84%	Contra Costa
95116	33.36%	Santa Clara
94511	34.42%	Contra Costa
94589	35.26%	Solano
94704	36.18%	Alameda
95407	36.25%	Sonoma
94102	39.30%	San Francisco
94565	39.38%	Contra Costa
94806	39.91%	Contra Costa
94533	41.58%	Solano
95122	41.96%	Santa Clara
94804	42.42%	Contra Costa
94124	44.94%	San Francisco
95110	45.32%	Santa Clara
94520	46.00%	Contra Costa
95111	46.15%	Santa Clara
94063	48.74%	San Mateo
94578	49.58%	Alameda

Source: Data gathered from Healthy Places Index

EXHIBIT 3.81 | Map of Priority ZIP Codes in the Bay Area region



Health places index priority zip codes

EXHIBIT 3.82 | Zoomed-in maps of priority ZIP codes in the Bay Area Region

(A) Sonoma County ZIP code, (B) Solano and northern East Bay ZIP codes, (C) San Francisco and East Bay ZIP codes, and (D) Peninsula and South Bay ZIP codes.

b. Pollution and public health

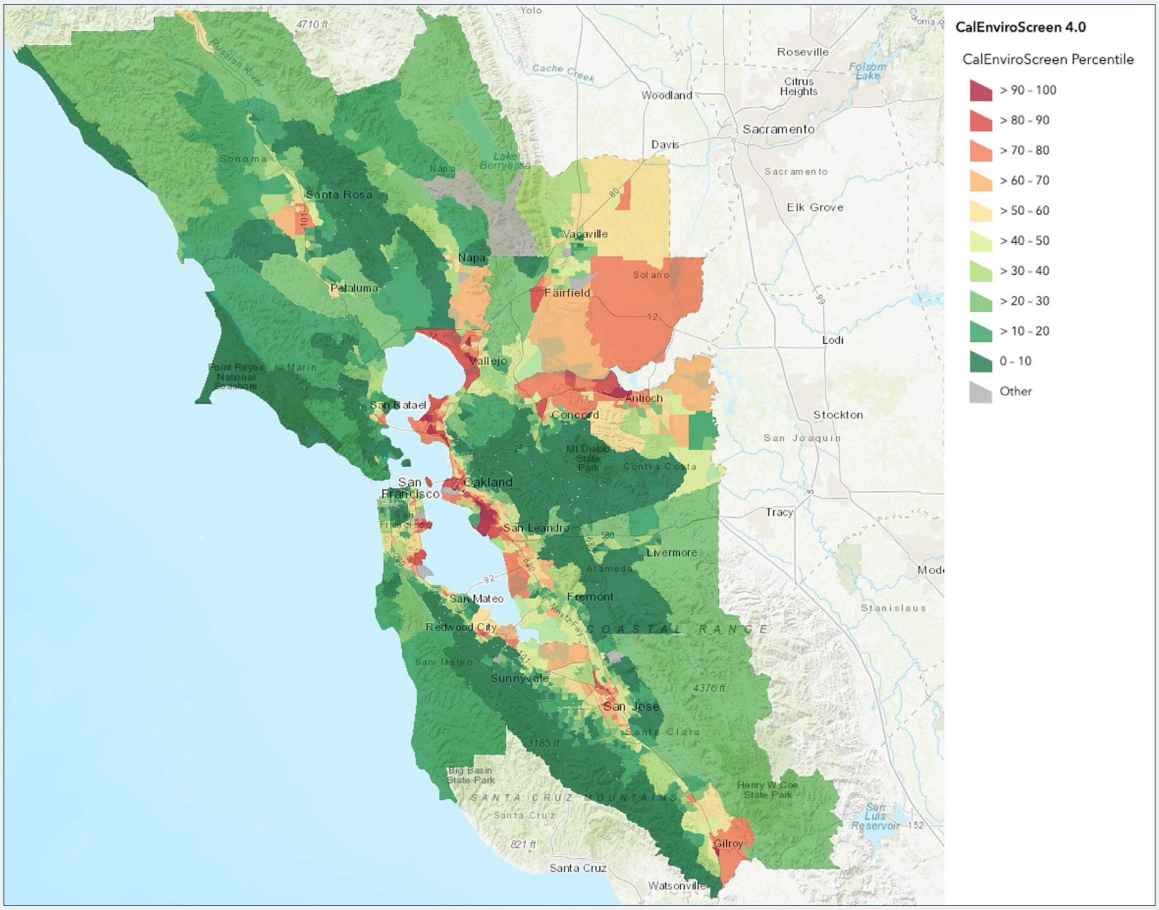
Greenhouse gas emissions, criteria pollutants, toxic and hazardous waste sites, and water pollutants are common indicators of poor environmental and public health. The concentration of these pollutants, as well as their mobilization throughout the region, will be impacted by climate change. As previously mentioned, several indices for measuring the public health impacts of these environmental hazards exist at federal, state, and local levels. For this section of our analysis, we use CalEnviroScreen's Percentile Values[4] to highlight some of the key hazards in the Bay Area.

At a high level, the Bay Area generally ranks better than other major urban and heavily populated regions of the state (i.e., San Diego, Los Angeles, Sacramento Valley, and Fresno) on CalEnviroScreen (*CalEnviroScreen 4.0 Data Dashboard,* n.d.). The average CalEnviroScreen score percentile for the nine-county Bay Area is 33.6. However, there is a large gap in environmental health scores between the region's "non-disadvantaged communities" and "disadvantaged communities," which are defined using CalEnviroScreen, in addition to other indicators (see **Exhibit 3.83** and **3.84**). The average CalEnviroScreen score percentile for census tracts considered to be "disadvantaged communities" is 79.8.

EXHIBIT 3.83 | Average CalEnviroScreen score percentiles for the entire Bay Area, the Bay Area's non-disadvantaged communities, and the Bay Area's disadvantaged communities

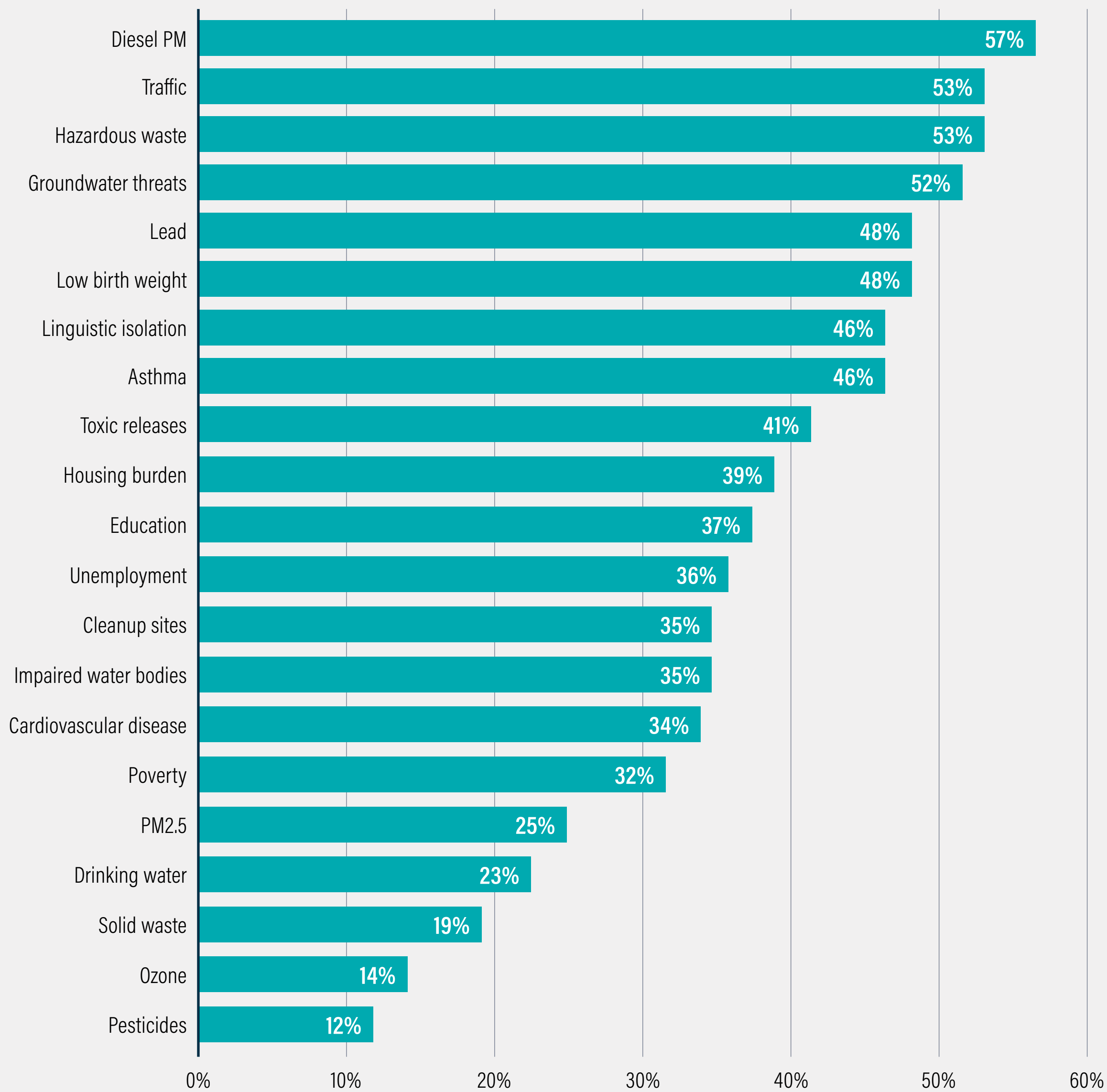
Community	Average CalEnviroScreen	Average Pollution Burden	Average Population Characteristics
Entire Bay Area	33.6%	36.9%	28.8%
Non-Disadvantaged Communities	28.8%	30.2%	32.6%
Disadvantaged Communities	79.8%	69.4%	79.0%

EXHIBIT 3.84 | CalEnviroScreen percentile values map of the nine-county Bay Area region



CalEnviroScreen scores are a calculated using four sets of indicators: Exposure, Environmental Effect, Sensitive Population, and Socioeconomic Factors (*Indicators Overview,* 2015). **Exhibit 3.85** summarizes the average indicator percentile values for the Bay Area. The region ranks highest for Diesel Particulate Matter (Exposure), Traffic Impacts (Exposure), Hazardous Waste Sites and Facilities (Environmental Effect), and Groundwater Threats (Environmental Threat), and lowest for Pesticide Use (Exposure), Air Quality: Ozone (Exposure), Solid Waste Sites and Facilities (Environmental Effect), and Drinking Water Contaminants (Exposure). Exposure and Environmental Effect indicators combine to generate a Pollution Burden score, while Sensitive Population and Socioeconomic Factor indicators combine to generate a Population Characteristics score. Within the nine-county Bay Area, there is a lot of variation in Pollution Burden scores and Population Characteristics scores.

EXHIBIT 3.85 | Average indicator percentile value for indicators used to calculate the CalEnviroScreen Environmental Health scores for the nine-county Bay Area



Source: CalEnviroScreen 4.0 Data Dashboard.

c. Climate change in priority ZIP codes

As noted, climate change will exacerbate existing environmental burdens on disadvantaged and disinvested communities across the Bay Area. Vulnerability to environmental and climate hazards is, in part, determined by exposure to the key pollution sources described above but also by the climate impacts projected for specific subregions. This subsection summarizes the anticipated climate impacts on priority ZIP codes using data provided by Cal-Adapt's Local Climate Change Snapshot tool. We identify projected changes for each ZIP code across four indicators: (1) maximum annual temperature; (2) annual extreme heat days; (3) annual precipitation; and (4) annual number of days where the Keetch-Byram Drought Index (KBDI) is greater than 600, a common proxy for wildfire risk. Each of these indicators is discussed in further detail below.

This subsection is intended to highlight the degree to which climate effects are sometimes hyper-localized to specific subregions, and even specific neighborhoods, in the Bay Area. While Cal-Adapt's Local Climate Change Snapshot tool can provide a helpful overview of localized impacts, there is still a greater need for more localized studies on hazard and vulnerabilities associated with climate change, coupled with local solutions, in addition to the regional-scale planning efforts underway.

Annual Average Maximum Temperature: Annual average maximum temperature provides an average of all the hottest daily temperatures in a year. This indicator can be a helpful metric for determining how maximum temperatures for the year might change under different emissions scenarios and climate timelines. We see the greatest change in average maximum temperatures in ZIP codes located in Contra Costa County and Solano County, where under a high-emissions scenario, specific ZIP codes could see an increase of 8 degrees Fahrenheit or more by the end of the century. There are also the ZIP codes where the degree increase is most frequently higher than that for the county, indicating that these ZIP codes may require hyper-local mitigation measures to adequately address the public health impacts of higher temperatures.

EXHIBIT 3.86 | Increase in annual average maximum temperature (degrees Fahrenheit) for priority ZIP codes

Zip	HPI Percentile	Annual Average Max Temperature - Increase in Degrees				High Emissions End-Century: Relationship to County Average
		Medium Emissions Scenario		High Emissions Scenario		
		Mid-Century	End-Century	Mid-Century	End-Century	
Alameda County		3.40	4.50	4.20	7.40	-
94621	10.36%	3.00	4.20	4.00	7.00	Below
94603	22.62%	3.10	4.30	4.00	7.10	Below
94601	24.60%	3.00	4.20	3.90	6.90	Below
94704	36.18%	3.10	4.30	4.00	7.00	Below
94578	49.58%	3.10	4.30	4.00	7.10	Below
Contra Costa County		3.60	4.60	4.40	7.60	-
94801	23.91%	3.00	4.20	3.80	6.90	Below
94509	31.84%	4.00	5.40	4.90	8.30	Above
94511	34.42%	4.10	5.50	5.10	8.40	Above
94565	39.38%	3.90	5.30	4.90	8.20	Above
94806	39.91%	3.10	4.40	4.00	7.10	Below
94804	42.42%	3.00	4.20	3.80	6.90	Below
94520	46.00%	3.70	5.10	4.70	7.80	Above
San Francisco County		2.70	3.70	3.50	6.60	
94130	5.79%	3.00	4.20	3.90	6.90	Above
94102	39.30%	3.00	4.20	3.80	7.00	Above
94124	44.94%	2.90	4.10	3.80	6.90	Above

EXHIBIT 3.86 (continued)

Zip	HPI Percentile	Annual Average Max Temperature - Increase in Degrees				High Emissions End-Century: Relationship to County Average
		Medium Emissions Scenario		High Emissions Scenario		
		Mid-Century	End-Century	Mid-Century	End-Century	
San Mateo		**2.90**	**3.70**	**4.00**	**6.80**	**-**
94063	48.74%	3.30	4.60	4.20	7.40	Above
Santa Clara		**3.40**	**4.50**	**4.20**	**7.40**	**-**
95116	33.36%	3.20	4.50	4.20	7.20	Below
95122	41.96%	3.20	4.50	4.20	7.20	Below
95110	45.32%	3.20	4.40	4.10	7.10	Below
95111	46.15%	3.20	4.50	4.10	7.20	Below
Solano		**3.80**	**4.90**	**4.60**	**7.90**	**-**
94535	6.25%	4.40	5.80	5.40	8.60	Above
94590	29.70%	3.50	4.80	4.40	7.50	Below
94589	35.26%	3.70	5.00	4.60	7.70	Below
94533	41.58%	4.30	5.80	5.30	8.60	Above
Sonoma		**3.80**	**4.90**	**4.60**	**7.90**	**-**
95407	36.25%	3.50	4.90	4.50	7.50	Above

Extreme Heat Days: Extreme heat days are the number of days in a year when daily maximum temperatures rise above a locally set threshold temperature. CalAdapt's local threshold is defined as the 98th percentile value of historical daily maximum or minimum temperatures observed at a location (*Cal-Adapt: Local Climate Change Snapshot Tool,* n.d.). Extreme heat days are particularly important for lower-income communities that are more likely to live in concrete-intensive urban heat islands and therefore experience higher vulnerability to the impacts of extreme heat due to the lack of trees and greenery that can mitigate heat impacts. Extreme heat days are associated with a wide range of public health impacts, including hospitalizations and deaths. In the priority ZIP codes, parts of the Contra Costa and Solano County are likely to see some of the greatest increases in annual extreme heat days. As with Annual Average Maximum Temperature, these ZIP codes are also where the average increase in days is higher than the average increase for the county in which each ZIP code is located.

EXHIBIT 3.87 | Increase in average annual extreme heat days for priority ZIP codes

Zip	HPI Percentile	Average Annual Extreme Heat Days - Increase in Days				High Emissions End-Century: Relationship to County Average
		Medium Emissions Scenario		High Emissions Scenario		
		Mid-Century	End-Century	Mid-Century	End-Century	
Alameda County		**9**	**12**	**12**	**26**	**-**
94621	10.36%	4	5	5	13	Below
94603	22.62%	5	7	6	15	Below
94601	24.60%	4	5	5	13	Below
94704	36.18%	3	5	4	12	Below
94578	49.58%	5	7	6	15	Below
Contra Costa County		**10**	**14**	**13**	**28**	**-**
94801	23.91%	3	5	4	10	Below
94509	31.84%	12	16	15	31	Above
94511	34.42%	12	17	16	34	Above
94565	39.38%	10	14	13	30	Above
94806	39.91%	4	6	5	13	Below
94804	42.42%	3	5	4	10	Below
94520	46.00%	10	14	13	28	Equal
San Francisco County		**3**	**4**	**4**	**10**	**-**
94130	5.79%	3	4	4	10	Equal
94102	39.30%	3	4	4	9	Below
94124	44.94%	3	4	3	10	Equal

EXHIBIT 3.87 (continued)

Zip	HPI Percentile	Average Annual Extreme Heat Days - Increase in Days				High Emissions End-Century: Relationship to County Average
		Medium Emissions Scenario		High Emissions Scenario		
		Mid-Century	End-Century	Mid-Century	End-Century	
San Mateo		**4**	**7**	**6**	**16**	**-**
94063	48.74%	5	8	7	18	Above
Santa Clara		**8**	**12**	**11**	**25**	**-**
95116	33.36%	6	9	9	20	Below
95122	41.96%	6	9	9	20	Below
95110	45.32%	6	9	8	18	Below
95111	46.15%	6	10	9	22	Below
Solano		**13**	**18**	**17**	**35**	**-**
94535	6.25%	14	19	18	36	Above
94590	29.70%	7	11	10	23	Below
94589	35.26%	8	12	10	24	Below
94533	41.58%	12	16	15	31	Below
Sonoma		**6**	**9**	**8**	**19**	**-**
95407	36.25%	7	10	9	20	Above

Annual Precipitation: Annual precipitation is the total precipitation projected for a year, frequently measured in inches (*Cal-Adapt: Local Climate Change Snapshot Tool,* n.d.). Projections suggest that while changes in precipitation will vary drastically under a changing climate, wet years will typically become wetter and dry years will become drier. Public health impacts from changes in precipitation include flooding, increase in exposure to pollutants and contaminants, increases in vector-borne diseases, and the health impacts associated with drought. Because of the higher likelihood of increased precipitation during extreme weather events, most ZIP codes in the Bay Area are expected to see some increase in average annual precipitation. The ZIP codes with the highest expected increase in precipitation are in Solano County.

EXHIBIT 3.88 | Percent Increase from baseline in average annual precipitation (in inches) for priority ZIP codes

Zip	HPI Percentile	Average Annual Precipitation - Percent Increase			
		Medium Emissions Scenario		High Emissions Scenario	
		Mid-Century	End-Century	Mid-Century	End-Century
Alameda County					
94621	10.36%	9.9%	11.0%	12.1%	23.1%
94603	22.62%	10.1%	11.1%	12.1%	22.7%
94601	24.60%	10.2%	11.1%	11.6%	23.1%
94704	36.18%	9.3%	10.7%	12.0%	23.6%
94578	49.58%	10.1%	11.1%	12.1%	22.7%
Contra Costa County					
94801	23.91%	9.5%	10.0%	11.4%	21.8%
94509	31.84%	7.9%	7.2%	8.6%	18.0%
94511	34.42%	7.0%	5.6%	7.7%	16.8%
94565	39.38%	9.0%	7.7%	9.6%	19.9%
94806	39.91%	10.0%	10.0%	11.4%	22.4%
94804	42.42%	9.5%	10.0%	11.4%	21.8%
94520	46.00%	9.8%	9.2%	10.9%	23.0%
San Francisco County					
94130	5.79%	9.0%	10.0%	11.4%	21.9%
94102	39.30%	8.0%	9.4%	9.4%	19.8%
94124	44.94%	8.6%	10.4%	10.4%	21.3%

EXHIBIT 3.88 (continued)

Zip	HPI Percentile	Average Annual Precipitation - Percent Increase			
		Medium Emissions Scenario		High Emissions Scenario	
		Mid-Century	End-Century	Mid-Century	End-Century
San Mateo					
94063	48.74%	10.0%	10.5%	13.0%	26.0%
Santa Clara					
95116	33.36%	7.5%	8.2%	8.8%	19.7%
95122	41.96%	7.5%	8.2%	8.8%	19.7%
95110	45.32%	6.9%	7.6%	8.3%	19.3%
95111	46.15%	10.4%	11.0%	12.2%	25.6%
Solano					
94535	6.25%	12.4%	12.4%	14.5%	29.5%
94590	29.70%	10.0%	9.0%	11.4%	22.9%
94589	35.26%	10.8%	9.9%	12.3%	25.0%
94533	41.58%	12.6%	11.6%	14.2%	27.9%
Sonoma					
95407	36.25%	10.7%	11.3%	12.5%	24.5%

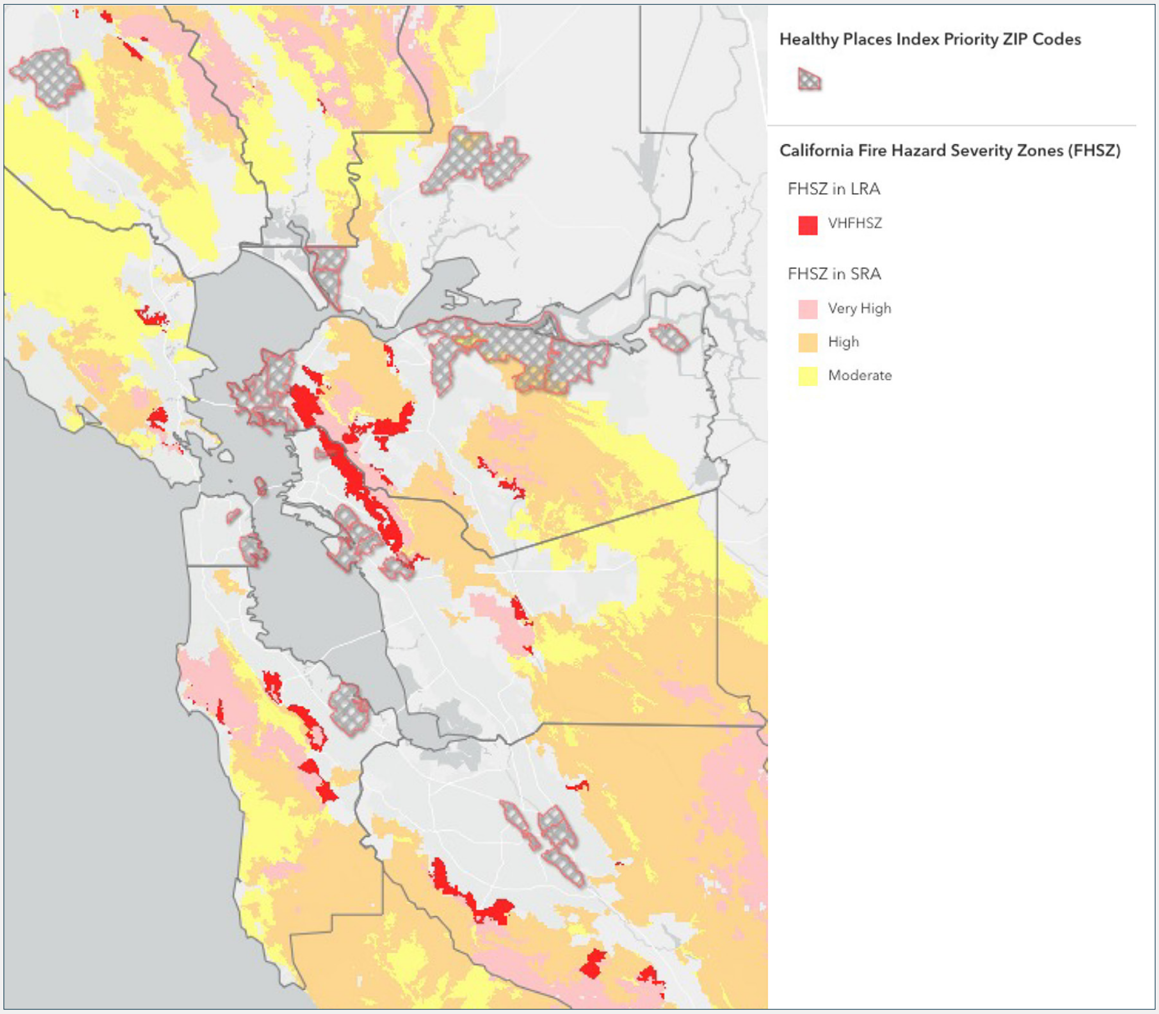
Wildfire Risk: The Keetch-Byram Drought Index (KBDI) serves as a simplified proxy for increased occurrence and spread of fire by assessing drought conditions as indicated by soil moisture depletion (*Keetch-Byram Drought Index (KBDI) – U.S. Forest Service | Drought.Gov,* n.d.). A KBDI value of more than 600 indicates that a region is experiencing severe drought, extreme wildfire risk, and increased wildfire occurrence. Public health impacts associated with wildfires include direct exposure to fire, exposure to wildfire smoke and particle pollution, and indirect physical and mental health impacts of fire damage on homes, communities, and essential services (*2022 Scoping Plan for Achieving Carbon Neutrality,* 2022). During the 2020 fire season, at least 95% of Californians experienced unhealthy air quality levels due to wildfires (Burke, 2020). Priority ZIP codes with the greatest increase in high wildfire risk days include those in Contra Costa, San Mateo, Santa Clara, and Solano County.

EXHIBIT 3.89 | Increase in average annual KBDI > 600 Days for priority ZIP codes

Zip	HPI Percentile	Average Annual KBDI > 600 Days - Increase in Days				High Emissions End-Century: Relationship to County Average
		Medium Emissions Scenario		High Emissions Scenario		
		Mid-Century	End-Century	Mid-Century	End-Century	
Alameda County		**28**	**36**	**34**	**67**	**-**
94621	10.36%	9.9%	11.0%	12.1%	23.1%	Below
94603	22.62%	10.1%	11.1%	12.1%	22.7%	Below
94601	24.60%	10.2%	11.1%	11.6%	23.1%	Below
94704	36.18%	9.3%	10.7%	12.0%	23.6%	Below
94578	49.58%	10.1%	11.1%	12.1%	22.7%	Below
Contra Costa County		**44**	**52**	**50**	**81**	**-**
94801	23.91%	9.5%	10.0%	11.4%	21.8%	Below
94509	31.84%	7.9%	7.2%	8.6%	18.0%	Above
94511	34.42%	7.0%	5.6%	7.7%	16.8%	Above
94565	39.38%	9.0%	7.7%	9.6%	19.9%	Above
94806	39.91%	10.0%	10.0%	11.4%	22.4%	Below
94804	42.42%	9.5%	10.0%	11.4%	21.8%	Below
94520	46.00%	9.8%	9.2%	10.9%	23.0%	Equal
San Francisco County		**1**	**1**	**1**	**10**	**-**
94130	5.79%	9.0%	10.0%	11.4%	21.9%	Equal
94102	39.30%	8.0%	9.4%	9.4%	19.8%	Below
94124	44.94%	8.6%	10.4%	10.4%	21.3%	Equal

EXHIBIT 3.89 (continued)						
Zip	HPI Percentile	Average Annual KBDI > 600 Days - Increase in Days				High Emissions End-Century: Relationship to County Average
		Medium Emissions Scenario		High Emissions Scenario		
		Mid-Century	End-Century	Mid-Century	End-Century	
San Mateo		**14**	**20**	**18**	**45**	**-**
94063	48.74%	40	53	49	91	Above
Santa Clara						
95116	33.36%	30	40	39	81	Above
95122	41.96%	30	40	39	81	Above
95110	45.32%	24	34	32	74	Below
95111	46.15%	40	49	47	87	Above
Solano		**41**	**48**	**46**	**73**	**-**
94535	6.25%	40	45	44	68	Below
94590	29.70%	41	53	49	87	Above
94589	35.26%	46	57	53	86	Above
94533	41.58%	44	50	48	74	Above
Sonoma		**24**	**29**	**28**	**47**	**-**
95407	36.25%	31	39	35	58	Above

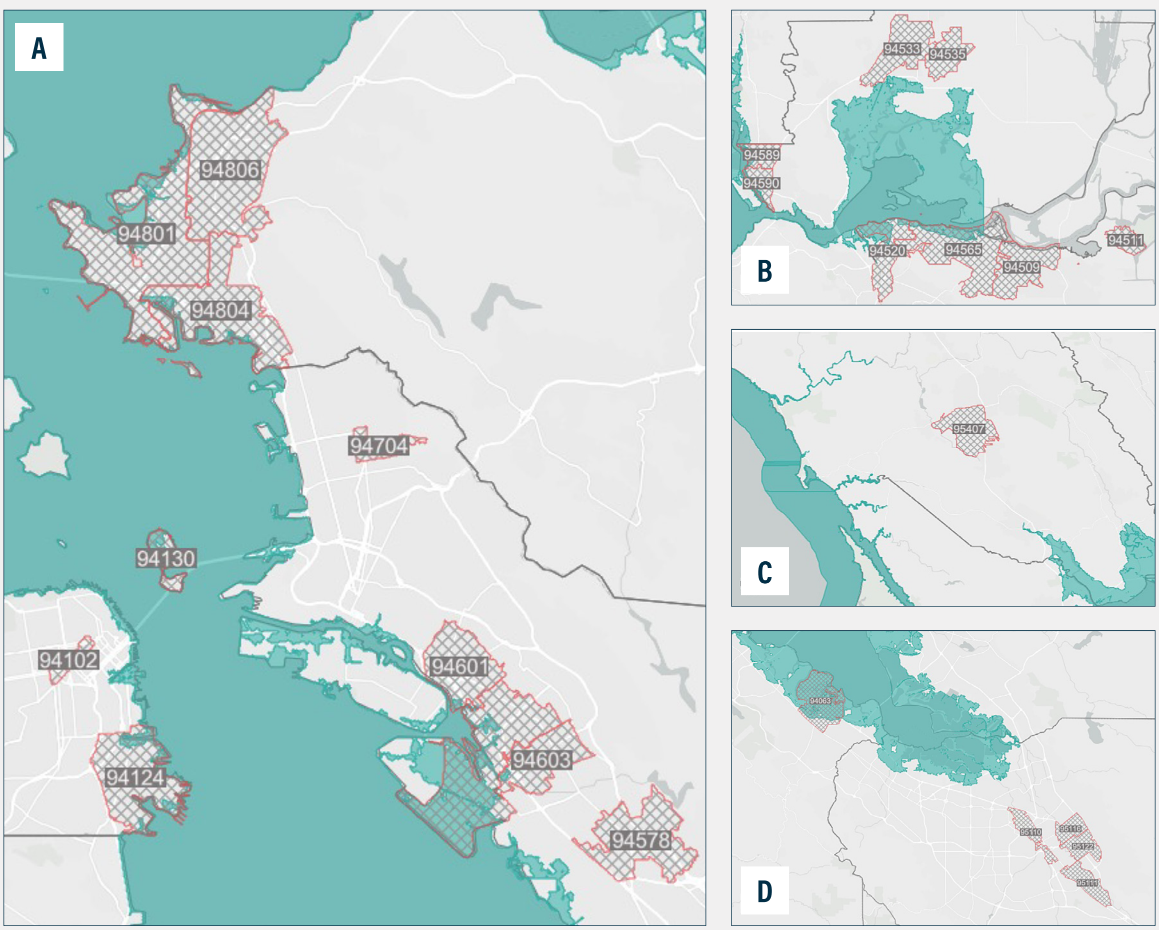
EXHIBIT 3.90 | Fire hazard severity zones overlayed on priority ZIP codes



Although priority ZIP codes do not currently fall into high or very high California Fire Hazard Severity Zones (see **Exhibit 3.90**), those zones could increase with increased drought and higher wind speeds associated with more extreme climate-induced storms. Future land use patterns also play a large role in the wildfire risk to communities at the wildland-urban interface.

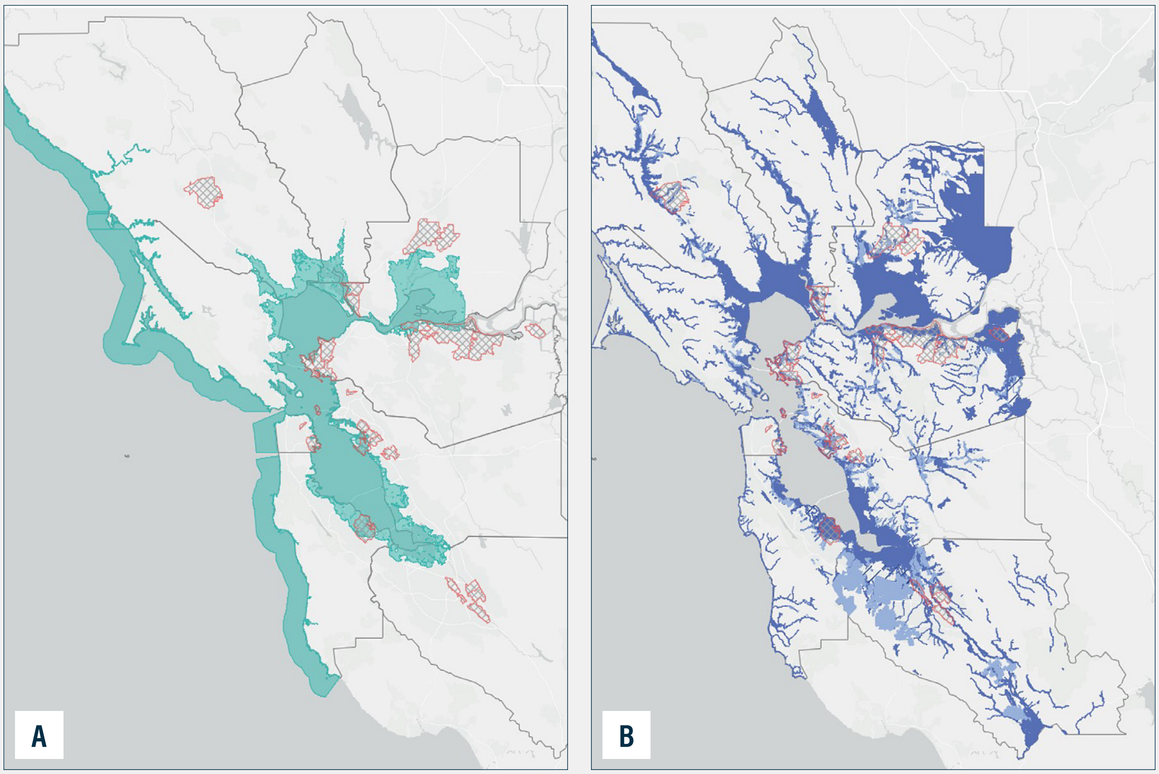
Sea Level Rise: Many of the priority ZIP codes are projected to experience some degree of exposure to climate-induced sea level rise flooding impacts. With 4.9 feet of total water level, ZIP codes in the East Bay, Solano County, and San Mateo County will see the greatest flood risk (see **Exhibit 3.91**). ZIP codes in San Jose, Sonoma, and inland San Francisco may not experience direct flooding impacts from coastal sea level rise. However, these ZIP codes are still vulnerable to precipitation-induced flooding along watershed corridors, as indicated by the fact that all but one (central San Francisco) of the priority ZIP codes fall into either a 100-year or 500-year FEMA Flood Hazard Zone (see **Exhibit 3.92**). The public health risks associated with sea level rise are further exacerbated by community-level vulnerability status (see **Exhibit 3.93**), because access to evacuation, recovery, and healthcare resources plays a vital part in households' capacity to respond during flooding events.

EXHIBIT 3.91 | Zoomed-in maps of priority ZIP codes and 4.9 feet of total water level



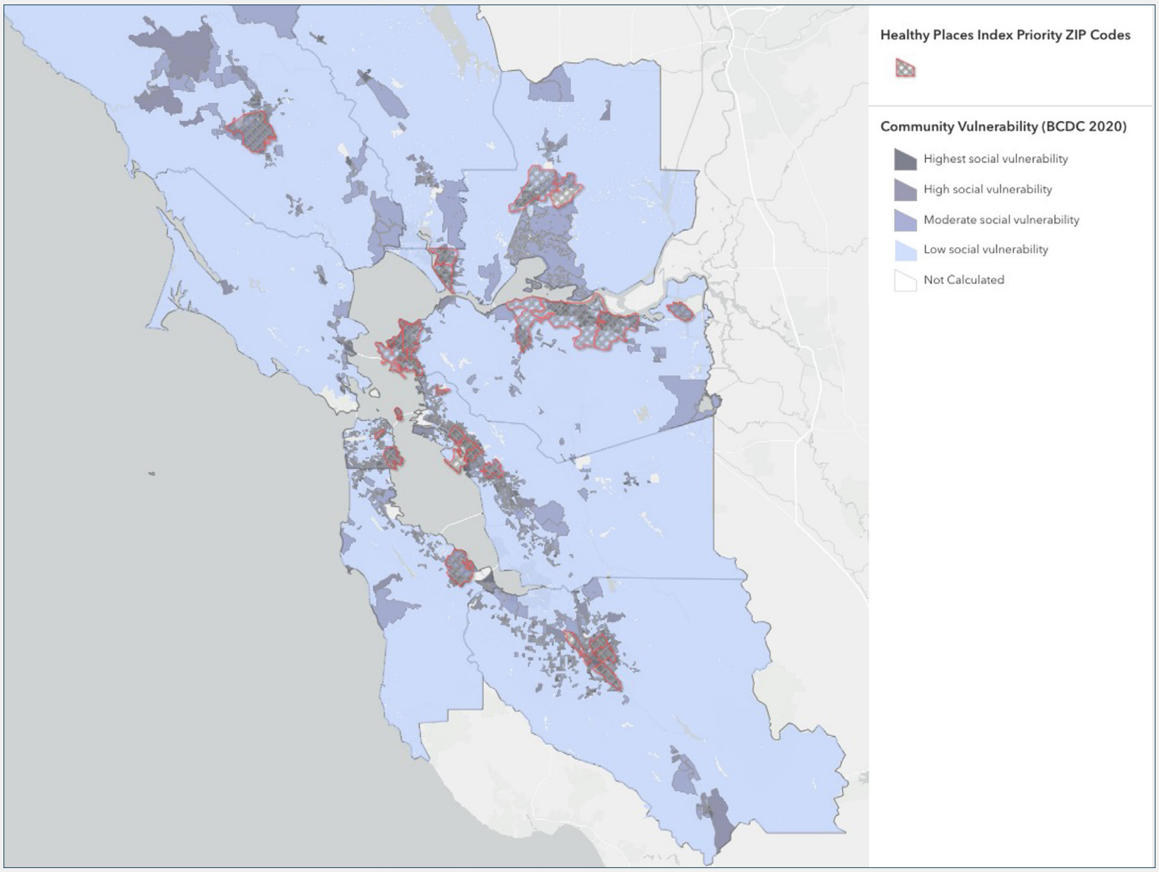
(A) Sonoma County ZIP code, (B) Solano and northern East Bay ZIP codes, (C) San Francisco and East Bay ZIP codes, and (D) Peninsula and South Bay ZIP codes. Source: Flooding Polygon data is from MTC.

EXHIBIT 3.92 | (A) Priority ZIP codes and 4.9 feet of total water level. (B) Priority ZIP codes and FEMA flood hazard zones



Source: Flooding Polygon data is from MTC; flood hazard zones are from FEMA.

EXHIBIT 3.93 | Priority ZIP codes and community vulnerability designations



Source: Community vulnerability layer is from Adapting to Rising Tides Bay Area (BCDC, 2020).

iii. Non-place-based climate and health vulnerabilities

Some communities will experience overlapping climate and health vulnerabilities that are difficult to capture with the place-based indicators used by the Healthy Places Index and CalAdapt. These communities may include outdoor workers, incarcerated populations, people experiencing housing instability or homelessness, and people who move within the same region at a frequent interval. There is more research on how homelessness is likely to increase an individual or household's vulnerability to climate impacts, while more work is needed to understand how individuals and households that experience frequent moves within a region, included those that do so as a result of incarceration or seasonal work, are made more vulnerable to climate change.

People who experience homelessness are more vulnerable to the impacts of climate change for a wide range of reasons. Lack of adequate shelter is associated with increased exposure to extreme weather, which compounds other intersectional adversity, including but not limited to both gender- and race-based discrimination, exposure to violence, and compromised physical and mental health (Kidd et al., 2023). Particular climate concerns for communities and individuals experiencing homelessness include extreme heat and cold, flooding from both heavy precipitation and sea level rise, drought, food and water insecurity, air pollution and poor air quality, and the increase in vector-borne diseases.

It can be more challenging to reach individuals and communities experiencing homelessness with warnings about climate hazards and other public health emergencies. As a result, these communities are less likely to know about evacuations that impact them and their belongings or to know where to seek shelter or access support resources. It can also be more difficult, for a variety of reasons, for emergency services to reach and aid people experiencing homelessness (Cornwall et al., 2014). People experiencing homelessness might engage in self-isolation or be resistant to relocating into or near central support facilities. This is often made more difficult by the close relationship between emergency services and law enforcement, which have a challenging relationship in many parts of California with individuals and communities experiencing homelessness. These communities may also depend more heavily on resources and industries that are subject to interruption during climate-related emergencies, like service shelters, churches, nonprofits, and other types of mobile resource providers. Inability to access basic resources during and after an emergency can result in poor health outcomes. Finally, housing instability frequently co-occurs with other social indicators that may increase vulnerability, including mental health challenges, experiences with substance abuse, linguistic isolation, and lack of U.S. citizenship.

The Bay Area region poses numerous overlapping challenges for these kinds of non-place-based vulnerabilities to climate impacts. The lack of adequate shelter for people experiencing homelessness compounds the health risks of extreme and changing weather, particularly in regions with heightened demand for health and emergency services (Kidd et al., 2023). The Bay Area is one such region, due in large part to its population size. The region's transportation system is also particularly vulnerable to impacts from climate change; public transportation, such as BART and Caltrain, are especially important to people experiencing housing instability and homelessness because they allow individuals to access resources throughout the region and remain mobile, if need be, to protect themselves from unsafe situations (e.g., domestic abuse, other forms of violence, etc.).

There is a downward cycle that can occur when an individual loses adequate housing because of climate pressures, experiences negative health outcomes because housing is a critical determinant of health and social stability, and thus experiences increasing and compounding exposure to climate hazards and further risks to health that may make it even more challenging for them to find housing or work in the future. This cycle can be exacerbated by other housing pressures, such as rising rents and gentrification, which are increasingly common in Bay Area communities. It is anticipated that the number of communities and individuals experiencing a range of housing-insecure and homelessness situations may increase as climate pressures damage residential systems (Kidd et al., 2023).

In light of these patterns, it is important that planning processes consider the growing population in the Bay Area for whom location-based data and mapping tools may not provide sufficient information on indicators of climate vulnerability. Understanding how non-place-based characteristics can influence climate vulnerability will reduce the chance that mitigation, adaptation, and planning efforts exclude or negatively impact individuals and households experiencing any degree of housing insecurity.

E. State and Local Government Planning Context

Planning to both mitigate and adapt to the impacts of climate change occurs within a larger landscape of regional and statewide environmental and economic planning efforts. Alignment of planning efforts plays a pivotal role in ensuring positive outcomes that account for co-occurring implementation efforts and take advantage of opportunities for planning activities to maximize the benefits of available resources.

In this section, we provide a summary of other climate and climate-adjacent planning efforts underway in the Bay Area Region. These efforts include those as local as neighborhood-level strategic plans and as high level as ABAG and MTC's Plan Bay Area 2050, a holistic approach to regional strategic planning. It is our intention that this section serve as a high-level summary of other planning efforts underway, and that a more detailed analysis of plan alignment, which is outside the scope of this work, could support more efficient and effective project implementation under California Jobs First.

It can also be helpful to understand the broader legislative context for how statewide planning efforts to address climate change interface with more regional planning approaches. Key California climate policies with adaption and resiliency planning implications are summarized in **Exhibit 3.94**.

EXHIBIT 3.94 | List of California climate legislation with adaptation and resiliency planning implications

Bill	Year	Sector or Topic	Climate Focus Area
SB 375	2008	Transportation	Mitigation
SB 535	2012	Disadvantaged Communities	Adaptation
SB 743	2013	Transportation	Mitigation
SB 379	2015	Safety Element Alignment	Adaptation & Resiliency
SB 1000	2016	Environmental Justice Element	Pollution Burdens, Adaptation & Resiliency
AB 617	2017	Disadvantaged Communities	Pollution Burdens
SB 100	2018	Electricity (Energy); Buildings and Transportation Infrastructure	Mitigation

i. City and county climate action plans

The California Governor's Office of Planning and Research tracks city and county climate action and adaptation planning efforts in its ResilientCA Adaptation Planning Map (RAP-Map) (*ResilientCA Adaptation Planning Map (RAP-Map)*, n.d.). Climate action and adaptation plans play an important role in addressing local mitigation and adaptation strategies for California's cities and counties, as well as providing a roadmap for how to address economic development and other growth challenges under a changing climate. According to the RAP-Map, eight out of the nine counties in the Bay Area have completed a vulnerability assessment and adaptation policy development; Contra Costa County has updated and adopted its Safety Element pursuant to SB 379. A large number of cities in the Bay Area, particularly those located in San Mateo and Santa Clara Counties, have completed vulnerability assessments and adopted adaptation policies, as well.

Climate Action Plans provide an opportunity for regional planning efforts to build on the work being done at the local level and to development regional partnerships for addressing climate impacts that extend beyond city or county boundaries. This can be particularly helpful for communities in the Bay Area, where aligned county efforts to address climate change will support healthier working conditions and living communities, given the large share of Bay Area residents who live in one county and work in another.

ii. Regional sea level rise planning

Sea level rise has recently been the focus of major regional planning efforts. Planning for sea level rise requires setting inundation benchmarks for infrastructure, home, and business resiliency. State guidance recommends that statewide adaptation planning include pathways to resiliency to 3.5 feet by 2050 and 6 feet by 2100, with a particular focus on critical infrastructure, coastal zone development, and disinvested communities (*State Agency Sea-Level Rise Action Plan for California,* 2022). Plan Bay Area 2050 assumes 3 feet of inundation by 2050 for the bay, in order prioritize adaptive action in areas with highest need. More recently, MTC, ABAG, and BCDC released a report titled "Sea Level Rise Adaptation Funding and Investment Framework," which uses 4.9 feet of Total Water Level (TWL) by 2050 to identify adaptation vulnerability and protection priorities. Total water level accounts for expected permanent inundation, as well as additional sea level rise from temporary flooding due to storms and high tides.

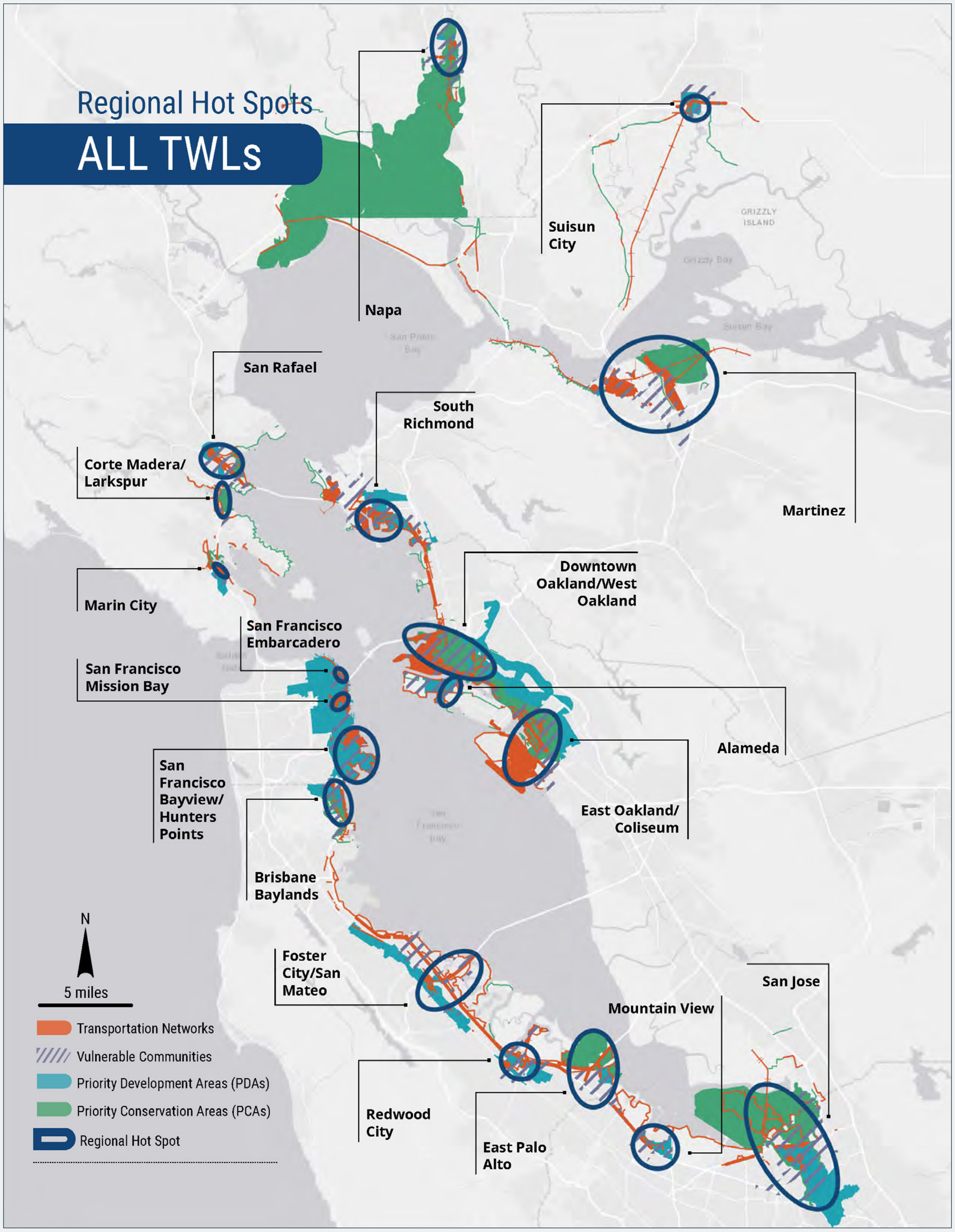
a. Adapting to rising tides

In addition to identifying the key impacts of climate change on Bay Area communities, the Bay Conservation and Development Commission's (BCDC) Adapting to Rising Tides initiative has identified regional hot spots of both sea level rise vulnerability and opportunity for strategic planning and investment. Many of these locations, as shown in **Exhibit 3.95**, include the priority ZIP codes identified through the Bay Area Jobs First baseline analysis work, providing an opportunity for aligned thinking around sea level rise planning in these priority locations.

iii. Plan Bay Area 2050

Plan Bay Area 2050 is a long-range plan developed by the Bay Area's Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), the region's two regional planning agencies (*Plan Bay Area 2050: A Vision for the Future,* 2021). Plan Bay Area provides 35 strategies across a wide range of topics to help address growth in the region over the next 30 years. The plan addresses multiple components of climate adaption, resilience, and equity, while also defining regions for strategic investments, termed "growth geographies," where targeted panning will support the most equitable outcomes for residents and visitors. The priority ZIP codes identified generally align with the Bay Area's growth geographies[5] (see **Exhibits 3.96** and **3.97**), indicating further alignment between broad regional planning efforts, like Plan Bay Area, and more focused planning efforts, like California Jobs First.

EXHIBIT 3.95 | Regional sea level rise flooding hotspots



Source: Adapting to Rising Tides Bay Area (BCDC, 2020).

EXHIBIT 3.96 | Map of priority ZIP codes overlayed on Plan Bay Area's 2050 Growth Geographies

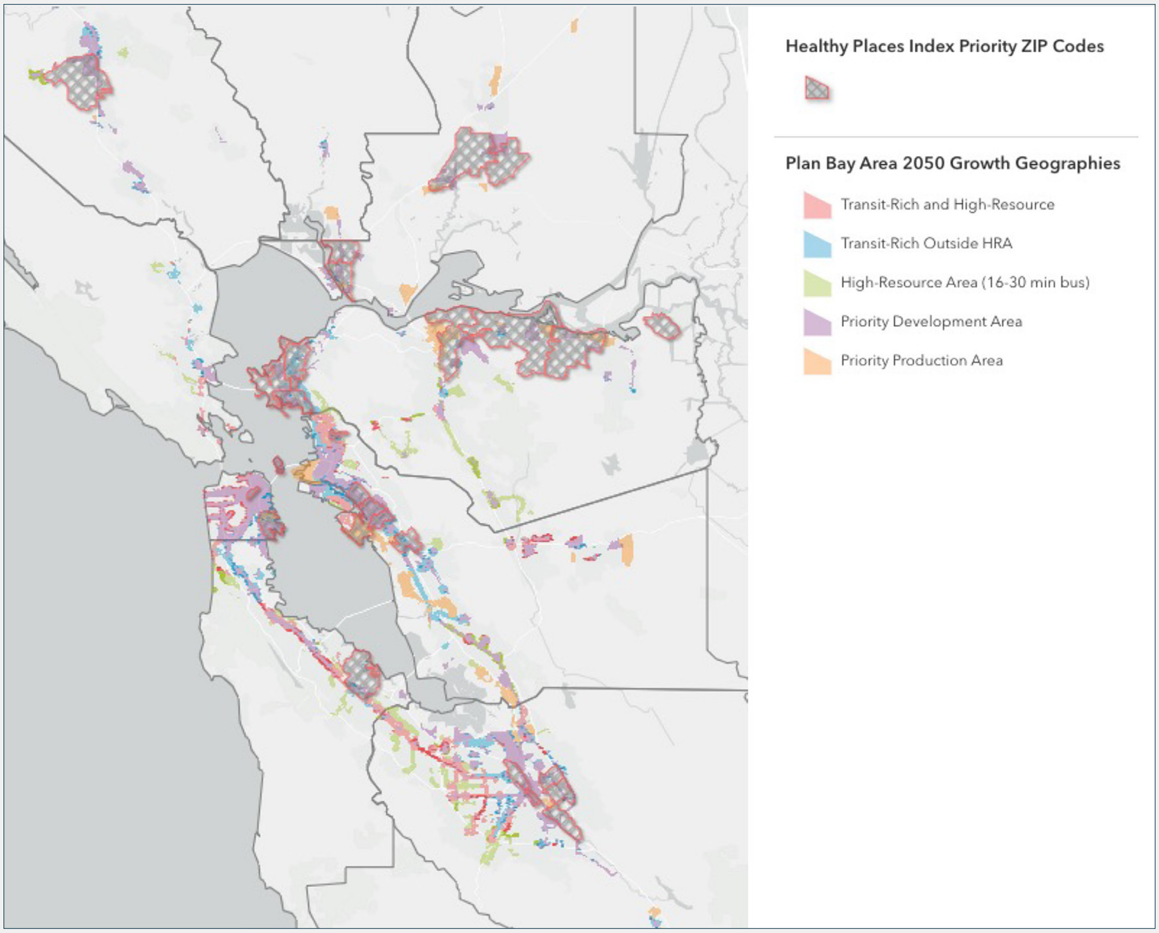
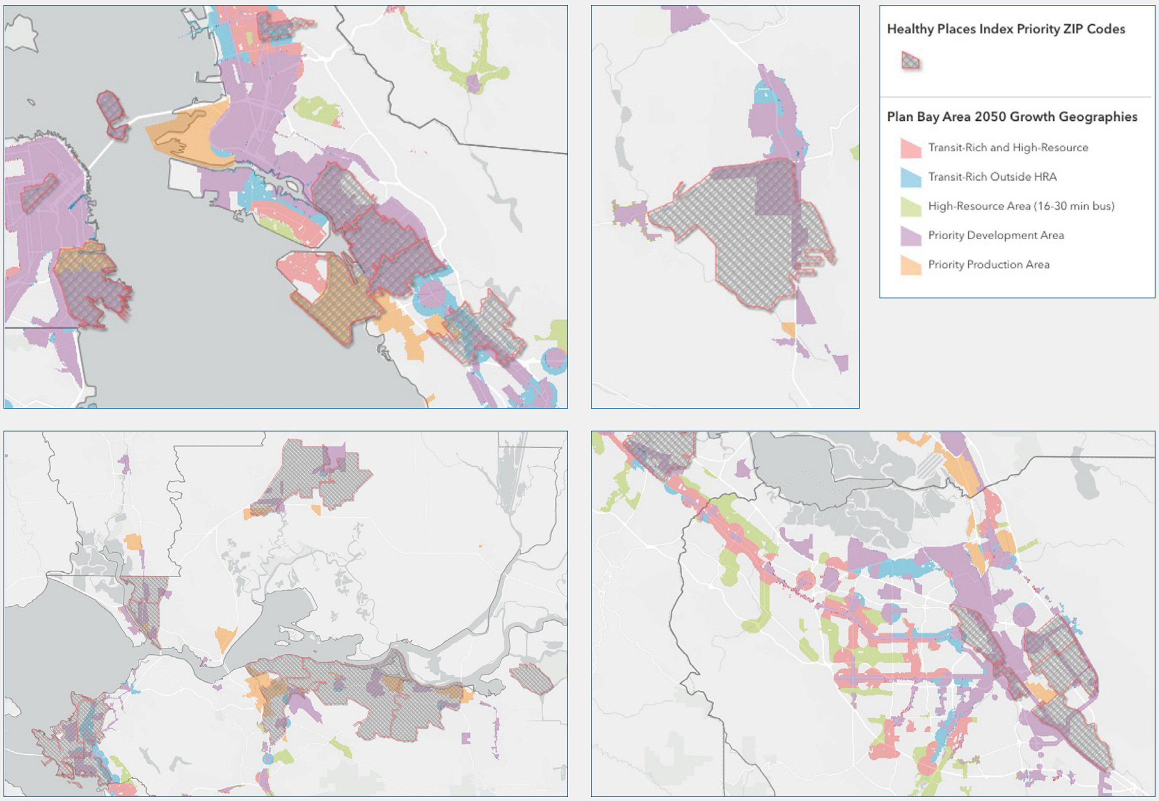


EXHIBIT 3.97 | Zoomed-in maps of priority ZIP codes overlayed on Plan Bay Area's 2050 Growth Geographies



F. Conclusion

The Bay Area is already experiencing impacts of climate change, ranging from extreme heat and higher-than-average temperatures to exacerbated flooding from sea level rise and high tides. The region's residential and working communities, industry sectors, and natural and working lands will continue to experience growing pressure from climate impacts, even with the efforts underway to curb local, national, and global GHG emissions.

i. Gaps and limitations

This climate impact analysis addresses climate impacts to a wide variety of key Bay Area sectors but does not provide the level of detail needed for some sectors to effectively adapt and transition in a world impacted by climate change. The transition of the oil and natural gas industry is one such topic not covered in detail. Oil and natural gas facilities are the highest-emitting industrial sources of greenhouse gases and are sited in some of the Bay Area's most-disinvested communities. Transitioning these sectors to renewable energy or other uses will be an essential to meeting the state's emissions reduction targets, while also addressing the disproportionate impacts these facilities have on communities that experience multiple climate and health vulnerabilities. However, these sectors also provide the Bay Area with a large number of jobs, underscoring the importance of transition planning that addresses potential job loss by creating new, safer, well-paying, high-quality jobs for workers impacted by climate mitigation and adaptation efforts.

Another limitation of this analysis is the lack of the most current climate projections for the Bay Area. The climate projections used are from California's Fourth Climate Change Assessment, completed in 2018. California's Fifth Climate Change Assessment is currently underway, and projections developed through the Fifth Assessment have only recently been released. This statewide effort, led by the Governor's Office of Planning and Research, will result in the most up-to-date research on climate impacts for each region of the state, including the Bay Area. The Fifth Assessment will provide updated data on climate impacts across sectors and to specific communities, enabling planning efforts to address hyper-local conditions more effectively. As the research conducted as part of the Fifth Assessment becomes public, it is recommended that local jurisdictions and planning entities ensure they are using the most up-to-date information and guidance when planning for climate change in their communities.

Endnotes

1 On average, 43% of Bay Area workers commute to work in a different county than the one in which they live.

2 The California Jobs First Fund defines "disinvested communities" as: (a) census tracts identified as "disadvantaged" by the California Environmental Protection Agency; or (b) census tracts with median household incomes at or below 80 percent of the statewide median income or with the median household incomes at or below the threshold designated as low-income by the Department of Housing and Community Development's list of state income limits adopted pursuant to Section 50093 of the California Health and Safety Code; or (c) "high poverty areas" and "high unemployment areas," as designated by the California Governor's Office of Business and Economic Development California Competes Tax Credit Program; or (d) California Native American tribes, as defined by the list maintained by the Native American Heritage Commission.

This section provides a general summary of how communities defined as disinvested experience disproportionate environmental harms. It also provides information on how the top polluting facilities in the region map onto communities that meet the disinvested definition per components (a), (b), and (d). This section does not map polluting facilities onto communities that are disinvested per component (c), due to a lack of spatial data on census tracts that meet that definition.

3 See the Public Health section of this report for detailed demographic information on the 25 priority ZIP codes.

4 CalEnviroScreen ranks locations based on the relative degree of environmental burdens experienced by people in that location: a higher percentile indicates a community with a greater environmental justice burden (i.e., those exposed to an unhealthier environment and more vulnerable to environmental health hazards). The Healthy Places Index (HPI), conversely, ranks locations based on the relative health of community conditions: a higher score indicates healthier conditions.

5 High-Resource Areas (HRs): State-identified places (using a subset of the high-opportunity areas identified by the California Department of Housing and Community Development) with well-resourced schools and access to jobs and open space, among other advantages. This designation only includes places that meet a baseline transit service threshold of bus service with peak headways of 30 minutes or better, when located in jurisdictions that have not nominated at least 50% of their priority development area (PDA) eligible lands.

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SECTION 4

Labor Market Analysis

CONTRIBUTORS

Aida Farmand
Enrique Lopezlira
Joan Martinez
Rebecca Alturk

UC Berkeley Center for Labor Research and Education

A. Introduction

In the evolving economic landscape of the San Francisco Bay Area, understanding labor market dynamics is paramount for shaping policy and ensuring that workers have access to quality jobs. This section provides a snapshot of the current forces shaping the region's workforce and delves deeper into nuances of its labor market. The analysis focuses in particular on the prevalence and availability of high-quality jobs and barriers preventing workers from accessing these jobs. It also provides an overview of existing relevant training programs and high road partnerships in the Bay Area. Please see **Appendix A** for an explanation of the methodology.

B. Key Findings

The analysis reveals significant disparities in access to jobs with desirable quality features. Notably, almost 55% of workers face precarious employment conditions, with an observed decline since 2017 in jobs that don't offer a living wage, lack access to health insurance, and don't provide full-time, full-year employment. Despite improvements, substantial challenges persist for workers, especially across gender, race, education, and occupation categories. For instance, women, Black, and Hispanic workers are disproportionately employed in precarious jobs.

> *"You think you're not worthy of a good-paying job because of your background—that you have to take whatever crumbs you can find. At the end of the day, we're smart. I tell people, 'Don't settle for Dollar Tree or McDonald's. You can do so much more.'"*
>
> — **MELISSA CONTRERAS,** formerly incarcerated worker, small business owner of Un Taco Mas catering

Housing and transportation costs emerge as significant barriers to accessing high road jobs in the Bay Area. Across all nine counties—Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma—households with income at 80% of the regional median have housing costs higher than the 30% affordability threshold. Commute issues, lack of affordable child care, geographical mismatch between residences and workplaces, and low union density further prevent workers from accessing high-quality jobs in the region.

Identified high- and low-income occupations provide insights into workforce distribution, highlighting the current importance of education and skills in securing high-quality employment. Bay Area jobs in the top quartile of the wage distribution—such as software developers, managers, and registered nurses—require high-levels of education. In contrast, jobs earning the lowest wages in the region—such as personal care aides, janitors, and truck drivers—have little to no formal educational requirements. However, many of these low-wage occupations provide essential services to the region. Ensuring that these essential workers are self-sufficient and can provide for their families is crucial to the future economic success of the Bay Area.

C. Job Quality

i. Overview of job quality

The quality of a job plays a crucial role in an employee's motivation, job satisfaction, and overall well-being, thereby significantly impacting their productivity. Studies suggest that job quality is as essential as an individual's health status in predicting their overall quality of life and is a better predictor than income (Rothwell & Steve, 2019). Consequently, over the last decade, several studies have been conducted to identify the characteristics of a good job. While many analyses of the labor market focus on factors such as pay and work hours (Clark, 2015), other approaches argue that additional aspects like autonomy, job security, and health insurance should also be considered when evaluating job quality (Esser & Olsen, 2011).

Unfortunately, the few indicators developed in recent years are either based solely on income or on a small set of factors, such as access to health care and retirement plans, combined with income (Clark, 2015). The lack of data on preferences for a broader range of job characteristics has meant that scholars have had to make assumptions about what workers value most. Gallup conducted the Great Jobs Study Survey to address this deficit. Their research examines how Americans define high-quality jobs by asking more than 6,600 U.S. workers about the factors that matter most for overall job quality and how their jobs stack up on those characteristics (Rothwell & Steve, 2019). The resulting measure includes common considerations such as income and employment benefits, career advancement opportunities, autonomy and control over their work lives, job security, and other attributes necessary to workers (Esser & Olsen, 2011; Rothwell & Steve, 2019).

EXHIBIT 4.1 | Principal expenditures: California vs SF Metro Area workers, 2020-2021 (USD)

	CALIFORNIA		SAN FRANCISCO METRO AREA	
Average annual expenditures	$72,468	100%	$91,290	100%
Housing	$28,247	38.98%	$38,212	41.90%
Transportation	$10,640	14.68%	$11,077	12%
Food	$9,097	12.55%	$10,864	11.90%
Health care	$5,154	7.11%	$2,446	6.40%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey, 2020-2021.

a. Living wages

One way to assess the quality of a job is to examine whether the wage that workers earn allows them to be self-sufficient. This means that the income earned by the worker should be enough to cover essential expenses, such as food, child care, health care, housing, and other basic needs. **Exhibit 4.1** compares the principal expenditures for workers in California and the San Francisco Metro area. It shows that workers in the San Francisco Metro area have higher average annual expenditures than workers in the rest of the state. This finding is especially true for housing, which accounts for more than 40% of the average annual expenditures of San Francisco Metro area workers.

By comparing wages in the Bay Area against a living wage measure, we can gauge whether jobs in the region are providing enough income for workers to provide for themselves and their families. The living wage framework ensures that wages align with the actual cost of living, offering a more individualized, realistic approach than the standard minimum wage. It adapts to regional cost variations that can significantly affect poverty. There are various living wage measures, but the measure of living wages we used in this analysis is the MIT Living Wage Calculator.[1]

EXHIBIT 4.2 | Living wage, by county, 2022

County	Hourly living wage (individual)	Hourly living wage (2 working adults, 2 children)	County median hourly wage
Alameda	$22.35	$33.50	$33.44
Contra Costa	$22.35	$32.61	$32.10
Marin	$26.63	$38.57	$38.49
Napa	$21.62	$31.07	$26.25
San Francisco	$26.63	$38.81	$41.17
San Mateo	$26.63	$38.17	$35.64
Santa Clara	$26.86	$35.96	$37.42
Solano	$20.11	$28.28	$25.72
Sonoma	$21.14	$30.52	$27.35

Source: MIT Living Wage Calculator, https://livingwage.mit.edu/pages/methodology.

Exhibit 4.2 compares the median wage in each Bay Area county for two types of households (a single worker with no children and two workers with two children) with the living wage for each county, according to the MIT Living Wage Calculator. Counties in the north Bay Area (Napa, Solano, and Sonoma) have a median wage just above the living wage for one worker without children, which means that a significant portion of workers in these counties are earning below a living wage. When compared to the living wage for a household with two workers and two children, seven of the nine Bay Area counties pay a median wage below the living wage threshold.

b. Health and retirement benefits

Another crucial factor that significantly impacts an employee's overall well-being is the availability of health insurance. Studies have shown that employees with access to healthcare coverage tend to experience lower mortality rates, better health outcomes, and increased productivity (O'Brien, 2003). Therefore, healthcare coverage is essential for a productive, secure, healthy life.

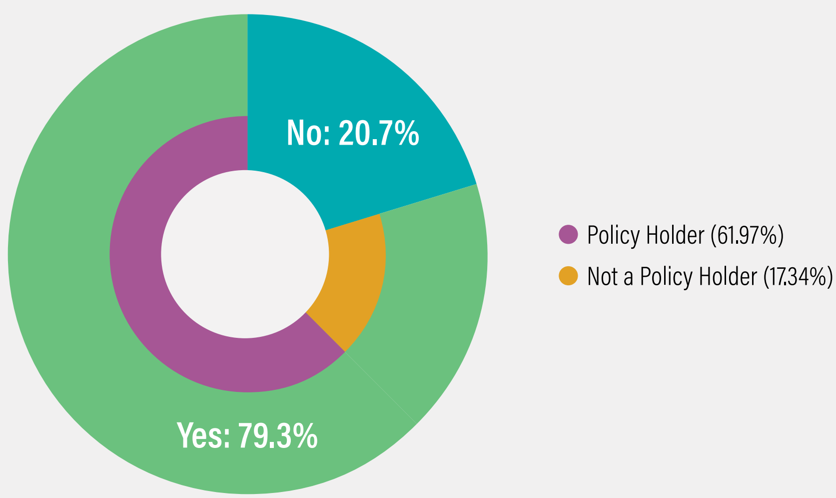
According to **Exhibit 4.3**, 79% of workers in the Bay Area receive health insurance through their employer or union. However, the picture is not as promising when we focus on low-wage workers. According to authors' calculations from the IPUMS-American Community Survey, around 67% of workers in California receive health insurance through their employer or union, but approximately one half of low wage workers do not receive health insurance benefits from their employer. Ensuring that all employees have access to healthcare insurance coverage is crucial for promoting employee well-being and productivity.

Access to a retirement plan at work is another factor that can improve the quality of a job. Having a retirement plan helps employees plan for their future, for example, by ensuring they have sufficient income to meet their financial needs after they stop working.

Sufficient retirement income provides a dignified retirement and contributes to the overall economic well-being of a region. Moreover, when retirees have a reliable source of income, they are less likely to become dependent on government support programs, which in turn reduces the burden on public finances and contributes to the stability and prosperity of the area's economy. **Exhibit 4.4** shows that three out of four workers in the Bay Area currently do not have access to a retirement plan through their work.

EXHIBIT 4.3 | Access to employer-sponsored health insurance (ESHI) in the Bay Area

Access to employer-sponsored health insurance based on Metropolitan Statistical Area

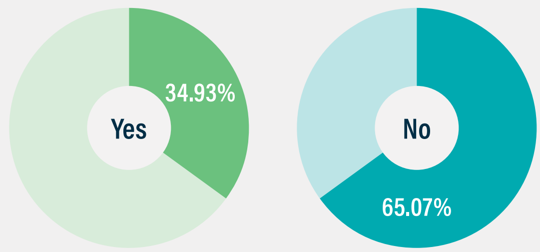


Source: IPUMS Current Population Survey (CPS), Annual Social Economic Supplement, 2020, 2021, 2022.

Note: Lowest access in Vallejo, Fairfield (27% do not have ESHI). Highest access in San Jose, Sunnyvale, Santa Clara (18% do not have ESHI).

EXHIBIT 4.4 | Access to retirement plan benefits in the Bay Area

Retirement plan at work based on Metropolitan Statistical Area



Source: IPUMS Current Population Survey (CPS), Annual Social Economic Supplement, 2020, 2021, 2022.

c. Full-time and full-year employment

Full-time, year-round jobs offer several benefits over part-time or seasonal employment, impacting not only the individual worker, but also the overall economy. According to Golden (2015), full-time employment is often associated with higher wages, increased job security, and access to essential benefits. Unstable work schedules represent a fundamental and underappreciated manifestation of the risk shift from firms to workers. Research reveals that erratic working schedules are associated with psychological distress, poor sleep quality, and unhappiness. Low wages are also associated with these outcomes (Schneider & Harknett, 2019). Part-time workers earn 29.3% less per hour worked than other workers with similar demographic characteristics and education levels (Golden, 2020).

ii. Job quality index

In this section, we develop an index to assess job quality in the Bay Area. Due to a lack of comprehensive data on job quality across different worker types and years, we will define jobs with desirable qualities using the definition from the Center for Social Innovation (2021). According to their criteria, a job is considered of higher quality if it pays above the median earnings (adjusted for local costs of living), provides employer-sponsored health insurance, and is full time (at least 35 hours a week) and full year (at least 50 weeks).

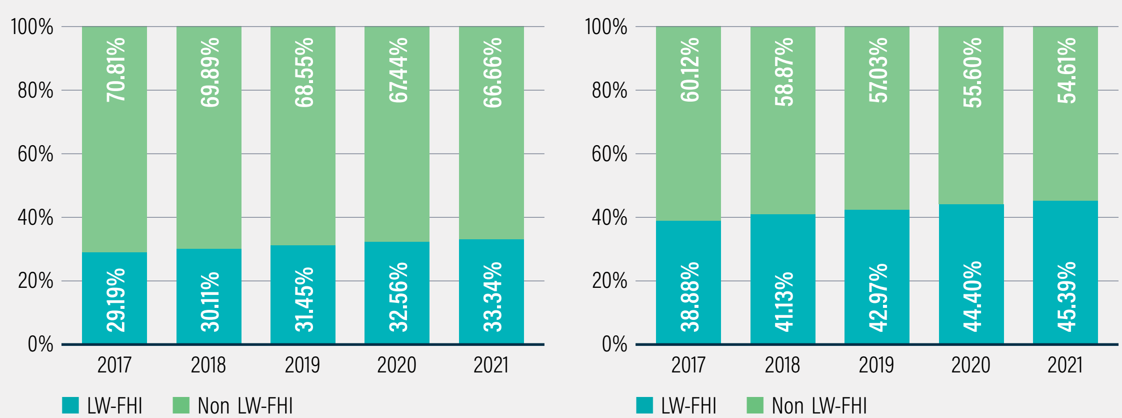
Utilizing data from the IPUMS American Community Survey 5-year sample (2017-2021),[2] we created a similar job quality index, categorizing jobs into two distinct groups. The first group comprises jobs that fulfill the criteria of providing a living wage according to the MIT Living Wage Calculator, offering employer-sponsored health insurance coverage and full-time, full-year employment (exceeding 35 hours per week and more than 50 weeks a year, respectively). We refer to jobs meeting these criteria as "Living Wage, Full-Time and Full-Year With Health Insurance" jobs, or more simply, "LW-FHI jobs." Conversely, jobs that do not satisfy these criteria will be referred to as "non-LW-FHI jobs."

We have adopted these criteria to facilitate the utilization of publicly accessible data sources and to serve as a foundational step toward understanding the intricate variances in job quality across categories of gender, race, education, and occupation, throughout the Bay Area.

iii. Job quality in the Bay Area

In this section, we use the job quality index to assess the distribution of jobs with desirable characteristics in the Bay Area. **Exhibit 4.5** shows the job quality distribution across California and the Bay Area. Over the past five years, there has been an improvement in the quality of jobs in the region. However, too many workers continue to hold precarious employment, with almost six out of ten workers in the Bay Area holding non-LW-FHI jobs. When compared to the rest of the state, the region does better, given that two out of three workers statewide hold non-LW-FHI jobs.

EXHIBIT 4.5 | Composition of jobs in California (left) and the Bay Area (right), by year, 2017-2021

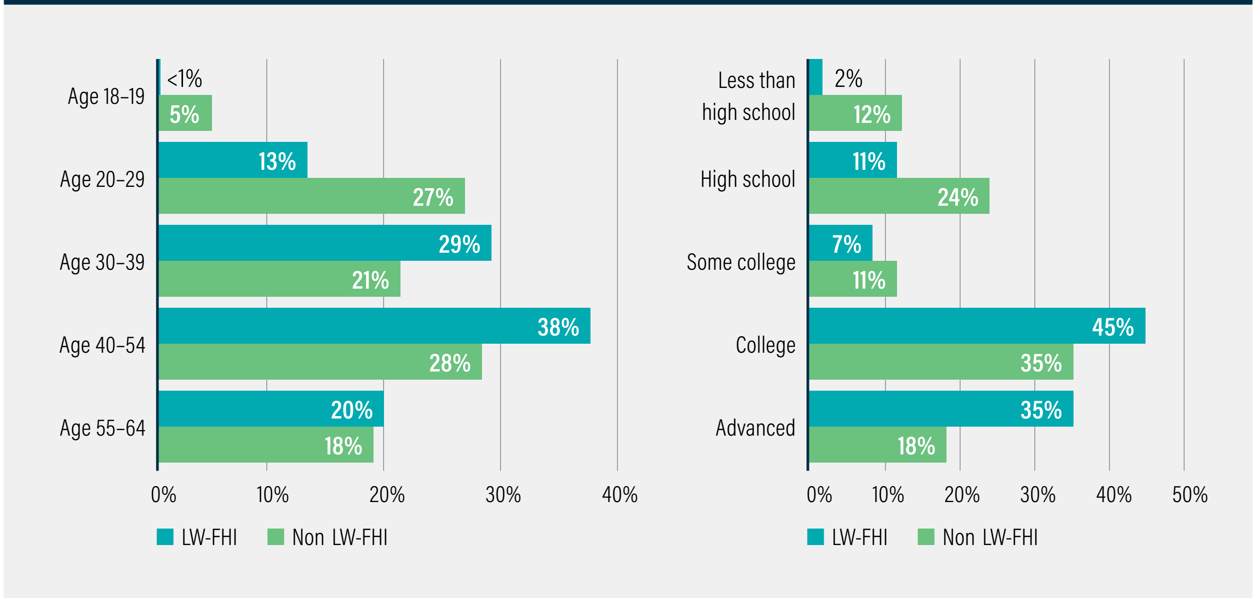


Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

"People would promise to pay me one amount, but then they didn't. I didn't want to call the police because I didn't have a license. I wasn't going to call someone for help when I knew they would punish me."

— **GUADALUPE PÉREZ,** housecleaner and Indigenous immigrant from Mexico

EXHIBIT 4.6 | Age and educational distribution (%) of Bay Area workers, by type of job, 2021



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

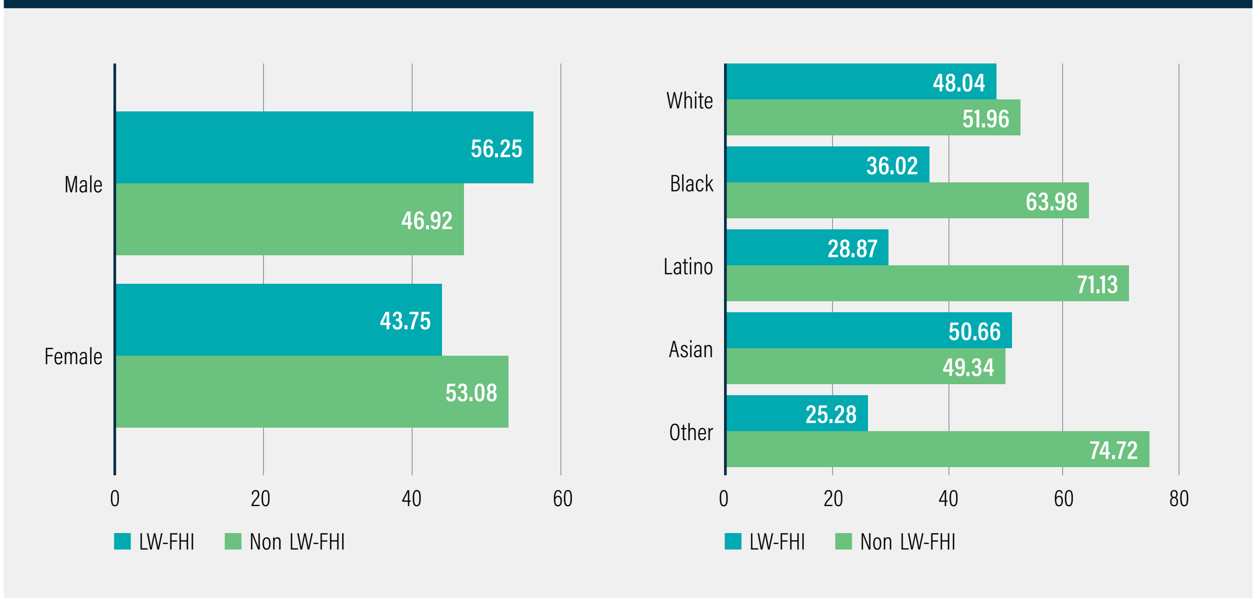
We next look at job quality distribution in the region along demographic, socioeconomic, and geographic dimensions. **Exhibit 4.6** shows this distribution by age and education. Bay Area workers in less favorable jobs tend to be younger, with only 13% of LW-FHI positions filled by workers under 30 years old. Workers in higher quality jobs tend to be prime age workers, with almost two thirds of these jobs held by workers in the 30 to 54 age range. The share of older workers (55-64) in both types of jobs is similar, with roughly one in five of these workers in both LW-FHI and non-LW-FHI jobs.

In terms of education, workers in non-LW-FHI jobs typically have lower educational attainment, with almost one in four workers holding a high school diploma as their highest degree and 12% having less than a high school education. In contrast, about 80% of LW-FHI jobs are held by workers with a bachelor's degree or higher.

Exhibit 4.7 examines the racial and gender composition of job quality in the region. The Bay Area is characterized by significant gender disparities. The majority of non-LW-FHI jobs are held by women, while men hold almost 60% of LW-FHI.

There are also significant disparities in terms of race. Most Black and Hispanic workers have precarious jobs, with about six out of ten Black workers and almost seven out of ten Hispanic workers holding non-LW-FHI jobs. Although one out of two Asian workers face precarious employment, Asian workers hold the highest percentage of LW-FHI of any group. This positive note notwithstanding, in general, the percentage of people in precarious jobs in the Bay Area remains high across all racial groups.

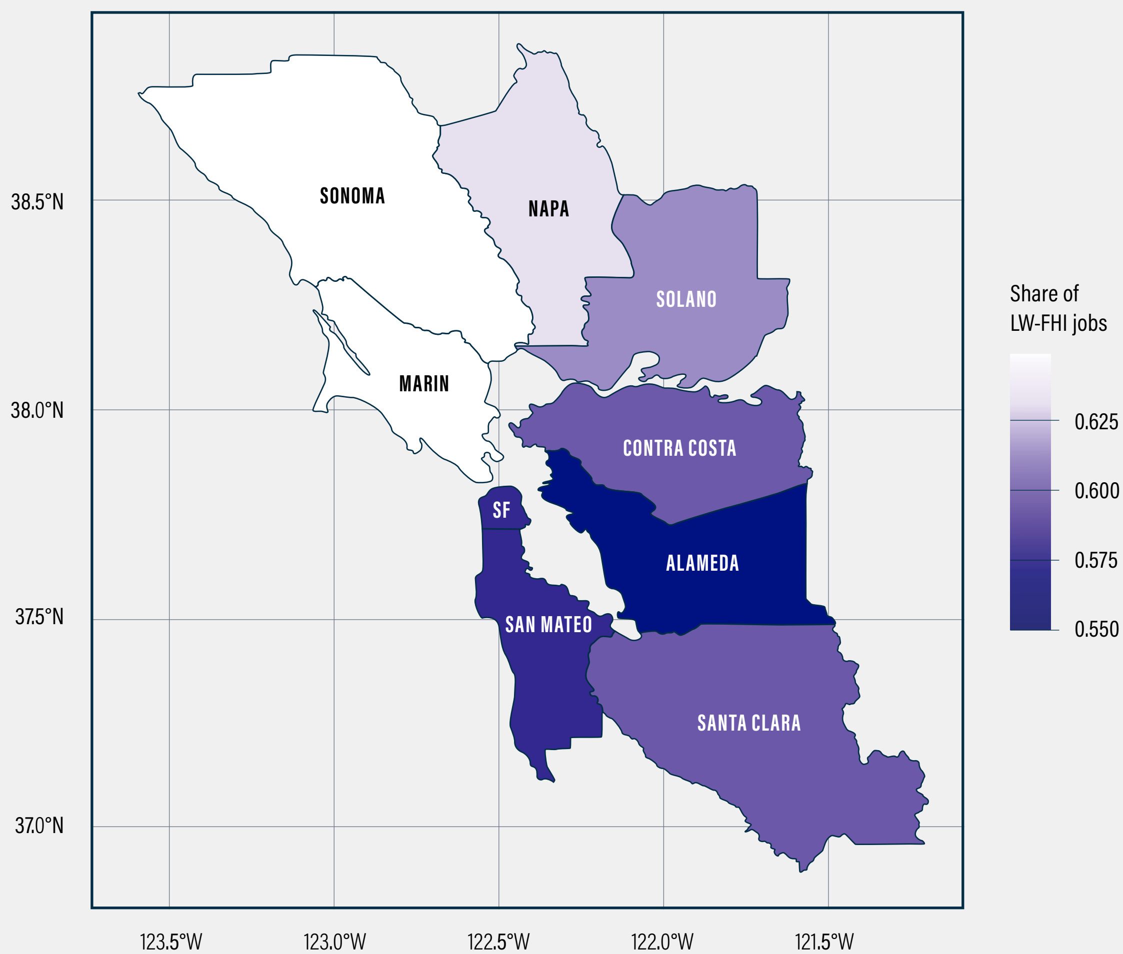
EXHIBIT 4.7 | Race and gender of Bay Area workers, by type of job, 2021



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Exhibit 4.8 shows the distribution of higher-quality jobs across counties in the region. North Bay Area counties have a higher share of these jobs, while counties in the south Bay Area have a comparatively lower share of LW-FHI.

EXHIBIT 4.8 | Composition of LW-FHI jobs in the Bay Area, 2021



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Note: The colors on the map correspond to the share of LW-FHI jobs in each county.

The persistence of racial and gender gaps in job quality cannot be overlooked when analyzing the nuances of economic development and the progression towards a sustainable economy. When certain demographic cohorts are systematically employed in low-wage and precarious employment, the consequent reduction in income leads to diminished aggregate demand, lowering economic growth.

Income inequality, exacerbated by differential access to better-quality jobs results in constrained economic activity, limited upward mobility, and cycles of intergenerational poverty and reduced human capital development. In efforts to transition to a sustainable economy, the existence of pronounced racial and gender job-quality gaps poses a substantial obstacle. The vision of a green economy is constructed on innovation, diversity, and inclusivity. However, when access to quality jobs and, by extension, economic opportunities is skewed, it detracts from the collective human capital pool necessary to drive innovation in green technologies and sustainable practices.

D. Labor Market Impacts From the COVID-19 Pandemic

In this section, we assess the impact of the pandemic on job quality in the Bay Area. Between 2019 and 2021, precarious jobs experienced a 6% decline, whereas LW-FHI jobs grew by 2%. Furthermore, the recovery for precarious jobs in 2021 was relatively slow and remained negative, even one year after the onset of the pandemic. These results show the uneven impact of the COVID-19 pandemic. Due to occupational segregation—the overrepresentation of women and workers of color in precarious jobs—these workers experienced greater economic loss and a slower recovery, which further widened economic inequality in the region.

EXHIBIT 4.9 | Change in employment in the Bay Area, by industry and type of job, 2019-2021

Industry	LW-FHI jobs	Non-LW-FHI jobs
Mining	-17%	-20%
Wholesale Trade	-3%	-10%
Finance, Insurance, Real Estate, and Rental and Leasing	1%	-8%
Arts, Entertainment, Recreation, Accommodations, and Food Services	2%	-5%
Retail Trade	4%	-3%
Professional, Scientific, Management, Administrative, and Waste Management Services	9%	-2%
Public Administration	4%	-2%
Manufacturing	2%	-2%
Agriculture, Forestry, Fishing and Hunting	11%	-2%
Other Services (Except Public Administration)	-2%	-2%
Information and Communications	9%	0%
Educational, Health, and Social Services	10%	0%
Construction	7%	2%
Transportation and Warehousing	9%	10%

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Note: Percentage changes are annual between 2019 and 2021.

Exhibit 4.9 shows the impact of the pandemic on specific industries. The most affected industries were mining, wholesale trade, finance insurance and real estate, which experienced decreases in both LW-FHI and non-LW-FHI jobs. However, the decrease in precarious jobs has been more pronounced across all industries.

Exhibit 4.10 shows the occupations most impacted by the pandemic. Sales and office, production and transportation, and natural resources, construction, and maintenance experienced the most loss of both types of jobs. However, as with industries, precarious jobs in the Bay Area saw a much larger decline in employment. Conversely, better-quality jobs that were able to be done remotely, like managerial and education occupations, experienced the fewest job losses.

EXHIBIT 4.10 | Change in employment in the Bay Area, by occupation and type of job, 2019-2021

Occupation	LW-FHI jobs	Non-LW-FHI jobs
Sales and Office	-4.0%	-8.0%
Production, Transportation, Material Moving	-2.6%	-6.0%
Natural Resources, Construction, and Maintenance	-1.7%	-7.0%
Management, Business, and Financial	-0.7%	-7.0%
Healthcare Practitioners and Technical	-0.6%	-5.0%
Service	-0.2%	-6.0%
Education, Legal, Community Service, Arts, and Media	0.2%	-5.0%
Computer, Engineering, and Science	1.6%	-5.0%

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Note: Percentage changes are annual between 2019 and 2021.

EXHIBIT 4.11 | Average year-over-year change in employment, by gender and type of job, 2019-2021

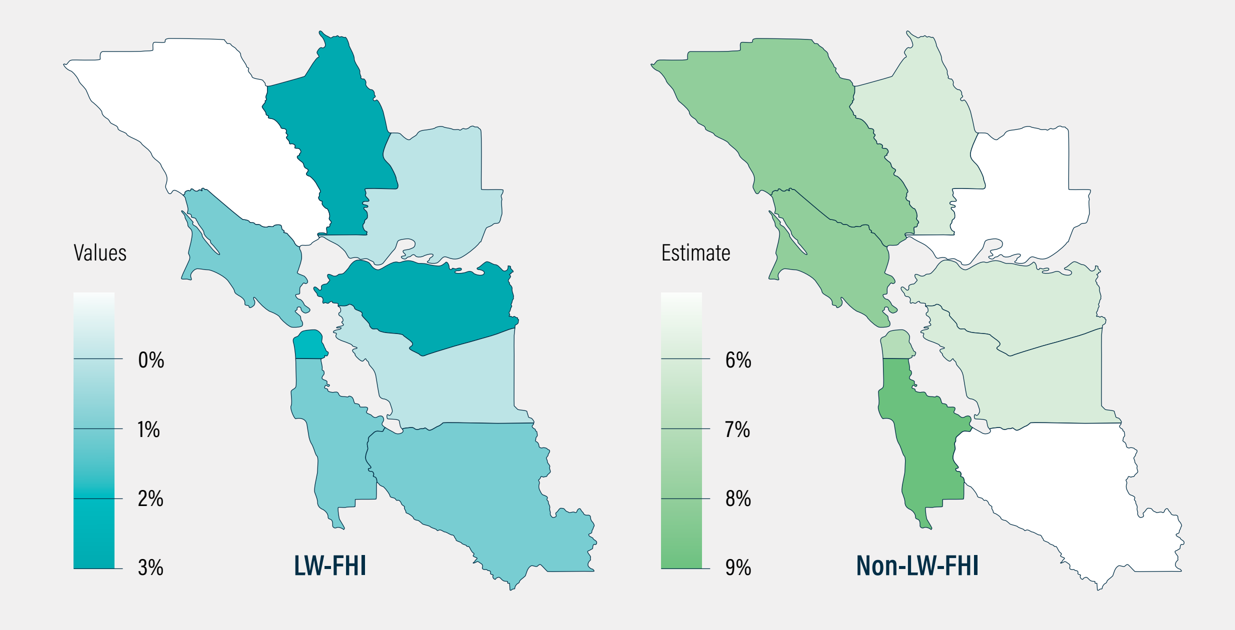
Gender	LW-FHI jobs	Non-LW-FHI jobs
Male	0%	-4%
Female	3%	-3%

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Exhibit 4.11 looks at changes in employment in the Bay Area by gender and job type. Men experienced a larger decrease in non-LW-FHI employment compared to women. This observation can be attributed to the higher representation of men in the overall workforce. Furthermore, as shown in previous exhibits, both male and female workers in precarious jobs were significantly affected adversely by the economic downturn.

We also examined the changes in employment during the pandemic across counties in the region. **Exhibits 4.12** and **4.13** show the COVID-19 pandemic had disparate employment effects across the nine counties. Napa, Contra Costa, and San Francisco Counties emerged as the areas with a significant decrease in employment. Conversely, Sonoma, Solano, and Alameda Counties demonstrated resilience, particularly in terms of better-quality jobs. San Mateo County had the largest decline in precarious employment during the pandemic, while both Napa and Contra Costa Counties saw the highest loss of better-quality jobs.

EXHIBIT 4.12 | Change in employment in the Bay Area, by type of job, 2019-2020



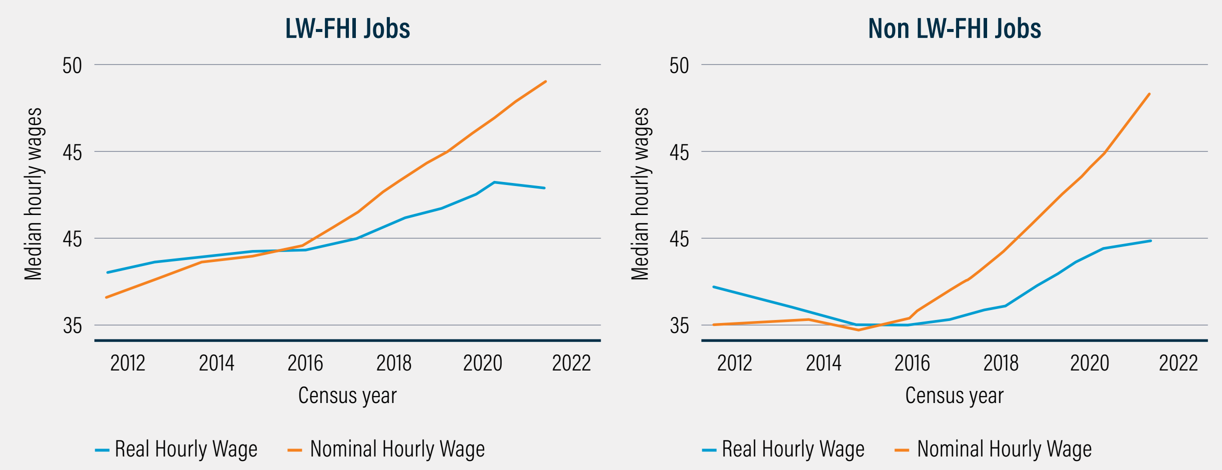
Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.13 | Change in employment in the Bay Area, by type of job, 2019-2020

County	LW-FHI jobs	Non-LW-FHI jobs
Alameda	0%	-6%
Contra Costa	-3%	-6%
Marin	-1%	-8%
Napa	-3%	-6%
San Francisco	-2%	-7%
San Mateo	-1%	-9%
Santa Clara	-1%	-5%
Solano	0%	-5%
Sonoma	1%	-8%

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.14 | Real and nominal hourly wage, by type of job, 2011-2021 (USD)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Exhibit 4.14 examines the evolution of median wages for non-LW-FHI and LW-FHI jobs in the region. As expected, real wages (wages adjusted for inflation) experienced a decline during the pandemic, as inflation from supply chain disruptions eroded gains in nominal wages (not adjusted for inflation). Although nominal wages have been rising for both job types over the last 10 years, nominal wages for non-LW-FHI jobs rose faster than nominal wages for LW-FHI jobs due to labor shortages, in particular for occupations on the lower end of the wage distribution (Autor et al., 2023). However, it is important to note that wage gains have been distributed unevenly throughout the workforce, with workers in some industries and occupations receiving far smaller wage gains than those in others.

As mentioned above, during the COVID-19 pandemic, on average the employment growth rate decreased by 2.3% for precarious jobs. While for those in stable employment positions, the rate increased by 2.3%. Furthermore, the employment growth rate for individuals in precarious jobs has stayed negative.

Our analysis highlights persistent disparities in the Bay Area's workforce, even amid broader economic improvements as the region recovers from the pandemic. Some notable patterns from our examination include:

» **Education:** Individuals in precarious jobs tend to have lower education levels than those in stable employment.

» **Race:** Most Black and Hispanic workers in the Bay Area are employed in precarious jobs.

- **Age:** Younger workers are more likely to be employed in precarious jobs, and prime age workers are more likely have better-quality jobs. Another pattern of interest is the prevalence of older, highly educated workers in unstable job roles. This finding can be linked to the rapid pace of technological innovation in the region, leading to skill mismatches and the tech industries' practices of age discrimination.
- **Occupation:** Workers in precarious jobs are often employed in occupations that require lower levels of education, such as services, sales, office work, and transportation. Specific industries and job sectors are more susceptible to precarious employment arrangements, potentially offering limited benefits and lower job security.

In addition to recovering or increasing the number of jobs lost during the pandemic, the emphasis should be on transforming existing jobs into better-quality jobs and ensuring the creation of high road jobs. It is important to recognize that a high road job encompasses various negotiable factors, such as a living wage, job security, and the provision of benefits.

Furthermore, the definition of a high road job should be continuously refined based on the available data. The criteria utilized in this report—living wage, health insurance, full-time and full-year employment—should serve as a floor for high road jobs. As previously mentioned, numerous other factors should be considered when assessing job quality. Analyzing a comprehensive range of factors will better inform efforts to transform the economic landscape of the Bay Area.

E. Barriers to High-Quality Employment

i. Housing costs

Housing costs can serve as a significant barrier to accessing high-quality employment, particularly in regions characterized by high living expenses. In areas where housing prices are steep, individuals may find themselves constrained to seek employment opportunities within proximate locales, limiting their access to potentially better job opportunities in distant areas. Moreover, employers in areas with high housing costs may struggle to attract or retain workers, as employees weigh the benefits of higher-quality jobs against the increasing living costs.

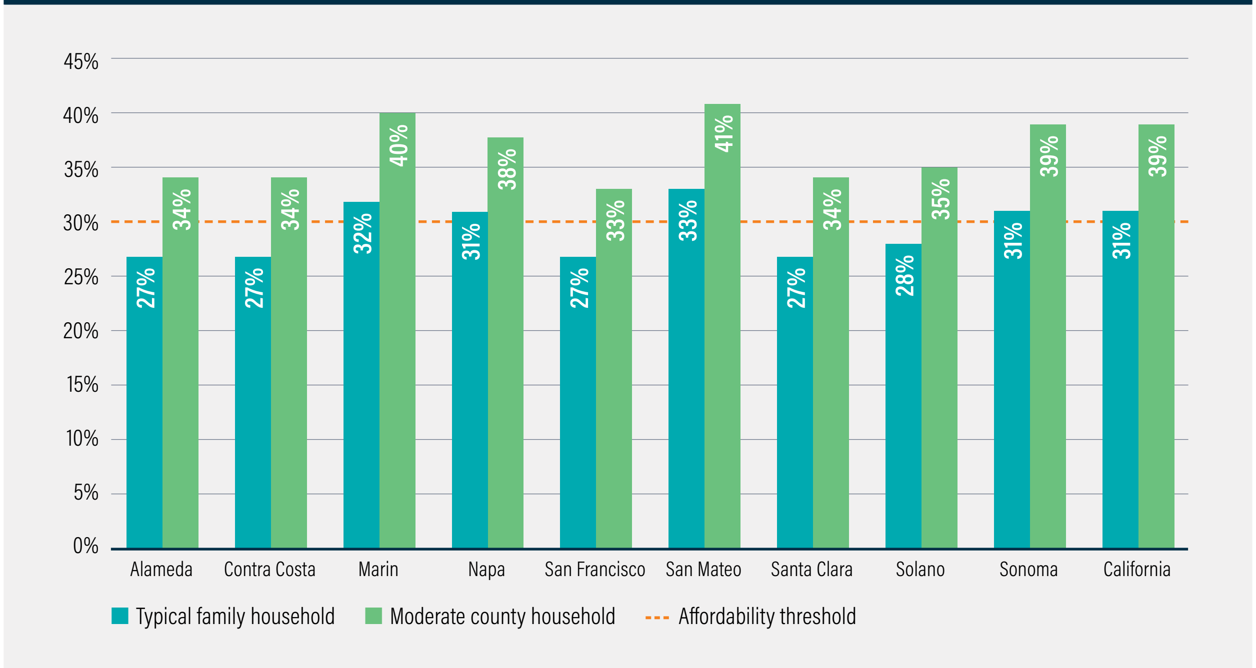
We utilize data from the Center for Neighborhood Technology's Housing and Transportation Affordability Index (H+T) to determine the cost burden of housing and transportation in the Bay Area and California.[3] We consider two types of households: a typical regional household and a moderate regional household. The typical regional household assumes a household earning the median income for the region, with the average household size for the region and the average number of commuters per household for the region. The moderate regional household assumes a household income of 80% of the regional median, the regional average household size, and the regional average commuters per household.

For moderate households, housing cost as a share of household income is higher than the 30% affordability threshold across all counties, with Marin and San Mateo Counties being the highest at 40% and 41%, respectively. For typical households, housing cost as a share of household income is higher than the 30% affordability threshold in Marin, San Mateo, Napa, and Sonoma Counties (**Exhibit 4.15**).

ii. Transportation costs

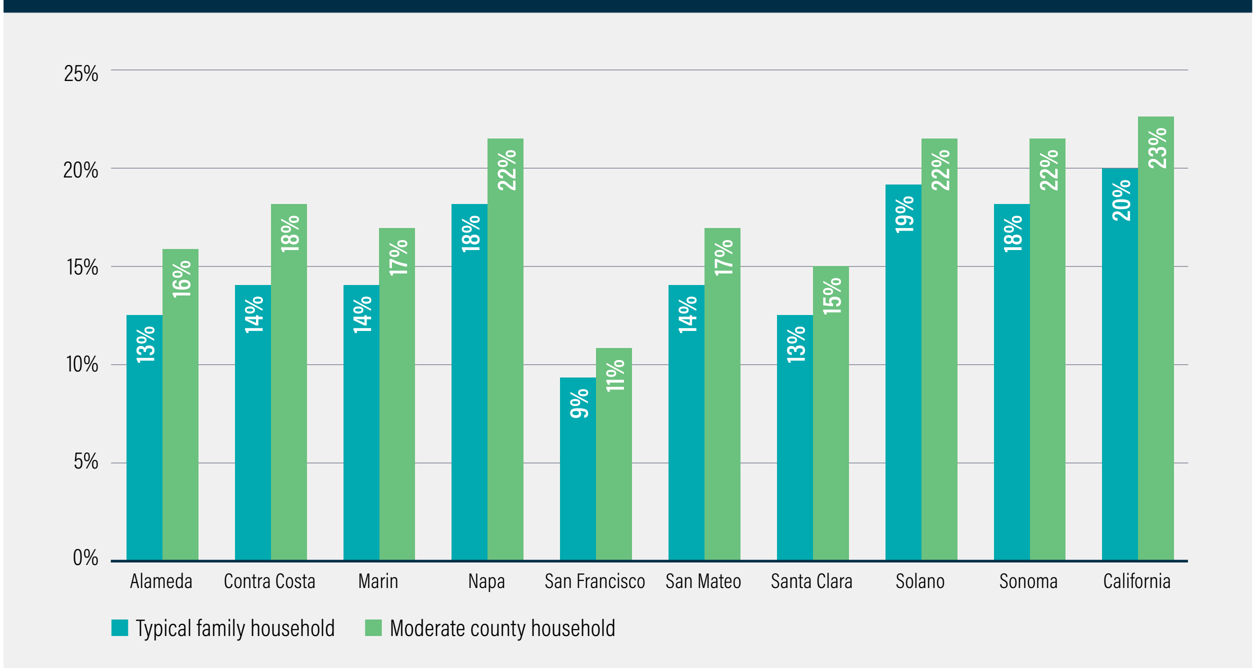
Another barrier to accessing high-quality employment is high transportation costs. The financial strain of commuting not only impedes workers' ability to access workplaces and job centers, but also significantly restricts their capacity to pursue opportunities located further away (**Exhibit 4.16**).

EXHIBIT 4.15 | Housing cost as a share of household income, by type of household



Source: H+T Index, 2020.

EXHIBIT 4.16 | Transportation cost as a share of household income, by type of household



Source: H+T Index, 2020.

a. Spatial mismatch and long commutes

The geographical mismatch phenomenon, intensified by housing affordability issues, denotes a complicated intersection of housing costs and job opportunities. As illustrated in **Exhibit 4.17**, aside from Santa Clara and Sonoma Counties, a majority of workers in each Bay Area county do not reside in their county of employment. The ramifications are most noticeable in Marin and San Mateo Counties, which have the most out-of-county workers. Research has shown that spatial mismatch can cause high unemployment rates and lead to longer spells of joblessness (Andersson et al., 2014).

Long commuting times create other challenges for workers. Beyond the immediate inconvenience of spending extended hours on the road, long commutes have tangible health and psychological impacts. Symptoms range from stress and depression to physical conditions like obesity. They also correlate with reduced job satisfaction and higher turnover rates. In the Bay Area, Contra Costa and Solano Counties stand out, with 8% and 7% of their workers, respectively, enduring extreme commutes (longer than 90 minutes), whereas San Mateo boasts the lowest percentage of extreme commuters in the region (2%).

EXHIBIT 4.17 | Count and share of workers employed in the selected county but living elsewhere

	2018		2019		2020	
County	**Count**	**Share**	**Count**	**Share**	**Count**	**Share**
Alameda	415,274	55.2%	436,819	54.1%	441,653	54.3%
Contra Costa	181,530	50.6%	194,389	50.1%	192,121	50.2%
Marin	66,087	63.5%	71,025	62.4%	71,432	62.7%
Napa	37,873	54.3%	40,918	53.1%	39,815	52.5%
San Francisco	451,828	63.40%	469,755	60.90%	457,284	60.90%
San Mateo	262,821	65.4%	270,291	63.9%	267,024	63.9%
Santa Clara	437,493	41.3%	449,728	40.3%	440,168	40.2%
Solano	67,889	51.0%	70,948	50.4%	83,995	54.7%
Sonoma	62,119	32.4%	65,907	32.1%	65,195	32.0%

Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, 2020.

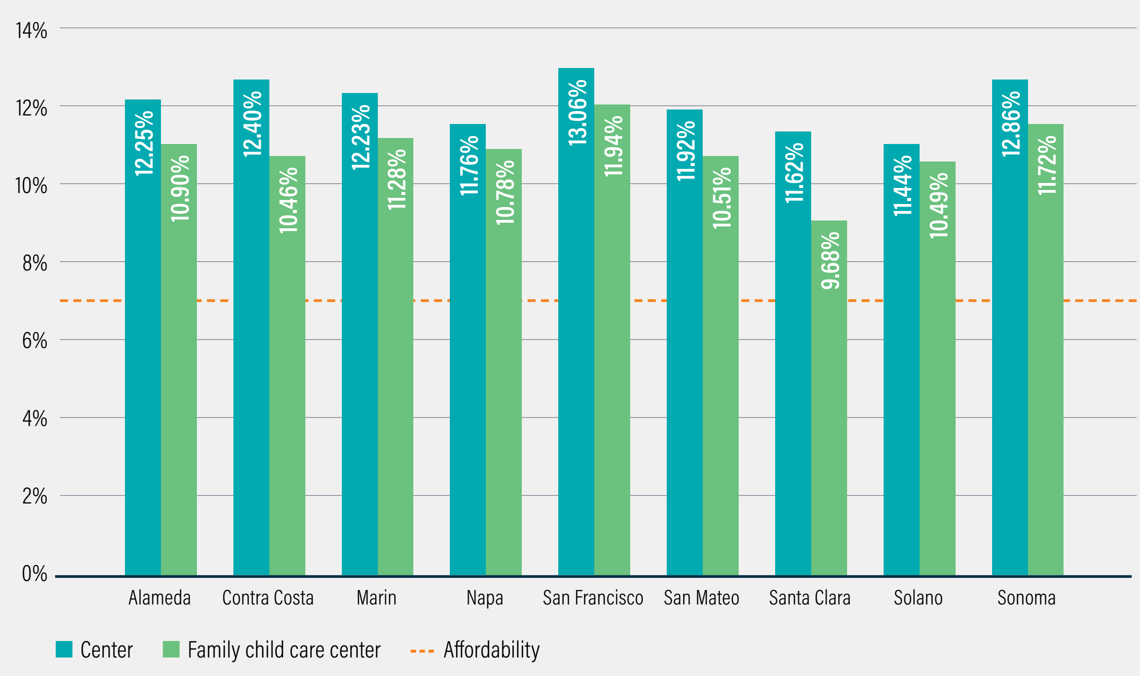
iii. Lack of access to affordable child care

A considerable segment of the workforce, especially parents, grapple with the dual responsibilities of work and caregiving. The dearth of affordable childcare options not only constrains their active participation in the labor market, but also impedes their work-life balance, career progression, and economic independence.

According to the U.S. Department of Health and Human Services' guidelines, child care is considered affordable when it is less than 7% of a household's income. **Exhibit 4.18** illustrates that childcare costs in all the Bay Area counties were much higher than this threshold. In other words, child care is unaffordable to many families in the region.

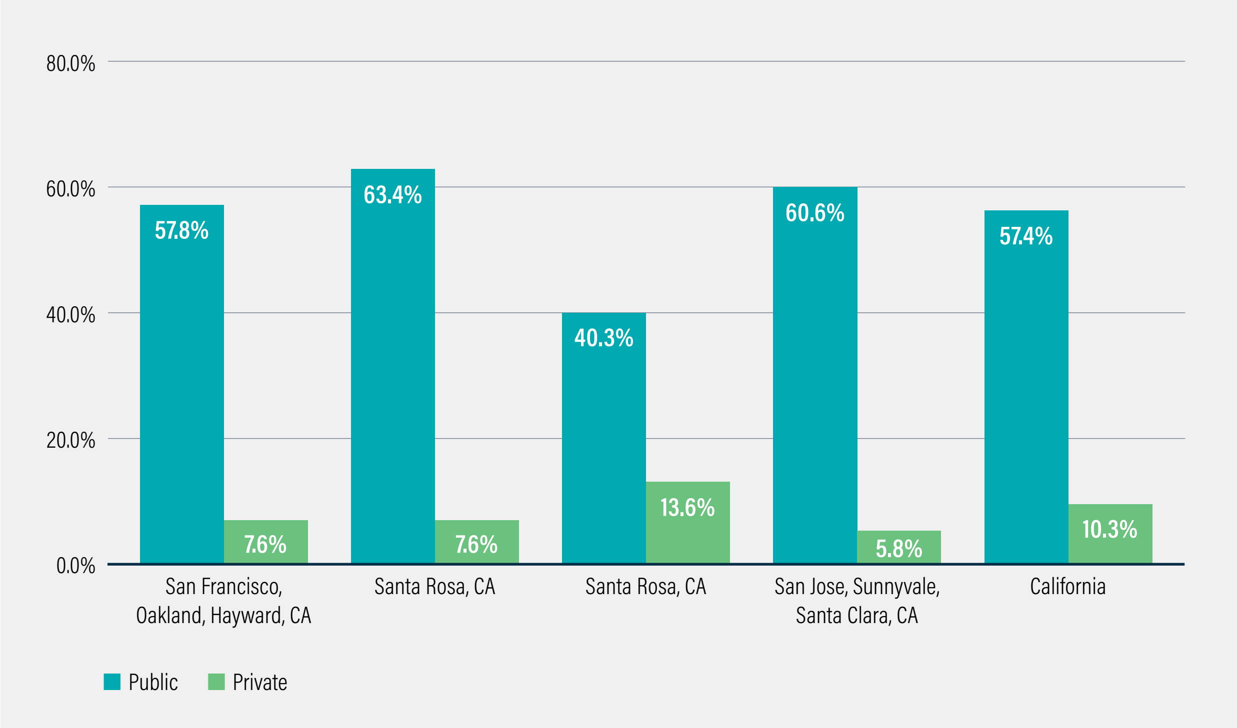
The steep cost of child care particularly affects women's employment, leading to decreased employment rates for mothers, even in places where women earn relatively higher wages. Furthermore, many childcare workers are not adequately compensated for the services they provide. According to the Center for the Study of Child Care Employment, the average childcare worker in California earns $13.43 an hour and rarely receives benefits, leading to high turnover and a demoralized profession (McLean et al., 2020).

EXHIBIT 4.18 | Childcare cost as a share of household income



Source: Childcare cost estimates are based on data from Ye et al. (2022). Median household income is calculated from the IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.19 | Union coverage in the Bay Area, by metropolitan statistical area, 2022



Source: Calculations by Hirsch et al. (2022) using the monthly household Current Population Survey (CPS) 2022.

iv. Low union density

Research shows unions strengthen the middle class and grow the economy (Feiveson, 2023). Low union density (the share of the workforce covered by a union contract) means workers have less power to bargain collectively and improve working conditions for all workers. **Exhibit 4.19** shows union density in various Bay Area metropolitan areas. With the exception of Vallejo, metro areas in the Bay Area have private-sector union densities lower than the state as a whole, which is already low, at 10% of the workforce. However, public-sector union density throughout the Bay Area is stronger, with most metro areas having a higher public-sector union density than the rest of the state.

v. Lack of English proficiency

The lack of English proficiency hinders access to better-quality jobs. Workers with limited English skills often find themselves confined to low-wage jobs. This confinement is not indicative of their skills, work ethic, or productivity, but rather a reflection of the communication barriers they encounter. Language, in this context, serves not just as a medium of communication, but as a critical tool that facilitates integration, networking, and access to opportunities (Chiswick & Miller, 2009).

> *"I know English by now, but I still have a lot of trouble with the professional words used in my field. If I want to have success in my line of work, I need to know how to speak the language of my clientele, which is English."*
>
> — **DAFNE RIZO,** housecleaner and owner of Susy's Cleaning SF

Moreover, the inability to effectively communicate in English can limit access to educational and training opportunities that are crucial for career progression. Many vocational and educational training programs necessitate a basic comprehension of English to ensure effective participation. Workers with limited English proficiency may find themselves at a disadvantage, unable to upskill or reskill, and as a result, they are often overlooked for promotions or better-paying jobs (Dustmann & Fabbri, 2003).

Linguistically isolated households are defined as households in which no member age 14 or older speaks only English or speaks English at least "very well." According to the 2021 Bay Area Equity Atlas, the share of linguistically isolated households in the Bay Area dropped slightly from 9.7% to 8.3% between 2010 and 2019 (Policy Link & USC Equity Research Institute, 2021). The region has a slightly lower share of linguistically isolated households compared to the share statewide.

Moreover, the 2021 Bay Area Equity Atlas also concludes that households speaking Asian or Pacific Islander languages are most likely to be linguistically isolated regionwide, and households speaking Indo-European languages (other than Spanish) are least likely. San Francisco County has the highest share of linguistically isolated households in the region (11%), and Marin County has the lowest (4%).

F. Occupational Landscape and Job Quality

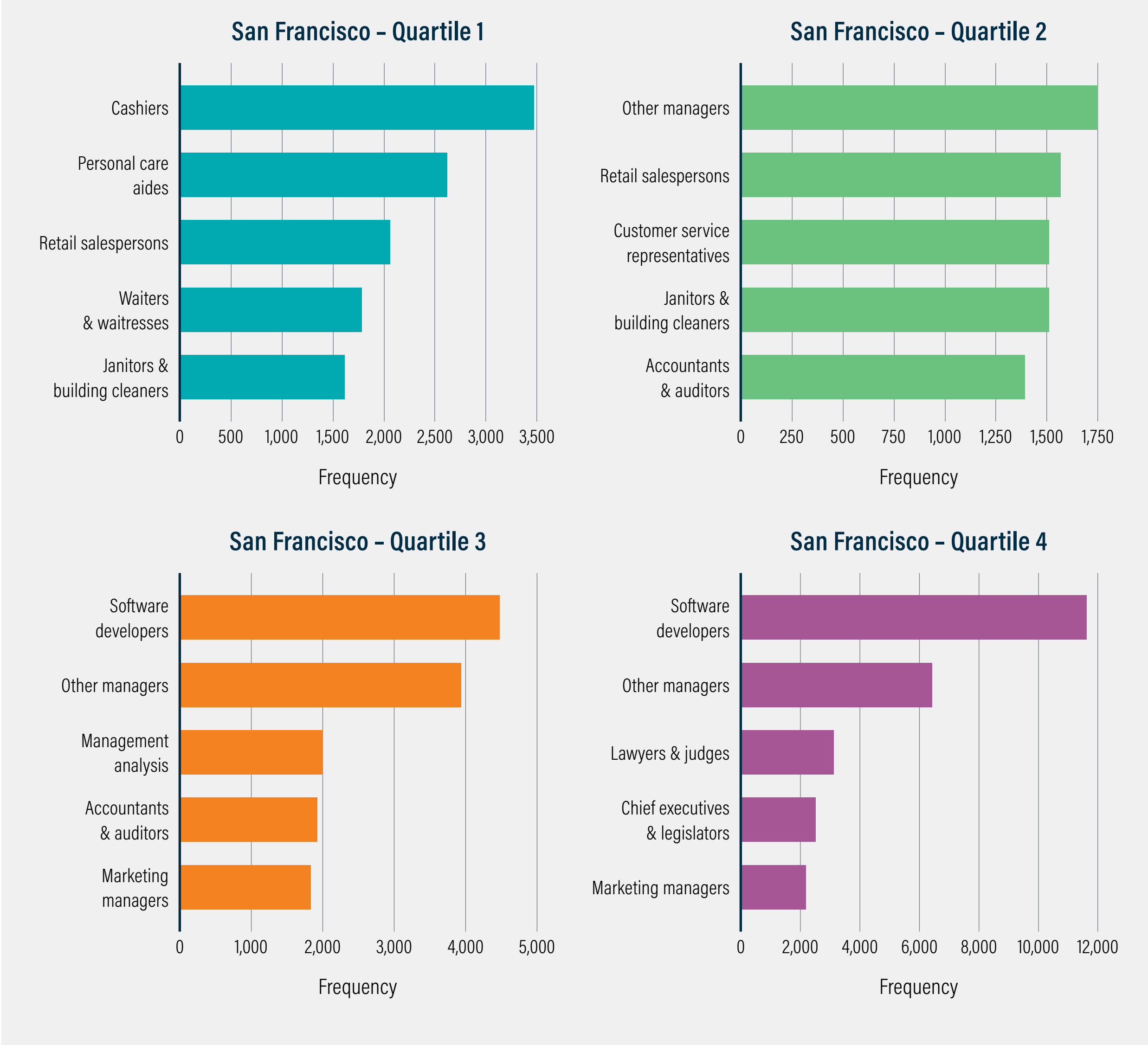
An assessment of the characteristics of major high- and low-income occupations within a region is important to our understanding of the labor market's economic and social dynamics. By categorizing occupations based on income, researchers, policymakers, and stakeholders can dissect the nuanced elements that contribute to income disparities, economic development, and the economic well-being of the workforce. Such an assessment likewise aids in the analysis of the skill sets, education levels, and training that are often associated with different income brackets. This analysis is helpful not only for individual career progression, but also for developing educational and training programs that align with labor demands in the region.

Furthermore, a granular examination of these occupations sheds light on systemic issues and opportunities for economic and social mobility (Chetty et al., 2014). By understanding the characteristics intrinsic to high- and low-income jobs, targeted policies can be formulated to address gaps, promote equity, and foster an environment where opportunities for growth and advancement are accessible across the spectrum.

i. Major low- and high-income occupations

Exhibits 4.20 to 4.25 present the most common occupations in each wage quartile for the six subregions of the Bay Area (Alameda, Contra Costa, Marin-Sonoma, Napa-Solano, San Francisco, and Santa Clara-San Mateo). Across the region as a whole, jobs in the top quartile are similar, consisting of software developers, managers, and registered nurses, among others. These occupations usually require high levels of formal education. The opposite is true for jobs in the bottom (lowest) wage quartile. However, many of these low-wage occupations—such as personal care aides, janitors, and truck drivers—are essential to the region's economy.

EXHIBIT 4.20 | Most common jobs in each wage quartile (San Francisco 2022)

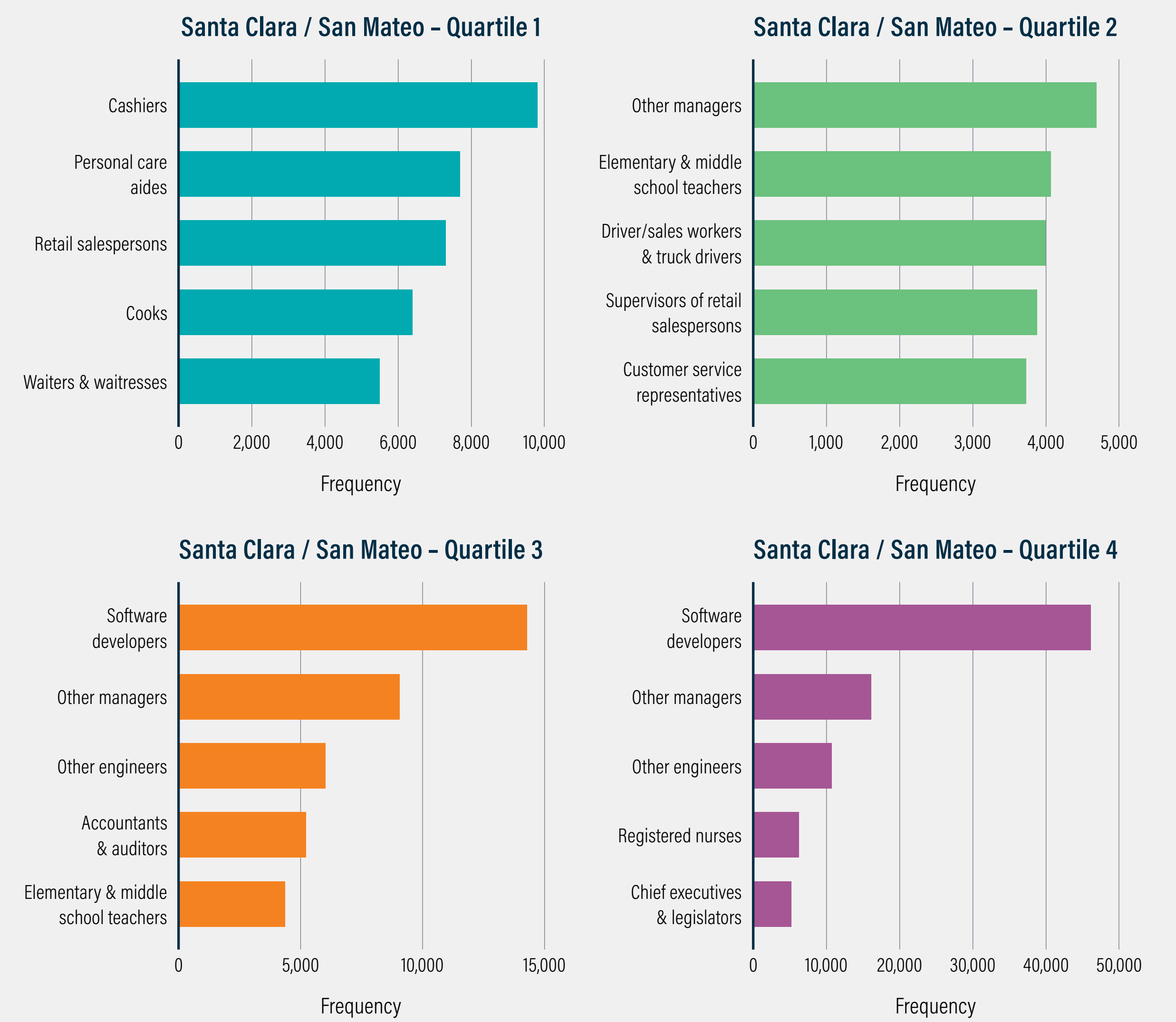


Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.21 | Most common jobs in each wage quartile (Marin / Sonoma 2022)

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.22 | Most common jobs in each wage quartile (Santa Clara / San Mateo 2022)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.23 | Most common jobs in each wage quartile (Contra Costa 2022)

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.24 | Most common jobs in each wage quartile (Alameda 2022)

Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.25 | Most common jobs in each wage quartile (Napa / Solano 2022)

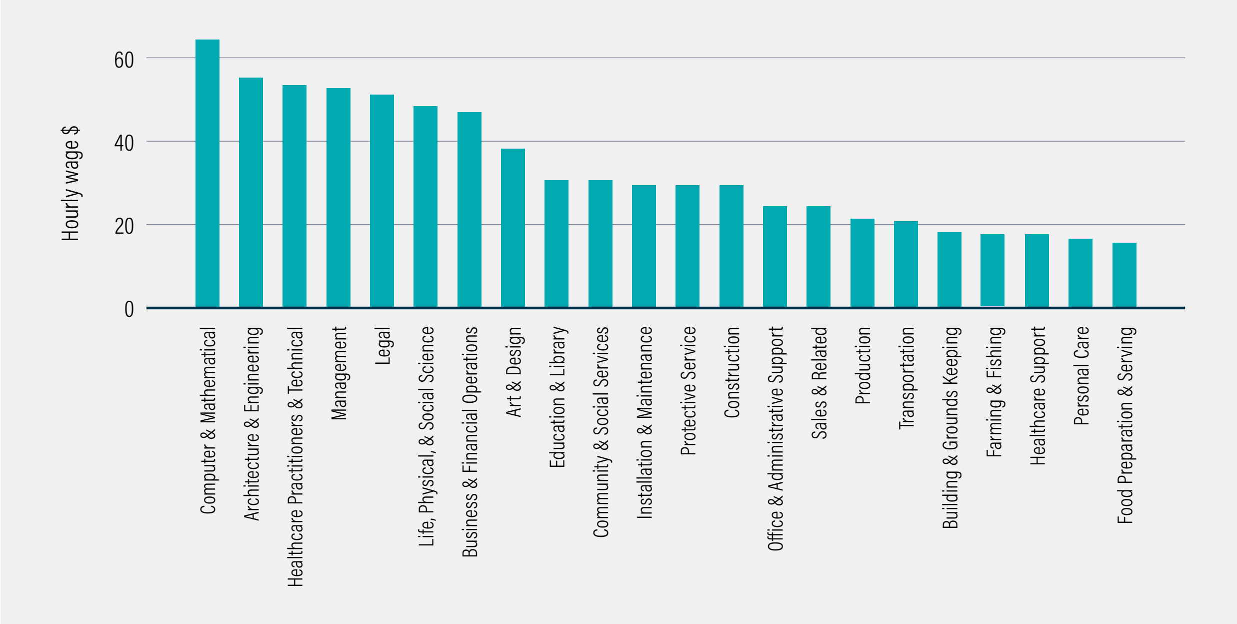
Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

ii. Median hourly wage in major occupational categories

Exhibits 4.26 to 4.31 present the median hourly wages for wage and salary workers in each occupational category in the Bay Area's subregions. Computer and mathematical occupations have the highest median hourly wages in every subregion, except in Marin-Sonoma and Napa-Solano. Healthcare practitioners and legal and management professionals are also among workers with the highest median hourly wages throughout the Bay Area.

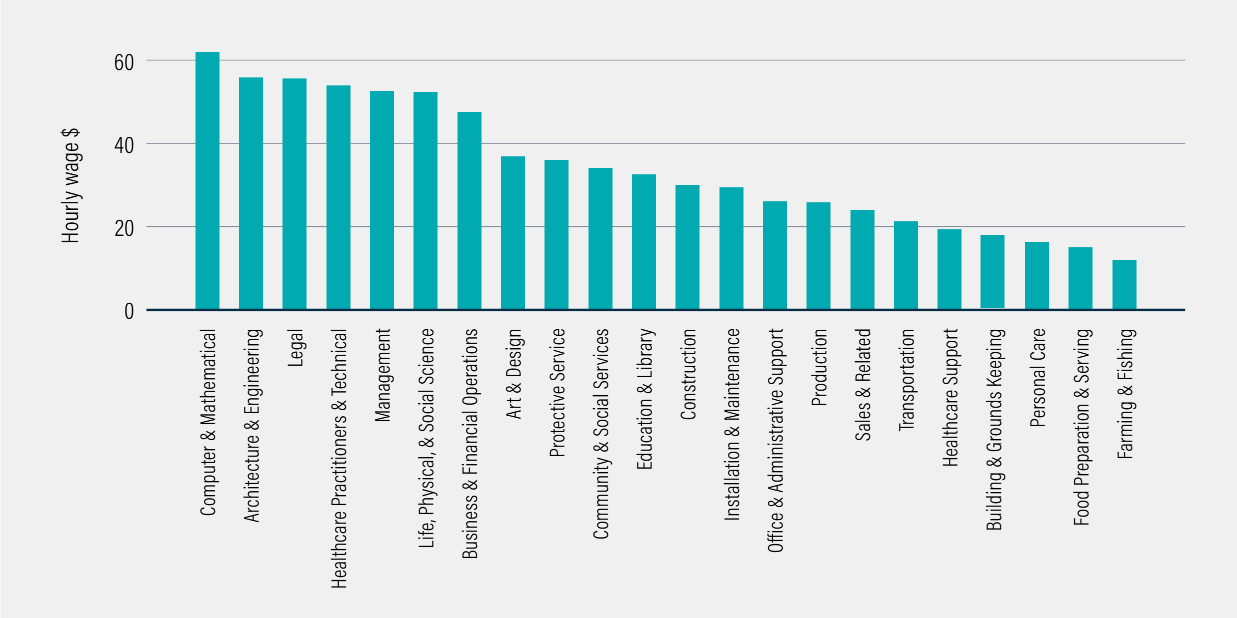
A glance at the other end of the distribution reveals that farming and fishing occupations, although an integral part of the region's economy, have the lowest median hourly wages. This trend persists across all subregions, except in Alameda and San Francisco. Healthcare support, personal care occupations, and food preparation roles also have median wages at the lower end of the distribution. The COVID-19 pandemic showed how valuable these occupations are to the region, yet this value is not reflected in the wages earned in these essential occupations.

EXHIBIT 4.26 | Median hourly wages in each occupation (Alameda 2022)



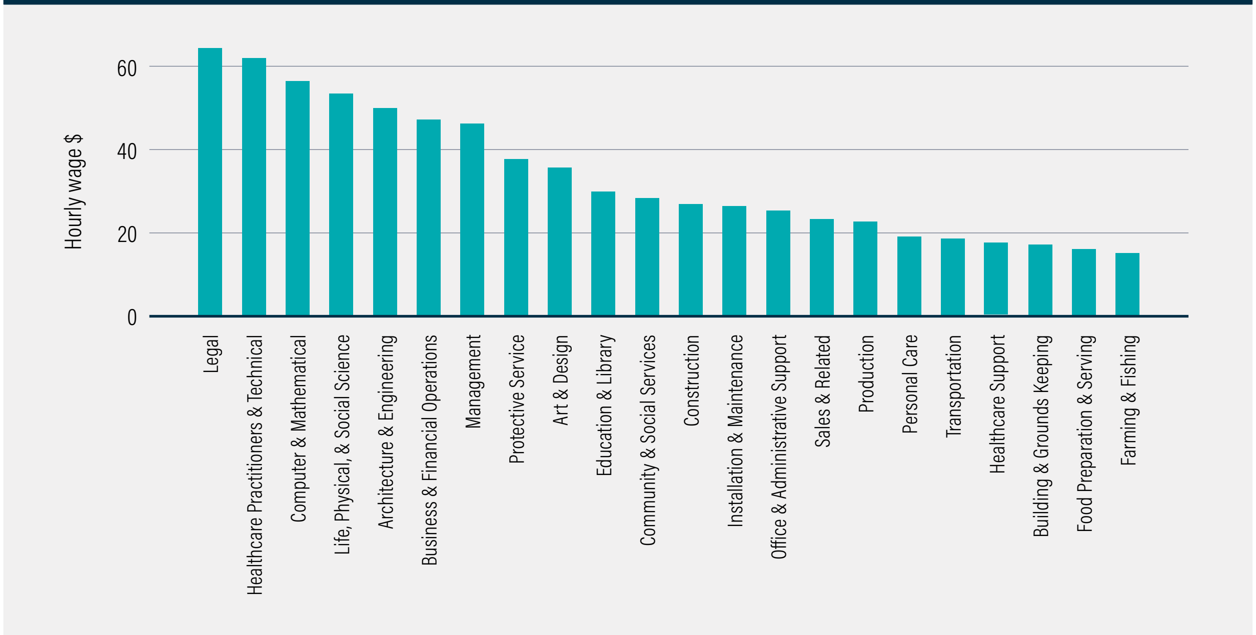
Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.27 | Median hourly wages in each occupation (Contra Costa 2022)



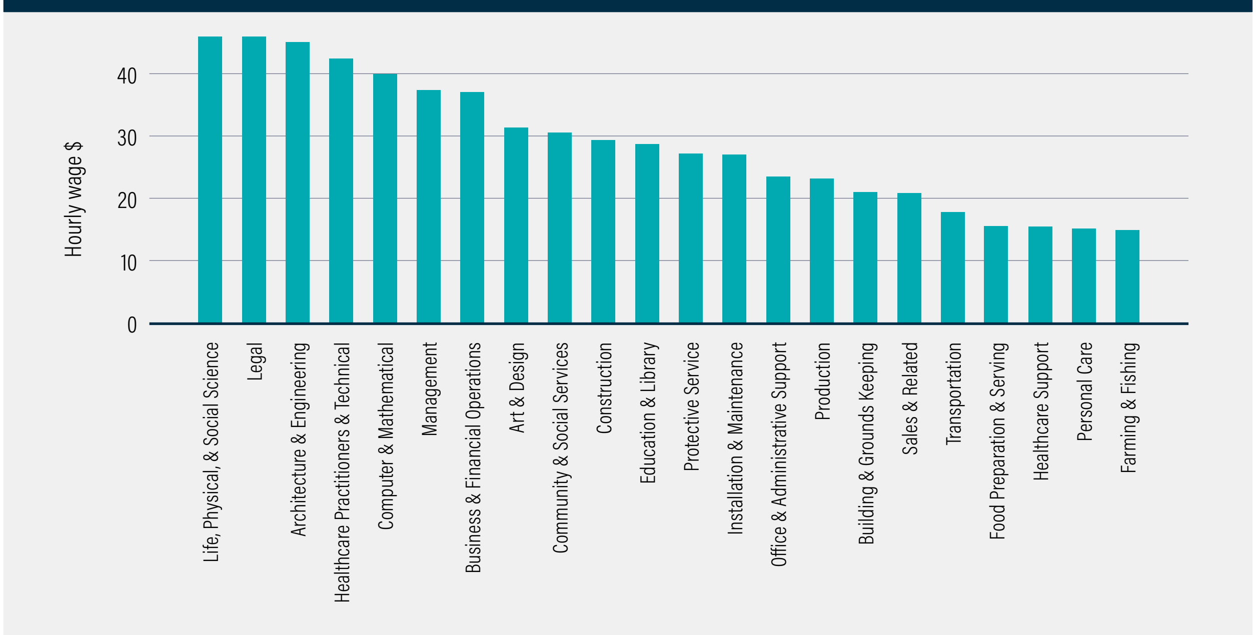
Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.28 | Median hourly wages in each occupation (Marin / Sonoma 2022)



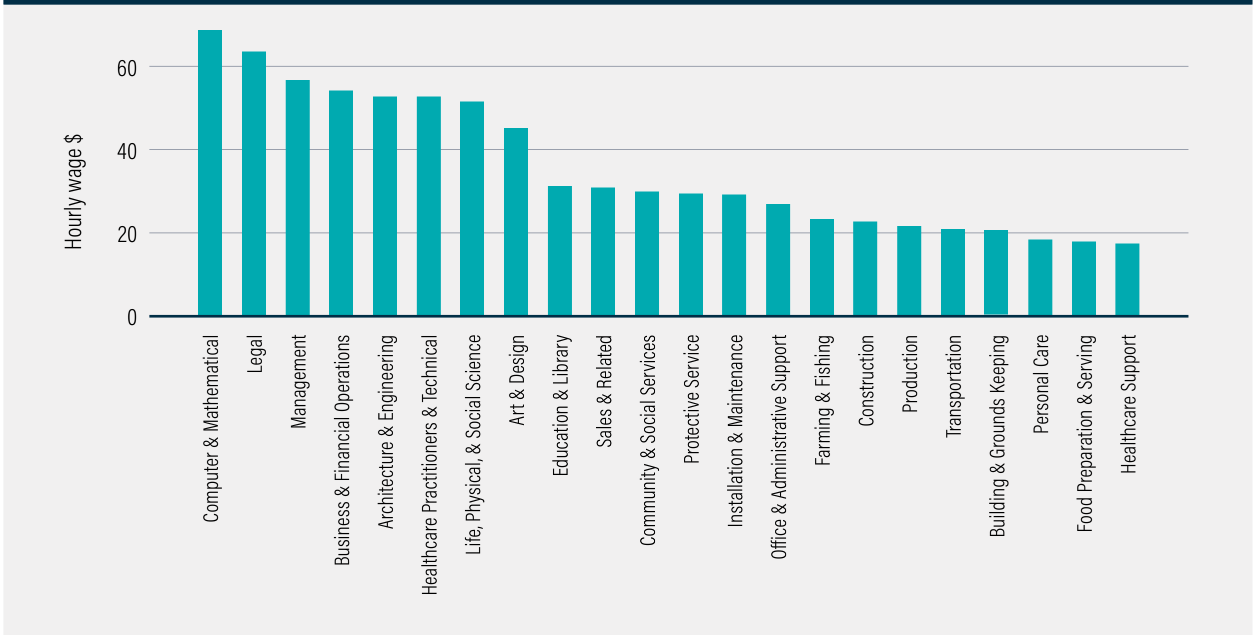
Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.29 | Median hourly wages in each occupation (Napa / Solano 2022)



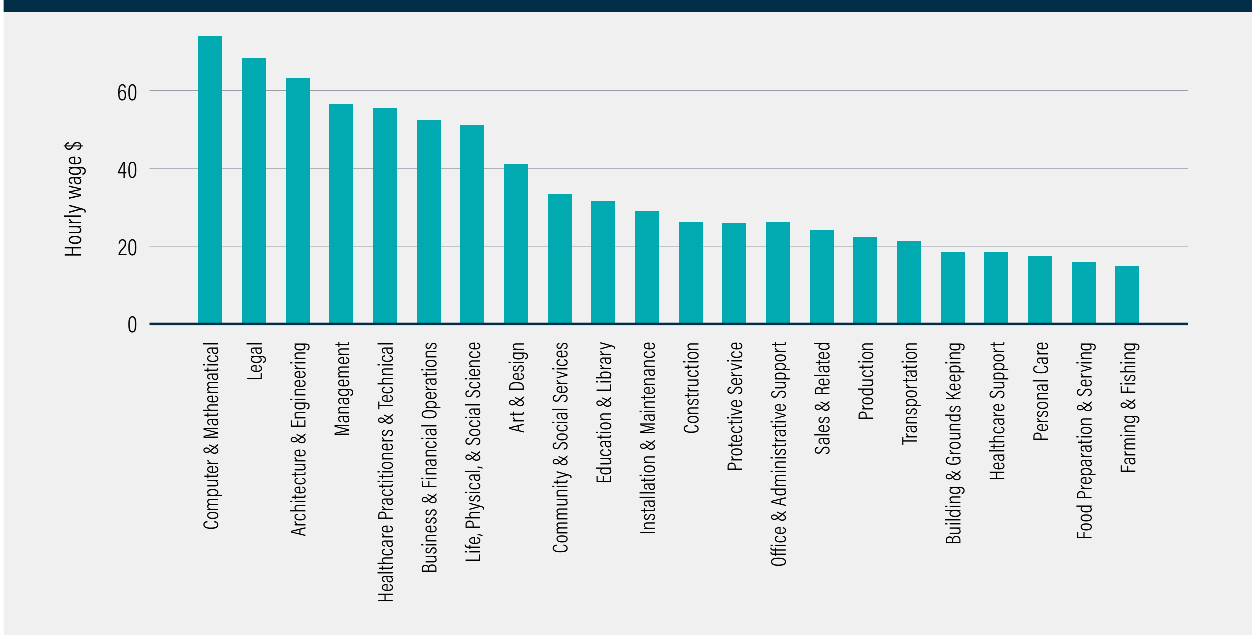
Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.30 | Median hourly wages in each occupation (San Francisco 2022)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.31 | Median hourly wages in each occupation (Santa Clara / San Mateo 2022)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

iii. Job quality in the most common occupations by race, education, and gender

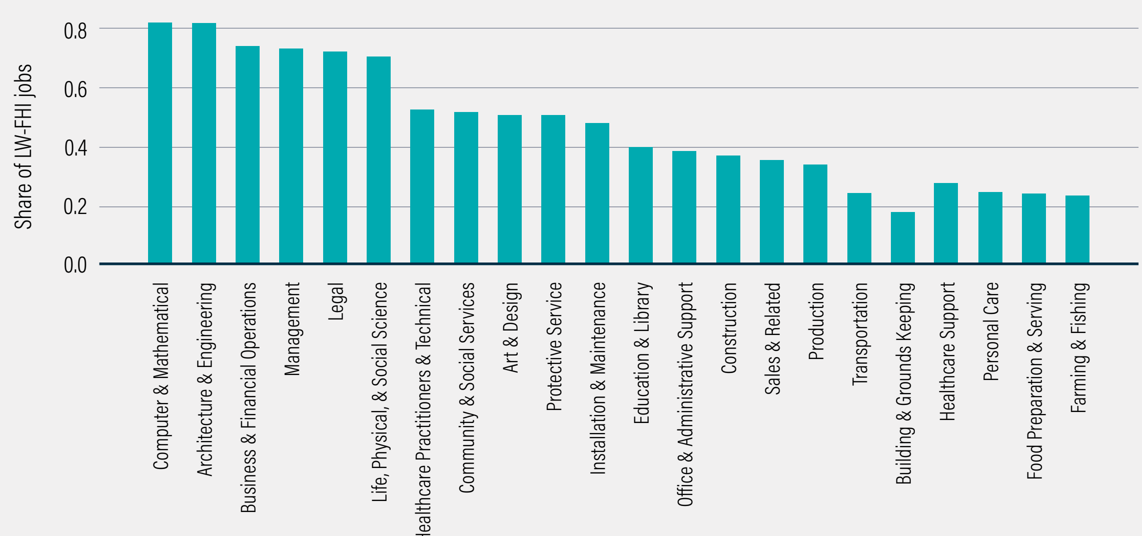
Disparities in occupational job quality reveal underlying structural, economic, and societal issues that can have significant implications for workers, businesses, and the economy at large. According to our job quality index, the primary disparities in job quality are differences in wages, regularity of schedule, and access to health insurance through the employer. Workers in low-quality jobs often face inadequate wages, insufficient benefits, and limited opportunities for advancement, leading to economic instability and increased poverty rates.

Job quality disparities also have significant health and social consequences. Workers in low-quality jobs often experience precarious working conditions, limited access to healthcare benefits, and increased exposure to occupational hazards. Such circumstances not only affect the workers' physical and mental health, but also lead to increased public health expenditures (Benach et al., 2014).

Furthermore, such disparities contribute to social inequalities. Job quality is often stratified by education, skill level, gender, and race, among other factors. For instance, workers with lower educational attainment or those belonging to marginalized communities often have limited access to high-quality jobs, leading to persistent social and economic inequalities.

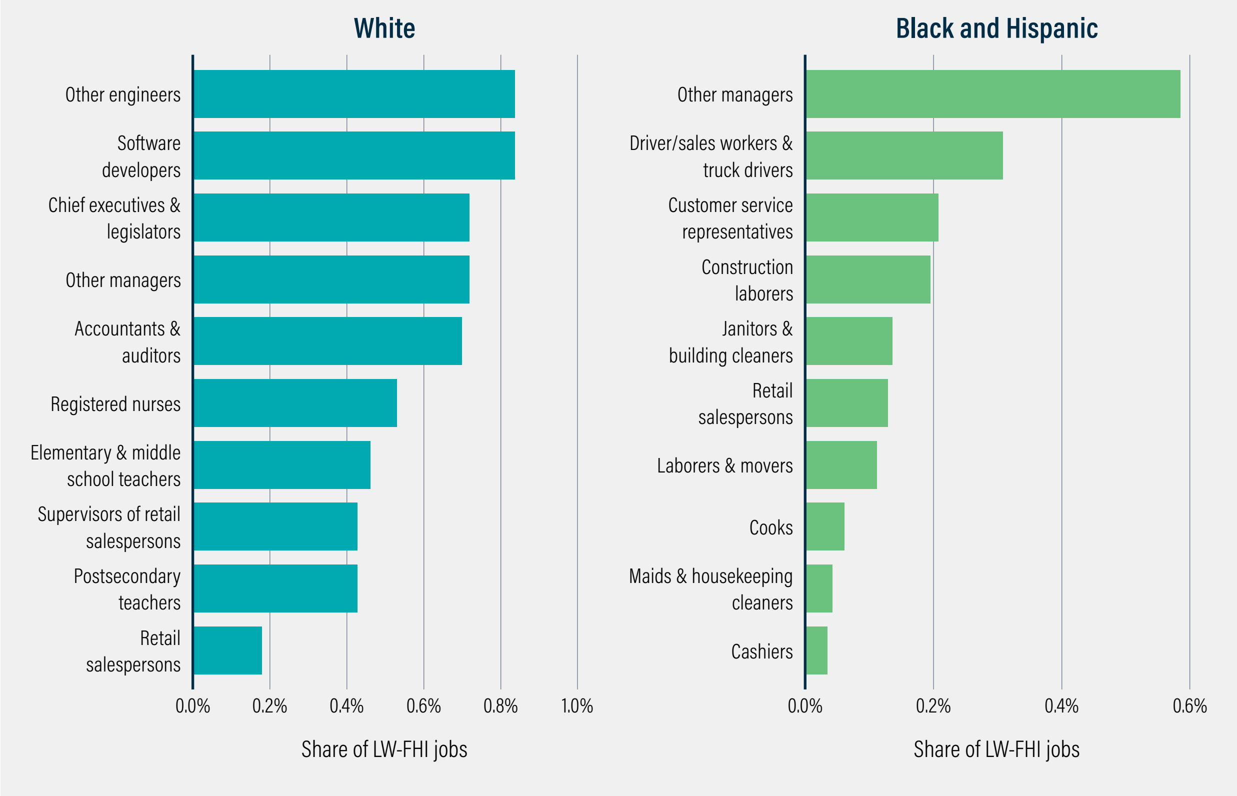
Exhibit 4.32 gives an overview of job quality in each occupational category in the Bay Area.

EXHIBIT 4.32 | Job quality by major occupation (Bay Area 2022)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

EXHIBIT 4.33 | Job quality for the most common jobs for White workers versus Hispanic and Black workers (Bay Area)

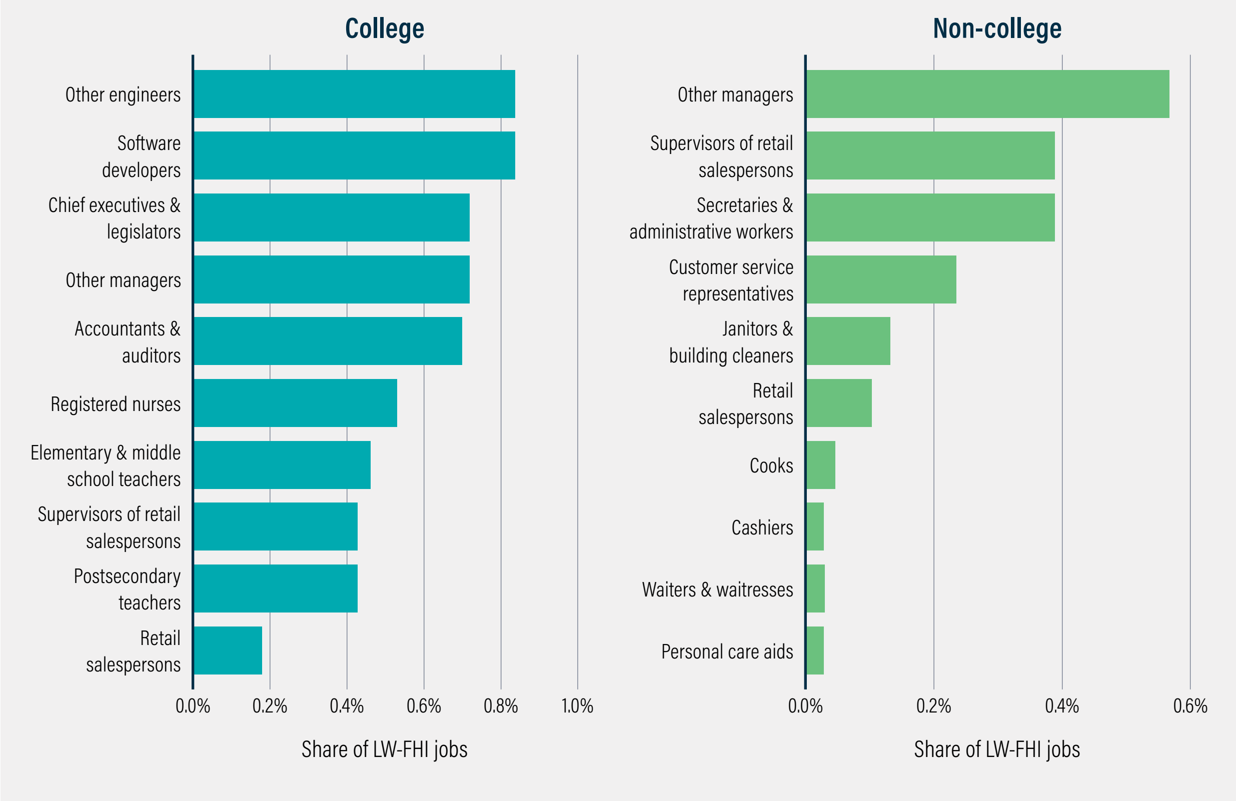


Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

Exhibits 4.33 to 4.35 identify the most common jobs and their associated job quality by race, educational attainment, and gender, respectively.

In six of the ten most common occupations for White workers, the majority of jobs are LW-FHI jobs, which provide a living wage, stable working schedule, and health insurance benefits. In contrast only one of the ten most common occupations for Black and Hispanic workers meets these criteria.

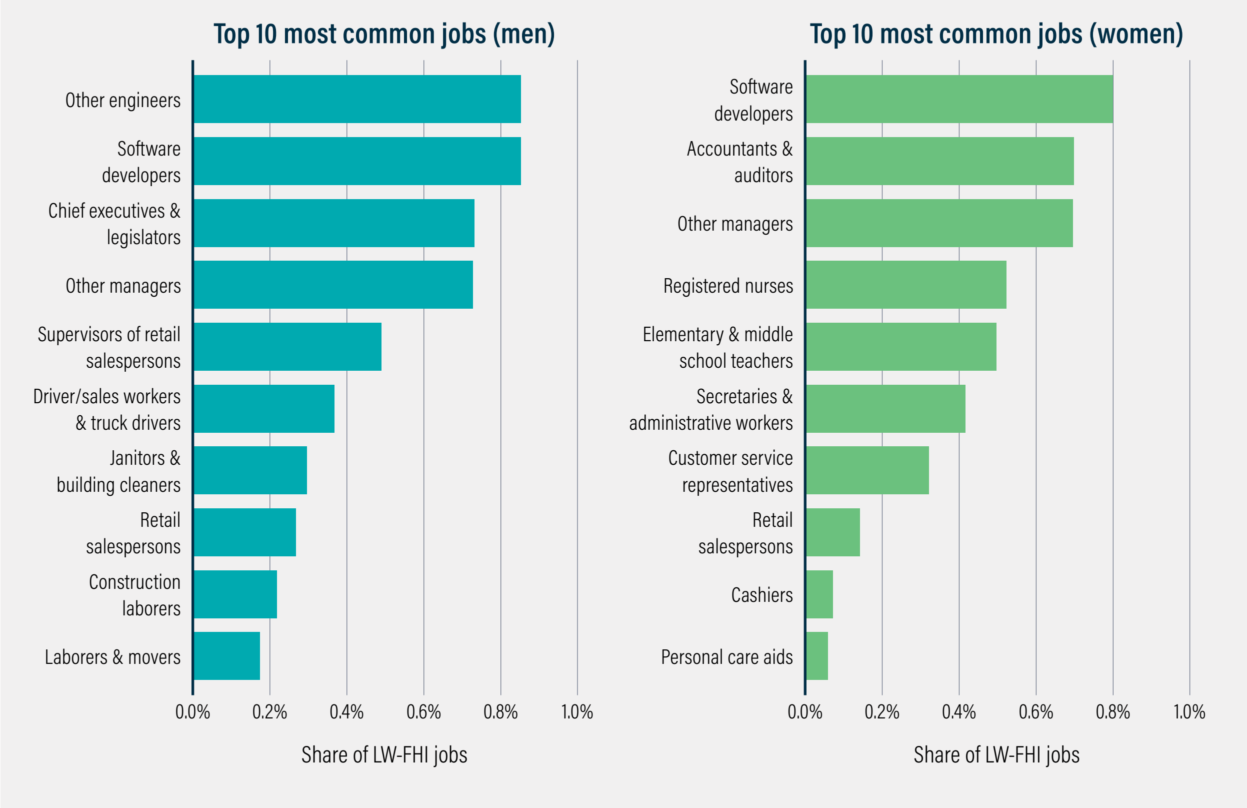
EXHIBIT 4.34 | Job quality for the most common jobs for workers with and without college degrees (Bay Area)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

In seven of the ten most common occupations for college-educated workers, the majority of jobs are LW-FHI jobs. In contrast only one of the ten most common occupations for non-college-educated workers meets these criteria. In terms of gender, four of the ten most common occupations for men and five of the ten most common occupations for women are LW-FHI jobs.

EXHIBIT 4.35 | Job quality for the most common jobs for men versus women (Bay Area)



Source: UC Berkeley Labor Center calculations using IPUMS 5-Year American Community Survey (ACS) 2017-2021.

G. Comparing Labor Laws Across the Bay Area

Labor laws help maintain and promote labor standards by setting forth minimum requirements that employers must meet, thereby protecting the rights and well-being of workers. From 2011 to 2016, California implemented a comprehensive framework called the California Policy Model (CPM). This model encompassed 51 legislative measures and policy implementations across a wide range of areas, including workers' rights, the safety net, the environment, taxation, infrastructure, and housing (Perry, 2017)

Significant strides were made in the realm of workers' rights. A notable change occurred in July 2014 when California raised its minimum wage from $8 to $9 per hour. This increase was followed by another raise in January 2016, bringing the minimum wage to $10 per hour. Consequently, around 3.3 million Californians were estimated to witness an average annual wage boost of $800 (Perry, 2017). Recognizing the need to sustain this progress, the state enacted Senate Bill (SB) 3 in 2016, setting a trajectory for the state minimum wage to reach $15 per hour by 2022 (Perry, 2017).

The CPM also incorporates several other policies aimed at expanding workers' rights. Notably, the state has taken measures to combat wage theft, ultimately ensuring fairer pay for workers. Furthermore, California has mandated paid sick leave for all workers and established a savings plan to promote retirement security among those lacking access to employer-provided retirement savings plans (Perry, 2017). The rest of this section provides a non-exhaustive summary of the various labor laws in the Bay Area, including labor standards set at the state level.

i. Statewide labor standards[4]

a. Unpaid leave

Family and Medical Leave: Employers with 50 or more employees are required to provide up to 12 weeks of unpaid leave for specified family and medical reasons under the federal Family and Medical Leave Act (FMLA) and the California Family Rights Act (CFRA).

Maternity Disability Leave: Employers are required to provide up to four months of unpaid, job-protected leave for employees who are disabled by pregnancy and childbirth.

Military Leave: Employers are required to provide job-protected, unpaid leave to employees who are called to active duty in the military.

School Activities Leave: Employers with 25 or more employees are required to provide up to 40 hours of unpaid leave per year for parents to attend school activities.

b. Paid leave

Paid Sick Leave (PSL): Leave begins accruing time on the first day of work and can be utilized 90 days after commencing. PSL accrues at a rate of one hour for every 30 hours worked. Employers may cap use at three days or 24 hours per year. PSL can only be used for illnesses, medical, or preventative care for the employee or to care for an ill family member.

Supplemental Paid Sick Leave (SPSL): COVID-19 SPSL was available from January 1, 2021, to September 30, 2021, and January 1, 2022, to September 30, 2022. Employers with 26 or more employees needed to provide up to 80 hours of leave in addition to PSL for any full-time or part-time employee. Although SPSL is no longer mandated in California, employers have the discretion to offer employees additional paid leave for cases related to COVID-19.

Short-Term Disability Payments: State Disability Insurance can be provided if individuals are unable to work or are working less due to a disability. The program provides eligible workers who are unable to work with partial wage replacement benefits to up to 60% or 70% of weekly wages, depending on income, for a maximum of 52 weeks. Employers with 10+ employees may cap an employee's sick time balance at 72 hours. Employers with fewer than 10 employees may cap an employee's sick time balance at 40 hours.

Health Insurance: While health insurance isn't required by state law, federal law requires employers with 50+ full-time equivalent employees to provide insurance with minimum essential coverage. Employers with at least 50 full-time employees must offer affordable health insurance coverage to their employees under the Affordable Care Act (ACA).

Retirement: All companies with more than five employees must offer a retirement plan to their workers.

ii. Examples of city- or county-specific labor standards

a. Berkeley[5]

Paid Sick Leave Ordinance: Employers must give their staff one hour of paid sick leave for every 30 hours worked. Small business employers (with fewer than 25 employees) may cap an employee's accrued paid sick leave at 48 hours and may cap the use of paid sick leave to 48 hours per year. Employers with 25 or more employees may cap an employee's accrual of paid sick leave at 72 hours but may not cap how much paid sick leave an employee uses in a calendar year.

Berkeley Family Friendly and Environment Friendly Ordinance: An employee has the right to request a flexible or predictable work schedule. The employer does not have to grant the request, but does have to respond in writing within 21 days. The ordinance applies to employers with 10 or more employees. Employees must have worked at least three months and must work at least eight hours per week on a regular basis.

Vendor Living Wage Ordinance: Vendors paid more than $25,000 per year by the City of Berkeley must comply with the Living Wage Ordinance. To comply, vendors must pay a living wage, offer health benefits or cash in lieu, and provide paid time off.

b. Oakland[6]

Hospitality Service Fees and Emergency Paid Time Off: Any hospitality fees charged to customers must be paid in their entirety to the hospitality workers who performed those services.

After a hotel employee has activated a panic button or otherwise alerted a supervisor or other management employee about violence or threatening behavior, a hotel employer must immediately allow the hotel employee sufficient paid time to contact and provide a statement to police and to consult with a counselor or advisor of the hotel employee's choosing.

c. Emeryville[7]

Paid Time Off: Minimum of 48 Paid Sick Leave (PSL) hours accrued for employees of small businesses (55 or fewer employees within Emeryville city limits) and 72 hours for employees of large businesses (56+ employees within Emeryville city limits). In each year of employment, an employee may use up to the total number of PSL hours accrued allowed by employer but subject to the minimum number of accruable PSL hours, as described above. The Emeryville ordinance broadens the definition of "family member" to include a designated individual (if the employee has no spouse or registered domestic partner) for whom an employee can use PSL to provide care. In addition, the employee may use PSL to provide care for a guide dog, signal dog, or service dog of the employee, the employee's family member, or the person designated by the employee.

Hospitality Fees: Any hospitality fees charged to customers must be paid in their entirety to the hospitality workers who performed those services.

d. San Francisco[8]

Paid Sick Leave (PSL): Employers with 10+ employees may cap an employee's PSL balance at 72 hours. Employers with fewer than 10 employees may cap an employee's PSL balance at 40 hours.

Unpaid Time Off: Ten days for full-time employees (at an accrual rate of 0.03846/hour) caps at 80 hours and rolls over to the following year. If an employer offers at least 22 days of Paid Time Off per year, additional unpaid time off is not required.

Health Care: Employers with 20+ workers (and non-profit employers with 50+ workers) must spend a minimum amount on health care for each employee who regularly works eight or more hours per week in San Francisco, satisfying the Employer Spending Requirement by making required health care expenditures on a quarterly basis on behalf of all covered employees at the following rates:

- Employers with 100 or more workers: $3.40 per hour;
- Employers with 20 to 99 workers worldwide (or nonprofits with 50-99 workers): $2.27 per hour; and
- Employers with 0 to 19 workers (or 0 to 49 for nonprofits) do not need to meet this requirement.

Family Leave: Paid Family Leave (PFL) provides benefit payments to people who need to take time off work to care for a seriously ill family member, bond with a new child, or participate in a qualifying event because of a family member's military deployment. PFL law applies to employers with 20+ employees. Employees must work at least eight hours a week within the geographical boundaries of San Francisco, and at least 40% of their total hours worked must be within the geographical boundaries of San Francisco.

Family Friendly Ordinance: Allows employees to request a flexible or predictable working arrangement, which may consist of intermediate or long-term changes to the number of days or hours worked or the time the employee arrives at or departs from work and arrangements to work from home or job-share. Employees are permitted to make requests at least two times per year, and employers are required to consider and respond to the request.

e. San Francisco Airport (SFO)

Healthy Airport Ordinance: The ordinance applies to employees covered by SFO's Quality Standards Program (QSP), which requires the implementation of minimum standards for hiring, training, performance management, and compensation and benefits. QSP-covered employees are those who either:

» Require Airport Badge issuance with Airfield Operations Area (AOA) access and work in and around the AOA to perform their job duties; or

» Are directly involved in passenger and facility security or safety (e.g., checkpoint screenings, passenger check-ins, and skycap and baggage check-in and handling).

Employers of QSP-covered employees must choose to either provide them with no-cost family health insurance (including coverage for their dependents) or pay $9.50 per hour (up to $380 per week) on behalf of the employee to the City Option Program. To comply with the family health insurance requirement, benefits must be offered at no cost to the covered employee or be actuarially equivalent to at least 90% of the full actuarial value of the benefits provided and include all benefits listed in California's Essential Health Benefits Benchmark Plan and be offered to covered employees within 30 days of their start date. A covered employee may voluntarily waive an offer of health plan benefits by providing proof of a current health plan coverage, including coverage for their dependents, and completing the Voluntary Waiver Form. Compliance requirements cannot be waived in a collective bargaining agreement.

iii. Labor standards applicable to multiple Bay Area cities or counties

Retail Workers Bill of Rights (San Jose, Emeryville, and San Francisco): Requires chain stores to: offer extra work hours to current part-time employees before hiring new employees; give part-time employees the same starting pay as full-time employees; notify and retain employees during change of ownership; and provide advance notice of schedule changes, plus provide predictability pay where inadequate notice is provided.

"Back to Work" or "Right of Recall" Ordinance (San Francisco, Oakland, Santa Clara): Requires covered employers to offer to rehire employees who were previously laid-off due to COVID-19, if they fill the same or similar positions, based principally on seniority.

Bay Area Commuter Benefits Program: Offices that have 50+ full-time employees located in any of the nine San Francisco Bay Area counties are required to offer commuter benefits to employees under the Bay Area Commuter Benefits Program. These benefits must include at least one of the following five options:

» Federal commuter pre-tax benefit: Allow employees to pay for their transit or vanpooling with pre-tax dollars;

» Employer-provided subsidy: Provide a subsidy to help employees pay for their monthly transit or vanpool costs;

» Employer-provided transit: Provide a free or low-cost bus, shuttle, or vanpool service to employees;

» Alternative commuter benefit: Create a unique package of commute benefits for employees; and

» Company-wide telework: Offer employees the option to telework one or more days a week.

iv. Minimum wage laws

Exhibit 4.36 provides a summary of the minimum wage in various cities and counties in the Bay Area. Cities in San Francisco County have the highest minimum wages in the region, with Emeryville having the highest minimum wage at $18.67 as of July 2023. The lowest minimum wages in the region are in Napa and Solano Counties, with minimum wages set at the state minimum wage of $15.50 per hour.

EXHIBIT 4.36 | Summary of minimum wages across counties and cities within the Bay Area

County	Minimum wages	Average
Alameda		
County	$15.50	$16.21
Alameda	$16.52	
Berkeley	$18.75	
Emeryville	$18.67	
Fremont	$16.80	
Oakland	$15.97	
Contra Costa		
County	$15.50	$15.63
El Cerrito	$17.35	
Richmond	$16.17	
Marin		
County		$15.86
Napa		
County		$15.50
San Francisco		
County		$17.39
San Mateo		
County	$15.50	$16.56
South San Francisco	$16.70	
Belmont	$16.75	
Burlingame	$16.47	
Daly City	$16.07	
East Palo Alto	$16.50	
Foster City	$16.50	
Half Moon Bay	$16.45	
Menlo Park	$16.20	
Palo Alto	$17.25	
Redwood City	$17.00	
San Carlos	$16.32	
San Mateo	$16.75	

County	Minimum wages	Average
Santa Clara		
County	$15.50	$16.55
Cupertino	$17.20	
Los Altos	$17.20	
Milpitas	$17.20	
Mountain View	$18.15	
San Jose	$17.20	
Santa Clara	$17.20	
Sunnyvale	$17.95	
Solano		
County		$15.50
Sonoma		
County	$15.50	$16.78
Petaluma	$17.06	
Santa Rosa	$17.06	

Source: Minimum wage data are from the government websites cited in the endnotes, specifically those affiliated with the labor standards departments of the respective municipal or county jurisdictions.

v. Other workers' rights and protections

The Bay Area is also subject to regulations against wage theft, comprehensive worker protection laws, and targeted initiatives supporting gig and freelance workers. Labor standards can vary greatly, with certain cities upholding more stringent worker protections and others working to strengthen current policies

H. Career Advancement Programs in the Bay Area

Other policies that should be considered are the programs aimed at developing and training the region's workforce. Significant efforts have been made in California to establish a cohesive framework encompassing workforce development programs, allowing for program evaluation and continuous quality improvement. These programs target workers across different demographics, industries, and occupations. Below, we list various workforce development and training efforts in the region.

i. Statewide workforce development programs

California Community Colleges Chancellor's Office (CCCCO) Career and Technical Education (CTE): The California Community Colleges system offers more than 200 workforce training programs, making it the largest provider in the world.[9] Recent empirical research suggests the average returns on CTE certificates and degrees range from 14% to 45%, with the highest returns for those employed in the healthcare sector (Stevens, 2019). The same study examined the average return excluding the healthcare sector and still found relatively high returns of 26% to 30%, indicating strong evidence that CTE programs substantially raise earnings, even in the short term. The California Community Colleges Chancellor's Office houses the Workforce and Economic Development Division, which "ensures that CTE programs are responsive to the workforce needs of business and industry while creating pathway opportunities for students with diverse goals" (California State Board of Education et al., 2020).

California Department of Education (CDE): Workforce Innovation and Workforce Investment Act (WIA) Title I Adult, Dislocated Worker, and Youth federally funded career services and training programs.

- » Opportunity Act (WIOA) Title II – Adult Education (T2AE)

California Department of Social Services (CDSS): Welfare-to-Work (WtW)

Department of Industrial Relations (DIR): State Certified Apprenticeship (SCA)

Department of Rehabilitation (DOR): WIOA Title IV – Vocational Rehabilitation (T4VR)

Employment Development Department (EDD):

» WIOA Title I – Adults (T1A)

» WIOA Title I – Dislocated Workers (T1DW)

» WIOA Title I – Youth (T1Y)

» WIOA Title III – Wagner-Peyser (WP)

» Trade Adjustment Assistance (TAA)

Employment Training Panel (ETP) incumbent worker on-the-job training programs: The California State Legislature created the program in 1982 and funds it through a special payroll tax on California employers.

» Trade Adjustment Assistance (TAA) programs for those displaced by a trade-related layoff

» State-certified apprenticeship programs

Moreover, the California Workforce Development Board has spearheaded a collaborative effort among seven state agencies responsible for overseeing workforce programs. The Cross-System Analytics and Assessment for Learning and Skills Attainment (CAAL-Skills) partnership has successfully established a comprehensive administrative data system. This system enables the evaluation of program effectiveness and has yielded valuable insights.

The report, "CAAL-Skills: Study of Workforce Training Programs in California" analyzed the impact of the programs above. The study found that most of these programs have enhanced labor market outcomes for participants. Such outcomes reinforce the importance and value of investing in these initiatives to create positive employment opportunities and improve overall economic prospects.

Workforce development programs play a pivotal role in shaping the economic fabric of any region. At their core, these programs are designed to enhance the skills and competencies of the workforce, ensuring they are aligned with current and emerging industry demands. For individuals, these programs can be a gateway to better job opportunities, higher wages, and greater job satisfaction. For businesses, a trained workforce means better quality of work, higher efficiency, and increased adaptability in a rapidly evolving labor market.

ii. Bay Area workforce development programs

Given its diverse economy, ranging from tech hubs to the agricultural heartlands, the need for effective workforce development is paramount. The region offers various broad categories of training programs to cater to this diverse range of industries and employment sectors.

High Road Training Partnerships: The California Workforce Development Board's High Road Training Partnerships (HRTP) initiative covers sectors such as transportation, health care, and hospitality. The HRTP model is based on partnerships that emphasize equity, sustainability, and job quality. These training partnerships, centered on industry needs and worker development, equip individuals with the skills needed by California's "high road" employers. These are companies that compete based on product and service quality achieved through innovation and investment in their workforce, resulting in the creation of family-sustaining jobs where workers have a say and agency.[10]

Youth Programs: These programs are aimed at younger individuals, helping them transition from school to work. They offer vocational training, internships, and apprenticeships.

- **Bay Area Young Adult Workforce Collaborative:** This program brings together various organizations to improve employment and education outcomes for young adults in the Bay Area, offering training in various sectors.
- **Year Up Bay Area**: A one-year program that provides young adults with technical and professional skills training in areas like IT, finance, and sales.

Adult Education and Vocational Training: These are designed for adults looking to upskill, reskill, or transition to a new career. They might cover anything from tech skills to trades. The California Adult Education Program (CAEP) is one major initiative in this category.

- **Bay Area Community College Consortium (BACCC):** This consortium of community colleges in the Bay Area collaborates with employers and key stakeholders to enhance and align workforce training programs with regional needs.
- **TechSF:** Funded by the City and County of San Francisco's Office of Economic and Workforce Development (OEWD), this initiative provides resources and training for individuals looking to enter the tech industry.

Dislocated Worker Programs: For individuals who've lost jobs due to plant closures, natural disasters, or shifts in industry demands, these programs provide retraining opportunities to help them re-enter the workforce. The Employment Development Department (EDD) manages several such initiatives.

Industry-Specific Training: Given the specialized nature of many of California's industries (like tech, entertainment, and agriculture), there are numerous programs tailored to the specific needs of these sectors.

- **The California Advanced Lighting Controls Training Program (CALCTP)** targets the electrical and energy industries.
- **Bay Area Bioscience Education Community (BABEC)** provides training and education in biotechnology, an industry that is especially robust in regions like South San Francisco.
- **The Bay Area Video Coalition (BAVC)** has a program focused on training individuals for careers in digital media, offering classes in video production, sound design, and other related fields.

Apprenticeship Programs: These programs provide hands-on training in various trades and professions, allowing participants to earn while they learn. The Division of Apprenticeship Standards (DAS) governs these initiatives in California, covering fields from construction to health care.

- **The Building and Construction Trades Council of Alameda County** offers apprenticeship programs in various trades like carpentry, electrical work, and plumbing, providing training opportunities for individuals in the East Bay.
- **Techtonica** is a Bay Area initiative that offers apprenticeships in software and tech for women and nonbinary adults from underrepresented backgrounds.

Endnotes

1 For more information about the MIT Living Wage Calculator, see https://livingwage.mit.edu/pages/methodology.

2 For more information about the IPUMS American Community Survey data, see https://usa.ipums.org/usa/about.shtml.

3 For more information on the Center for Neighborhood Technology's Housing and Transportation Affordability Index (H+T) see https://htaindex.cnt.org/.

4 For more information see, the California Department of Industrial Relations, Division of Labor Standards Enforcement, https://www.dir.ca.gov/dlse/.

5 For more information, see City of Berkeley Workforce Standards and Enforcement: https://berkeleyca.gov/doing-business/operating-berkeley/workforce-standards-and-enforcement.

6 For more information, see City of Oakland Workplace and Employment Standards: https://www.oaklandca.gov/departments/workplace-employment-standards.

7 For more information, see City of Emeryville Labor Standards: https://www.ci.emeryville.ca.us/1277/Labor-Standards.

8 For more information, see City of San Francisco Office of Labor Standards and Enforcement: https://sf.gov/departments/office-labor-standards-enforcement.

9 For more information, see https://www.cccco.edu/Students/Career-Education.

10 For more information on the various HRTP projects throughout the state, see the California Workforce Development Board: https://cwdb.ca.gov/initiatives/high-road-training-partnerships/.

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SECTION 5

Industry Cluster Analysis

CONTRIBUTORS

Jeff Bellisario
Estevan Lopez

Bay Area Council Economic Institute

A. Introduction

This section provides foundational data on the Bay Area's employment profile. Using these data points will allow stakeholders to better plan for investments, partnerships, and policies that will facilitate a shift towards emerging industries and subindustries. Using this analysis in conjunction with other research can lead toward a more equitable and sustainable recovery in the region that takes advantage of global, national, state, and local trends. Please see **Appendix A** for an explanation of the methodology.

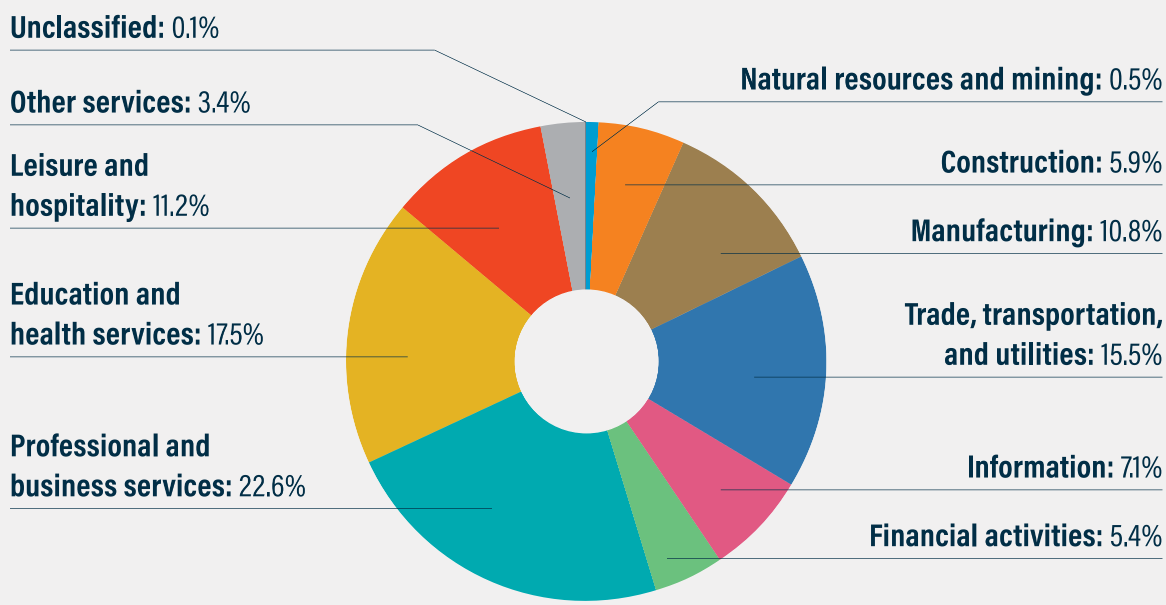
While most of this section focuses on analysis by subregion, findings at a regional level can also provide important insights. Professional and Business Services has been one of the largest and fastest growing industries in the Bay Area, particularly in San Francisco and Silicon Valley, which have historically been at the forefront of technology and innovation. Occupations within this industry are often high-paying, high-skilled jobs. The adverse impacts from COVID-19 have been most felt by Leisure and Hospitality, as well as Trade, Transportation, and Utilities, but in particular, Retail Trade: many storefronts have closed because of the pandemic, and staffing levels have been slow to return to pre-pandemic levels. Jobs within these service industries tend to skew toward the lower portion of the wage spectrum.

B. Key Findings

Compared to other parts of California, the industries that lead growth in the Bay Area require a highly skilled workforce. The largest employment sectors in the region include Professional and Business Services, Education and Health Services, and Trade, Transportation, and Utilities. Professional and Business Services, which has occupations in administration, management, legal services, scientific research, and computer systems design, accounts for more than a fifth of all jobs in the region (**Exhibit 5.1**).

Since 2017, the most substantial job growth has occurred in technology-related fields, specifically Information and Professional and Business Services, which have seen growth rates of 21% and 7% respectively, adding more than 110,000 jobs combined. Industries with lower average wages have seen a significant decline in employment in the Bay Area, particularly due to the COVID-19 pandemic and the shift to remote work. Since 2017, Trade, Transportation, and Utilities, along with Leisure and Hospitality, collectively experienced a loss of 75,000 jobs. This dynamic—of job loss in lower-wage sectors—creates a scenario for California Jobs First to fund projects that upskill workers or provide new avenues for family-sustaining wage jobs in traditionally low-wage industries.

EXHIBIT 5.1 | Bay Area employment in Q4 2022, by industry



Source: U.S. Bureau of Labor Statistics, 2023.

Note: This analysis contains the average employment estimates for the nine-county San Francisco Bay Area, which includes the following counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

Taking a deeper look into the six designated subregional areas of the Bay Area provides important insight into where to allocate resources to enhance resilient and emerging industries that will increase equity and economic opportunity for workers.

San Francisco County: The agglomeration of web-related technology companies in San Francisco has led to an increase of 20,917 (+33%) jobs in the Information sector and 12,543 (+6.1%) jobs in the Professional and Business Services sector since 2017. The Education and Health Services industry also experienced a 6.8% increase in employment, adding nearly 6,500 jobs since 2017. Additionally, these industries have a large concentration of jobs compared to the other eight counties of the Bay Area and the rest of California, particularly in the Information sector, which has 2.5 times greater concentration of jobs in San Francisco compared to the state.

San Mateo and Santa Clara Counties: Silicon Valley and the greater Peninsula region of the Bay Area are home to the most cutting-edge technology companies in the world. As in San Francisco, job growth has been concentrated in industries focused on the development and use of technology, particularly in Information and Professional and Business Services. Since 2017, there has been an increase of more than 75,000 jobs collectively across these industries. Manufacturing, particularly in computers, semiconductors, and biotech, makes up a 14.2% share of employment by industry as of Q4 2022. Since 2017, there has been a growth of nearly 15,000 jobs in manufacturing.

Alameda County: Alameda County enjoys one of the most strategic trade locations in the world, providing the critical goods movement infrastructure, including the Port of Oakland, the Oakland International Airport, and various rail and highway infrastructure. As a result, the largest share of employment in the county is captured within the Trade, Transportation, and Utilities industry at 20.1%. Notably, Manufacturing has also emerged as a strong and resilient sector, adding more than 15,000 jobs to the county since 2017, a 16% increase. Both the Manufacturing and Trade, Transportation, and Utilities industries are over-represented in Alameda County, having a concentration of 1.3 times jobs compared to the Bay Area as a whole.

Contra Costa County: The largest share of employment in Contra Costa County is in Education and Health Services at 23.5%, which also experienced the largest growth, adding 6,705 jobs, an 8.8% increase. With the help of industry and education partners, the Contra Costa Economic Partnership has identified six high-demand careers in health care in alignment with their 2021-2024 Local Plan. The Trade, Transportation, and Utilities sector has the second-largest share of employment at 20.3%, with most jobs in transportation in trucking and warehousing.

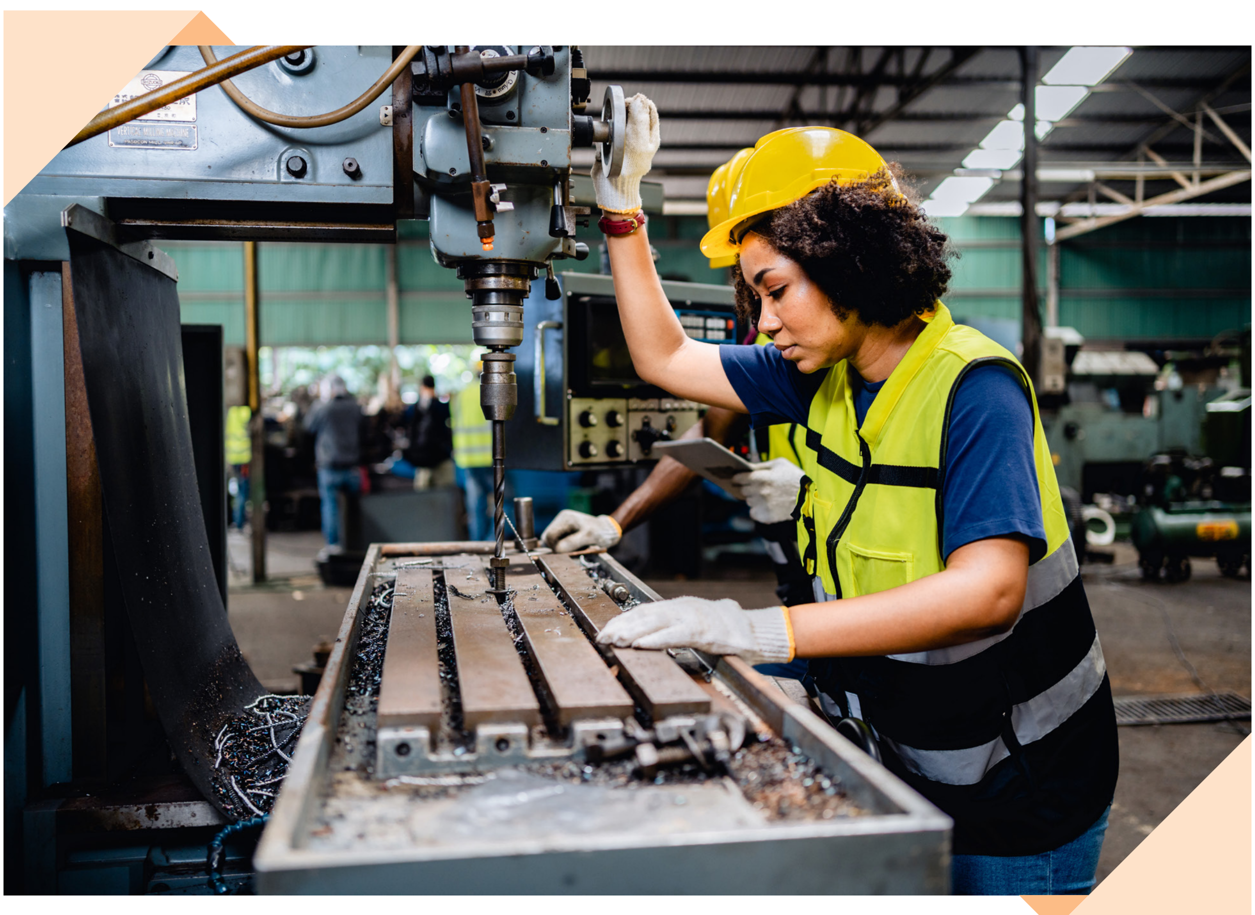
Marin and Sonoma Counties: Employment gains in this subregion have only been seen in the construction and professional and business services, with both counties increasing employment by more than 3,000 workers each since 2017. In the wake of the devastating fires in 2018, the substantial volume of home rebuilds fueled this growth in Sonoma County. Construction in Marin County has generally been limited but is expected to grow with the hefty requirement of 3,569 housing units by 2031 in accordance with the Regional Housing Needs Allocation (RHNA) plan.

Napa and Solano Counties: The Napa and Solano Counties subregion experienced a growth in employment in industries such as Education and Health Services, adding 1,652 jobs (+4.5%), Construction, adding 973 jobs (+6%), and Manufacturing, adding 775 jobs (+3%) since 2017. This subregion was the only one to experience growth in the Leisure and Hospitality industry, adding 771 jobs (+2.7%) since 2017. This increase is attributed to strong growth in the Food Services and Drinking Places subsector, which added 1,344 jobs over the previous five years.

Regional growth opportunities

Overall, we can highlight opportunities for job growth in the Bay Area aligned with California Jobs First objectives across a number of industries and their subsectors. These subsectors were chosen for their positioning in a growing industry of regional importance, where they also stand to take advantage of global, national, and regional trends:

1. Green economy-related production (e.g., renewable fuel production);
2. Health care (e.g., community health workers and laboratory technicians);
3. Construction workers to meet the Bay Area's housing needs (e.g., electricians, plumbers, other skilled trades);
4. Advanced manufacturing (e.g., machinists, quality-control workers); and
5. Child care and early childhood education (e.g., childcare operators, transitional kindergarten teachers).



C. Subregional Analysis

The Bay Area employment base is remarkably diverse, with more than 4 million individuals working for thousands of employers across a dozen primary industry sectors. Using the six subregional geographies chosen by the The Bay Area Jobs First Collaborative (**Exhibit 5.2**), we conducted an industry cluster analysis over a five-year period to assess the relative importance of industries to the local and regional economy and to determine if an industry's employment and share is growing or declining over time. The following section details the findings for each subregion within the Bay Area.

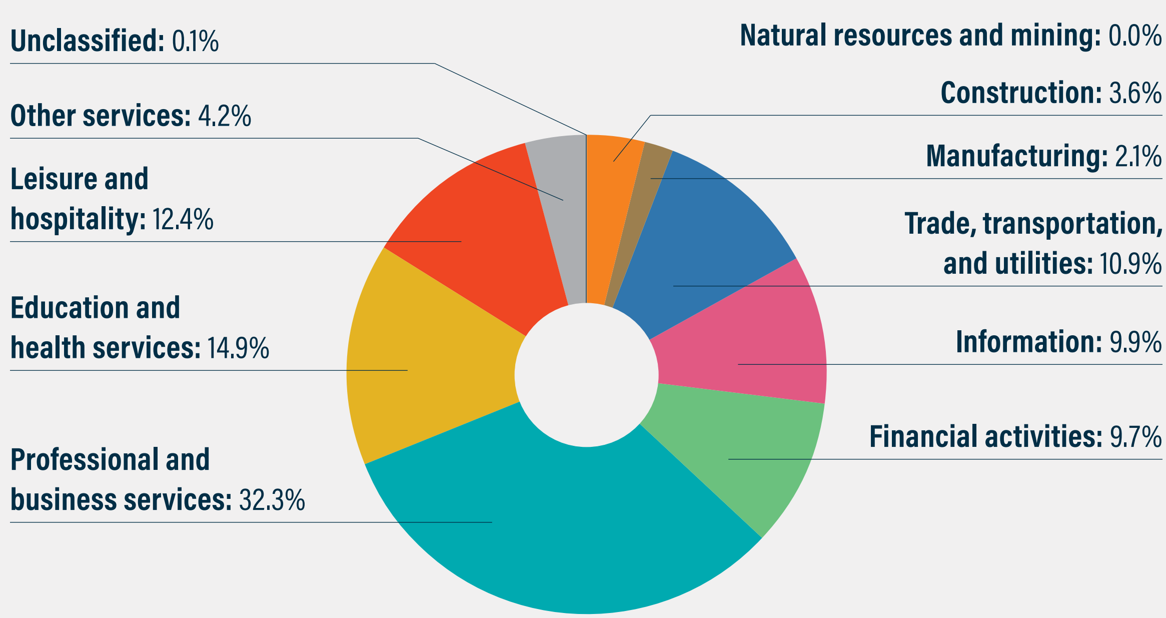
EXHIBIT 5.2 | Subregions of analysis within the nine-county Bay Area

i. City and County of San Francisco

a. Employment by industry

Exhibit 5.3 captures the City and County of San Francisco's industry breakdown by employment, with 640,000 workers across different sectors in Q4 2022 and a 3.0% unemployment rate. Professional and Business Services (32.3%) and Information (9.9%), fundamental pillars of the region's economy, are increasingly concentrated in San Francisco. Service sectors including Education and Health Services (14.9%) and Leisure and Hospitality (12.4%), which directly support the growing Information and Professional and Business Services industries, also make up a significant portion of employment. Despite San Francisco's recent decline as a global financial center, the Financial Activities sector as a share of employment is 9.7%, higher than the national average of 6.6% (U.S. Bureau of Labor Statistics, 2023).

EXHIBIT 5.3 | San Francisco Country employment in Q4 2022, by industry



Source: U.S. Bureau of Labor Statistics, 2023.

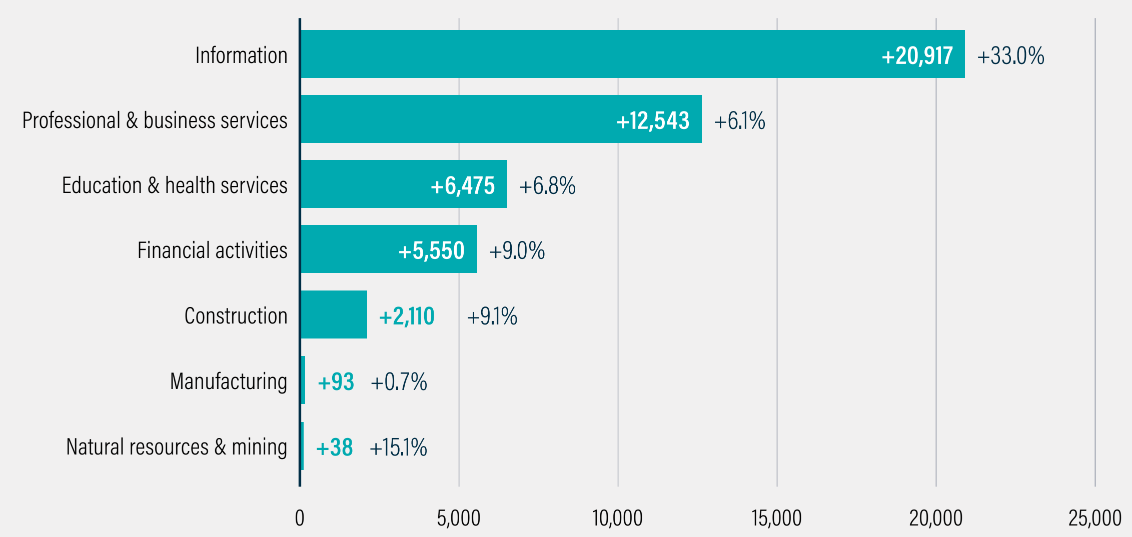
b. Growing industries and subsectors

Over the past five years, job growth in the City and County of San Francisco has been concentrated around industries focused on the development and use of technology, particularly in Information and Professional and Business Services (**Exhibit 5.4**). The agglomeration of web-related information technology companies in San Francisco has led to a significant increase of 21,000 jobs in the Information industry and 12,500 jobs in the Professional and Business Services over the previous five years. Education and Health Services has also experienced strong growth.

While the Bay Area's prominence as the West Coast's financial center has eroded over the years, including the recent notable failure of Silicon Valley Bank and the collapse of First Republic Bank, San Francisco has experienced an increase of 5,500 financial jobs, a 9% increase over the past five years.

A deeper look into the industries provides insight into which subsectors are growing in terms of employment and establishments (**Exhibit 5.5**). The Professional and Technical Services subsector has had tremendous growth since 2017, adding more than 23,000 jobs to San Francisco. Occupations in this subsector are primarily engaged in activities where human capital is the major input, which requires a high level of expertise and training, to offer specializations and services to a variety of industries.

EXHIBIT 5.4 | Growing industries in San Francisco County



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

Data Processing, Hosting, and Related Services in the Information sector has gained nearly 13,000 workers since 2017. This subsector includes occupations such as computer programmers, support specialists, systems analysts, and software developers, which are often high-paying, high-quality jobs.

EXHIBIT 5.5 | Top 10 growing subsectors in San Francisco County

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Professional & technical services	541	Professional & business services	1,296	23,703
ISPs, search portals, & data processing	518	Information	125	12,694
Credit intermediation & related activity	522	Financial activities	21	6,021
Social assistance	624	Education & health services	3,045	5,842
Ambulatory health care services	621	Education & health services	188	5,679
Construction of buildings	236	Construction	146	2,007
Couriers & messengers	492	Trade, transportation, & utilities	3	1,627
Support activities for transportation	488	Trade, transportation, & utilities	14	1,310
Transit & ground passenger transport	485	Trade, transportation, & utilities	-28	846
Real estate	531	Financial activities	328	542

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

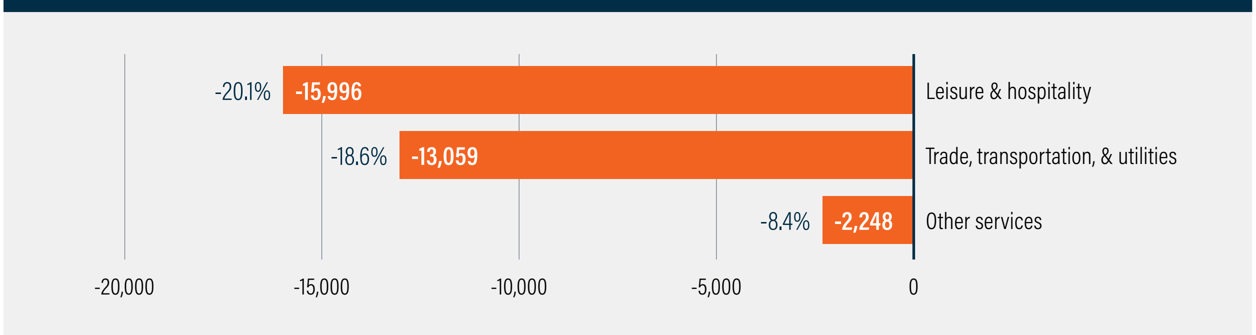
c. Declining industries and subsectors

The COVID-19 pandemic had devastating impacts on San Francisco's Leisure and Hospitality industry (with a decline of nearly 16,000 workers, a 20.1% decrease) and Trade, Transportation, and Utilities (with a decline of nearly 13,000 workers, an 18.6% decrease) since 2017 (**Exhibit 5.6**). Many small, downtown-serving businesses in San Francisco have struggled to stay afloat amid new variants of the virus, shutdowns, and a shift towards remote work. The impact of COVID-19 is particularly visible in the Financial District and Chinatown neighborhoods, which have experienced more business closures than openings from March 2020 to February 2023 (DataSF, n.d.).

The Bay Area's tourism industry has experienced one of the slowest recoveries in the nation. Between shutdowns during the pandemic and the fundamental shift to remote work, the region's Leisure and Hospitality industry has struggled to stay afloat. This impact is most notable in San Francisco, which has been the slowest to recover its employment to pre-pandemic levels, primarily because of slow job recovery in the subsectors of Food Services and Drinking Places (bars, restaurants, and caterers), and Accommodation (hotels, lodging, or other short-term accommodation), which have lost more than 15,000 jobs since 2017 (**Exhibit 5.7**).

While the Professional and Business services and Information sectors have experienced tremendous growth overall, subsectors including the Management of Companies and Enterprises and Other Information Services also saw a decline of more than 15,000 jobs, collectively.

EXHIBIT 5.6 | Declining industries in San Francisco County



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.7 | Top 10 declining subsectors in San Francisco County

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Food services & drinking places	722	Leisure & hospitality	17	-10,549
Management of companies & enterprises	551	Professional & business services	3	-8,776
Other information services	519	Information	-261	-7,362
Accommodation	721	Leisure & hospitality	5	-4,479
Merchant wholesalers, nondurable goods	424	Trade, transportation, & utilities	-27	-3,596
Hospitals	622	Education & health services	0	-2,655
Administrative & support services	561	Professional & business services	76	-2,578
Educational services	611	Education & health services	90	-1,794
Electronic markets & agents/brokers	425	Trade, transportation, & utilities	-88	-1,666
Amusement, gambling & recreation industry	713	Leisure & hospitality	24	-1,158

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

d. Employment distribution

With the agglomeration of technology companies, San Francisco has one of the largest shares of regional and statewide jobs in the Information and Professional and Business Services sectors, paralleling growth in high-tech industries. Despite recent turmoil in the financial activities industry in the Bay Area, San Francisco remains the financial center of the Bay Area and California. However, while the Financial Activities sector has long been one of the pillars of the regional economy, the share of jobs has been declining over the years. The Manufacturing sector in San Francisco is extremely small in comparison to the surrounding Bay Area counties and statewide (**Exhibit 5.8**).

EXHIBIT 5.8 | San Francisco County location quotients

Industry	Employment	% Share of Employment	Bay Area Location Quotient	California Location Quotient
Professional & business services	206,595	32.3%	1.39	1.74
Education & health services	95,185	14.9%	0.82	0.80
Leisure and hospitality	79,500	12.4%	1.08	0.98
Trade, transportation, & utilities	70,085	11.0%	0.68	0.53
Information	63,311	9.9%	1.35	2.53
Financial activities	61,970	9.7%	1.73	1.79
Other services	26,835	4.2%	1.19	1.19
Construction	23,153	3.6%	0.60	0.62
Manufacturing	13,136	2.1%	0.19	0.24
Unclassified	468	0.1%	0.76	0.71
Natural resources & mining	253	0.0%	0.07	0.01

Source: U.S. Bureau of Labor Statistics, 2023.

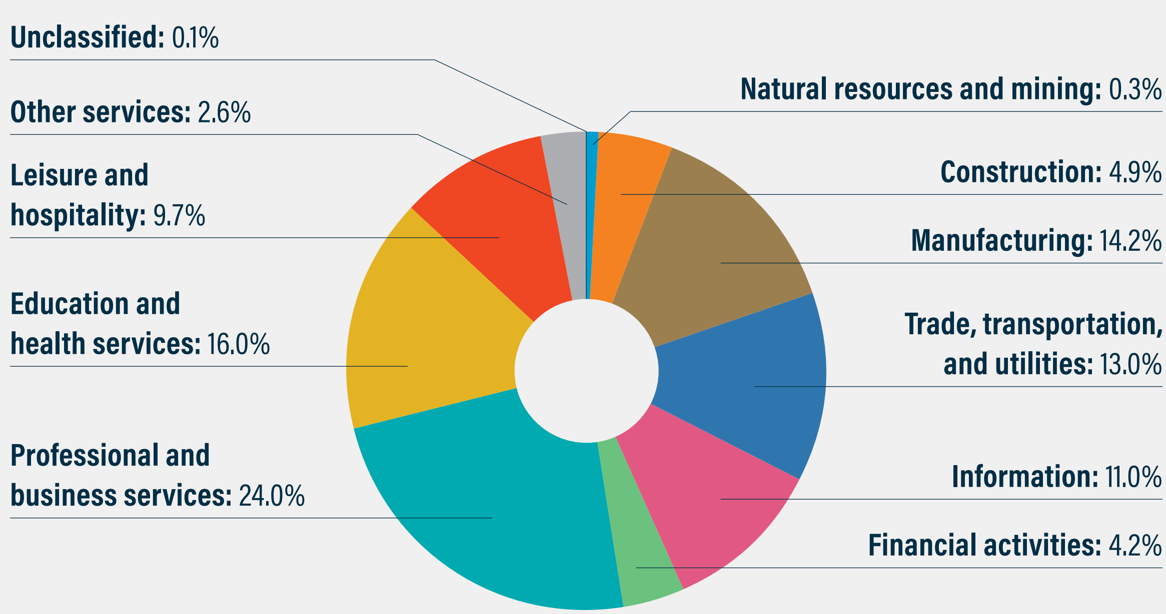
ii. San Mateo and Santa Clara Counties

a. Employment by industry

Santa Clara and San Mateo Counties (also known as Silicon Valley) are home to some of the most cutting-edge technology companies in the world. With 1.4 million workers combined across different sectors, the aggregated industry breakdown by employment is captured in **Exhibit 5.9**. Like San Francisco, the Professional and Business Services (24.0%) and Information (11.0%) sectors have provided some of the greatest economic benefits to this subregion and account for more than one third of the total share of employment.

Additionally, service sectors including Education and Health Services (16.0%) and Leisure and Hospitality (9.7%) together make up one quarter of employment. In contrast to San Francisco, Manufacturing plays a larger role, representing 14.2% of employment across these two counties.

EXHIBIT 5.9 | San Mateo County and Santa Clara County employment in Q4 2022, by industry



Source: U.S. Bureau of Labor Statistics, 2023.

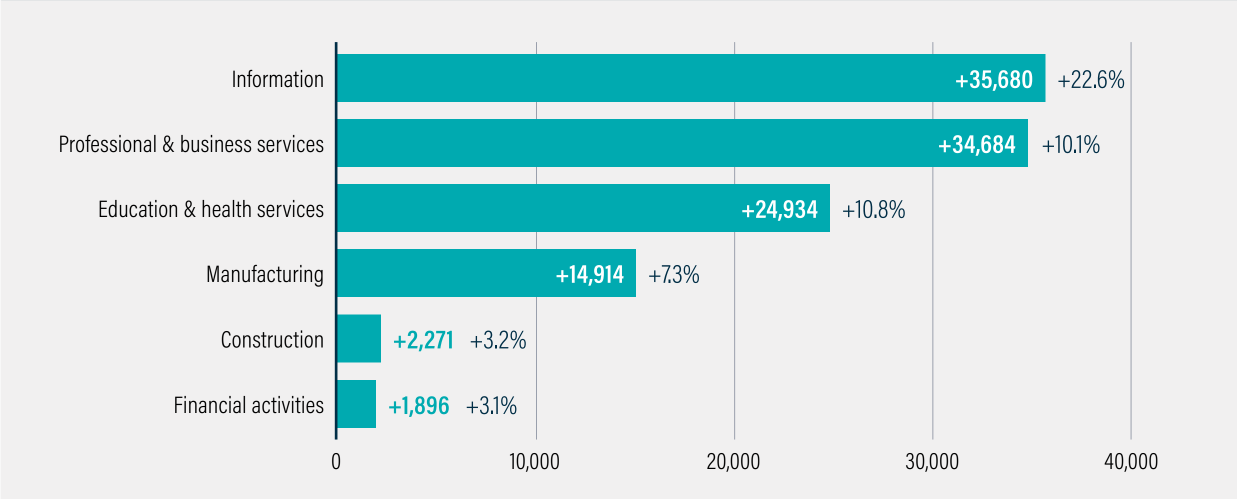
Note: Data are aggregated.

b. Growing industries and subsectors

Fittingly, Silicon Valley has experienced tremendous growth in employment in Information as well as Professional and Business Services and in complimentary industries like Education and Health Services (**Exhibit 5.10**). The concentration of web-related information technology companies—some of which are deemed in finance lingo as "unicorn" companies valued at more than $1 billion—have continued to expand their footprint with new office spaces and campuses, creating jobs in construction and other industries. Along a parallel track, there has been a strong growth in Manufacturing in the subregion. This growth has been primarily led by the semiconductor industry and computer and electronic product manufacturing.

Several subsectors across different industries have experienced growth of more than 1,000 jobs since 2017. Professional and Technical services, which includes professions like administrative services and management, legal services, scientific research, and computer systems and design, tops the list, adding more than 33,000 jobs and 1,800 establishments. As previously mentioned, the Computer and Electronic Product Manufacturing subsector has also experienced tremendous growth, adding more than 17,000 jobs during the same span. Subsectors in the services have also expanded, reflecting the increased demand for education, health care, and transportation industries (**Exhibit 5.11**).

EXHIBIT 5.10 | Growing industries in San Mateo and Santa Clara Counties



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.11 | Top 10 growing subsectors in San Mateo and Santa Clara Counties

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Professional & technical services	541	Professional & business services	1,800	33,501
Computer & electronic product manufacturing	334	Manufacturing	30	17,710
Ambulatory health care services	621	Education & health services	613	8,879
Social assistance	624	Education & health services	6,706	7,719
ISPs, search portals, & data processing	518	Information	154	7,628
Transportation equipment manufacturing	336	Manufacturing	55	6,088
Hospitals	622	Education & health services	-1	4,347
Educational services	611	Education & health services	348	4,024
Couriers & messengers	492	Trade, transportation, & utilities	79	3,303
Transit & ground passenger transport	485	Trade, transportation, & utilities	-16	2,561

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

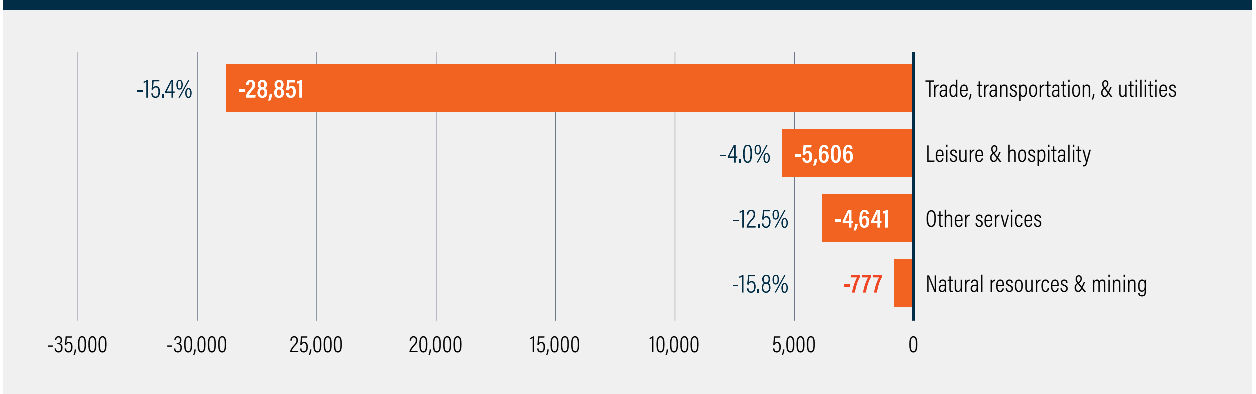
Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes to indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

c. Declining industries and subsectors

The trade, transportation, and utilities industry in San Mateo and Santa Clara Counties has experienced a significant decline in employment, with a loss of more than 28,000 jobs since (**Exhibit 5.12**). Like most other regions, the leisure and hospitality industry has been slow to recover post-pandemic, with a decline of more than 5,500 jobs.

As the home of two major airports—San Francisco International Airport (SFO) and San Jose Mineta International Airport (SJC)—the Air Transportation subsector, which provides air transportation of passengers and/or cargo, has experienced the largest decline in employment, with a loss of more than 8,000 jobs (**Exhibit 5.13**). Subsectors in the service industry, including food Services, Accommodation, Personal and Laundry Services, and Repair and Maintenance, have lost more than 10,000 jobs in aggregate since 2017. With the Bay Area region lagging behind other metro areas in terms of economic recovery, these subsectors represent a major indicator for the slowed recovery.

EXHIBIT 5.12 | Declining industries in San Mateo and Santa Clara Counties



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are aggregated. Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.13 | Top 10 declining subsectors in San Mateo and Santa Clara Counties

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Air transportation	481	Trade, transportation, & utilities	-12	-8,283
Electronic markets & agents/brokers	425	Trade, transportation, & utilities	-171	-3,844
Accommodation	721	Leisure & hospitality	36	-3,495
Food services & drinking places	722	Leisure & hospitality	463	-3,493
Merchant wholesalers, durable goods	423	Trade, transportation, & utilities	-47	-3,448
Motor vehicle & parts dealers	441	Trade, transportation, & utilities	3	-2,238
Personal & laundry services	812	Other services	182	-2,021
Repair & maintenance	811	Other services	-27	-1,620
Management of companies & enterprises	551	Professional & business services	-6	-1,324
Chemical manufacturing	325	Manufacturing	13	-1,314

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

d. Employment distribution

Like San Francisco, the high-tech industries (including Professional and Business Services and Information) have a larger share of employment than the region and state (**Exhibit 5.14**). This finding is particularly true for Information, which has a concentration of three times more jobs than the entire state. Manufacturing in this subregion also has a strong concentration in jobs, which is dominated by computer and semiconductor manufacturing and biotech manufacturing firms. The remaining industries collectively have a smaller share of employment when compared to the region and the state.

EXHIBIT 5.14 | San Mateo County and Santa Clara County location quotients

Industry	Employment	% Share of Employment	Bay Area Location Quotient	California Location Quotient
Professional & business services	345,111	24.0%	1.10	1.38
Education & health services	230,489	16.0%	0.95	0.92
Manufacturing	204,001	14.2%	1.37	1.76
Trade, transportation, & utilities	186,786	13.0%	0.87	0.68
Information	158,223	11.0%	1.61	3.02
Leisure & hospitality	139,217	9.7%	0.90	0.82
Construction	70,052	4.9%	0.86	0.89
Financial activities	60,265	4.2%	0.80	0.83
Other services	37,257	2.6%	0.79	0.79
Natural resources & mining	4,913	0.3%	0.68	0.14
Unclassified	1,617	0.1%	1.25	1.17

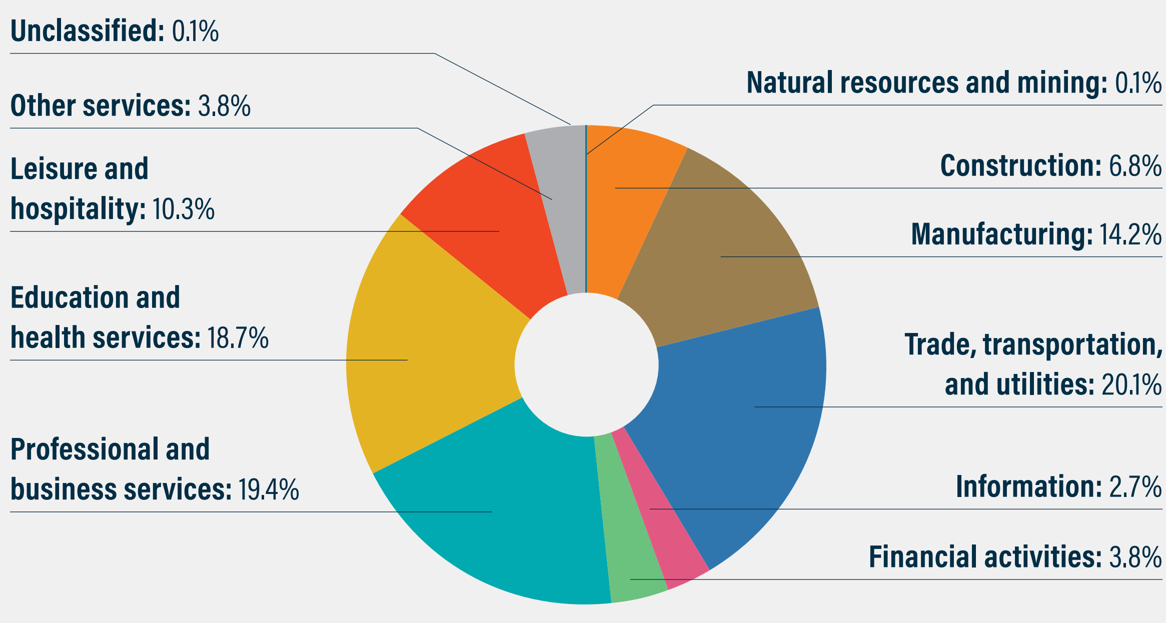
Source: U.S. Bureau of Labor Statistics, 2023.

iii. Alameda County

a. Employment by industry

Alameda County, located in the East Bay, enjoys one of the most strategic trade locations in the world, resulting in the largest share of its employment captured within the Trade, Transportation, and Utilities industry (**Exhibit 5.15**). The county provides critical goods movement infrastructure—the Port of Oakland, the Oakland International Airport, and various rail and highway infrastructure—which the rest of the Bay Area counties and greater Northern California rely on for both international and domestic markets. With core Bay Area cities, including Oakland, Alameda County and its 685,000 workers also boast a large share of employment in Professional and Business Services. Another key industry to highlight is Manufacturing (14.2%), which has emerged as a strong and resilient sector that will be key to the region's recovery.

EXHIBIT 5.15 | Alameda County employment in Q4 2022, by industry



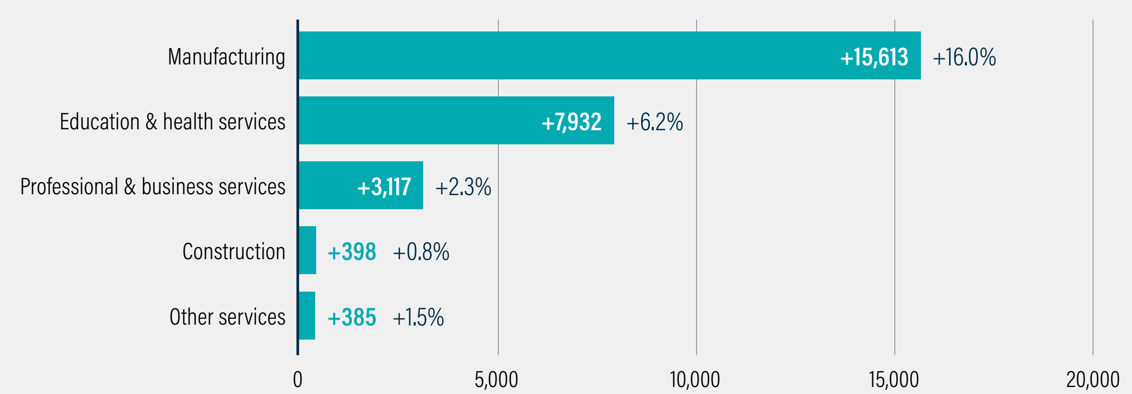
Source: U.S. Bureau of Labor Statistics, 2023.

b. Growing industries and subsectors

In 2021, East Bay Economic Development Alliance (East Bay EDA) received a grant from the U.S. Economic Development Administration (EDA) Economic Adjustment Assistance (EAA) Program for a project known as "Resilient East Bay" to support small to mid-sized businesses in manufacturing, transportation, distribution, logistics, and biomedical/life sciences in Alameda County as well as Contra Costa County, which is also part of the East Bay (East Bay EDA, n.d.). In 2019, these industries, combined with wholesale trade, represented 25% of the East Bay's gross regional product (GRP) at $202 billion (U.S. Bureau of Economic Analysis, 2022). Since 2017, the manufacturing industry in Alameda County has added more than 15,000 jobs, a 16% increase (**Exhibit 5.16**). While the COVID-19 pandemic caused major disruptions to the East Bay's economy, efforts from the private and public sectors have resulted in a resilient, emerging industry that will be key to economic mobility and recovery.

While there has been a major emphasis placed on Manufacturing, subsectors in Education, Health Care, Professional and Business Services, and Trade, Transportation, and Utilities have experienced growth in employment and establishments in the past five years (**Exhibit 5.17**). Particularly in Health Care, the Ambulatory Health Care Services subsector (including professions such as outpatient physicians, dentists, and other health practitioners) tops the list, adding nearly 8,000 jobs to the county.

EXHIBIT 5.16 | Growing industries in Alameda County



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.17 | Top 10 growing subsectors in Alameda County

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Ambulatory health care services	621	Education & health services	408	7,806
Warehousing & storage	493	Trade, transportation, & utilities	30	5,693
Professional & technical services	541	Professional & business services	1,314	5,077
Social assistance	624	Education & health services	3,559	4,278
Couriers & messengers	492	Trade, transportation, & utilities	81	4,154
Management of companies & enterprises	551	Professional & business services	-5	3,035
Computer & electronic product manufacturing	334	Manufacturing	31	2,736
Machinery manufacturing	333	Manufacturing	6	2,189
Miscellaneous manufacturing	339	Manufacturing	-2	2,034
ISPs, search portals, & data processing	518	Information	78	1,838

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

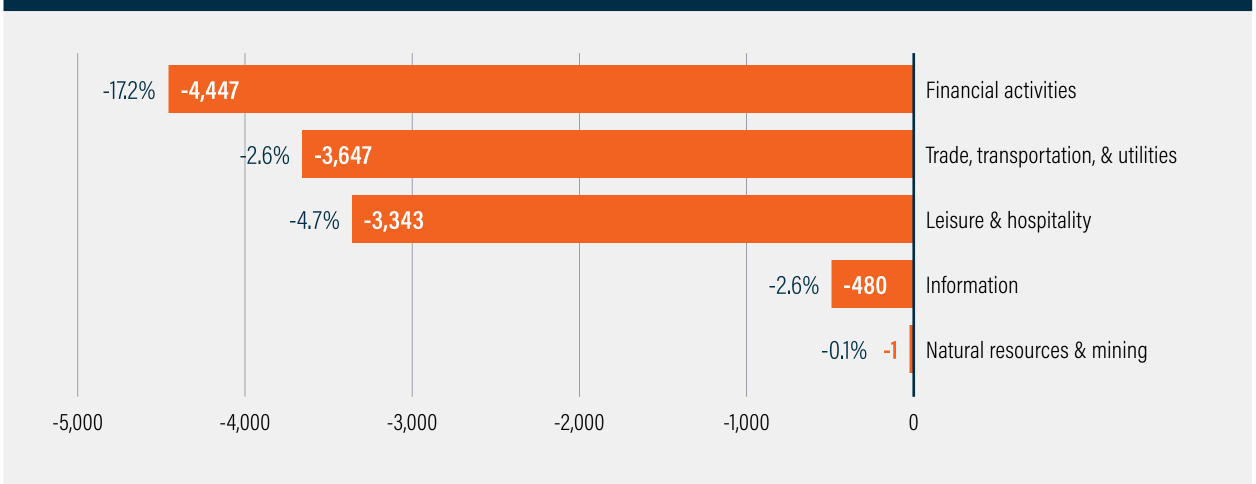
Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

c. Declining industries and subsectors

While Alameda County has a strong concentration of jobs in the Trade, Transportation, and Utilities industry, this industry has experienced a loss of more than 3,500 jobs, a 2.6% decrease, since 2017 (**Exhibit 5.18**). This finding is mostly attributed to the decline of retail trade, which was heavily impacted by the pandemic in 2020. Overall, Financial Activities was the industry hardest hit, resulting in a loss of nearly 4,500 jobs, a 17.2% decline, as of 2022. The largest losses were at banks, insurance firms, and car rental agencies (CalTrans, n.d.). This industry is expected to be relatively slow to recover.

While professional and business services experienced overall growth in employment, subsectors including Administrative and Support Services saw a decline of nearly 5,000 employees since 2017 (**Exhibit 5.19**). These lost jobs include occupations that support the day-to-day operations of other organizations. Job losses of subsectors in Merchant Wholesalers, Durable Goods, and Electronic Markets and Agents/Brokers also contributed to the overall decline of the Trade, Transportation, and Utilities industry.

EXHIBIT 5.18 | Declining industries in Alameda County



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.19 | Top 10 declining subsectors in Alameda County

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Administrative & support services	561	Professional & business services	289	-4,982
Food services & drinking places	722	Leisure & hospitality	366	-3,255
Hospitals	622	Professional & business services	-5	-3,179
Merchant wholesalers, durable goods	423	Trade, transportation, & utilities	-29	-3,135
Insurance carriers & related activities	524	Financial activities	-77	-2,735
Other information services	519	Information	-70	-2,608
Credit intermediation & related activity	522	Financial activities	-21	-1,761
Electronic markets & agents/brokers	425	Trade, transportation, & utilities	-93	-1,590
Chemical manufacturing	325	Manufacturing	10	-1,526
Nursing & residential care facilities	623	Education & health services	8	-1,206

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

d. Employment distribution

The growth in manufacturing in the East Bay has been supported by dedicated efforts in the region from the public and private sectors. As a result, Alameda County boasts a larger share of manufacturing jobs than the rest of the Bay Area and statewide. Additionally, with the Port of Oakland, Oakland International Airport, and warehouse infrastructure, Alameda County has a large concentration of Bay Area jobs in the Trade, Transportation, and Utilities sector. It is important to note that the concentration of jobs in the Professional and Business Services is lower than the share of those jobs in the Bay Area (**Exhibit 5.20**).

EXHIBIT 5.20 | Alameda County location quotients

Industry	Employment	% Share of Employment	Bay Area Location Quotient	California Location Quotient
Trade, transportation, & utilities	138,217	20.1%	1.27	1.00
Professional & business services	133,207	19.4%	0.84	1.05
Education & health services	128,741	18.7%	1.05	1.01
Manufacturing	97,438	14.2%	1.29	1.66
Leisure & hospitality	70,812	10.3%	0.90	0.81
Construction	47,003	6.8%	1.14	1.17
Financial activities	25,965	3.8%	1.08	1.08
Other services	25,880	3.8%	0.68	0.70
Information	18,220	2.7%	0.37	0.68
Natural resources & mining	920	0.1%	0.25	0.06
Unclassified	515	0.1%	0.78	0.74

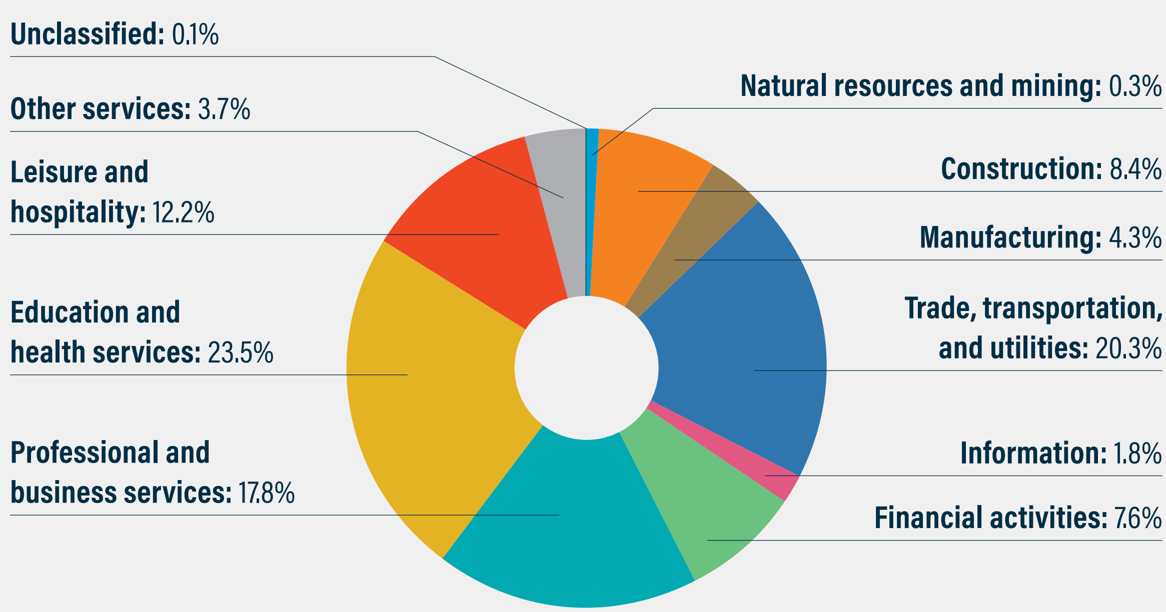
Source: U.S. Bureau of Labor Statistics, 2023.

iv. Contra Costa County

a. Employment by industry

Contra Costa County is home to a diverse array of industries. With nearly 325,000 workers, Education and Health Services composes the largest share of employment at 23.5%. (**Exhibit 5.21**). The Trade, Transportation, and Utilities sector composes the second-largest share of employment in the county, with most transportation in trucking and warehousing. Although the Manufacturing industry makes up 4.3% of employment, oil refineries—the leading manufacturing activity—are a principal employer in the county.

EXHIBIT 5.21 | Contra Costa County employment in Q4 2022, by industry



Source: U.S. Bureau of Labor Statistics, 2023.

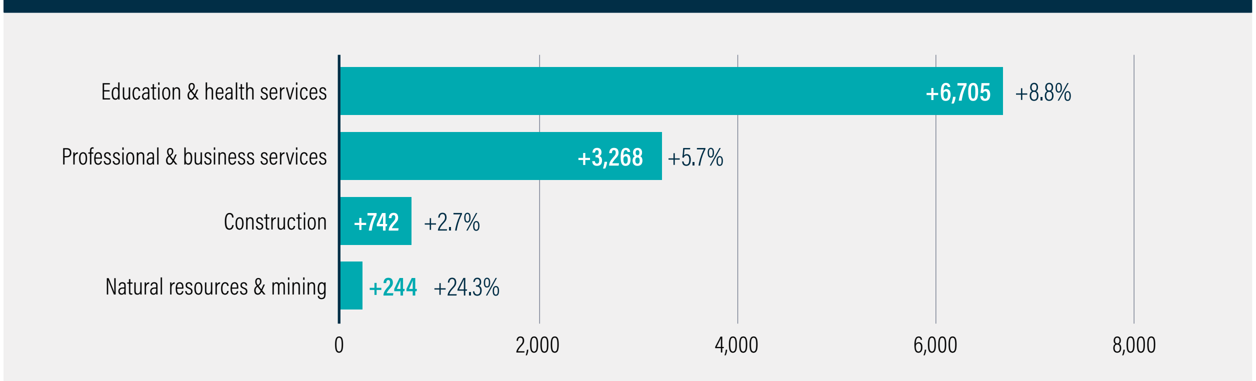
b. Growing industries and subsectors

The Education and Health Services industry experienced the largest and fastest growth of any sector in Contra Costa County in the past five years, adding more than 6,500 jobs, an 8.8% increase (**Exhibit 5.22**). In 2022, the Workforce Development Board of Contra Costa County held strategic meetings to bolster the healthcare workforce in alignment with the county's 2021-2024 Local Plan (Workforce Development Board of Contra Costa County, 2022). With the help of industry and education partners, the Contra Costa Economic Partnership has identified six high-demand careers in health care, along with barriers to training and employment in these fields.

Professional and Business Services also saw growth in employment, adding more than 3,000 jobs over the past five years, a 5.7% increase. This growth has been centered on scientific and technical services. With the surge of home prices in 2020—due to an increase in population and the shift towards remote work—the construction of new homes has increased employment within the Construction sector, with a net gain of almost 750 new jobs since 2017.

The growth of the Education and Health Services industry was led by the Social Assistance and Ambulatory Health Care Services subsectors, which include occupations such as social workers, childcare providers, and outpatient health practitioners, adding more than 6,500 jobs to the county (**Exhibit 5.23**). With the increased demand for residential and nonresidential buildings within Contra Costa County, subsectors in the Construction industry added more than 2,500 jobs in aggregate. Unlike other counties in the Bay Area, Food and Beverage Stores saw an increase of more than 50 establishments, increasing employment in retail trade by more than 2,000 jobs in the past five years.

EXHIBIT 5.22 | Growing industries in Contra Costa County



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.23 | Top 10 growing subsectors in Contra Costa County

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Social assistance	624	Education & health services	3,210	4,346
Ambulatory health care services	621	Education & health services	263	3,211
Professional & technical services	541	Professional & business services	692	2,486
Food & beverage stores	445	Trade, transportation, & utilities	53	2,206
Construction of buildings	236	Construction	260	1,778
Administrative & support services	561	Professional & business services	212	1,484
Warehousing & storage	493	Trade, transportation, & utilities	13	1,434
Couriers & messengers	492	Trade, transportation, & utilities	43	1,342
Specialty trade contractors	238	Construction	308	747
Water transportation	483	Trade, transportation, & utilities	5	592

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

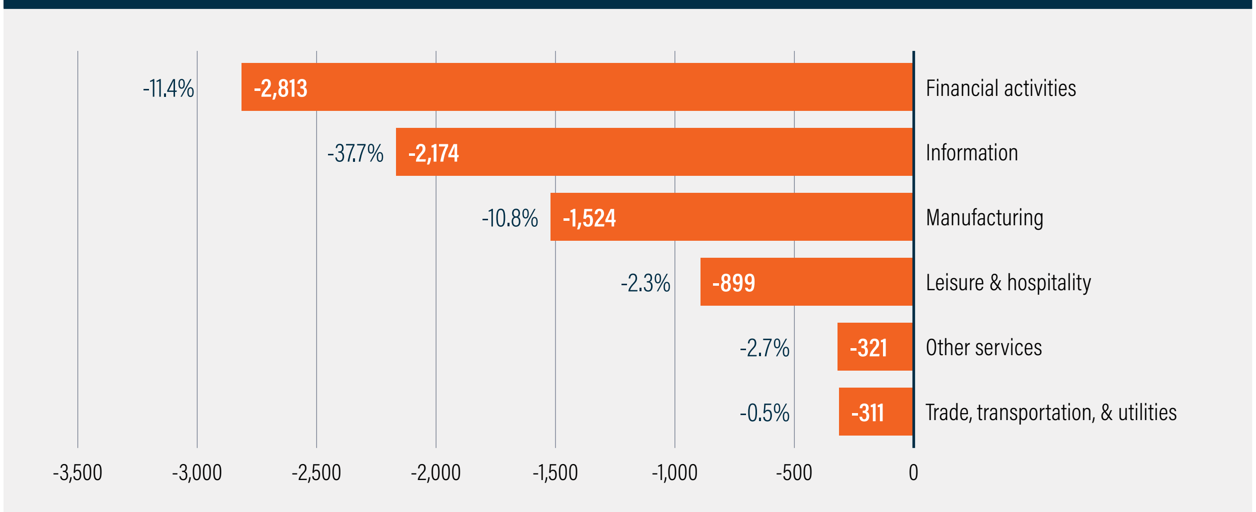
c. Declining industries and subsectors

Financial Activities has experienced large job losses in Contra Costa County over the past five years, with the largest losses attributed to banks (**Exhibit 5.24**). In Contra Costa, telecommunications dominates the Information sector, which saw a loss of more than 2,000 jobs since 2017, nearly 38% decline. While the Manufacturing industry serves as a pillar of employment in the county, particularly in oil refining, the industry has been steadily declining over the past years, with a loss of more than 1,500 jobs, a 10.8% decline.

The declining employment of subsectors within Contra Costa County is spread across a diverse array of industries. As noted in the previous subsection, the decline in the Financial Activities industry can be attributed to banks, more specifically credit intermediation and related activity, which lost almost 2,700 jobs over five years. Offset by gains in Warehousing, Food and Beverage Stores, and Water Transportation, subsectors in the Trade, Transportation, and Utilities industry (including Merchant Wholesalers, Electronic Markets, and Motor Vehicle and Parts Dealers) lost more than 3,750 jobs since 2017 (**Exhibit 5.25**).

With oil refinery activity on the decline due to consolidations and shutdowns of different facilities, the Petroleum and Coal Products Manufacturing subsector experienced a decrease of more than 1,500 jobs. Similarly, Telecommunications has been impacted by consolidation, losing almost 1,750 jobs during the same time span.

EXHIBIT 5.24 | Declining industries in Contra Costa County



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.25 | Top 10 declining subsectors in Contra Costa County

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Credit intermediation & related activity	522	Financial activities	-33	-2,698
Merchant wholesalers, durable goods	423	Trade, transportation, & utilities	25	-2,016
Heavy & civil engineering construction	237	Construction	-3	-1,783
Telecommunications	517	Information	-32	-1,743
Petroleum & coal products manufacturing	324	Manufacturing	-2	-1,501
Electronic markets & agents/brokers	425	Trade, transportation, & utilities	-209	-1,221
Management of companies & enterprises	551	Professional & business services	-9	-923
Motor vehicle & parts dealers	441	Trade, transportation, & utilities	-10	-574
Accommodation	721	Leisure & hospitality	13	-542
Hospitals	622	Education & health services	2	-538

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data were dropped from this analysis.

d. Employment distribution

There is significant employment concentration in the Services sector in Contra Costa County—the Education and Health Services, Leisure and Hospitality, and Other Services industries all have larger shares of employment in these industries, compared to the region (**Exhibit 5.26**). The concentration of employment in the Construction industry is also 1.41 times that of the concentration of construction jobs in the Bay Area, making Contra Costa County a regional hub for construction-related employment.

EXHIBIT 5.26 | Contra Costa County location quotients

Industry	Employment	% Share of Employment	Bay Area Location Quotient	California Location Quotient
Education & health services	75,988	23.5%	1.32	1.28
Trade, transportation, & utilities	65,908	20.3%	1.29	1.01
Professional & business services	57,687	17.8%	0.78	0.97
Leisure & hospitality	39,415	12.2%	1.07	0.97
Construction	27,239	8.4%	1.41	1.45
Financial activities	24,641	7.6%	1.38	1.43
Manufacturing	14,051	4.3%	0.40	0.51
Other services	12,072	3.7%	1.08	1.07
Information	5,767	1.8%	0.25	0.46
Natural resources & mining	1,003	0.3%	0.58	0.12
Unclassified	269	0.1%	0.87	0.82

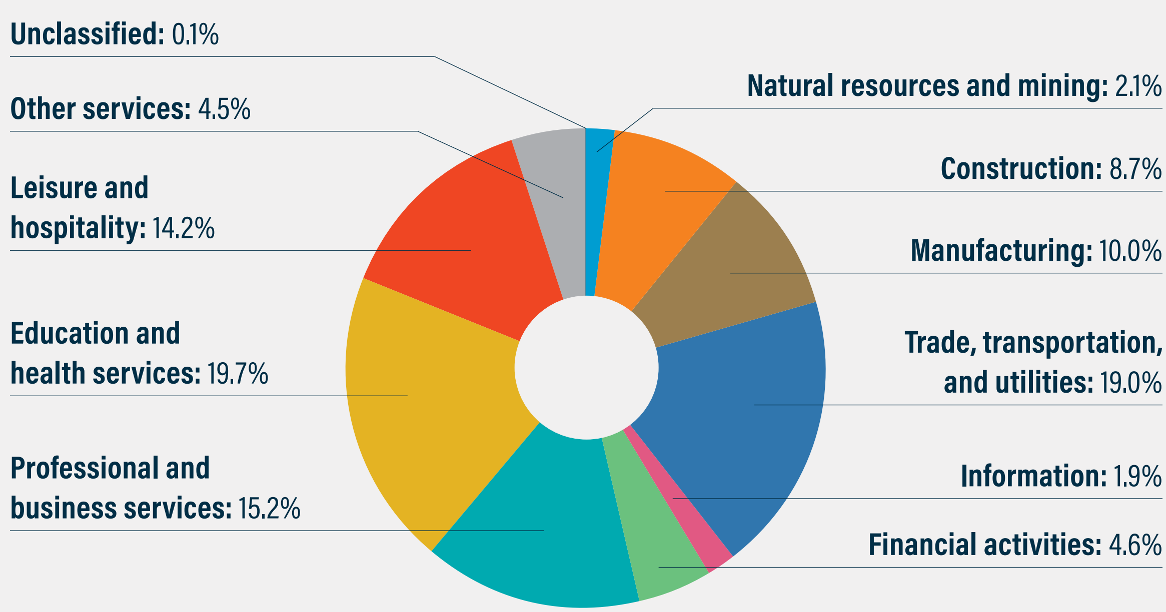
Source: U.S. Bureau of Labor Statistics, 2023.

v. Marin and Sonoma Counties

a. Employment by industry

Located in the North Bay, Marin County, the smallest county in the Bay Area by geography and population, and Sonoma County, which borders Marin to the north, have the largest share of employment in the Education and Health Services industry, making up nearly one fifth of the total employment in the subregion (**Exhibit 5.27**). With concentrations in pharmaceutical manufacturing, breweries, and wineries, the Manufacturing industry composes 10% of employment.

EXHIBIT 5.27 | Marin County and Sonoma County employment in Q4 2022, by industry



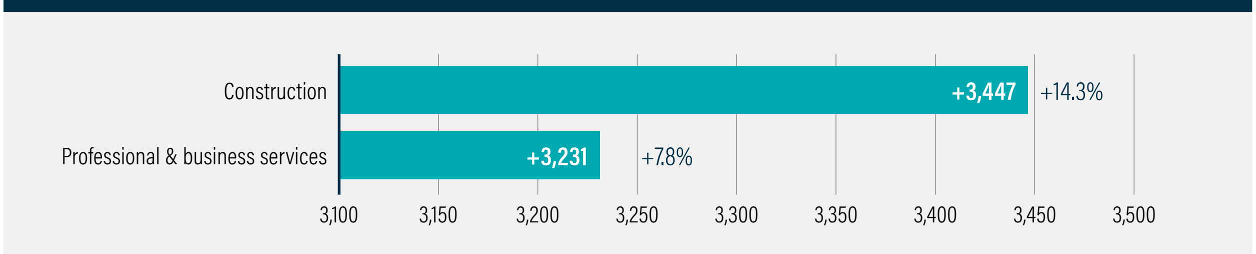
Source: U.S. Bureau of Labor Statistics, 2023.

b. Growing industries and subsectors

Employment gains in this subregion have only been seen in the Construction and Professional and Business Services industries, each of which increased employment by more than 3,000 workers since 2017 (**Exhibit 5.28**). In the wake of the devastating fires in Sonoma County in 2018, the substantial volume of home rebuilds fueled this growth. Construction in Marin County, on the other hand, has generally been limited but is expected to grow with the hefty requirement of 3,569 new housing units by 2031 issued by the California Department of Housing and Community Development (HCD) in accordance with the Association of Bay Area Government's Regional Housing Needs Allocation (RHNA) plan (County of Marin, 2023).

The top 10 growing subsectors by employment in the Marin and Sonoma Counties subregion are concentrated in five industries: Construction; Professional and Business Services; Education and Health Services; Manufacturing; and Trade, Transportation, and Utilities (**Exhibit 5.29**). As noted previously, in wake of the devastating fires in 2018, there has been a major increase in the construction of buildings, particularly the rebuilding of homes, with defensible space and resilient building materials, which is captured in the gain of nearly 3,000 construction jobs.

EXHIBIT 5.28 | Growing industries in Marin and Sonoma Counties



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.29 | Top 10 growing subsectors in Marin and Sonoma Counties

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Specialty trade contractors	238	Construction	246	2,099
Administrative & support services	561	Professional & business services	119	2,025
Construction of buildings	236	Construction	244	994
Computer & electronic product manufacturing	334	Manufacturing	14	701
Ambulatory health care services	621	Education & health services	168	673
Professional & technical services	541	Professional & business services	402	655
Accommodation	721	Education & health services	20	514
Couriers & messengers	492	Trade, transportation, & utilities	15	495
Utilities	221	Trade, transportation, & utilities	18	426
Air transportation	481	Trade, transportation, & utilities	5	410

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

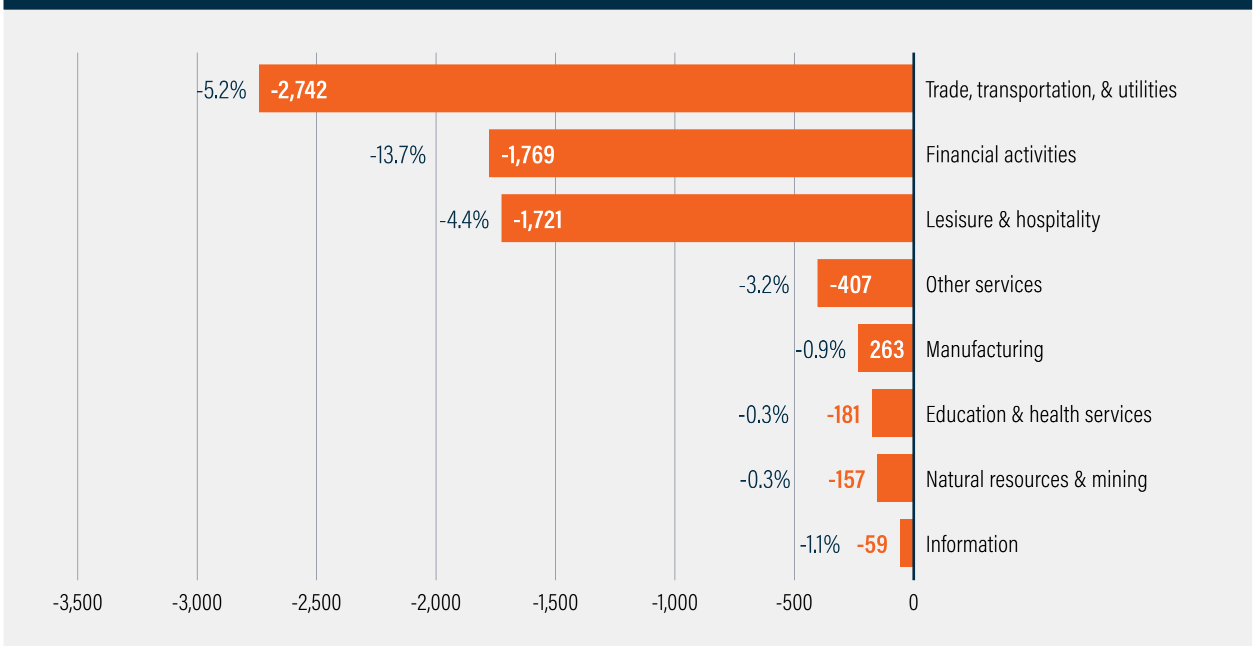
Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes to indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data was dropped from this analysis.

c. Declining industries and subsectors

Compared to other subregions, the Marin and Sonoma Counties subregion experienced a decline in employment across the largest array of industries, with eight in decline from 2017 to 2022 (**Exhibit 5.30**). As a result of the pandemic, Retail Trade and the Leisure and Hospitality sectors have struggled to recover jobs. Trade, Transportation, and Utilities was the most impacted, with a loss of almost 2,750 jobs, and the Leisure and Hospitality industry lost more than 1,700. Financial Activities, specifically occupations in real estate, banks, and insurance firms, also saw an aggregated decline in employment since 2017, losing more than 1,700 jobs. Even with the largest share of employment concentrated in Education and Health Care, this subregion is the only one to experience a decline in employment in this industry.

Declining subsectors in this subregion are aggregated within the Leisure and Hospitality and Trade, Transportation, and Utilities industries (**Exhibit 5.31**). The Retail Trade and Hospitality sector was negatively impacted in 2020 because of the shutdowns and restrictions affecting food services, drinking places, and brick-and-mortar shops.

EXHIBIT 5.30 | Declining industries in Marin and Sonoma Counties



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.31 | Top 10 declining subsectors in Marin and Sonoma Counties

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Food services & drinking places	722	Leisure & hospitality	-2	-1,804
Credit intermediation & related activity	522	Financial activities	-46	-1,152
Amusement, gambling & recreation industry	713	Leisure & hospitality	48	-733
Social assistance	624	Education & health services	667	-635
Merchant wholesalers, nondurable goods	424	Trade, transportation, & utilities	-1	-581
Plastics & rubber products manufacturing	326	Manufacturing	-25	-535
Electronic markets & agents/brokers	425	Trade, transportation, & utilities	-35	-519
Motor vehicle & parts dealers	441	Trade, transportation, & utilities	3	-484
Personal & laundry services	812	Other Services	108	-359
Beverage & tobacco product manufacturing	312	Manufacturing	69	-349

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes to indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data was dropped from this analysis.

d. Employment distribution

Compared to the Bay Area as a whole, the Marin and Sonoma Counties subregion has a greater concentration of employment across a wide array of industries, including Education and Health Services (1.1 times that of the region), Trade, Transportation, and Utilities (1.2 times), Leisure and Hospitality (1.25 times), Construction (1.46 times), Other Services (1.3 times), and Natural Resources and Mining (3.84 times) (**Exhibit 5.32**). In comparison to the state, this subregion has a 1.5 times greater concentration of jobs in construction, which has been attributed to the rebuilding of the North Bay in the wake of the 2018 fires.

EXHIBIT 5.32 | Marin County and Sonoma County location quotients

Industry	Employment	% Share of Employment	Bay Area Location Quotient	California Location Quotient
Education & health services	54,522	19.7%	1.10	1.07
Trade, transportation, & utilities	52,669	19.0%	1.20	0.94
Professional & business services	42,134	15.2%	0.66	0.83
Leisure & hospitality	39,439	14.2%	1.25	1.13
Manufacturing	27,724	10.0%	0.91	1.17
Construction	24,178	8.7%	1.46	1.50
Financial activities	12,889	4.6%	0.84	0.87
Other services	12,555	4.5%	1.30	1.30
Natural resources & mining	5,688	2.1%	3.84	0.78
Information	5,323	1.9%	0.27	0.50
Unclassified	303	0.1%	1.15	1.08

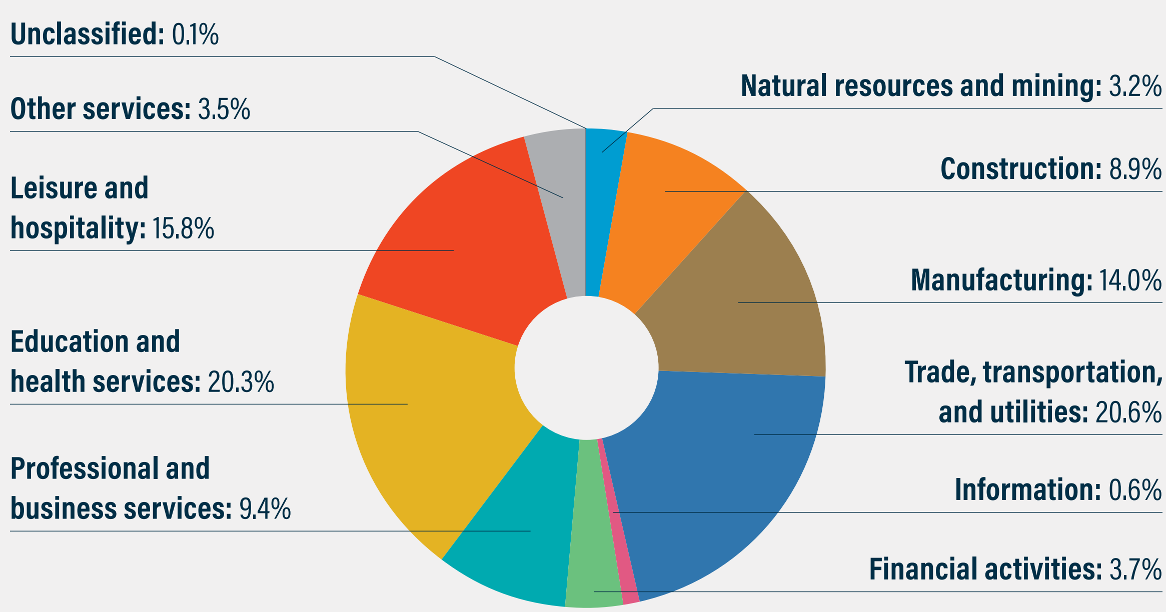
Source: U.S. Bureau of Labor Statistics, 2023.

vi. Napa and Solano Counties

a. Employment by industry

Located in the North Bay, Napa County, home of world-renowned wineries, and Solano County, with its rolling hillsides and fertile farmland, have the largest shares of employment in the Trade, Transportation, and Utilities industry and Education and Health Services, together making up 40% of total employment in the subregion (**Exhibit 5.33**). Compared to other Bay Area counties, this subregion has the largest share of employment in the Leisure and Hospitality sector at 15.8%.

EXHIBIT 5.33 | Napa County and Solano County employment in Q4 2022, by industry



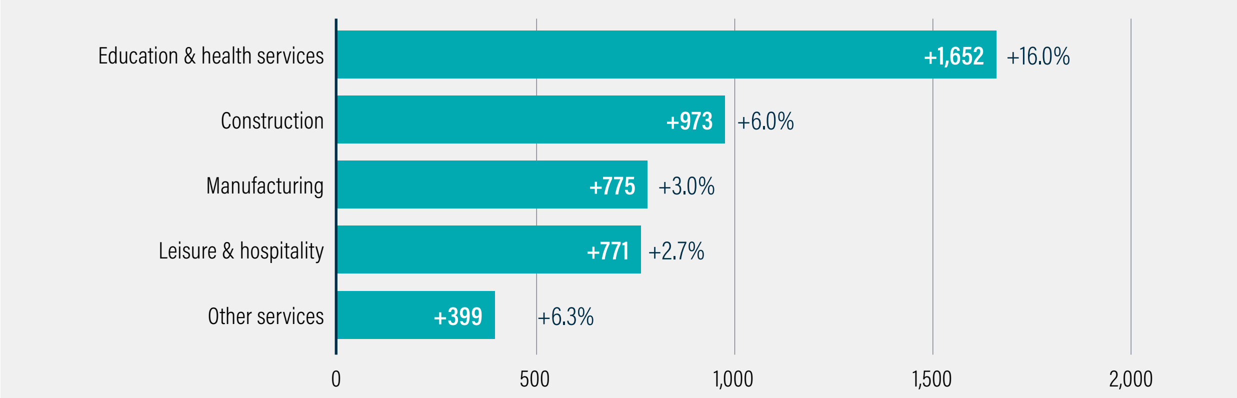
Source: U.S. Bureau of Labor Statistics, 2023.

b. Growing industries and subsectors

The Napa and Solano Counties subregion experienced a growth in employment in industries such as Education and Health Services, adding 1,652 jobs (+4.5%), Construction, adding 973 jobs (+6.0%), and Manufacturing, adding 775 jobs (+3.0%) over the past five years (**Exhibit 5.34**). This subregion was the only one to experience growth in the Leisure and Hospitality sector, adding 771 jobs (+2.7%) since 2017. This increase is attributed to strong growth in the Food Services and Drinking Places subsector which added 1,344 jobs over the previous five years—significant growth in this industry pre-pandemic was offset by job losses during the depth of the pandemic.

Growth in the Leisure and Hospitality industry and Manufacturing industry can be attributed to significant growth in food- and beverage-related subsectors (**Exhibit 5.35**). Job growth in Ambulatory Health Care Services helped bolster the Education and Health Services industry, adding more than 2,400 jobs. Similar to the Marin and Sonoma Counties subregion, employment growth in the Construction industry is a result of the need for the construction of buildings and heavy-duty construction projects, which added more than 1,100 jobs over the five-year span.

EXHIBIT 5.34 | Growing industries in Napa and Solano Counties



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.35 | Top 10 growing subsectors in Napa and Solano Counties

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Ambulatory health care services	621	Education & health services	161	2,408
Food services & drinking places	722	Leisure & hospitality	112	1,344
Beverage & tobacco product manufacturing	312	Manufacturing	71	1,205
Insurance carriers & related activities	524	Financial activities	124	1,138
Food manufacturing	311	Manufacturing	10	839
Couriers & messengers	492	Trade, transportation, & utilities	18	809
Warehousing & storage	493	Trade, transportation, & utilities	30	653
Heavy & civil engineering construction	237	Construction	-5	601
Construction of buildings	236	Construction	111	563
Transportation equipment manufacturing	336	Manufacturing	6	445

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

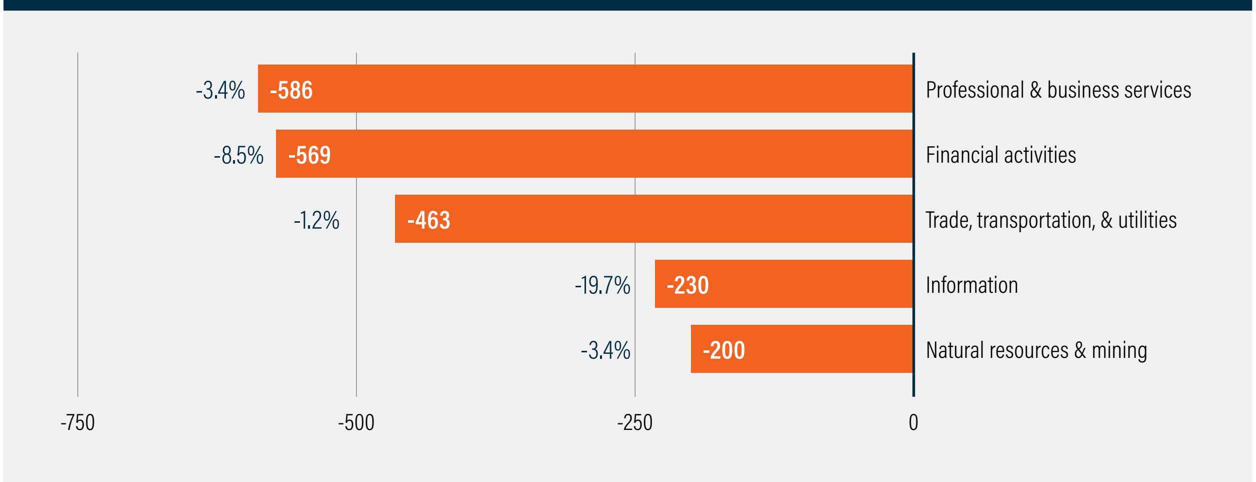
Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data was dropped from this analysis.

c. Declining industries and subsectors

Contrary to the other subregions, the Napa and Solano Counties subregion experienced the greatest loss in employment in the Professional and Business Services industry, with a decline of 586 jobs (-3.4%) since 2017 (**Exhibit 5.36**). Other industries—including Financial Activities, Information, and Trade, Transportation, and Utilities—also experienced a decline in employment over the five-year span. Even with the subregion's fertile farmland and prominent wineries, the Natural Resources and Mining sector also saw a decline in employment, losing 200 jobs (-3.4%) over the past five years.

While the Manufacturing industry experienced an overall growth in employment, the Chemical Manufacturing subsector lost 2,061 jobs in the past five years (**Exhibit 5.37**). The decline in the Professional and Business services industry can be attributed to the Administrative and Support Services and Management of Companies and Enterprises subsectors, which collectively lost more than 1,100 jobs. Due to restrictions during the pandemic, the Scenic and Sightseeing Transportation subsector experienced a loss of 338 jobs.

EXHIBIT 5.36 | Declining industries in Napa and Solano Counties



Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates.

EXHIBIT 5.37 | Top 10 declining subsectors in Napa and Solano Counties

Difference in establishments and employment (Q4 2017 - Q4 2022)

Subsector	NAICS Code	Major Industry	Establishments	Employment
Chemical manufacturing	325	Manufacturing	6	-2,061
Administrative & support services	561	Professional & business services	91	-844
Hospitals	622	Education & health services	-3	-469
Electronic markets & agents/brokers	425	Trade, transportation, & utilities	-26	-442
Amusement, gambling & recreation industry	713	Leisure & hospitality	13	-424
Credit intermediation & related activity	522	Financial activities	-18	-385
Scenic & sightseeing transportation	487	Trade, transportation, & utilities	-9	-338
Plastics & rubber products manufacturing	326	Manufacturing	-1	-296
Management of companies and enterprises	551	Professional & business services	-5	-288
Nonmetallic mineral product manufacturing	327	Manufacturing	-5	-223

Source: U.S. Bureau of Labor Statistics, 2018, 2023.

Note: Data are from each respective year (Q4 2017 and Q4 2022). The three-digit NAICS codes indicate subsectors. The difference is calculated via the following equation: Q4 2022 employment estimates – Q4 2017 employment estimates. Suppressed data was dropped from this analysis.

d. Employment distribution

With a broad mix of industries making up its employment mix, the distribution of employment in Napa and Solano Counties is similar to the rest of the region. Outliers exist in the Natural Resources and Mining industry, which has 4.4 times greater concentration of employment than the Bay Area as a whole, and the Professional and Business Services industry, which has the lowest concentration of jobs compared to the greater region (**Exhibit 5.38**).

EXHIBIT 5.37 | Napa County and Solano County location quotients

Industry	Employment	% Share of Employment	Bay Area Location Quotient	California Location Quotient
Trade, transportation, & utilities	37,594	20.6%	0.96	0.75
Education & health services	37,143	20.3%	0.84	0.81
Leisure & hospitality	28,787	15.8%	1.02	0.92
Manufacturing	25,511	14.0%	0.94	1.20
Professional & business services	17,142	9.4%	0.30	0.38
Construction	16,230	8.9%	1.09	1.13
Financial activities	6,733	3.7%	0.49	0.51
Other services	6,383	3.5%	0.74	0.74
Natural resources & mining	5,863	3.2%	4.41	0.90
Information	1,169	0.6%	0.07	0.12
Unclassified	150	0.1%	0.63	0.59

Source: U.S. Bureau of Labor Statistics, 2023.

D. Regional Growth Opportunities

Overall, we can highlight areas of job growth in the Bay Area across a number of industries and their subsectors:

1. Green economy-related production (e.g., renewable fuels);
2. Health care (e.g., community health workers, laboratory technicians);
3. Construction workers to meet the Bay Area's housing needs (e.g., electricians, plumbers, other skilled trades);
4. Advanced manufacturing (e.g., machinists, quality-control workers); and
5. Child care and early childhood education (e.g., childcare operators, transitional kindergarten teachers)

i. Green economy-related production

As a worldwide leader in climate change mitigation, the state and the California Air Resources Board (CARB) released its updated proposal in November 2022 to achieve net zero carbon emissions by 2045. This climate action plan is the most ambitious of any jurisdiction in the world, taking unprecedented steps to drastically slash pollution and accelerate the transition to clean energy. The roadmap of California's climate plan includes reducing air pollution by 71%, slashing greenhouse gas (GHG) emissions by 85%, and dropping gas consumption by 94%. This plan is estimated to create 4 million new jobs across the state and save Californians $200 billion in healthcare costs due to pollution (Office of Governor Gavin Newsom, 2022).

California's ambitious goal of achieving net-zero emissions by 2045 is expected to stimulate job growth across various industries, paving the way for a new era of sustainable economic development. The shift toward this greener economy will create employment opportunities across several key sectors:

Renewable Energy: Clean energy sources like wind, solar, and hydroelectric power will fuel a surge in renewable energy jobs. The construction, manufacturing, maintenance, and operation of renewable energy facilities, such as wind turbines, will require a skilled workforce.

Electric Vehicles: To reduce car emissions, California promotes electric vehicle (EV) adoption to phase out gasoline-powered vehicles. This shift will generate manufacturing and maintenance jobs for EVs and charging infrastructure. These new jobs include roles in car and battery design and production, assembly, and charging station installation and maintenance.

Energy Efficiency and Green Infrastructure: To reduce emissions, California will prioritize energy-efficient technologies and building practices, along with substantial investments in green infrastructure projects. The California Electric Homes Program (CalEHP) initiative, which provides technical assistance and financial incentives to residential developers and builders constructing new, market-rate homes with all-electric appliances and equipment will serve as a key component to reach these goals and create new jobs through the training and upskilling of workers (California Energy Commission, 2023). Additionally, the shift toward clean energy in places such as Contra Costa and Solano Counties, which are home to several refineries, has the potential to reshape their workforce to meet these new demands.

Agriculture: There is a concerted effort to adopt sustainable farming and forestry practices across the state to reduce emissions. With increased investment, job opportunities will emerge in sustainable land management, reforestation, and innovation of agricultural equipment and procedures.

Transportation: Like EVs, the state's commitment to the reduction of emissions from transportation by electrifying public transportation systems and building supporting infrastructure, transit-oriented development, and the construction or enhancement of infrastructure for pedestrians and bicyclists will create jobs of all skill levels across industries.

Environmental Services: With strengthened environmental regulations, there will be a growing demand for professionals in environmental consulting, monitoring, and compliance. Pertinent occupations include scientists, engineers, auditors, lawyers, and more.

Education and Training: With the shift towards a greener economy, there will be a need for workforce training programs and educational initiatives to equip workers with the skills required for jobs across industries. Greening industries will thus create job opportunities in the education and training sector.

Research and Innovation: California's initiative of net zero emissions will require continuous research and innovation in clean technology and sustainable practices. This process will lead to job growth in research institutions, tech companies, and startups.

Key regional data points

- The majority of the wind/solar/electrical five-digit NAICS codes employment data are suppressed, e.g., Electric Power Generation (NAICS 22111), however, construction data is readily available, which will be a focal point for renewable energy and electrification.
- Residential Building Construction (NAICS 23611) saw an increase of 5,090 jobs (+16.9%) since 2017.
- Commercial Building Construction (NAICS 23622) boomed, with even greater increase by adding 10,162 jobs (+87.2%) since 2017.
- With a shift toward the electrification of homes across the state, Electrical Contractors (NAICS 23821) gained 4,379 jobs (+8.7%) over the five-year span.
- Plumbing and HVAC Contractors (NAICS 23822) saw an increase of 1,230 jobs (+7.9%) since 2017.
- Electrical Equipment Manufacturing (NAICS 33531) gained 1,670 jobs (+183.1%) as an emerging subsector. It is important to note that three counties (Marin, Napa, and Solano) had suppressed data in this category (U.S. Bureau of Labor Statistics, 2018, 2023).

California's commitment to achieving a carbon-neutral economy by 2045 is not only an environmental imperative, but also an economic opportunity for workers regionally and across the state. The transition into a green economy will generate a wide range of job and career opportunities, fostering economic growth while addressing pressing challenges of climate change.

ii. Health care

The Bay Area's healthcare sector is primed for growth due to various factors. With the growing demand for healthcare services, the demand for jobs in health care will evolve due to the following:

Population Growth and Aging: The Bay Area's population is projected to keep growing, and an aging demographic will increase the demand for healthcare services (Beck & Johnson, 2015). This increasing demand will lead to a need for more healthcare professionals, including doctors, nurse practitioners, nurses, lab workers, healthcare aids, etc., to provide care for an older and larger population.

Healthcare Access: California is committed to providing and improving equitable healthcare access, especially in underserved areas. With initiatives to expand Medi-Cal and increase the number of community health centers paired with the heightened need to provide culturally competent care will require more healthcare workers and jobs in outreach services to provide accessible care to residents, particularly in rural and low-income communities (Department of Health Care Services, 2023). Additionally, the region is likely to pioneer innovative care models. Professionals in care coordination, population health management, and healthcare administration will all be in demand.

Tech-Enabled Health Care: The Bay Area is uniquely positioned to develop and integrate technology in health care, increasing demand for professionals skilled in healthcare IT, data analysis, telemedicine, and the development and deployment of healthcare apps and platforms.

Additionally, as a hub for startups, the digital health sector is positioned to grow in areas such as health tech for preventative and lifestyle medicine through wearable devices and AI-driven diagnostics, creating jobs in product development, marketing, and management.

Biotechnology and Life Sciences: With the concentration of biotech and pharmaceutical companies, the Bay Area is at the forefront of research and innovation in life sciences. This biotech boom will drive the need for researchers, scientists, lab technicians, clinical trial specialists, and supporting roles in marketing, sales, and administration.

Mental Health and Well-Being: The emphasis on mental health is growing. The Bay Area will require more psychiatrists, psychologists, counselors, and social workers to address the mental health needs of its population.

Healthcare Policy and Advocacy: The Bay Area's continued engagement in healthcare policy and advocacy efforts will continue to create demand for professionals who can navigate healthcare regulations, advocate for healthcare reform, and help shape the future of policy decisions, both regionally and statewide.

Key regional data points

» The healthcare sector added more than 45,000 jobs in the Bay Area from 2017 to 2023.

» Services for the Elderly and Disabled (NAICS 62412) saw an increase of 18,244 jobs (+16%) since 2017.

» Offices of Physicians (NAICS 62111) saw an increase of 4,500 jobs (+11.4%). This growth includes establishments of health practitioners having the degree of M.D. (Doctor of Medicine) or D.O. (Doctor of Osteopathy) primarily engaged in the practice of general or specialized medicine or surgery. Occupations include cardiologists, medical doctors, orthopedic surgeons, physicians, and radiologists.

» Other Outpatient Care Centers (NAICS 62149) saw an increase of 7,206 jobs (+13.3%) from 2017 in places such as dialysis centers and clinics, outpatient community health centers and clinics, and health maintenance organization (HMO) medical centers and clinics (U.S. Bureau of Labor Statistics, 2018, 2023).

The Bay Area's healthcare job landscape in the future is best characterized by a fusion of technology and healthcare innovation, with a focus on preventative care and the pursuit of health equity for the entire population. Through this lens, there will be a growing demand for healthcare workers across various specialties to meet the evolving needs of the region's population.

iii. Construction

Driven by the demand for new housing, infrastructure, commercial real estate, and sustainable building, the Bay Area's construction industry has significant potential for growth in the future:

Housing Construction: As the Bay Area continues to face an ongoing housing shortage, an increased demand for residential construction—including apartment buildings, single-family homes, affordable and mixed-use housing units—will lead to more jobs in construction, architecture, and real estate development. In 2022, the California Department of Housing and Community Development (HCD) approved the ABAG Regional Housing Needs Allocation (RHNA) Plan, which requires the Bay Area to plan for and revise local zoning to accommodate 441,176 units of additional housing units during the 2023-2031 period (Association of Bay Area Governments, 2022). This enhanced enforcement of housing unit construction to address housing affordability challenges and the emphasis on mixed-use developments that combine residential, commercial, and retail spaces will have a significant impact on current and future employment within the construction industry.

Infrastructure Development: The region will require extensive investment in infrastructure, including roads, bridges, public transportation systems, EV charging stations, and airports. This shift will generate job opportunities in construction, civil engineering, and urban planning.

Green and Sustainable Building: As mentioned in the section on the Bay Area's path toward a green economy, the commitment to sustainability and green building practices will have a significant positive impact on employment in the construction sector. This will lead to a growing demand for professionals and expertise in sustainable construction techniques, renewable energy integration, and LEED certification.

Seismic Retrofitting: The region's vulnerability to earthquakes mean ongoing needs for seismic retrofitting of existing structures, creating opportunities for structural engineers, contractors, laborers, architects, and safety experts.

Safety and Regulation Compliance: As construction regulations become more stringent, there will be an increased need for safety inspectors, code compliance experts, and professionals in construction law and regulations.

Workforce Education and Training: To bolster the workforce in the construction industry, the development of current and future construction workers must be led by programs and initiatives. Such educational opportunities are particularly important within the trades, which can upskill and train future employees of all backgrounds to become certified and start working in construction as carpenters, electricians, plumbers, roofers, general contractors, and more. The collaboration of unions, trades, public and private partnerships, and companies can help foster and develop the construction workforce of the future.

The Bay Area's construction sector will be driven by a diverse range of projects, including housing, infrastructure, green building, and tech-driven initiatives. With a strong focus on housing affordability, infrastructure improvements, sustainability, and innovation, the construction industry will continue to be a significant share of employment and economic growth in the region.

iv. Advanced manufacturing

High-value research and development continues to be a strength of the Bay Area. Much of the R&D is directly tied to the manufacturing process. Rebuilding and bringing advanced manufacturing back to the forefront will require the development of a digitally capable workforce, supported by California's state universities, community colleges, and industry. With new opportunities emerging in the manufacturing sector, the future of the advanced manufacturing in the Bay Area has the potential to grow across various sectors as follows:

Semiconductor Industry: The Bay Area is a key player in the semiconductor and microelectronics manufacturing with the largest concentration of semiconductor jobs in the United States (Semiconductor Industry Association, 2019). In 2022, President Biden signed into law the CHIPS and Science Act of 2022, which contains $278 billion in new funding, with $52.7 billion appropriated for semiconductor manufacturing, research, and workforce development, along with another $24 billion in tax credits allocated for chip production (The White House, 2022). If California is successful in attaining this funding, in addition to supporting national security goals and economic competitiveness, new investment in chip manufacturing is expected to bring major economic benefits to the region where it occurs.

In 2021, the Semiconductor Industry Association estimated that $50 billion in federal incentives would directly create 43,000 in new semiconductor industry jobs, a total of 280,000 permanent jobs when the secondary effects of increased semiconductor manufacturing are included (Semiconductor Industry Association & Oxford Economics, 2021). The demand for cutting-edge semiconductor technology, particularly in AI applications, will continue to grow, creating job opportunities across several sectors of employment, including manufacturing, professional and business services, and construction.

Biotechnology and Pharmaceuticals: The region is already a hub for biotech and pharmaceutical companies. Advanced manufacturing in these sectors will expand, particularly in the production of new medical product manufacturing technologies that can improve drug quality, address shortages of medicines, increase supply chain resilience, and speed up time-to-market. Unlike other medicines, biopharmaceuticals are manufactured from biological sources that require complex manufacturing processes, thus innovations in technology can help rapidly scale capabilities for vaccines and other medical countermeasures to respond faster to emerging threats and other public health emergencies, such as COVID-19. As this technology emerges, job opportunities in biotech will expand.

Aerospace and Defense: The Bay Area has a strong aerospace and defense presence. Advanced manufacturing plays a key role in the automation and production of the aerospace sector, with its critical need for lightweight, durable, and reliable parts and materials. Four key technologies implemented within aerospace manufacturing include additive manufacturing or 3D printing, robotics, laser welding, and composite materials. Through these four technologies, the aerospace and defense sector can assure consistency in quality, streamline production, reduce weight and pollution, and resolve supply chain issues. The creation and implementation of these new technologies will require highly skilled workers in the professional and business services and manufacturing industry. With ongoing collaboration between universities and industry partners, the aerospace sector will see an increase in employment, contributions to overall national security, and strength of the U.S. presence in aerospace manufacturing.

Training and Workforce Development: As technology continues to be developed and implemented, advanced manufacturing will require a highly skilled workforce. In collaboration with universities, community colleges, and industry partners, training programs and educational initiatives can help equip workers with the necessary skills across different fields to help promote advanced manufacturing and create high-wage jobs in the region.

The Bay Area's Manufacturing sector in the future will be led by technological innovation, sustainability, adaptability to changing demands, and potentially grant funding. Through training programs and workforce development, this sector has the potential to upskill and train workers in the region to attain high-wage jobs. This sector will continue to be a driving force behind the region's economic growth and unparalleled innovation.

v. Child care and early education

Jobs in the Bay Area's Child Care and Early Education sector are set to undergo significant changes, driven by population and job factors:

Bilingual and Multilingual Educators: The Bay Area's diverse population will drive the demand for educators proficient in multiple languages to provide culturally relevant instruction and support for students. There is a positive trend emerging in the direct and indirect economic benefits of multilingualism, including economic, educational, and health-related outcomes. As the labor market is increasingly globalizing, the Bay Area—and California at large—are poised to remain globally competitive with a diverse and multilingual workforce. While there currently exists a shortage of multilingual educators in California, there have been several new policies proposed to help address the challenges to create pathways for educators and implement multilingual learning programs that hold the immense potential to transform California's education system to prepare students to thrive in an increasingly connected world (Kaplan & Dias Mesquita, 2019).

Child Care: The need for child care in the Bay Area is driven by several factors, including the high cost of living, diverse population, educational outcomes, child development, and support for families. Many families in the region have demanding careers and rely on dual incomes, making quality child care a necessity to balance work and family life. Parents from all backgrounds in the Bay Area prioritize education, seeking high-quality early education to give their children a strong educational foundation. Roles such as childcare operators and transitional kindergarten (TK) teachers will be critical for the future of education in the Bay Area.

The need for early care and education (ECE) in the Bay Area is multifaceted and integral to the region's diversity, competitiveness, and economic success. Addressing the needs of this sector not only supports working parents and workers within the ECE field, but also contributes to the overall well-being and development of children, the community, and future workforce of the Bay Area (Powell, et al., 2019).

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SECTION 6

SWOT Analysis

CONTRIBUTOR

Enrique Lopezlira

UC Berkeley Center for Labor Research and Educationy

SWOT Analysis Process

The Bay Area Jobs Collaborative and the research partners held an initial meeting with Steering Committee members and the co-conveners of the Sub-Regional Tables to develop the SWOT (strengths, weaknesses, opportunities, and threats) analysis for the Bay Area, especially concerning the promotion of an equitable economy and the expansion of sustainable industries. During this meeting, a "Jamboard" document was used to discuss, explore, and identify common themes. This document was then shared with all the Sub-Regional Tables so their members could add their input to the analysis. This section reflects the results of this collaborative process.

A. Regional Strengths

Stakeholders were asked to identify strengths of the region that contribute to equitable economic resilience and growth of sustainable industry clusters. The analysis identified the following themes: Natural Resources; Infrastructure; Education; Economic and Research Innovation; Community and Culture; and Workforce.

i. Natural Resources

- Strong agricultural sector and community
- Diverse landscape
- Biodiversity (greenspaces)
- Access to renewable resources, including wind and solar

ii. Infrastructure

- Logistical hub with ports, freeways, and public and private access roads that support import and export of goods and services
- Robust infrastructure for private capital and philanthropy
- Planning and economic development infrastructure in place (but needs additional community input)

- Long-term focus on environmental quality infrastructure (governmental programs and well-developed nonprofit/philanthropic ecosystem)

iii. Education

- Large number of and breadth of educational institutions
- High-quality educational institutions
- Highly educated population

iv. Economic and Research Innovation

- World center for technology and biotechnology innovation, driven and supported by the people and communities of the region
- International reputation for technological innovation impacts in other sectors like tourism, travel, and hospitality
- Leader in the research and development of biofuels and other clean technologies
- Diverse economy, with all sectors and industries present
- Political support for technological innovations

v. Community and Culture

- History of leadership and innovation in economic equity initiatives
- Numerous community organizations and worker centers organizing underserved communities
- Highly diverse communities rich in experience and knowledge, able to bring together different perspectives and approaches to problem solving
- Diversity and richness of the communities gives rise to deep wells of cultural and artistic talent

vi. Workforce

- Strong labor movement
- Highly desirable place to live, work, and play, which helps recruit talent
- Multiple job centers: not a single-hub economy
- Enormous creative potential in Bay Area's diverse communities, especially youth, lifts up art, performance, cultural work as job creators

B. Regional Weaknesses

Stakeholders were asked to identify challenges that hinder equitable economic resilience and growth of sustainable industry clusters. The analysis identified the following themes: Socio-Economic Disparities; Lack of Representative Data; Social Determinants of Work; Environmental Justice; Systems Alignment and Coordination.

i. Socio-Economic Disparities

- High income inequality
- Occupational discrimination and occupational segregation
- Unequal access to education
- Focus on technology sector makes economic mobility a challenge for many workers, especially immigrant workers and workers of color
- Digital divide limits education and job opportunities
- Inequitable distribution of corporate and philanthropic investments

ii. Lack of Representative Data

- Traditional data sources for labor market analysis or industry analysis do not shed light on many of the most compelling opportunities or greatest threats to marginalized populations
- Limited and/or non-available data for specific populations makes it difficult to track outcomes

iii. Social Determinants of Work

» High cost of living

» High cost and inadequate childcare options

» Lack of access to affordable housing

» Transportation, traffic, and other commute challenges

iv. Environmental Justice

» Lack of access to healthy, sustainably produced, and culturally competent food for many lower-income community members

» Gentrification pushing marginalized communities into environments at high risk for extreme climate events

v. Systems Alignment and Coordination

» Lack of a regional entity responsible for economic development

» Lack of connection between regional economic and workforce development strategies

» Since the Bay Area is very large and heterogenous, "regional" entitles and strategies often don't include all of the region, resulting in disproportional representation

C. Opportunities

Stakeholders were asked to identify opportunities available for equitable economic resilience and growth of sustainable industry clusters. The analysis identified the following themes: Funding; Infrastructure; Regional Marketing Trends; Policies; and Public Support.

i. Funding

- Unprecedented federal funding, much of it primarily focused on economic development with labor standard requirements
- Bay Area Housing Finance Authority and coalition working on $10-20 billion regional housing bond
- Untapped and/or uncoordinated philanthropic resources: a clear vision, plan, and outreach could bring more to the table
- High level of private wealth in the region

ii. Infrastructure

- Desire to create regional economic development strategies and infrastructure
- Decent public transportation can become much better
- Opportunities to invest in climate-resilient residential construction
- Opportunities to further develop basic infrastructure

iii. Regional Marketing Trends

- Greentech and cleantech can create sustainable jobs
- Sustainable agriculture: supporting local farming practices can provide fresh foods to low-income communities
- Arts and culture as sustainable economic activities and community identity
- Green architecture and promotion of green buildings: sustainable architecture
- Social impact investing: encouraging investment in companies with social or environmental missions as drivers of sustainable growth

iv. Policies

- New state policies passed with potential to improve job quality and empower workers in key sectors, including child care, health care, and fast food
- Workforce development program: creating paid training, apprenticeships, and internships that allow low-income residents to learn as they earn
- Post-pandemic economy provides opportunity for policies that lead to real transformational change
- Region is ready for its next economic identity

v. Public Support

- High public support of unions and labor; leverage to ensure strong labor standards across all industries in the region
- Public support to tackle inequities
- Public support to face the climate crisis
- The region has a coalition of the willing to affect systemic change

D. Regional Threats

Stakeholders were asked to identify challenges that pose risks to the region. The analysis identified the following themes: Education; Housing; Disparities; Climate; Regional Trends; Regional Threats; and Perception.

i. Education

- Inequality in educational opportunities
- Dysfunctional and inequitable K-12 education systems
- Shortage of teachers at all levels; shortage of childcare workers and affordable care; impacts of both shortages on women in the workforce
- Disproportionately low high school graduation and college enrollment rates from our public schools
- Community college funding tied to college and certificate program enrollment, making it harder to sustain workforce and continuing education programs for adults

ii. Housing

- Housing growth stagnate; catching up takes significant resources, and housing policy and development is often not geared towards low-wage workers
- Housing required for any net new jobs created
- There is a jobs and housing mismatch in the region

iii. Disparities

- Ongoing displacement of many of the region's historic communities of color and immigrant communities, as well as businesses owned by people of color
- High cost of living, wage stagnation for low-income workers, and significant bifurcation of the labor market between low- and high-wage workers
- Disproportionate life expectancy and other health outcomes tracked to social determinants that are exacerbated by climate issues
- Income gap between the richest and poorest in the region
- Threatened loss of Deferred Action for Childhood Arrivals (DACA) students: large segment of the population losing work authorization
- Displacement of artists and cultural performers of color, who cannot make a living from their art in much of the Bay Area

iv. Climate

- Lack of climate-resilient residential construction techniques and materials
- Competition for resources like water and energy can lead to environmental challenges
- Impacts of climate change that disproportionately affect people of color, as well as lower-income and immigrant communities
- Climate risks (e.g., fire, drought, flooding, high temperatures, unusual weather patterns) are starting to cause economic challenges for workers
- Climate change is elevating the need for land stewardship, including wildfire fuel reduction, flood resilience, habitat restoration

v. Trends

- Aging population: one fourth of the population is projected to be over 60 by 2030
- Outflow migration from remote work and cost of living issues
- Other regions outside of California building innovation hubs
- Losing artists and cultural workforce, which leads to losing industries that rely on creative talent
- Challenging small business climate
- The "future of work" era of technological disruption resulting in skills gaps and job displacement

vi. Regional Threats

- Political instability
- Supply chain vulnerabilities
- Labor market changes: off-shoring and automation
- Cybersecurity threats
- Threat of an economic downturn

vii. Perception

- National media skewing Bay Area's image
- Perceptions of declining public safety in the region
- Perception of burdensome regulatory environment for businesses

E. Conclusion

Despite the diverse nature of the Bay Area, the region has unique strengths, weaknesses, opportunities, and threats. The conditions presented in this section—and described in more detail throughout the various sections in this report—serves to inform development of the strategic plan for the Bay Area in the next phase of the California Jobs First program.

Appendices

Appendix A: Methodology

Appendix B: Bay Area Jobs First Collaborative Stakeholder Organizations

Appendix C: Priority Zip Code Tables

Appendix D: Stratified Data Tables

Appendix E: Data Dictionary

Appendix A: Methodology

The following appendix serves as a comprehensive guide to the research processes, frameworks, and analytical tools employed in the development of Sections 2-5 of the Bay Area Regional Plan Part 1 report. The methodologies outlined herein are designed to provide transparency and clarity, offering readers a detailed understanding of the systematic approaches used to collect, analyze, and interpret data relevant to the subregional and regional dynamics impacting the development of a sustainable high road economy in the Bay Area. All sources cited in the following are contained in the references of each section.

Section 2: Stakeholder Mapping

This section compiles an inventory of organizations that have participated in the Bay Area Jobs First process to date. It includes organizations involved in the initial planning of the Bay Area Jobs First Collaborative (BAJFC) as well as current members of the BAJFC Steering Committee and regional co-conveners. The database also includes organizations that have participated in the convenings at all six of the BAJFC's Sub-Regional Tables.

The stakeholder inventory was compiled with the assistance of the BAJFC convener and the co-conveners of the Sub-Regional Tables. Each Sub-Regional Table provided us a spreadsheet that included the names of organizations that attended Sub-Regional Table convenings and a description of the stakeholder category each organization represents: community-based organization, labor organization, employer and business association, tribal organization, or government agency. The exception to these categories was the Marin and Sonoma Sub-Regional Table, which classified organizations into three categories: non-profit, private, and public.

To identify disinvested communities, we used data from the California Environmental Protection Agency (CalEPA). CalEPA identifies census tracts as "disadvantaged" based on several criteria, including census tracts representing the 25% highest-scoring tracts in CalEnviroScreen 4.0, census tracts previously identified in the top 25% in CalEnviroScreen 3.0, census tracts with high amounts of pollution and low populations, and federally recognized tribal areas as identified by the Census in the 2021 American Indian Areas Related National Geodatabase..

To identify racial and economic segregation, we utilized data from the Bay Area Equity Atlas regions exhibiting a notable accumulation of White wealth and areas marked by concentrated disadvantage, predominantly impacting communities of Black, Latino, and Asian American and Pacific Islander (AAPI) backgrounds.

To identify areas of opportunity, we utilized data on opportunity zones from the California Department of Finance. Opportunity Zones are economically distressed communities where new investments may be eligible for preferential tax treatment. They were created as part of the Tax Cuts and Jobs Act of 2017.

Section 3: Regional Summary

This section analyzes the demographic and socio-economic landscape in the region. Emphasis is placed on areas characterized by diverse economic structures and varying levels of economic resilience. Notably, the discussion delves into influential industry trends shaping the regional economy. The summary further identifies and tackles regional inequities, encompassing economic, health, and environmental disparities that impact communities throughout the area.

Section 3.1: Economy and Economic Development

The bulk of the analysis in this section is based on the 2021 1-year American Community Survey (ACS) microdata from IPUMS USA. The few charts that look at decadal changes since 1990 utilize the 1990 5% state microdata sample, the 2000 5% sample, and the 2010 1-year ACS sample—all from IPUMS USA. Data on total employment and the unemployment rate for each county over time is from the U.S. Bureau of Labor Statistics' Local Area Unemployment Statistics. Data showing population by race/ethnicity for each county in 2017 and 2022 is from the U.S. Census Population Division's Annual County Resident Population Estimates by Age, Sex, Race, and Hispanic Origin and reflect estimates for July 1 of each year. Data on total employment for each county in 2017 and the fourth quarter of 2022 is from the U.S. Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW).

The industry sectoral analysis is based on data from the QCEW 2017 annual averages and 2022 fourth quarter averages. The employment by employer size analysis is based on data from the U.S. Census Bureau's Statistics of U.S. Businesses (for data by enterprise size category) and County Business Patterns (for data by establishment size category). The analysis of occupations and occupational career ladders is based on data from the California Employment Development Department's Long Term Projections database

(2020-2030), Occupational Employment and Wage Statistics (OEWS) Employment and Wages Data Tables (wage estimates for May 2021 updated to reflect the first quarter of 2022), and the Bureau of Labor Statistics' Industry-Occupation Matrix Data (2021), by Industry.

Section 3.2: Public Health

The data presented in this analysis draw from the Healthy Places Index (HPI), a composite of 23 social determinants of health indicators strongly associated with life expectancy at birth. Life expectancy at birth is an essential metric for assessing population health and well-being that encapsulates all-age and all-cause mortality, from injuries as well as non-communicable diseases. All 23 indicators are quantified as both values and percentiles compared to the rest of the state. Higher percentiles indicate healthier conditions compared to other California areas.

While county-level HPI percentiles offer a broad overview, county-level data alone is insufficient and inequitable given the considerable variations in social, economic, and environmental conditions within a single county. For that reason, this analysis focuses on "priority ZIP codes." Priority ZIP codes are those where overall HPI percentiles fall below the 50th percentile compared to all ZIP codes in California. A 50th percentile cutoff is used to determine which indicators are areas of opportunity. For additional geographies and indicators, please visit the HPI website at https://www.healthyplacesindex.org/ and make use of the full mapping tool, which is far more detailed and expansive than can be captured in this report.

Section 3.3: Climate and Environmental Impacts

This section was prepared by conducting a review of existing research on climate impacts on the Bay Area region. Reviewed documents included climate impacts assessment reports, regional and county Climate Action Plans (CAPs), and literature on climate impacts to key Bay Area industries and workforce as well as literature on climate impacts to critical industry-sustaining infrastructure. This section also includes an analysis of anticipated climate impacts on the priority ZIP codes identified in Section 3.2, using data provided by the Cal-Adapt platform and the United States Geological Survey (USGS) Hazard Exposure and Reporting Analytics (HERA) website.

Section 4: Labor Market Analysis

This section creates a comprehensive job quality index by utilizing data from the American Community Survey (ACS) 5-year sample, which covers the years 2017 to 2021. This index categorizes jobs into two distinct groups.

The first group, referred to as LW-FHI (Living Wage, Full-Time and Full-Year With Health Insurance) jobs, consists of jobs that meet specific criteria. These criteria include a living wage based on the MIT Living Wage Calculator, employer-sponsored health insurance coverage, and full-time employment (exceeding 35 hours per week) for the entire year (more than 50 weeks annually).

The second group, referred to as non-LW-FHI jobs, encompasses jobs that do not meet these criteria. It is important to note that because the ACS does not distinguish whether workers covered by an employer-based health insurance plan are the policyholders or not, estimations presented may slightly overestimate the share of LW-FHI jobs. The three criteria utilized—living wage, health insurance, and full-time employment—serve as a minimum benchmark for defining good jobs; high-quality jobs would typically offer additional benefits to workers.

The ACS sample was restricted to employees between 18 and 64 years of age. Hourly wages were calculated by dividing the workers' total annual salary by the total hours worked. Affordability thresholds specific to each county were determined using the MIT Living Wage Calculator, and subsequently, wages were compared to these living wage thresholds. Given that the ACS does not include an hourly earnings measure, we followed standard practice and constructed the hourly wage measure by dividing the worker's annual earnings by the product of their usual hours worked per week and weeks worked in the past year. The ACS annual earnings variable reports income earned from wages or a person's own business or farm. Outliers in hourly wages were trimmed by removing wages less than $0.50 or greater than $100 (in 1989 dollars).

Additionally, we utilized data from the Center for Neighborhood Technology's Housing and Transportation (H+T) Affordability Index to assess the cost burden of housing and transportation in the Bay Area and California. Our analysis considered two types of households:

» The regional typical household, which assumes a household earning the median income for the region, with the average household size and the average number of commuters per household for the region; and

» The regional moderate household, which assumes a household income of 80% of the regional median, the regional average household size, and the regional average number of commuters per household.

Transportation costs were calculated as the sum of auto ownership costs, auto use costs, and transit use costs. Dividing these costs by the representative income illustrates the cost burden placed on a typical household by transportation costs.

Section 5: Industry Cluster Analysis

To conduct an industry cluster analysis, data from the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) was analyzed over a five-year period from the fourth quarter of 2017 and 2022 for each of the nine counties in the San Francisco Bay Area. Data was pulled at the county levels, utilizing the two- and three-digit North American Industry Classification System (NAICS) codes for private employment only.

Exhibits presented herein represent job locations based on payroll data (based on work location, not where workers live), using standard sector codes for the most recent period available (Q4 2022). Percentage changes in employment refer to job growth/loss from Q4 2017 to Q4 2022. This period was chosen to include a period of economic growth, pandemic-induced job loss, and the subsequent employment recovery. As a note, the data is limited to only those workers paid under a payroll system and therefore excludes employment of contractors, gig workers, and participants in the informal economy. Additionally, demographic data for these workers is not captured within this analysis.

For subregions containing multiple counties, establishments and employment figures are aggregated. For each subregion, the following was calculated for each industry: share of total employment; growth or decline of employment; and location quotients for each industry. The latter statistic measures a region's industrial specialization relative to a larger geographic unit, which in this case is the nine-county Bay Area and statewide throughout California.

Location quotients are ratios that allow an area's distribution of employment by industry to be compared to a reference area's distribution. While location quotients are often compared at the national level, for purposes of this analysis the nine-county Bay Area and California are the reference areas. The formula for each calculation is detailed as follows:

$$\textbf{Bay Area LQ:}\quad \frac{\text{(Subregion, Private Ownership, High-Level Industry)} \,/\, \text{(Subregion, All Ownerships, High-Level Industry)}}{\text{(Nine-County Bay Area, Private Ownership, High-Level Industry)} \,/\, \text{(Nine-County Bay Area, All Ownerships, High-Level Industry)}}$$

$$\textbf{California Area LQ:}\quad \frac{\text{(Subregion, Private Ownership, High-Level Industry)} \,/\, \text{(Subregion, All Ownerships, High-Level Industry)}}{\text{(California, Private Ownership, High-Level Industry)} \,/\, \text{(California, All Ownerships, High-Level Industry)}}$$

If a location quotient is equal to one, then the industry has the same share of its area employment as it does in the comparative geographical area. A location quotient that is greater than or less than 1 indicates a greater or lesser share of the local area employment than the comparative geographical area.

Appendix B: Bay Area Jobs First Collaborative Stakeholder Organizations

This appendix lists the stakeholder organizations that participated in the California Jobs First planning process in the Bay Area and provided input into the development of the Bay Area Jobs First Collaborative's Regional Plan Part 1 report.

The information in each table was provided by the Bay Area Jobs First Collaborative's regional convener and the co-conveners for each of the six Bay Area Sub-Regional Tables and may have some differences in the format, presentation, or granularity of the information.

BAY AREA JOBS FIRST COLLABORATIVE STEERING COMMITTEE

Organization	Co-Chair	Stakeholder category
ABAG / MTC		Regional governmental agencies
Asian Pacific Environmental Network		Environmental justice
Bay Area Community College Consortium		Post-secondary education (instruction)
Bay Area Council (BAC)		Employers, businesses and business associations
Bay Area Regional Health Inequities Initiative (BARHII)	Yes	Public health
Building Trades Council of Alameda		Building and Construction Trades
CA Federation of Teachers		Education labor organizations
California Association for Micro Enterprise Opportunity (CAMEO)		Small businesses and small business associations
Canal Alliance	Yes	Community-based organizations (immigrant rights)
Chinese Progressive Association		Worker centers
Contra Costa Workforce Development Board		Workforce development agencies
County of Santa Clara		Housing and homelessness organizations
Greenbelt Alliance		Environmental Justice
On the Move		Community-based organizations (youth)
Safe Return Project		Community-based organizations (racial justice)
San Francisco Foundation		Philanthropic organizations
San Francisco Labor Council	Yes	Central Labor Councils
Solano Economic Development Corporation		Economic development organizations
UC Berkeley Labor Center		Post-secondary education (research)
Working Partnerships USA		Community-based organization (serving disinvested communities)

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE		
Organization	Co-Convener	Stakeholder category
(ACES) Consortium Adult Career Ed Services		Workforce development providers
ACCEL SMC Adult Education Consortium		Local government
Acterra		Environmental
AFSCME 829		Labor organization
AFT 1481		Labor organization
All Home		Other
Amgen		Business
Amigos de Guadalupe Ctr Justice Empowerment		CBO - serving disinvested communities
Applied Materials		Business
AT&T		Business
Bay Area Community College Consortium		Post-secondary education (instruction)
BIA Bay Area (Building Industry Association)		Business
Biocom California Institute		Business
Black Leadership Kitchen Cabinet		CBO - racial justice
Bloom Energy		Business
Bristol Myers Squibb		Business
BSP (Building Skills Partnership)		Workforce development providers
CA Life Sciences		Business
CA State Assembly Marc Berman AD23		Local government
CA State Assembly Member Papan		Local government
CA State Senator Josh Becker		Local government
CAA (California Apartment Association)		Business
CACE Campbell Adult/Community Education		Workforce development providers
California Faculty Association		Labor organization
California Institute of Integral Studies		Post-secondary education (instruction)
California Labor Federation		Labor organization
Caltrain		Local government
CAMEO		Small business association
CARAS		CBO - serving disinvested communities
Caring Across Generations		CBO - serving disinvested communities
CCPU Training Fund		Workforce development providers
CEMA		Labor organization
Center for Employment Training		Workforce development providers

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
Centro Community Partners		CBO - serving disinvested communities
CFA		Labor organization
Chajinel Home Care Services		Business
Chamber San Mateo County		Business
Child Care Partnership Council		Local government
Children's Council of San Francisco		CBO - youth
City College of San Francisco		Post-secondary education (instruction)
City Council of San Mateo		Local government
City of Belmont		Local government
City of Burlingame		Local government
City of Cupertino		Local government
City of Cupertino		Local government
City of East Palo Alto		Local government
City of Foster City		Local government
City of Fremont		Local government
City of Half Moon Bay		Local government
City of Milpitas		Local government
City of Morgan Hill		Local government
City of Mountain View		Local government
City of Pacifica		Local government
City of San Bruno		Local government
City of San Jose		Local government
City of San Jose OED		Local government
City of San Mateo		Local government
Coastside Hope		CBO - serving disinvested communities
Collaborative Education Advisors		Other
College of San Mateo		Post-secondary education (instruction)
Comcast		Business
Community Health Partnership		Public health
Community Strong Strategies		none (consultants)
County of Santa Clara		Local government
Crown Castle		Business
CSEA 350		Labor organization

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
CSEA 363		Labor organization
Cupertino Chamber		Business
CWA District 9		Labor organization
Daly City Economic/Community Dev.		Economic development organizations
De Anza College		Post-secondary education (instruction)
Destination Home		CBO - housing and homelessness
Downtown Streets Team		CBO - housing and homelessness
El Concilio of San Mateo County		CBO - serving disinvested communities
Embarc		Business
ENGIE		Business
Epacenter Arts		Arts & culture
ESO Ventures		Business
Evergreen Valley College		Post-secondary education (instruction)
Excite Credit Union CDFI		Business
Fight for 15		Worker centers
First 5 Santa Clara County		CBO - youth
Foothill College		Post-secondary education (instruction)
FUHSD		Post-secondary education (instruction)
GO-Biz		Other
Grail Family Services		CBO - serving disinvested communities
Graniterock		Business
Green Foothills		Environmental
Greenbelt Alliance		Environmental
Ground Floor Public Affairs		Other
Healthier Kids Foundation		CBO - youth
Hispanic Chamber of Commerce Silicon Valley		Small business association
IBEW 617		Labor organization
IBEW Local 1245		Labor organization
IBEW Local Union 1245		Labor organization
ICA Fund		Business
ICAN International Children's Assistance Netwk		CBO - immigrant rights
Immigrants Rising		CBO - immigrant rights
Indian Health Center		Tribal organizations

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
International Association of Machinists		Union
Jamii Technology		Business
JobTrain		Workforce development providers
Juma Ventures		Business
Kaiser Permanente		Business
Krupka Consulting		Other
La Raza Roundtable		CBO - serving disinvested communities
Latinas Contra Cancer		CBO - serving disinvested communities
Latino Business Community Foundation		Philanthropic organizations
Lighthouse Public Affairs		Other
LinkedIn		Business
LiUNA Laborers Local 270		Labor organization
Local Color		Arts & culture
LUNA (Latinos United for a New America)		Environmental justice
Machinists Institute		Labor organization
MACLA Movimiento Arte Cultura Latino		Arts & culture
Midpeninsula Regional Open Space District		Environmental
Mind Builder Center		Business
Minority Business Consortium		Small business association
Mission College		Post-secondary education (instruction)
Morgan Hill Chamber		Business
Morgan Hill Community Foundation		Philanthropic organizations
Mosaic America		Arts & culture
Musicians Union AFM Local 6		Labor organization
National Institute Innovation Technology		Business
Notre Dame de Namur University		Post-secondary education (research)
NOVAworks		Workforce development providers
OE (Operating Engineers Union) Local 3		Labor organization
Peninsula Clean Energy		Environmental
Policy Works California		Other
Prosperity Lab		Small business association
PUENTE		CBO - serving disinvested communities
Ray Mueller San Mateo County Supervisor		Local government

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
Recology		Business
Renaissance Center		Small business association
SAMCEDA	Yes	Economic development organizations
San Jose City College		Post-secondary education (instruction)
San Jose Conservation Corps		CBO - youth
San Jose Downtown Association		Business
San Jose Jazz		Arts & culture
San Jose Office of Economic Development		Local government
San Jose Taiko		Arts & culture
San Mateo 4Cs		CBO - youth
San Mateo Area Chamber of Commerce		Business
San Mateo Building Trades		Labor organization
San Mateo County Executive Office		Local government
San Mateo County Office of Education		Local government
San Mateo County Transit District		Local government
San Mateo Labor Council	Yes	Labor organization
San Mateo Resource Conservation District		Environmental
San Mateo SBDC		Small business association
Santa Clara Building Trades Council		Building Trades Council
Santa Clara County Wage Theft Coalition		Worker centers
Santa Clara University		Post-secondary education (research)
SBLC (South Bay Labor Council)	Yes	Labor organization
SCCOE Santa Clara County Office of Education		Local government
School of Arts & Culture		Arts & culture
Second Harvest Food Bank		CBO - serving disinvested communities
SEIU 2015		Labor organization
SEIU 521		Labor organization
SEIU Education and Support Fund		Workforce development providers
SEIU UHW		Labor organization
SEIU USWW		Labor organization
SEMI Foundation		Business
Sequoia Hospital Dignity Health		Business
SFMade and MFG SJ (Manufacture San Jose)		Small business association

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
SFO (San Francisco International Airport)		Business
SFOEWD		Workforce development providers
Silicon Valley African Film Festival		Arts & culture
Silicon Valley Black Chamber of Commerce		Small business association
Silicon Valley Clean Energy		Environmental
Silicon Valley Community Foundation		Philanthropic organizations
Silicon Valley Council of Nonprofits		CBO - serving disinvested communities
Silicon Valley Leadership Grp, City East Palo Alto		Business
SIREN		CBO - immigrant rights
SJ Evergreen CC Dist Workforce Institute		Workforce development providers
Skyline College		Post-secondary education (instruction)
Small Business Majority		Small business association
SMBCTC		Labor organization
SMCLC Retired		Labor organization
Somos Mayfair	Yes	CBO - serving disinvested communities
South Bay Pride at Work		Labor organization
South Coast Sustainable		Environmental
South San Francisco Chamber		Business
SPUR		Business
Stanford Digital Education		Post-secondary education (research)
Stanford Educational Leadership Initiative		Post-secondary education (research)
Stanford Health Care		Post-secondary education (research)
Stanford Medicine Children's Health		Post-secondary education (research)
Stanford University Health Care		Public health
Summer Hill		Business
SVEDA (Silicon Valley Econ Dev Alliance)		Economic development organizations
Teamsters 350		Labor organization
Teamsters 853		Labor organization
Teamsters 856		Labor organization
Teamsters JC 7		Labor organization
Teamsters SFO 856 and Local 986		Labor organization
Teatro Vision		Arts & culture
The San Francisco Peninsula		Business
The Tech Interactive		Arts & culture

SANTA CLARA AND SAN MATEO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
Thrive Alliance		CBO - serving disinvested communities
U.S. Small Business Administration		Small business association
UC Berkeley Labor Center		Post-secondary education (research)
UCSC Institute of Social Transformation		Post-secondary education (research)
UFCW Local 5		Labor organization
UNITE HERE Local 19		Labor organization
UNITE HERE Local 2		Labor organization
Upward Scholars		CBO - immigrant rights
Valley Water / BAYWORK		Local government
Veggielution		CBO - serving disinvested communities
West Valley College		Post-secondary education (instruction)
Work2future		Workforce development providers
Working Partnerships USA	Yes	CBO - serving disinvested communities
YMCA of Silicon Valley		CBO - youth
Youth Liberation Movement		CBO - youth

ALAMEDA COUNTY SUB-REGIONAL TABLE		
Organization	Co-Convener	Stakeholder category
67 Sueños		Workforce Development
Abode Services		CBO, Disinvested Communities
ACCE		CBO, Disinvested Communities
Acta Non Verba		Environmental Justice
Afghan Coalition		CBO, Disinvested Communities
Akonadi Foundation		Philanthropic Organization
Alameda County Community Food Bank		CBO, Disinvested Communities
Alameda County Workforce Development Board		Workforce Development
Alameda Labor Council	Yes	Union
Andrea Prebys-Williams Consulting		Other Regional Stakeholder
APEN		Environmental Justice
Avanzando		CBO, Disinvested Communities
Bike East Bay		Environmental Justice
Black Cultural Zone		CBO, Disinvested Communities
BOSS		CBO, Disinvested Communities
Building Futures		CBO, Disinvested Communities
California Community Builders		CBO, Disinvested Communities
California Teachers Association		Union
Causa Justa Just Cause		CBO, Disinvested Communities
Centro Legal		CBO, Disinvested Communities
Communities for a Better Environment		Environmental Justice
Community and Youth Outreach		CBO, Disinvested Communities
CTWI		Workforce Development
CURYJ		CBO, Disinvested Communities
Cypress Mandela		Workforce Development
Davis Street Community Center		CBO, Disinvested Communities
Downtown Streets Team		CBO, Disinvested Communities
East Bay Community Foundation		Philanthropic Organization
East Bay Economic Development Alliance		Employer and Business Association
East Bay Leadership Council		Employer and Business Association
East Oakland Collective		CBO, Disinvested Communities
East Side Arts Alliance		CBO, Disinvested Communities
EBASE		CBO, Disinvested Communities

ALAMEDA COUNTY SUB-REGIONAL TABLE (continued)		
Organization	**Co-Convener**	**Stakeholder category**
EBFE		CBO, Disinvested Communities
El Timpano		CBO, Disinvested Communities
Ella Baker Center		CBO, Disinvested Communities
Emerald Cities Collaborative		Environmental Justice
Fremont Chamber of Commerce		Employer and Business Association
Greenbank Associates		Other Regional Stakeholder
Greenbelt Alliance	Yes	Environmental Justice
Hack the Hood		Workforce Development
Hayward Chamber of Commerce		Employer and Business Association
Hively		Other Regional Stakeholder
Homies Empowerment		CBO, Disinvested Communities
Hope Collaborative		CBO, Disinvested Communities
IBEW Local 595		Union
Indivisible East Bay		Economic Development
Intertribal Friendship House		CBO, Disinvested Communities
Joint Venture Silicon Valley/Silicon Valley Economic Development Alliance		Economic Development
La Clínica de la Raza		Other Regional Stakeholder
La Familia		CBO, Disinvested Communities
Las Positas-Chabot Community College		Post-Secondary Education
LISC Bay Area		Economic Development
Marcus Foster Education Institute		Post-Secondary Education
Midori Law Group / Transition US		Other Regional Stakeholder
Missey		CBO, Disinvested Communities
Mujeres Unidas y Activas		CBO, Disinvested Communities
Native American Health Center		Other Regional Stakeholder
NEJAC / Common Vision		Environmental Justice
Oakland African American Chamber of Commerce		Employer and Business Association
Oakland Chinatown Chamber of Commerce		Employer and Business Association
Oakland Climate Action Coalition		Environmental Justice
Oakland Latino Chamber of Commerce		Employer and Business Association
Oakland Metro Chamber of Commerce		Employer and Business Association
Oakland Rising		CBO, Disinvested Communities

ALAMEDA COUNTY SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
Oakland Tenants Union		CBO, Disinvested Communities
Oakland Vietnamese Chamber of Commerce		Employer and Business Association
Oakland Workforce Development Board		Workforce Development
Office of Planning and Research		Government Agencies
Ohlone Community College		Post-Secondary Education
Olivia Smartt Photography		Other Regional Stakeholder
Original Scraper Bike Team		CBO, Disinvested Communities
OUSD		Government Agencies
Parent Voices		CBO, Disinvested Communities
Peralta Community College District		Post-Secondary Education
Peralta Hacienda		Environmental Justice
Planning Forward Land Use Solutions		Economic Development
Port of Oakland		Government Agencies
Project MORE Foundation Inc.		CBO, Disinvested Communities
Prospera		Workforce Development
Regional Center of the East Bay (RCEB)		CBO, Disinvested Communities
Rising Sun Opportunity Center		Workforce Development
Roots Health Clinic		Other Regional Stakeholder
San Francisco Bay Area Rapid Transit District (BART)		Government Agencies
San Leandro 2050		Environmental Justice
Santa Clara University		Post-Secondary Education
Save The Bay		Environmental Justice
Sierra Club		Environmental Justice
Sogorea Te' Land Trust		Economic Development
Spanish Speaking Citizen's Foundation		CBO, Disinvested Communities
Street Level Health		Other Regional Stakeholder
Tech Equity Collaborative		Other Regional Stakeholder
The Greenlining Institute		CBO, Disinvested Communities
Third Sector		Other Regional Stakeholder
Transform		Economic Development
Tri Ced		Other Regional Stakeholder
Tri City Ecology		Environmental Justice
Tri-Valley Non-profit Alliance		CBO, Disinvested Communities

ALAMEDA COUNTY SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
TRYBE		CBO, Disinvested Communities
Unity Council		Economic Development
Urban Habitat		CBO, Disinvested Communities
Urban Strategies Council		Other Regional Stakeholder
Wellbeing Economy Alliance California		Other Regional Stakeholder
West Oakland Environmental Indicators Project		Environmental Justice
West Oakland Job Resource Center		Workforce Development
Youth Alive		CBO, Disinvested Communities
Youth Employment Partnership		Workforce Development
Youth UpRising		CBO, Disinvested Communities

CONTRA COSTA COUNTY SUB-REGIONAL TABLE		
Organization	Co-Convener	Stakeholder category
350 Contra Costa		Environmental Justice
ACCE		CBO, Disinvested Communities
Asian Pacific Environmental Network	Yes	Environmental Justice
Blue Green Alliance		Formerly Incarcerated
CA Community College Consortium (Sara Goldware)		Post-secondary education (instruction)
CAMEO		Employer and Business Associations
CBE		Contra Costa HRTP
CCIRA- Contra Costa Immigrant Rights Alliance		CBO, Disinvested Communities
Contra Costa Building and Construction Trades Council		Labor organization
Contra Costa County		Government Agencies
Contra Costa Labor Council	Yes	Labor organization
Contra Costa Workforce Development board		Workforce Development
East Bay EDA- Stephen or Patience		Economic Development
East Bay Leadership Council		Employer and Business Associations
EBASE		CBO, Disinvested Communities
First 5		CBO, Disinvested Communities
Healthy Contra Costa (invited)		Other Stakeholder Organizations
Hijas del Campo		CBO, Disinvested Communities
Lift Up Contra Costa		CBO, Disinvested Communities
Monument Impact		CBO, Disinvested Communities
NAMI		Environmental Justice
Richmond Workforce Development Board		Workforce Development
Rubicon		Workforce Development
Safe Return		CBO, Disinvested Communities
Safe Return Project		CBO, Disinvested Communities
Sogorea Te' Land Trust		Economic Development
UC Berkeley Labor Center		Post-secondary education (research)
United Teachers of Richmond		Labor organization

NAPA AND SOLANO SUB-REGIONAL TABLE		
Organization	Co-Convener	Stakeholder category
Abode Services		CBO Disinvested Communities
AFSCME 2620 (vocational counselors for prison)		Workforce Development
All Home		CBO Disinvested Communities
American Canyon		Governmental Agencies
Area Agency on Aging - Napa/ Solano		CBO Disinvested Communities
Bay Area Community Colleges- North Bay Subregion		Post-Secondary Education (instruction)
Boys and Girls Club, Napa		CBO Disinvested Communities
Buckelew Programs		Other Stakeholder Organizations
CA Human Development Corp (farmworker housing)		CBO Disinvested Communities
CA TANIF		Tribal Organization
Chamber of Commerce - Vallejo		Employers and Business Associations
City of Napa		Governmental Agencies
City of Vallejo		Governmental Agencies
Clinic Ole		Other Stakeholder Organizations
Common Ground		CBO Disinvested Communities
Community Health Initiative		Other Stakeholder Organizations
Community Resources for Children		CBO Disinvested Communities
CTA		Labor Organization
CTA - VEA		Labor Organization
CTWI		Workforce Development
FACO Filipino American Cultural Organization		CBO Disinvested Communities
Fair Housing Napa Valley	Yes	CBO Disinvested Communities
Fairfield		Governmental Agencies
Fil-Am Chamber of Commerce - Solano		Employers and Business Associations
First Five Napa		CBO Disinvested Communities
First Five Solano		CBO Disinvested Communities
FSUSD		Governmental Agencies
Gasser Foundation		Philanthropic Organizations
Greenbelt Alliance		Environmental Justice
Hispanic Chamber of Commerce - Fairfield		Employers and Business Associations
Hospitality Association of Napa		Employers and Business Associations
Immigration Institute of the Bay Area		CBO Disinvested Communities
Mentis		Other Stakeholder Organizations

NAPA AND SOLANO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
MTC/ABAG		Governmental Agencies
NALC		Labor Organization
Napa Bicycle Coalition		Environmental Justice
Napa Climate Now		Environmental Justice
Napa County		Governmental Agencies
Napa County Public Health		Other Stakeholder Organizations
Napa Farm Bureau		Employers and Business Associations
Napa Housing Coalition		CBO Disinvested Communities
Napa Resource Conservation District		Environmental Justice
Napa State Hospital		Other Stakeholder Organizations
Napa Valley Community Foundation		Philanthropic Organizations
Napa Valley Grape Growers		Employers and Business Associations
Napa Valley Vintners		Employers and Business Associations
Napa-Solano Building and Construction Trades Council		Labor Organization
Napa-Solano Central Labor Council	Yes	Labor Organization
NEWS		CBO Disinvested Communities
NUHW		Healthcare Workers
NVC		Post-Secondary Education (instruction)
On the Move		CBO Disinvested Communities
PG&E		Employers and Business Associations
Puertas Abiertas		CBO Disinvested Communities
Queen of the Valley Care Network/Providence		Other Stakeholder Organizations
Queen of the Valley/ Providence		Employers and Business Associations
Realtors Association		Employers and Business Associations
SEIU		Labor Organization
SEIU 2015		Labor Organization
Sheetmetal Workers Union 104		Labor Organization
Sierra Club, Solano Group/Napa		Environmental Justice
Solano Black Chamber of Commerce		Employers and Business Associations
Solano CC		Post-Secondary Education (instruction)
Solano Community Foundation		Philanthropic Organizations
Solano County		Governmental Agencies
Solano Department of Resource Management		Governmental Agencies

NAPA AND SOLANO SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
Solano Economic Development Corporation		Economic Development
Solano Economic Development Corporation		Economic Development
Solano-Napa Small Business Development Center		Employers and Business Associations
St. Helena		Governmental Agencies
Suisun City		Governmental Agencies
Sunrise Movement		Environmental Justice
Suscol Inter Tribal Agency		Tribal Organization
Sustainable Solano		Environmental Justice
Teamsters		Labor Organization
Temporary Agencies		Employers and Business Associations
Touro University		Post-Secondary Education (instruction)
Tri-City NAACP		CBO Disinvested Communities
UC Berkeley Labor Center		Post-Secondary Education (research)
UC Davis Labor Center		Post-Secondary Education (research)
UFCW		Labor Organization
UFW		CBO Disinvested Communities
UpValley Family Center		CBO Disinvested Communities
Vacaville		Governmental Agencies
WDB Napa County		Workforce Development
WDB Solona County		Workforce Development

MARIN AND SONOMA SUB-REGIONAL TABLE		
Organization	Co-Convener	Stakeholder category
All Home		Nonprofit
Bay Area Community College Consortium (BACCC)		Public
California Association for Micro Enterprise Opportunity		Private
California Indian Museum and Cultural Center		Nonprofit
Canal Alliance	Yes	Nonprofit
City of San Francisco - OED (Our Funder)		Public
City of San Rafael		Public
Community Action Marin (CAM)		Nonprofit
County of Sonoma Department of Human Services		Public
CSU Fresno		Public
Employment Development Dept.		Private
Good Green Work		Private
Homeward Bound of Marin		Nonprofit
Kaiser		Private
LandPaths		Nonprofit
Legal Aid of Sonoma County		Nonprofit
Los Cien		Nonprofit
Marin Center for Independent Living		Nonprofit
Marin City Community Development Corporation		Nonprofit
Marin County Office of Education		Public
Marin RCD		Public
Nature Based Solutions		Private
North Bay Jobs with Justice		Nonprofit
North Bay Labor Council	Yes	Nonprofit
North Bay Leadership Council		Nonprofit
North Bay Workforce Alliance		Public
Rural County Representatives of California		Nonprofit
San Francisco District Office U.S. Small Business Administration		Public
Santa Rosa Metro Chamber		Nonprofit
Sonoma County		Public
Sonoma County Economic Development Board		Public
Sonoma County, Office of Equity		Public

MARIN AND SONOMA SUB-REGIONAL TABLE (continued)		
Organization	**Co-Convener**	**Stakeholder category**
Sonoma Land Trust		Nonprofit
Strategic Energy Innovations		Nonprofit
UC Berkeley Labor Center		Public
Workforce Alliance of the North Bay		Public

SAN FRANCISCO COUNTY SUB-REGIONAL TABLE		
Organization	Co-Convener	Stakeholder category
AFT2121		Union
Bayview Advocates		CBO Disinvested Communities
Black Wall Street		CBO Disinvested Communities
CA Institute of Integral Studies		Post-Secondary Education
Causa Justa Just Cause		CBO Disinvested Communities
Chinese for Affirmative Action (CAA)		CBO Disinvested Communities
Chinese Progressive Association (CPA)	Yes	CBO
City College		Post-Secondary Education Instruction
Coalition on Homelessness		CBO Disinvested Communities
Coleman Advocates		CBO Disinvested Communities
Community Youth Developers		Workforce Development
Dolores Street Community Services		CBO Disinvested Communities
Emerald Cities		Environmental Justice Organizations
Excelsior Works		CBO Disinvested Communities
Filipino Community Center		CBO Disinvested Communities
GreenAction		Environmental Justice Organizations
Greenbank Associates		Environmental Justice Organizations
Hospitality House/HESPA Coalition		CBO Disinvested Communities
IFPTE Local 21		Union
Juma		Workforce Development
Kai Ming Head Start		Workforce Development
La Cocina Marketplace		Workforce Development
Larkin Street Youth/HESPA Coalition		CBO Disinvested Communities
Mission Economic Development Agency (MEDA)		Workforce Development
Mission Hiring Hall		CBO Disinvested Communities
Mujeres Unidas y Activas		CBO Disinvested Communities
Native Indian Cultural District		California Native American Tribes
PODER		CBO Disinvested Communities
Samoan Community Development Center		CBO Disinvested Communities
San Francisco Labor Council	Yes	Union
SEIU 1021		Union
SEIU 2015		Union
SEIU USWW		Union

SAN FRANCISCO COUNTY SUB-REGIONAL TABLE (continued)		
Organization	Co-Convener	Stakeholder category
Self-Help for the Elderly		CBO Disinvested Communities
SF Buliding Trades		Union
SF Chamber of Commerce		Employers and Business Associations
SF DPH		Government Agencies
SF Foundation		Philanthropic Organizations
SF Jobs with Justice		CBO Disinvested Communities
SF MADE		Employers and Business Associations
SF OEWD		Government Agencies
SF Public Defender		Government Agencies
SF Rising		CBO Disinvested Communities
SF Symphony		Employer
Sierra Club		Environmental Justice Organizations
Small Business Association		Employers and Business Associations
SOMCAN		CBO Disinvested Communities
South East Asian Development Center		CBO Disinvested Communities
SPUR		Economic Development
Trabajadores Unidos Workers United		CBO Disinvested Communities
UC Berkeley Labor Center		Post-Secondary Education Research
UESF		Union
Unite Here		Union
Wu Yee		Workforce Development
Zellerbach Family Foundation		Philanthropic Organizations

Appendix C: Priority Zip Code Tables

EXHIBIT C1 | Zip code 94130

Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.1	5.8
Economic Domain	-1.3	6.5
Neighborhood Domain	-0.8	4.0
Healthcare Access Domain	-1.0	8.7
Poverty Rate (%)	33.3%	2.2
Employment Rate (%)	62.3%	15.1
Per Capita Income ($)	$21,322.00	16.3
Diesel PM (kg/day)	0.5	5.6
Impervious Surface Cover (%) [higher percentile = less healthy]	49.5%	67.0
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	85.9%	99.3
Park Access (%)	0.0%	0.2
Retail Density (jobs/acre)	0.6	19.0
Equity Indicators		
Racial/ethnicity diversity index (%)	78.8%	100.0
Location Quotient: American Indian/Alaska Native	4.5	94.2
Location Quotient: Asian	0.3	24.3
Location Quotient: Black	4.4	99.3
Location Quotient: Hispanic/Latino	1.7	93.9
Location Quotient: Native Hawaiian/Pacific Islander	8.0	98.9
Location Quotient: White	0.7	18.8
Residential Segregation: All Non White	0.4	28.9
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	81.4%	9.3
Asthma Rate (%) [higher percentile = less healthy]	10.6%	85.9
Low Birthweight (%) [higher percentile = less healthy]	6.0%	87.0
Mental Health Not Good (%) [higher percentile = less healthy]	19.1%	97.8
Other Indicators (25th percentile cutoff)		
High School Enrollment (%)	79.4%	1.1
Automobile Access (%)	66.3%	1.4
Homeownership (%)	0.0%	0.2
Low-Income Homeowner Severe Housing Cost Burden (%)	14.3%	21.6
2020 Census Response Rate (%)	46.7%	7.5
Voting (%)	62.8%	5.3

EXHIBIT C2 | Zip code 94535		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.1	6.2
Economic Domain	-0.8	20.1
Neighborhood Domain	-0.7	8.8
Poverty Rate (%)	70.0%	46.1
Employment Rate (%)	29.2%	0.4
Per Capita Income ($)	$23,109.00	20.6
Drinking Water Contaminants	534.5	36.0
Extreme Heat (days): >100°F, 2035-2064 [higher percentile = less healthy]	49.0	67.4
Extreme Heat (days): >100°F, 2070-2099 [higher percentile = less healthy]	71.9	65.9
Extreme Heat (days): >90°F, 2035-2064 [higher percentile = less healthy]	122.7	65.3
Extreme Heat (days): >90°F, 2070-2099 [higher percentile = less healthy]	146.8	63.6
Extreme Heat (days): >baseline, 2035-2064 [higher percentile = less healthy]	26.2	64.2
Extreme Heat (days): >baseline, 2070-2099 [higher percentile = less healthy]	45.7	59.1
Park Access (%)	0.5%	1.0
Retail Density (jobs/acre)	1.2	27.1
Equity Indicators		
Racial/ethnicity diversity index (%)	70.3%	96.5
Location Quotient: American Indian/Alaska Native	0.1	9.2
Location Quotient: Asian	0.7	54.7
Location Quotient: Black	1.1	73.3
Location Quotient: Hispanic/Latino	0.6	36.5
Location Quotient: Native Hawaiian/Pacific Islander	2.2	86.8
Location Quotient: White	1.3	67.1
Residential Segregation: All Non White	0.3	14.1
Key Health Indicators (50th percentile cutoff)		
Low Birthweight (%) [higher percentile = less healthy]	5.3%	72.2
Preterm Birth (%) [higher percentile = less healthy]	7.3%	73.1
Other Indicators (25th percentile cutoff)		
Preschool Enrollment (%)	26.6%	10.2
Homeownership (%)	1.5%	0.5
Low-Income Homeowner Severe Housing Cost Burden (%)	39.8%	0.0
2020 Census Response Rate (%)	54.5%	13.7
Voting (%)	65.8%	9.4

EXHIBIT C3 | Zip code 94621		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.1	10.4
Economic Domain	-1.0	15.4
Healthcare Access Domain	-1.0	8.1
Poverty Rate (%)	46.1%	9.2
Employment Rate (%)	66.3%	24.9
Per Capita Income ($)	$18,047.00	9.6
Diesel PM (kg/day)	0.3	17.4
Impervious Surface Cover (%) [higher percentile = less healthy]	67.2%	92.5
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	12.0%	87.2
Tree Canopy (%)	4.1%	26.5
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	57.7%	71.9
Location Quotient: American Indian/Alaska Native	0.2	16.6
Location Quotient: Asian	0.1	11.2
Location Quotient: Black	2.9	97.1
Location Quotient: Hispanic/Latino	2.5	99.7
Location Quotient: Native Hawaiian/Pacific Islander	1.8	83.0
Location Quotient: White	0.1	2.8
Residential Segregation: All Non White	0.7	83.7
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	78.3%	4.3
Life Expectancy (years)	74.4	2.3
Asthma Rate (%) [higher percentile = less healthy]	11.9%	99.0
Low Birthweight (%) [higher percentile = less healthy]	7.4%	97.2
Preterm Birth (%) [higher percentile = less healthy]	7.8%	85.1
Mental Health Not Good (%) [higher percentile = less healthy]	18.1%	95.3
Physical Health Not Good (%) [higher percentile = less healthy]	18.0%	90.5

EXHIBIT C3 | Zip code 94621 (continued)

Other Indicators (25th percentile cutoff)	Value	Percentile
Bachelor's Education or Higher (%)	10.5%	10.4
High School Enrollment (%)	96.1%	20.1
Automobile Access (%)	79.9%	3.7
Homeownership (%)	30.0%	7.6
Low-Income Homeowner Severe Housing Cost Burden (%)	20.9%	2.8
Low-Income Renter Severe Housing Cost Burden (%)	34.4%	9.2
Uncrowded Housing (%)	80.8%	6.6
2020 Census Response Rate (%)	59.9%	22.4
Voting (%)	61.9%	4.6

EXHIBIT C4 | Zip code 94603		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.2	22.6
Economic Domain	-0.7	25.4
Healthcare Access Domain	-0.5	18.7
Poverty Rate (%)	54.7%	18.4
Employment Rate (%)	68.8%	33.0
Per Capita Income ($)	$20,201.00	14.2
Diesel PM (kg/day)	0.3	22.0
Impervious Surface Cover (%) [higher percentile = less healthy]	64.1%	89.5
Urban Heat Island Index [higher percentile = less healthy]	4961.7	51.7
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	0.8%	52.7
Tree Canopy (%)	4.1%	26.2
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	55.2%	65.1
Location Quotient: American Indian/Alaska Native	1.0	55.8
Location Quotient: Asian	0.2	14.3
Location Quotient: Black	2.9	97.3
Location Quotient: Hispanic/Latino	2.5	99.8
Location Quotient: Native Hawaiian/Pacific Islander	0.8	59.8
Location Quotient: White	0.1	1.8
Residential Segregation: All Non White	0.7	82.9
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	85.8%	21.3
Life Expectancy (years)	75.7	5.9
Asthma Rate (%) [higher percentile = less healthy]	11.2%	96.6
Low Birthweight (%) [higher percentile = less healthy]	6.5%	93.3
Preterm Birth (%) [higher percentile = less healthy]	7.8%	84.6
Mental Health Not Good (%) [higher percentile = less healthy]	16.5%	88.9
Physical Health Not Good (%) [higher percentile = less healthy]	16.1%	77.7

EXHIBIT C4 | Zip code 94603 (continued)		
Other Indicators (25th percentile cutoff)	Value	Percentile
Bachelor's Education or Higher (%)	13.4%	16.3
Automobile Access (%)	89.4%	12.9
Homeownership (%)	45.9%	23.9
Low-Income Homeowner Severe Housing Cost Burden (%)	16.9%	9.9
Low-Income Renter Severe Housing Cost Burden (%)	31.5%	15.5
Uncrowded Housing (%)	82.6%	8.3
Voting (%)	65.3%	7.9

EXHIBIT C5 | Zip code 94801		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.2	23.9
Economic Domain	-0.5	33.8
Healthcare Access Domain	-0.8	10.9
Poverty Rate (%)	56.6%	21.5
Employment Rate (%)	70.9%	41.3
Per Capita Income ($)	$24,742.00	25.8
Diesel PM (kg/day)	0.8	1.8
Impervious Surface Cover (%) [higher percentile = less healthy]	61.1%	85.4
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	7.8%	80.9
Tree Canopy (%)	5.1%	39.4
Equity Indicators		
Racial/ethnicity diversity index (%)	53.2%	59.0
Location Quotient: American Indian/Alaska Native	1.7	77.6
Location Quotient: Asian	0.6	48.8
Location Quotient: Black	1.6	86.4
Location Quotient: Hispanic/Latino	2.3	99.2
Location Quotient: Native Hawaiian/Pacific Islander	0.1	22.2
Location Quotient: White	0.3	8.4
Residential Segregation: All Non White	0.8	90.1
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	82.1%	11.0
Life Expectancy (years)	76.7	10.4
Asthma Rate (%) [higher percentile = less healthy]	10.7%	88.5
Low Birthweight (%) [higher percentile = less healthy]	6.0%	88.1
Preterm Birth (%) [higher percentile = less healthy]	7.7%	83.8
Mental Health Not Good (%) [higher percentile = less healthy]	15.9%	84.7
Physical Health Not Good (%) [higher percentile = less healthy]	15.4%	68.8
Other Indicators (25th percentile cutoff)		
Preschool Enrollment (%)	36.4%	21.9
Automobile Access (%)	89.3%	12.6
Homeownership (%)	43.8%	21.2
Low-Income Homeowner Severe Housing Cost Burden (%)	16.1%	12.6
Uncrowded Housing (%)	86.6%	15.5
Voting (%)	66.5%	10.4

EXHIBIT C6 | Zip code 94601		
Key Climate/Economic Indicators (50th percentile cutoff)	**Value**	**Percentile**
Overall HPI	0.2	24.6
Economic Domain	-0.7	25.8
Healthcare Access Domain	-0.8	10.0
Poverty Rate (%)	50.9%	13.8
Employment Rate (%)	69.0%	33.8
Per Capita Income ($)	$22,267.00	18.3
Diesel PM (kg/day)	0.4	9.9
Impervious Surface Cover (%) [higher percentile = less healthy]	69.9%	94.0
Urban Heat Island Index [higher percentile = less healthy]	5811.7	57.4
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	1.2%	57.2
Tree Canopy (%)	5.7%	45.9
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	63.3%	85.8
Location Quotient: American Indian/Alaska Native	1.1	59.8
Location Quotient: Asian	0.5	42.0
Location Quotient: Black	1.8	89.4
Location Quotient: Hispanic/Latino	2.3	99.0
Location Quotient: Native Hawaiian/Pacific Islander	0.5	47.9
Location Quotient: White	0.3	8.3
Residential Segregation: All Non White	0.6	73.8
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	82.4%	11.4
Life Expectancy (years)	78.1	21.3
Asthma Rate (%) [higher percentile = less healthy]	10.1%	68.2
Low Birthweight (%) [higher percentile = less healthy]	5.1%	66.6
Preterm Birth (%) [higher percentile = less healthy]	7.3%	75.7
Mental Health Not Good (%) [higher percentile = less healthy]	15.6%	81.1
Physical Health Not Good (%) [higher percentile = less healthy]	15.7%	72.4

EXHIBIT C6 | Zip code 94601 (continued)

Other Indicators (25th percentile cutoff)	Value	Percentile
Automobile Access (%)	83.5%	5.4
Homeownership (%)	33.0%	9.7
Housing Habitability (%)	97.7%	12.0
Low-Income Homeowner Severe Housing Cost Burden (%)	17.6%	7.6
Low-Income Renter Severe Housing Cost Burden (%)	29.6%	22.3
Uncrowded Housing (%)	79.5%	5.3
Voting (%)	69.7%	17.0

EXHIBIT C7 | Zip code 94590		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.3	29.7
Economic Domain	-0.4	37.1
Healthcare Access Domain	0.0	38.5
Poverty Rate (%)	61.3%	30.7
Employment Rate (%)	71.0%	41.7
Per Capita Income ($)	$27,200.00	33.4
Diesel PM (kg/day)	0.3	15.9
Impervious Surface Cover (%) [higher percentile = less healthy]	64.1%	89.4
Urban Heat Island Index [higher percentile = less healthy]	7201.3	65.2
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	11.5%	86.3
Equity Indicators		
Racial/ethnicity diversity index (%)	70.6%	96.8
Location Quotient: American Indian/Alaska Native	0.6	39.1
Location Quotient: Asian	0.7	57.5
Location Quotient: Black	1.7	88.3
Location Quotient: Hispanic/Latino	1.3	81.3
Location Quotient: Native Hawaiian/Pacific Islander	0.6	53.6
Location Quotient: White	0.7	18.6
Residential Segregation: All Non White	0.4	34.7
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	89.6%	39.5
Life Expectancy (years)	75.7	6.2
Asthma Rate (%) [higher percentile = less healthy]	10.9%	91.3
Low Birthweight (%) [higher percentile = less healthy]	7.0%	96.3
Mental Health Not Good (%) [higher percentile = less healthy]	15.0%	74.6
Physical Health Not Good (%) [higher percentile = less healthy]	15.3%	67.8
Other Indicators (25th percentile cutoff)		
Preschool Enrollment (%)	32.3%	16.0
Automobile Access (%)	87.6%	9.7
Homeownership (%)	38.1%	14.4
Low-Income Renter Severe Housing Cost Burden (%)	32.9%	11.9
Voting (%)	71.9%	21.2

EXHIBIT C8 | Zip code 94509		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.3	31.8
Economic Domain	-0.5	30.8
Healthcare Access Domain	-0.1	34.4
Poverty Rate (%)	63.5%	34.0
Employment Rate (%)	66.9%	26.9
Per Capita Income ($)	$26,352.00	30.1
Diesel PM (kg/day)	0.2	44.8
Impervious Surface Cover (%) [higher percentile = less healthy]	53.1%	73.1
Urban Heat Island Index [higher percentile = less healthy]	6028.5	58.8
Tree Canopy (%)	6.0%	49.4
Equity Indicators		
Racial/ethnicity diversity index (%)	68.9%	95.3
Location Quotient: American Indian/Alaska Native	1.6	75.3
Location Quotient: Asian	0.4	31.4
Location Quotient: Black	2.2	92.4
Location Quotient: Hispanic/Latino	1.5	89.7
Location Quotient: Native Hawaiian/Pacific Islander	0.6	51.6
Location Quotient: White	0.7	19.5
Residential Segregation: All Non White	0.3	10.5
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	88.8%	34.6
Life Expectancy (years)	76.8	10.7
Asthma Rate (%) [higher percentile = less healthy]	10.8%	89.6
Low Birthweight (%) [higher percentile = less healthy]	5.8%	83.1
Preterm Birth (%) [higher percentile = less healthy]	7.1%	69.1
Mental Health Not Good (%) [higher percentile = less healthy]	15.8%	83.9
Physical Health Not Good (%) [higher percentile = less healthy]	15.5%	70.2
Other Indicators (25th percentile cutoff)		
Bachelor's Education or Higher (%)	16.6%	23.1
Preschool Enrollment (%)	35.2%	20.0
Automobile Access (%)	93.5%	34.5
Low-Income Renter Severe Housing Cost Burden (%)	34.1%	9.8
Voting (%)	72.4%	22.4

EXHIBIT C9 | Zip code 95116		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.3	33.4
Economic Domain	-0.2	47.5
Healthcare Access Domain	-0.3	25.4
Poverty Rate (%)	63.0%	33.3
Per Capita Income ($)	$23,061.00	20.5
Diesel PM (kg/day)	0.5	4.0
Impervious Surface Cover (%) [higher percentile = less healthy]	63.3%	88.2
Retail Density (jobs/acre)	3.2	49.3
Tree Canopy (%)	5.2%	39.8
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	51.2%	53.9
Location Quotient: American Indian/Alaska Native	0.6	35.5
Location Quotient: Asian	0.7	52.3
Location Quotient: Black	1.1	74.6
Location Quotient: Hispanic/Latino	2.5	99.6
Location Quotient: Native Hawaiian/Pacific Islander	1.3	73.5
Location Quotient: White	0.2	5.2
Residential Segregation: All Non White	0.6	75.7
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	86.5%	24.0
Low Birthweight (%) [higher percentile = less healthy]	5.4%	73.2
Preterm Birth (%) [higher percentile = less healthy]	7.5%	79.8
Mental Health Not Good (%) [higher percentile = less healthy]	13.7%	55.7
Physical Health Not Good (%) [higher percentile = less healthy]	14.3%	56.7
Other Indicators (25th percentile cutoff)		
Bachelor's Education or Higher (%)	16.4%	22.8
Preschool Enrollment (%)	38.0%	24.8
Automobile Access (%)	90.2%	15.2
Homeownership (%)	36.7%	13.2
Low-Income Homeowner Severe Housing Cost Burden (%)	15.6%	14.4
Uncrowded Housing (%)	74.1%	1.8
Voting (%)	71.4%	19.8

EXHIBIT C10 | Zip code 94511		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.3	34.4
Economic Domain	-0.2	48.8
Neighborhood Domain	-0.7	6.7
Clean Environment Domain	0.4	59.1
Healthcare Access Domain	-0.1	33.5
Poverty Rate (%)	53.3%	16.7
Employment Rate (%)	55.3%	6.2
Per Capita Income ($)	$26,841.00	32.3
Drinking Water Contaminants	530.8	36.6
Extreme Heat (days): >100°F, 2035-2064 [higher percentile = less healthy]	34.6	55.7
Extreme Heat (days): >100°F, 2070-2099 [higher percentile = less healthy]	58.9	56.3
Extreme Heat (days): >90°F, 2035-2064 [higher percentile = less healthy]	113.8	57.2
Extreme Heat (days): >90°F, 2070-2099 [higher percentile = less healthy]	140.3	57.0
Extreme Heat (days): >baseline, 2035-2064 [higher percentile = less healthy]	21.9	52.3
Extreme Heat (days): >baseline, 2070-2099 [higher percentile = less healthy]	40.3	51.4
Park Access (%)	29.5%	9.1
Retail Density (jobs/acre)	0.1	6.2
Tree Canopy (%)	4.4%	29.7
Equity Indicators		
Racial/ethnicity diversity index (%)	55.4%	65.9
Location Quotient: American Indian/Alaska Native	0.0	0.0
Location Quotient: Asian	0.2	13.3
Location Quotient: Black	1.1	72.5
Location Quotient: Hispanic/Latino	0.9	58.3
Location Quotient: Native Hawaiian/Pacific Islander	0.0	0.0
Location Quotient: White	1.4	72.1
Residential Segregation: All Non White	0.6	66.1

EXHIBIT C10 | Zip code 94511 (continued)		
Key Health Indicators (50th percentile cutoff)	**Value**	**Percentile**
Insured Adults (%)	80.4%	7.3
Life Expectancy (years)	78.3	22.8
Asthma Rate (%) [higher percentile = less healthy]	10.0%	66.3
Low Birthweight (%) [higher percentile = less healthy]	6.1%	88.6
Preterm Birth (%) [higher percentile = less healthy]	6.7%	50.2
Physical Health Not Good (%) [higher percentile = less healthy]	14.5%	59.1
Other Indicators (25th percentile cutoff)		
Bachelor's Education or Higher (%)	11.0%	11.5
Preschool Enrollment (%)	28.9%	11.8
Active Commuting (%)	0.0%	1.2
Automobile Access (%)	90.2%	15.2
Low-Income Homeowner Severe Housing Cost Burden (%)	16.2%	12.3
2020 Census Response Rate (%)	51.8%	11.5

EXHIBIT C11 | Zip code 94589		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.4	35.3
Economic Domain	-0.4	36.0
Poverty Rate (%)	67.2%	41.8
Employment Rate (%)	67.6%	29.1
Per Capita Income ($)	$26,895.00	32.6
Diesel PM (kg/day)	0.2	27.1
Impervious Surface Cover (%) [higher percentile = less healthy]	61.8%	86.2
Urban Heat Island Index [higher percentile = less healthy]	8368.0	69.9
Extreme Heat (days): >100°F, 2035-2064 [higher percentile = less healthy]	11.9	37.8
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	10.9%	85.2
Retail Density (jobs/acre)	1.3	28.1
Tree Canopy (%)	5.8%	47.4
Equity Indicators		
Racial/ethnicity diversity index (%)	72.7%	98.4
Location Quotient: American Indian/Alaska Native	0.2	14.5
Location Quotient: Asian	1.7	89.8
Location Quotient: Black	1.7	88.0
Location Quotient: Hispanic/Latino	1.1	71.3
Location Quotient: Native Hawaiian/Pacific Islander	1.6	81.0
Location Quotient: White	0.4	11.0
Residential Segregation: All Non White	0.6	69.4
Key Health Indicators (50th percentile cutoff)		
Life Expectancy (years)	78.8	28.6
Asthma Rate (%) [higher percentile = less healthy]	9.8%	59.5
Low Birthweight (%) [higher percentile = less healthy]	7.1%	96.6
Preterm Birth (%) [higher percentile = less healthy]	7.1%	68.3
Physical Health Not Good (%) [higher percentile = less healthy]	13.7%	51.1
Other Indicators (25th percentile cutoff)		
High School Enrollment (%)	88.0%	2.9
Low-Income Renter Severe Housing Cost Burden (%)	31.0%	17.3
Voting (%)	72.5%	22.7

EXHIBIT C12 | Zip code 95407		
Key Climate/Economic Indicators (50th percentile cutoff)	**Value**	**Percentile**
Overall HPI	0.4	36.3
Economic Domain	-0.2	48.6
Neighborhood Domain	-0.3	26.4
Healthcare Access Domain	-0.6	15.7
Poverty Rate (%)	62.3%	32.3
Per Capita Income ($)	$24,719.00	25.6
Diesel PM (kg/day)	0.2	26.1
Impervious Surface Cover (%) [higher percentile = less healthy]	46.9%	63.1
Park Access (%)	64.5%	33.4
Tree Canopy (%)	5.5%	44.6
Equity Indicators		
Racial/ethnicity diversity index (%)	57.5%	71.0
Location Quotient: American Indian/Alaska Native	2.1	83.6
Location Quotient: Asian	1.4	83.2
Location Quotient: Black	2.0	91.0
Location Quotient: Hispanic/Latino	2.1	98.3
Location Quotient: Native Hawaiian/Pacific Islander	0.6	50.8
Location Quotient: White	0.5	13.3
Residential Segregation: All Non White	0.7	81.7
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	83.1%	12.6
Life Expectancy (years)	79.1	31.9
Asthma Rate (%) [higher percentile = less healthy]	9.8%	60.7
Mental Health Not Good (%) [higher percentile = less healthy]	15.5%	80.5
Physical Health Not Good (%) [higher percentile = less healthy]	14.0%	53.9
Other Indicators (25th percentile cutoff)		
Bachelor's Education or Higher (%)	13.7%	16.9
Preschool Enrollment (%)	29.2%	12.1
Uncrowded Housing (%)	87.5%	17.5

EXHIBIT C13 | Zip code 94102		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.4	39.3
Clean Environment Domain	0.0	37.3
Poverty Rate (%)	63.5%	33.9
Diesel PM (kg/day)	1.2	0.8
Impervious Surface Cover (%) [higher percentile = less healthy]	88.1%	99.8
Tree Canopy (%)	3.8%	21.8
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	69.8%	96.1
Location Quotient: American Indian/Alaska Native	4.9	95.7
Location Quotient: Asian	0.8	62.8
Location Quotient: Black	1.8	89.3
Location Quotient: Hispanic/Latino	1.3	79.5
Location Quotient: Native Hawaiian/Pacific Islander	0.5	48.8
Location Quotient: White	0.9	30.8
Residential Segregation: All Non White	0.3	15.9
Key Health Indicators (50th percentile cutoff)		
Life Expectancy (years)	76.2	7.8
Low Birthweight (%) [higher percentile = less healthy]	5.9%	86.7
Other Indicators (25th percentile cutoff)		
Automobile Access (%)	30.8%	0.2
Homeownership (%)	8.9%	1.3
Housing Habitability (%)	80.4%	0.1
Low-Income Homeowner Severe Housing Cost Burden (%)	31.5%	0.1
Uncrowded Housing (%)	87.6%	18.0
2020 Census Response Rate (%)	57.5%	16.9

EXHIBIT C14 | Zip code 94565		
Key Climate/Economic Indicators (50th percentile cutoff)	**Value**	**Percentile**
Overall HPI	0.4	39.4
Economic Domain	-0.3	41.9
Neighborhood Domain	0.0	49.1
Healthcare Access Domain	-0.1	32.6
Poverty Rate (%)	65.4%	37.8
Employment Rate (%)	71.6%	43.8
Per Capita Income ($)	$28,103.00	35.5
Diesel PM (kg/day)	0.2	33.8
Impervious Surface Cover (%) [higher percentile = less healthy]	52.8%	72.4
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	2.3%	66.1
Retail Density (jobs/acre)	1.8	34.3
Tree Canopy (%)	5.6%	45.5
Equity Indicators		
Racial/ethnicity diversity index (%)	64.5%	88.1
Location Quotient: American Indian/Alaska Native	1.1	62.7
Location Quotient: Asian	0.7	55.6
Location Quotient: Black	1.9	90.0
Location Quotient: Hispanic/Latino	1.9	96.5
Location Quotient: Native Hawaiian/Pacific Islander	1.2	71.3
Location Quotient: White	0.4	9.9
Residential Segregation: All Non White	0.6	68.2
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	88.4%	32.8
Life Expectancy (years)	78.3	22.6
Asthma Rate (%) [higher percentile = less healthy]	10.3%	77.1
Low Birthweight (%) [higher percentile = less healthy]	5.4%	74.3
Preterm Birth (%) [higher percentile = less healthy]	7.4%	75.9
Mental Health Not Good (%) [higher percentile = less healthy]	15.0%	73.9
Physical Health Not Good (%) [higher percentile = less healthy]	14.4%	58.1
Other Indicators (25th percentile cutoff)		
Uncrowded Housing (%)	89.2%	23.4
Voting (%)	73.0%	24.5

EXHIBIT C15 | Zip code 94806		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.4	39.9
Economic Domain	-0.2	45.5
Healthcare Access Domain	-0.5	19.7
Poverty Rate (%)	66.6%	40.4
Employment Rate (%)	72.5%	49.1
Per Capita Income ($)	$26,080.00	29.2
Diesel PM (kg/day)	0.4	10.3
Impervious Surface Cover (%) [higher percentile = less healthy]	57.5%	80.3
Equity Indicators		
Racial/ethnicity diversity index (%)	63.1%	85.2
Location Quotient: American Indian/Alaska Native	1.2	63.7
Location Quotient: Asian	1.0	73.1
Location Quotient: Black	1.7	88.2
Location Quotient: Hispanic/Latino	2.0	98.0
Location Quotient: Native Hawaiian/Pacific Islander	1.3	73.9
Location Quotient: White	0.3	5.8
Residential Segregation: All Non White	0.7	83.2
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	85.4%	19.9
Life Expectancy (years)	79.7	39.0
Asthma Rate (%) [higher percentile = less healthy]	10.0%	67.6
Low Birthweight (%) [higher percentile = less healthy]	5.7%	82.7
Preterm Birth (%) [higher percentile = less healthy]	7.7%	82.5
Mental Health Not Good (%) [higher percentile = less healthy]	14.4%	66.1
Physical Health Not Good (%) [higher percentile = less healthy]	14.4%	57.7
Other Indicators (25th percentile cutoff)		
High School Enrollment (%)	96.4%	21.9
Preschool Enrollment (%)	29.7%	12.7
Homeownership (%)	46.1%	24.1
Uncrowded Housing (%)	88.8%	22.5

EXHIBIT C16 | Zip code 94533		
Key Climate/Economic Indicators (50th percentile cutoff)	**Value**	**Percentile**
Overall HPI	0.4	41.6
Economic Domain	-0.2	48.2
Poverty Rate (%)	68.8%	44.1
Employment Rate (%)	72.0%	46.3
Per Capita Income ($)	$29,999.00	40.3
Diesel PM (kg/day)	0.1	47.8
Impervious Surface Cover (%) [higher percentile = less healthy]	56.8%	79.6
Extreme Heat (days): >100°F, 2035-2064 [higher percentile = less healthy]	35.0	56.1
Extreme Heat (days): >100°F, 2070-2099 [higher percentile = less healthy]	54.4	54.0
Extreme Heat (days): >90°F, 2035-2064 [higher percentile = less healthy]	103.4	52.3
Extreme Heat (days): >90°F, 2070-2099 [higher percentile = less healthy]	128.5	51.3
Extreme Heat (days): >baseline, 2035-2064 [higher percentile = less healthy]	22.5	54.4
Extreme Heat (days): >baseline, 2070-2099 [higher percentile = less healthy]	39.0	49.5
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	2.4%	66.6
Equity Indicators		
Racial/ethnicity diversity index (%)	71.6%	97.7
Location Quotient: American Indian/Alaska Native	1.4	70.5
Location Quotient: Asian	0.9	64.9
Location Quotient: Black	1.3	79.6
Location Quotient: Hispanic/Latino	1.3	82.9
Location Quotient: Native Hawaiian/Pacific Islander	1.5	78.1
Location Quotient: White	0.7	19.7
Residential Segregation: All Non White	0.3	13.8
Key Health Indicators (50th percentile cutoff)		
Life Expectancy (years)	77.6	16.3
Asthma Rate (%) [higher percentile = less healthy]	10.5%	82.6
Low Birthweight (%) [higher percentile = less healthy]	5.5%	78.2
Mental Health Not Good (%) [higher percentile = less healthy]	14.6%	68.0
Physical Health Not Good (%) [higher percentile = less healthy]	13.8%	52.5
Other Indicators (25th percentile cutoff)		
High School Enrollment (%)	95.1%	14.6
Voting (%)	73.0%	24.4

EXHIBIT C17 | Zip code 95122		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.4	42.0
Neighborhood Domain	0.0	49.4
Healthcare Access Domain	-0.1	33.5
Poverty Rate (%)	68.0%	43.1
Per Capita Income ($)	$23,830.00	22.9
Diesel PM (kg/day)	0.3	18.8
Impervious Surface Cover (%) [higher percentile = less healthy]	61.5%	85.8
Urban Heat Island Index [higher percentile = less healthy]	4774.3	50.3
Tree Canopy (%)	4.8%	36.2
Equity Indicators		
Racial/ethnicity diversity index (%)	50.2%	50.6
Location Quotient: American Indian/Alaska Native	0.6	38.8
Location Quotient: Asian	1.0	70.0
Location Quotient: Black	0.5	42.5
Location Quotient: Hispanic/Latino	2.3	99.1
Location Quotient: Native Hawaiian/Pacific Islander	3.3	92.4
Location Quotient: White	0.1	1.7
Residential Segregation: All Non White	0.7	82.3
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	88.7%	34.3
Life Expectancy (years)	80.2	46.0
Low Birthweight (%) [higher percentile = less healthy]	4.8%	53.5
Preterm Birth (%) [higher percentile = less healthy]	7.4%	76.2
Mental Health Not Good (%) [higher percentile = less healthy]	13.5%	52.6
Physical Health Not Good (%) [higher percentile = less healthy]	13.8%	51.8
Other Indicators (25th percentile cutoff)		
Bachelor's Education or Higher (%)	16.0%	21.5
High School Enrollment (%)	96.2%	20.4
Low-Income Homeowner Severe Housing Cost Burden (%)	14.2%	22.1
Low-Income Renter Severe Housing Cost Burden (%)	33.2%	11.6
Uncrowded Housing (%)	77.3%	3.3
Voting (%)	72.2%	21.9

EXHIBIT C18 | Zip code 94804		
Key Climate/Economic Indicators (50th percentile cutoff)	**Value**	**Percentile**
Overall HPI	0.4	42.4
Economic Domain	-0.3	43.0
Healthcare Access Domain	-0.5	19.2
Poverty Rate (%)	56.4%	21.2
Employment Rate (%)	72.6%	49.7
Per Capita Income ($)	$28,337.00	36.5
Diesel PM (kg/day)	0.7	2.5
Impervious Surface Cover (%) [higher percentile = less healthy]	62.0%	86.5
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	6.7%	78.3
Tree Canopy (%)	5.1%	39.0
Equity Indicators		
Racial/ethnicity diversity index (%)	64.5%	88.3
Location Quotient: American Indian/Alaska Native	1.4	70.1
Location Quotient: Asian	0.7	58.0
Location Quotient: Black	2.7	96.2
Location Quotient: Hispanic/Latino	1.6	91.8
Location Quotient: Native Hawaiian/Pacific Islander	0.7	58.0
Location Quotient: White	0.4	10.8
Residential Segregation: All Non White	0.7	80.0
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	86.1%	22.7
Life Expectancy (years)	77.3	14.3
Asthma Rate (%) [higher percentile = less healthy]	10.9%	90.7
Low Birthweight (%) [higher percentile = less healthy]	6.5%	93.2
Preterm Birth (%) [higher percentile = less healthy]	7.0%	64.8
Mental Health Not Good (%) [higher percentile = less healthy]	14.9%	73.2
Physical Health Not Good (%) [higher percentile = less healthy]	15.0%	65.2
Other Indicators (25th percentile cutoff)		
Automobile Access (%)	90.0%	14.6
Homeownership (%)	45.4%	22.8
Low-Income Homeowner Severe Housing Cost Burden (%)	15.3%	16.3

EXHIBIT C19 | Zip code 94124		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.4	44.9
Economic Domain	-0.2	46.9
Clean Environment Domain	0.0	33.8
Poverty Rate (%)	64.0%	35.5
Employment Rate (%)	72.2%	47.3
Per Capita Income ($)	$31,651.00	44.1
Diesel PM (kg/day)	1.2	0.8
Impervious Surface Cover (%) [higher percentile = less healthy]	69.3%	93.7
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	63.7%	86.6
Location Quotient: American Indian/Alaska Native	0.5	32.2
Location Quotient: Asian	1.0	73.7
Location Quotient: Black	5.2	99.4
Location Quotient: Hispanic/Latino	1.6	92.4
Location Quotient: Native Hawaiian/Pacific Islander	6.3	98.2
Location Quotient: White	0.2	4.2
Residential Segregation: All Non White	0.7	86.4
Key Health Indicators (50th percentile cutoff)		
Life Expectancy (years)	76.9	11.2
Asthma Rate (%) [higher percentile = less healthy]	9.6%	53.9
Low Birthweight (%) [higher percentile = less healthy]	7.1%	96.7
Preterm Birth (%) [higher percentile = less healthy]	7.1%	65.9
Mental Health Not Good (%) [higher percentile = less healthy]	14.0%	60.1
Physical Health Not Good (%) [higher percentile = less healthy]	13.8%	52.0
Other Indicators (25th percentile cutoff)		
Automobile Access (%)	81.7%	4.3
Low-Income Homeowner Severe Housing Cost Burden (%)	18.2%	6.5
Voting (%)	73.1%	24.8

EXHIBIT C20 | Zip code 95110		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.5	45.3
Healthcare Access Domain	-0.1	33.3
Poverty Rate (%)	61.5%	31.1
Employment Rate (%)	72.4%	48.2
Diesel PM (kg/day)	0.5	4.6
Impervious Surface Cover (%) [higher percentile = less healthy]	68.2%	92.9
Tree Canopy (%)	5.5%	44.2
Equity Indicators		
Historically redlined tract within?	Yes	–
Racial/ethnicity diversity index (%)	55.6%	66.6
Location Quotient: American Indian/Alaska Native	1.3	68.6
Location Quotient: Asian	0.4	35.1
Location Quotient: Black	1.7	87.4
Location Quotient: Hispanic/Latino	2.1	98.2
Location Quotient: Native Hawaiian/Pacific Islander	0.4	41.3
Location Quotient: White	0.7	20.1
Residential Segregation: All Non White	0.4	42.3
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	88.9%	34.9
Low Birthweight (%) [higher percentile = less healthy]	4.8%	56.0
Preterm Birth (%) [higher percentile = less healthy]	6.9%	57.9
Mental Health Not Good (%) [higher percentile = less healthy]	13.4%	52.2
Other Indicators (25th percentile cutoff)		
Homeownership (%)	38.7%	15.0
Housing Habitability (%)	97.4%	8.8
Low-Income Renter Severe Housing Cost Burden (%)	32.9%	12.0
Uncrowded Housing (%)	86.2%	14.7

EXHIBIT C21 | Zip code 94520		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.5	46.0
Healthcare Access Domain	-0.7	14.0
Poverty Rate (%)	62.8%	32.8
Per Capita Income ($)	$28,893.00	38.2
Diesel PM (kg/day)	0.3	15.8
Impervious Surface Cover (%) [higher percentile = less healthy]	56.7%	79.3
Urban Heat Island Index [higher percentile = less healthy]	12696.3	80.9
Tree Canopy (%)	5.6%	45.7
Equity Indicators		
Racial/ethnicity diversity index (%)	62.6%	84.1
Location Quotient: American Indian/Alaska Native	1.2	64.6
Location Quotient: Asian	0.8	63.1
Location Quotient: Black	0.6	47.0
Location Quotient: Hispanic/Latino	1.7	94.7
Location Quotient: Native Hawaiian/Pacific Islander	2.3	87.7
Location Quotient: White	0.7	19.6
Residential Segregation: All Non White	0.5	48.8
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	82.4%	11.5
Life Expectancy (years)	77.8	18.3
Asthma Rate (%) [higher percentile = less healthy]	9.6%	54.1
Low Birthweight (%) [higher percentile = less healthy]	4.7%	50.7
Mental Health Not Good (%) [higher percentile = less healthy]	14.5%	66.7
Other Indicators (25th percentile cutoff)		
Automobile Access (%)	90.9%	17.7
Homeownership (%)	35.1%	11.3
Low-Income Renter Severe Housing Cost Burden (%)	30.8%	17.7
Uncrowded Housing (%)	84.6%	11.6

EXHIBIT C22 | Zip code 95111		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.5	46.2
Neighborhood Domain	0.0	43.9
Healthcare Access Domain	-0.1	35.9
Poverty Rate (%)	67.6%	42.1
Per Capita Income ($)	$26,761.00	31.7
Diesel PM (kg/day)	0.2	27.3
Impervious Surface Cover (%) [higher percentile = less healthy]	60.5%	84.3
Urban Heat Island Index [higher percentile = less healthy]	5376.4	54.3
Retail Density (jobs/acre)	2.2	38.8
Tree Canopy (%)	5.2%	39.8
Equity Indicators		
Racial/ethnicity diversity index (%)	56.3%	68.6
Location Quotient: American Indian/Alaska Native	2.0	82.5
Location Quotient: Asian	1.0	71.1
Location Quotient: Black	0.8	62.1
Location Quotient: Hispanic/Latino	2.0	97.6
Location Quotient: Native Hawaiian/Pacific Islander	1.8	82.9
Location Quotient: White	0.3	5.8
Residential Segregation: All Non White	0.6	70.0
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	88.9%	35.3
Low Birthweight (%) [higher percentile = less healthy]	5.5%	76.1
Other Indicators (25th percentile cutoff)		
High School Enrollment (%)	96.4%	21.6
Low-Income Homeowner Severe Housing Cost Burden (%)	15.5%	14.9
Low-Income Renter Severe Housing Cost Burden (%)	30.4%	18.9
Uncrowded Housing (%)	82.7%	8.4

EXHIBIT C23 | Zip code 94063		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.5	48.7
Neighborhood Domain	0.0	47.0
Healthcare Access Domain	-0.3	25.0
Poverty Rate (%)	61.0%	30.0
Diesel PM (kg/day)	0.3	16.0
Impervious Surface Cover (%) [higher percentile = less healthy]	68.0%	93.0
Urban Heat Island Index [higher percentile = less healthy]	19341.5	89.0
Population in Sea Level Rise Inundation Area (%) [higher percentile = less healthy]	40.0%	96.0
Park Access (%)	72.0%	42.0
Equity Indicators		
Racial/ethnicity diversity index (%)	48.1%	45.9
Location Quotient: American Indian/Alaska Native	1.3	66.0
Location Quotient: Asian	0.3	23.0
Location Quotient: Black	1.1	73.0
Location Quotient: Hispanic/Latino	2.5	100.0
Location Quotient: Native Hawaiian/Pacific Islander	1.0	67.0
Location Quotient: White	0.7	17.0
Residential Segregation: All Non White	0.6	66.0
Key Health Indicators (50th percentile cutoff)		
Insured Adults (%)	85.8%	21.5
Life Expectancy (years)	79.7	39.7
Low Birthweight (%) [higher percentile = less healthy]	5.4%	74.5
Mental Health Not Good (%) [higher percentile = less healthy]	14.3%	65.2
Other Indicators (25th percentile cutoff)		
High School Enrollment (%)	95.1%	14.2
Homeownership (%)	34.4%	11.0
Low-Income Homeowner Severe Housing Cost Burden (%)	16.9%	9.8
Low-Income Renter Severe Housing Cost Burden (%)	32.6%	12.4
Uncrowded Housing (%)	78.5%	4.2

EXHIBIT C24 | Zip code 94578		
Key Climate/Economic Indicators (50th percentile cutoff)	Value	Percentile
Overall HPI	0.5	49.6
Poverty Rate (%)	66.0%	40.0
Per Capita Income ($)	$31,265.00	43.0
Diesel PM (kg/day)	0.7	3.0
Impervious Surface Cover (%) [higher percentile = less healthy]	63.0%	88.0
Urban Heat Island Index [higher percentile = less healthy]	6678.2	63.0
Tree Canopy (%)	5.0%	40.0
Equity Indicators		
Racial/ethnicity diversity index (%)	71.9%	97.9
Location Quotient: American Indian/Alaska Native	1.1	60.0
Location Quotient: Asian	0.9	69.0
Location Quotient: Black	1.5	84.0
Location Quotient: Hispanic/Latino	1.5	89.0
Location Quotient: Native Hawaiian/Pacific Islander	0.3	39.0
Location Quotient: White	0.6	16.0
Residential Segregation: All Non White	0.4	23.0
Key Health Indicators (50th percentile cutoff)		
Life Expectancy (years)	79.9	42.8
Asthma Rate (%) [higher percentile = less healthy]	9.5%	51.6
Low Birthweight (%) [higher percentile = less healthy]	5.6%	79.9
Preterm Birth (%) [higher percentile = less healthy]	6.8%	56.6
Mental Health Not Good (%) [higher percentile = less healthy]	13.4%	51.8
Other Indicators (25th percentile cutoff)		
Preschool Enrollment (%)	34.1%	18.8
Automobile Access (%)	92.4%	24.4
Homeownership (%)	40.2%	17.0
Uncrowded Housing (%)	86.9%	16.1

Appendix D: Stratified Data Tables

EXHIBIT D1 | City-level per capita income stratified by race/ethnicity

City	Focus ZIPs Included	Asian alone	Hispanic or Latino	Black or African American alone	American Indian and Alaska Native alone	Native Hawaiian and Other Pacific Islander alone	White alone, not Hispanic or Latino	Some other race alone	Two or more races	All
San Francisco	94130, 94102, 94124	$54,010	$37,504	$38,785	$34,796	$33,183	$99,408	$27,326	$47,992	$68,883
Oakland	94621, 94603, 94601	$38,849	$22,688	$31,192	$29,199	$26,659	$76,606	$19,428	$32,384	$43,191
Richmond	94804	$32,969	$19,396	$32,731	$43,163	$22,581	$55,578	$17,477	$27,726	$31,089
North Richmond	94801	$23,113	$18,416	$27,888	–	–	$30,865	$20,302	$6,232	$20,886
Vallejo	94590, 94589	$33,833	$21,313	$28,859	$28,027	$28,116	$43,003	$21,447	$20,148	$31,230
Antioch	94509	$35,430	$21,926	$26,564	$20,508	$27,876	$39,078	$21,570	$21,663	$29,591
San Jose	95116, 95122, 95110, 95111	$50,634	$25,706	$37,299	$32,185	$37,895	$69,361	$21,995	$28,680	$46,599
Fairfield	94533	$35,289	$23,925	$37,617	$19,249	$31,490	$46,688	$22,738	$23,743	$35,271
Bethel Island	94511	–	$14,942	$17,243	–	–	$32,611	$10,536	–	$26,841
Santa Rosa	95407	$36,989	$20,409	$30,209	$32,088	$23,609	$47,824	$18,165	$22,612	$36,935
Bay Point	94565	$28,664	$18,161	$27,145	$16,506	$33,060	$42,582	$15,972	$12,476	$22,856
Pittsburg	94565	$36,886	$20,998	$29,135	$19,827	$27,635	$48,126	$21,018	$16,434	$29,972
San Pablo	94806	$22,891	$17,911	$23,746	$19,930	$28,741	$32,142	$18,113	$23,210	$20,769
Concord	94520	$42,524	$25,438	$35,945	$44,171	$24,157	$49,673	$22,328	$24,833	$39,877
Redwood City	94063	$81,083	$25,081	$46,499	$17,648	$46,119	$83,593	$20,285	$40,962	$60,389
San Leandro	94578	$32,194	$26,334	$39,430	$35,173	$31,104	$55,111	$26,870	$26,765	$36,755
Average	–	*$38,714*	*$22,843*	*$31,893*	*$27,804*	*$29,462*	*$54,081*	*$20,751*	*$25,276*	*$37,162*
Standard Deviation	–	*$13,977*	*$5,181*	*$6,914*	*$9,023*	*$6,565*	*$19,284*	*$4,221*	*$10,004*	*$13,438*

EXHIBIT D2 | City-level adult insurance rates stratified by race/ethnicity

City	Focus ZIPs Included	Asian alone	Hispanic or Latino	Black or African American alone	American Indian and Alaska Native alone	Native Hawaiian and Other Pacific Islander alone	White alone, not Hispanic or Latino	Some other race alone	Two or more races	All
San Francisco	94130, 94102, 94124	95.6%	90.1%	93.8%	90.4%	93.4%	97.0%	86.4%	96.0%	95.3%
Oakland	94621, 94603, 94601	92.7%	79.1%	90.9%	83.6%	85.4%	95.8%	75.0%	91.6%	89.6%
Richmond	94804	93.7%	77.5%	92.3%	70.5%	96.2%	91.7%	76.0%	84.0%	85.9%
North Richmond	94801	100.0%	77.2%	95.7%	100.0%		48.0%	76.9%	100.0%	82.3%
Vallejo	94590, 94589	94.4%	89.7%	94.1%	97.2%	88.7%	94.7%	90.5%	94.2%	93.1%
Antioch	94509	94.2%	86.6%	93.9%	89.0%	100.0%	93.9%	82.5%	87.6%	91.2%
San Jose	95116, 95122, 95110, 95111	95.7%	86.6%	93.2%	87.8%	89.3%	95.7%	85.4%	94.9%	92.9%
Fairfield	94533	96.1%	87.6%	94.1%	93.6%	97.8%	96.5%	85.8%	94.1%	93.4%
Bethel Island	94511	100.0%	82.0%	–	–	–	78.7%	75.1%	100.0%	80.4%
Santa Rosa	95407	94.0%	80.1%	89.8%	89.3%	79.5%	94.6%	74.2%	91.2%	89.6%
Bay Point	94565	97.4%	75.2%	90.5%	85.3%	100.0%	94.5%	71.6%	80.5%	82.2%
Pittsburg	94565	90.5%	85.3%	94.2%	84.4%	96.3%	95.9%	82.4%	96.5%	90.6%
San Pablo	94806	88.2%	75.5%	95.7%	100.0%	100.0%	92.5%	76.8%	95.8%	81.9%
Concord	94520	95.5%	80.2%	93.5%	91.6%	100.0%	96.0%	71.8%	94.9%	91.2%
Redwood City	94063	96.6%	84.9%	99.4%	95.0%	97.4%	97.2%	81.8%	95.4%	92.8%
San Leandro	94578	95.6%	85.4%	95.4%	93.3%	87.8%	95.3%	78.8%	92.8%	92.7%
Average	–	*95.0%*	*83.3%*	*93.8%*	*90.4%*	*93.6%*	*91.5%*	*80.1%*	*93.2%*	*89.5%*
Standard Deviation	–	*2.9%*	*5.3%*	*2.3%*	*7.4%*	*6.3%*	*12.0%*	*6.2%*	*5.1%*	*5.0%*

EXHIBIT D3 | County-level adult insurance rates stratified by race/ethnicity

County	Asian alone	Hispanic or Latino	Black or African American alone	American Indian and Alaska Native alone	Native Hawaiian and Other Pacific Islander alone	White alone, not Hispanic or Latino	Some other race alone	Two or more races	All
Alameda	96.7%	87.5%	92.7%	89.0%	92.4%	96.7%	85.3%	94.4%	94.2%
Contra Costa	95.1%	84.8%	94.1%	88.5%	97.4%	96.2%	80.4%	93.8%	92.8%
Marin	96.7%	80.5%	89.9%	83.3%	83.3%	97.4%	74.2%	95.0%	94.3%
Napa	95.6%	84.4%	95.9%	94.5%	80.3%	95.6%	83.2%	92.7%	91.6%
San Francisco	95.5%	90.1%	93.8%	90.4%	93.3%	97.0%	86.4%	96.0%	95.3%
San Mateo	96.4%	87.3%	93.1%	88.0%	90.2%	96.7%	84.6%	94.6%	94.1%
Santa Clara	96.5%	87.1%	93.8%	89.1%	92.8%	96.4%	86.0%	95.2%	94.1%
Solano	94.4%	88.7%	94.0%	90.7%	94.7%	95.3%	87.2%	94.8%	93.2%
Sonoma	93.2%	82.7%	89.3%	90.5%	78.3%	94.7%	76.7%	92.1%	91.2%
Average	*95.6%*	*85.9%*	*93.0%*	*89.3%*	*89.2%*	*96.2%*	*82.7%*	*94.3%*	*93.4%*
Standard Deviation	*1.2%*	*3.0%*	*2.1%*	*3.0%*	*6.8%*	*0.9%*	*4.6%*	*1.2%*	*1.4%*

EXHIBIT D4 | County-level life expectancy at birth stratified by race/ethnicity

County	Non-Hispanic Black	Non-Hispanic American Indian and Alaska Native	Latino	Non-Hispanic Asian	Non-Hispanic White	All
Alameda	75.7	83.6	84.6	88.2	82.0	82.9
Contra Costa	76.6	77.9	85.4	88.0	81.9	82.4
Marin	78.8	–	88.6	90.2	85.3	85.4
Napa	79.8	–	86.7	89.1	80.7	81.8
San Francisco	72.8	77.2	85.6	87.5	82.9	83.8
San Mateo	79.4	–	87.5	88.9	83.3	84.7
Santa Clara	79.6	81.3	84.2	89.6	82.8	84.6
Solano	75.5	78.6	85.1	85.7	78.9	80.0
Sonoma	80.4	79.1	86.0	86.7	81.5	82.0
Average	*77.6*	*79.6*	*86*	*88.2*	*82.2*	*83.1*
Standard Deviation	*2.6*	*2.4*	*1.4*	*1.4*	*1.8*	*1.7*

Appendix E: Data Dictionary

Indicator	Technical Definition	Data Source	Year(s)
Key Climate/Economic Indicators			
Poverty Rate	Percentage of the population with an income exceeding 200% of federal poverty level.	American Community Survey, Table S1701	2015-2019
Employment Rate	Percentage of population aged 20-64 who are employed	American Community Survey, Table S2301	2015-2019
Per Capita Income	Per capita income in the past 12 months (in 2019 inflation-adjusted dollars).	American Community Survey, Table B19301	2015-2019
Diesel PM	Spatial distribution of gridded diesel PM emissions from on-road and non-road sources in 2016	CalEnviroScreen 4.0	2016
Drinking Water Contaminants	CalEnviroScreen 4.0 drinking water contaminant index for selected contaminants, 2011 to 2019	CalEnviroScreen 4.0	2011-2019
Ozone	Mean of summer months (May-October) of the daily maximum 8-hour ozone concentration (ppm), averaged over three years (2016 to 2018)	CalEnviroScreen 4.0	2016-2018
PM 2.5	Annual mean concentration of PM2.5 (weighted average of measured monitor concentrations and satellite observations, microgram/m^3), over three years (2015 to 2017).	CalEnviroScreen 4.0	2015-2017
Impervious Surface Cover	Percent of land covered by surfaces that do not allow water to soak into the soil	NLCD	2016
Urban Heat Island Index	Urban heat island index: sum of 182 day temp. differences (degree-hr) between urban and rural reference	CalEPA	2015
Extreme Heat: >100°F, 2035-2064	Projected number of days above 100 degrees F in Mid-Century (2035 - 2064) under the RCP 8.5 scenario, using data from California's four priority global climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5).	CalAdapt_CanESM2_CNRM-CM5_HadGEM2-ES_MIROC5_LOCA_RCP8.5	2018

Indicator	Technical Definition	Data Source	Year(s)
Extreme Heat: >100°F, 2070-2099	Projected number of days above 100 degrees F in End of Century (2070 - 2099) under the RCP 8.5 scenario, using data from California's four priority global climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5).	CalAdapt_CanESM2_CNRM-CM5_HadGEM2-ES_MIROC5_LOCA_RCP8.5	2018
Extreme Heat: >90°F, 2035-2064	Projected number of days above 90 degrees F in Mid-Century (2035 - 2064) under the RCP 8.5 scenario, using data from California's four priority global climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5).	CalAdapt_CanESM2_CNRM-CM5_HadGEM2-ES_MIROC5_LOCA_RCP8.5	2018
Extreme Heat: >90°F, 2070-2099	Projected number of days above 90 degrees F in End of Century (2070 - 2099) under the RCP 8.5 scenario, using data from California's four priority global climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5).	CalAdapt_CanESM2_CNRM-CM5_HadGEM2-ES_MIROC5_LOCA_RCP8.5	2018
Extreme Heat: >baseline, 2035-2064	Projected number of extreme heat days in Mid-Century (2035 - 2064) under the RCP 8.5 scenario. Defined as the projected number of days above the 98th percentile of daily maximum temperatures (based on observed historical data from 1961 - 1990 between April and October).	CalAdapt_CanESM2_CNRM-CM5_HadGEM2-ES_MIROC5_LOCA_RCP8.5	2018
Extreme Heat: >baseline, 2070-2099	Projected number of extreme heat days in End of Century (2070 - 2099) under the RCP 8.5 scenario. Defined as the projected number of days above the 98th percentile of daily maximum temperatures (based on observed historical data from 1961 - 1990 between April and October).	CalAdapt_CanESM2_CNRM-CM5_HadGEM2-ES_MIROC5_LOCA_RCP8.5	2018
Population in Sea Level Rise Inundation Area	Percentage of population living in a 100-year flood zone with 55 inches of sea level rise.	Pacific Institute	2009
Wildfire Risk	Percent of population currently living in very high wildfire risk areas.	California Department of Forestry and Fire Prevention	2007

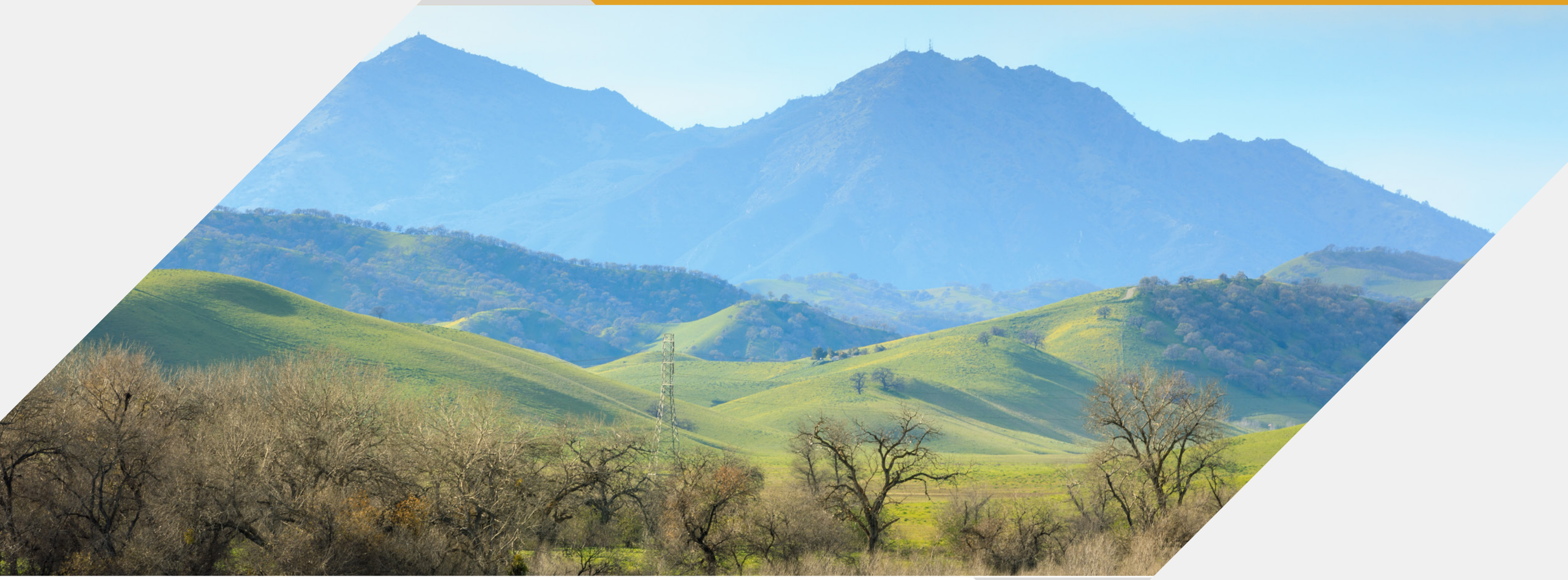
Indicator	Technical Definition	Data Source	Year(s)
Park Access	Percentage of the population living within a half-mile of a park, beach, or open space greater than 1 acre	California Department of Public Health	2017
Retail Density	Gross retail, entertainment, services, and education employment density (jobs/acre) on unprotected land	US EPA Smart Location Database 3.0	2021
Tree Canopy	Population-weighted percentage of the census tract area with tree canopy	CDPH/National Land Cover Database	2011
Equity Indicators			
Historically redlined (tract)	Neighborhood historically redlined. Given a grade "C" or "D" by the Home Owners' Loan Corporation between 1935-1940.	Mapping Inequality	1934-1940
Racial/ethnicity diversity index	Probability that two people in this geography, chosen at random, will be of different race/ethnicities (Gini-Simpson Diversity Index)	American Community Survey, Table DP05	2015-2019
Location Quotient: American Indian/ Alaska Native	The over- or under-representation of non-American Indian and Alaska Native persons compared to the county population of non-American Indian and Alaska Native persons	American Community Survey, Table B03002	2015-2019
Location Quotient: Asian	The over- or under-representation of non-Hispanic Asian persons compared to the county population of non-Hispanic Asian persons	American Community Survey, Table B03003	2015-2019
Location Quotient: Black or African American	The over- or under-representation of non-Hispanic Black persons compared to the county population of non-Hispanic Black persons	American Community Survey, Table B03004	2015-2019
Location Quotient: Hispanic or Latino	The over- or under-representation of Hispanic/ Latino persons compared to the county population of Hispanic/Latino persons	American Community Survey, Table B03005	2015-2019

Indicator	Technical Definition	Data Source	Year(s)
Location Quotient: Native Hawaiian and Other Pacific Islander	The over- or under-representation of non-Hispanic Native Hawaiian and Other Pacific Islander persons compared to the county population of non-Hispanic Native Hawaiian and Other Pacific Islander persons	American Community Survey, Table B03006	2015-2019
Location Quotient: White	The over- or under-representation of non-Hispanic White persons compared to the county population of non-Hispanic White persons	American Community Survey, Table B03007	2015-2019
Residential Segregation: All Non White	Index of dissimilarity, a demographic measure of the evenness with which a race/ethnic group are distributed across component geographic areas that make up a larger region. The index of dissimilarity was calculated using aggregated census blocks compared to the overall County average.	2010 Decennial Census	2010
Gini Coefficient of Inequality - City Level	Gini coefficient of inequality (0 = equality, 1 = inequality) at the city level	American Community Survey, Table B19083	2011-2015
Gini Coefficient of Inequality - County Level	Gini coefficient of inequality (0 = equality, 1 = inequality) at the county level	American Community Survey, Table B19083	2011-2015
Key Health Indicators			
Insured Adults	Percentage of adults aged 18 to 64 years currently insured	American Community Survey, Table S2701	2015-2019
Life Expectancy at Birth	Estimate of life expectancy at birth	CDC USALEEP	2010
Life Expectancy at Birth (Stratified)	Estimate of life expectancy at birth	Processed By: Advancement Project California. Copyright Advancement Project California; RACE COUNTS; racecounts.org, 2020.	2017

Indicator	Technical Definition	Data Source	Year(s)
Asthma Rate	Percent of population who report ever having been told by a doctor, nurse, or other health professional that they have asthma AND still have asthma	CDC PLACES	2018
Low Birthweight Infants	Percent of low birthweight infants	CalEnviroScreen 3.0	2006-2012
Preterm Births	Percent of singleton births delivered preterm (<37 weeks of gestation). These represent modelled rates; for areas in which there is insufficient data on the rate of preterm births, modelled rates are developed using data from surrounding areas.	California Environmental Health Tracking Program	2015
Mental Health Not Good	Percent of adults aged >=18 years who report 14 or more days during the past 30 days during which their mental health was not good	CDC PLACES	2018
Physical Health Not Good	Percent of adults aged >=18 years who report 14 or more days during the past 30 days during which their physical health was not good	CDC PLACES	2018
Other Indicators			
Bachelor's Education or Higher	Percentage of population over age 25 with a bachelor's education or higher.	American Community Survey, Table DP02	2015-2019
High School Enrollment	Percentage of 15-17 year olds enrolled in school	American Community Survey, Table S1401	2015-2019
Preschool Enrollment	Percentage of 3 and 4 year olds enrolled in school	American Community Survey, Table S1401	2015-2019
Active Commuting	Percentage of workers (16 years and older) who commute to work by transit, walking, or cycling	American Community Survey, Table B08006	2015 - 2019
Automobile Access	Percentage of households with access to an automobile.	American Community Survey, Table DP04	2015 - 2019

Indicator	Technical Definition	Data Source	Year(s)
Homeownership	Percentage of occupied housing units occupied by property owners	American Community Survey, Table DP04	2015-2019
Housing Habitability	Percentage of households with kitchen facilities and plumbing	HUD CHAS Tables 15A-C	2013-2017
Low-Income Homeowner Severe Housing Cost Burden	Percentage of low income owner households with housing costs exceeding 50% of income	HUD CHAS Table 8	2013-2017
Low-Income Renter Severe Housing Cost Burden	Percentage of low income renter households with housing costs exceeding 50% of income	HUD CHAS Table 8	2013-2017
Uncrowded Housing	Percentage of households with 1 or fewer occupants per room	American Community Survey, Table DP04	2015-2019
2020 Census Response Rate	Percent of 2020 decennial households who completed census forms online, by mail, or by phone	2020 Decennial Census	2020
Voting	Percentage of registered voters voting in the 2020 general election	UC Berkeley Statewide Database	2020

Acknowledgments



Acknowledgements

The UC Berkeley Labor Center would like to thank Ken Jacobs, Brenda Muñoz, and Julie Light for their advice and guidance. Thank you to Azucena Beltran from the Community Economic Mobilization Initiative for her invaluable assistance with the power mapping of the Bay Area. We are also grateful to Devon Baker for their support in developing the Stakeholder Inventory and to Coral del Mar Murphy-Marcos for the interview quotes featured in the report.

Human Impact Partners would like to extend their gratitude to the Public Health Alliance of Southern California for developing the Healthy Places Index, which was the backbone of this analysis and without whom the process of identifying priority areas would not have been possible.

All Home would like to thank: the San Francisco Office of Economic Workforce Development; the Bay Area Good Jobs Partnership for Equity, an association of workforce development boards (WDBs) and regional workforce planning units across the nine-county Bay Area region including Alameda County WDB, Sonoma County WDB, WDB of Contra Costa County, NOVAworks, Oakland WDB, Richmond WDB, WDB of Solano County, work2future, SFOEWD, Workforce Alliance of the North Bay; and the Bay Area Jobs First Steering Committee.

The entire Regional Plan Part 1 research team would like to acknowledge the invaluable support and assistance from Jay Banfield, Diana Orozco, and Laura Maldonado at All Home, as well as Jennifer Hand and Glenn Eagleson at the San Francisco Office of Economic and Workforce Development.

Special thanks to Deborah Meacham for her amazing copyediting work and to Tia Stoller, Travis Retter, Erin Meier, and the rest of the Stoller Design Group for the beautiful layout and design of this report.