California Jobs First

Part One Baseline Assessment Report

NORTHERN SAN JOAQUIN VALLEY

December 31, 2023

PREPARED FOR

Governor's Office of Planning and Research

1400 10th St # 100, Sacramento, CA 9581

Contents in Brief

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Glossary of Acronyms

Acronym	Full
BARHII	Bay Area Regional Health Inequities Initiative
BIPOC	Black, Indigenous, People of Color
CDPH	California Department of Public Health
CEJST	Climate and Economic Justice Screening Tool
CERF	Community Economic Resilience Fund
CHIP	Community Health Improvement Plan
CHNA	Community Health Needs Assessment
DAC	Disadvantaged Community
DHHS	U.S. Department of Health & Human Services
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ER	Emergency Room
HPI	Healthy Places Index
HRTC	High Road Transition Collaborative
LGBTQ	Lesbian, gay, bisexual, transgender, queer or questioning
NSJV	Northern San Joaquin Valley
PM	Particulate matter
RFQ	Requests for Qualifications
SB	Senta Bill
SDOH	Social determinants of health
UN	United Nations

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Executive Summary

The California Economic Resilience Fund, or CERF, has provided the Northern San Joaquin Valley (NSJV) a 'once-in-a- generation' opportunity to establish a roadmap for inclusive economic prosperity. Never before has a coordinated effort aimed to bring together hundreds of stakeholders, from Stockton to Merced, to define and envision what economic resilience looks like for the northern section of California's Heartland. Stakeholders – residents, community advocates, government leaders, educators and industry champions – started with two honest questions: What makes us a region? What is our vision of a more equitable future?

This Part 1 Report begins to answer both of the questions by describing the hard work and output of more than three dozen community organizers, researchers and volunteers who together have assembled a body of quantitative and qualitative research. To begin, the information they have gathered has demonstrated important 'through-lines' that tell the shared story of a true region; the data demonstrates that both in its strengths and challenges, Merced, Stanislaus and San Joaquin Counties are bound to one another economically and culturally. Next, the work of the past months has gone far in capturing a diversity of residents' views on what matters to them, what they request from their civic and economic leaders, and the outline of investments that they feel would have long-term benefit for their families. This qualitative work has included the interview or engagement of more than 430 residents, 25 community-based organizations, and dozens more civic leaders. In truth, this work has only begun and what is presented here is a beginning, a starting point that will continue to be developed in conversation with the steering committee and research advisory council through the first half of 2024.

Early on, North Valley THRIVE (NVT) adopted guiding principles that have informed its process to-date:

- A commitment to transparency and inclusion in key decision-making as a way to bolster trust and demonstrate commitment to equity;
- A bias toward action – to focus on "doing," and making data and mapping actionable;
- A 'community-first' process that first gathers community insights and direction, followed by traditional government, economic and industry stakeholders;
- An 'everyone together' (*todos juntos*) approach that seeks to create connection across the three counties and their various networks by purposely designing events and interactions that establish connective tissue and alignment; and
- An understanding that the Phase One Planning Process is a 'proof-of-concept' for what we ultimately are building: a durable process and infrastructure for the ongoing cultivation of our shared economic agenda.

It is then no surprise that very quickly the Northern San Joaquin Valley CERF took on a new name – its own moniker to signify that this was more than a State-sponsored exercise; it was a new era for the NSJV. This important decision happened at CERF's first convening in Sacramento, March 2023. The NSJV team of volunteers – two philanthropic leaders, a workforce board director, a community leader, and a non-profit strategist – debated a number of names and landed on THRIVE, an acronym for "The High Road for an Inclusive, Vibrant Economy."

Part 1 of the Planning Phase Process has yielded significant progress including: establishing a new, trusted entity to connect and serve the region; the formation of a locally-led research collaborative that includes the region's three universities; a clear and trusted process for the selection of the HRTC; and a body of research that highlights important indicators, assets and opportunities.

The data and process description included herein is the starting point of our Baseline Research that will continue to evolve and develop as it takes an increasing role in Part 2 of the Planning Phase as we develop our regional vision and goals along with our socioeconomic development strategies.

1 Introduction

1.1 Process

The stakeholder planning process began by identifying leaders in the region that were connected to the communities they served and had a strong understanding of the strengths and areas of growth in their area. Intentional recruiting was conducted to ensure that there was a variety of individuals and organizations that served under-represented groups.

A democratic process was used to elect our County Coordinators. The main role for these individuals (or groups) is to connect with neighborhoods and populations that have traditionally faced disinvestment, marginalization, and negative economic outcomes. The Coordinators then identified partner organizations with a background in racial equity and knowledge of the unique challenges that face communities.

1.2 Analysis

The data and research assembled for the Baseline Assessment involved a coordinated research program among the NSJV's largest research institutions (California State University, Stanislaus; University of California, Merced; and University of the Pacific) that strives to empower the community with data, monitoring and evaluation capabilities

An RFQ was used to establish an analytical team for the Baseline Assessment. While initiating the baseline research effort four additional research components were identified and have started to be developed. The first of these is a regional geospatial partnership that informs the baseline analyses as well as identifying options and value in the establishment of an enduring regional data platform. Building on that effort, the research partnership is also building a climate relationship tool that will link environmental and climate risks to geographic locations and provide users with resources and services aimed at reducing those risks. The second component that will be developed to inform the Baseline Assessment is an innovation and entrepreneurship ecosystem assessment.

Recognizing a need to augment and validate the Baseline Assessment and stakeholder engagement, two pilot surveys have also been initiated and one completed. The first of these is a pilot survey of public health disparities. As discussed in Section 3.3, the NSJV has significant disparities in health, socioeconomic status, and environmental challenges resulting in extensive health disparities. Nonetheless, there is very limited information about the incidence and distribution of these disparities. Therefore, the pilot survey which was completed in December 2023 identifies benefits from better understanding those disparities by increasing knowledge about the degree of health disparities in our region. The other pilot survey which is planned to launch in early 2024 focuses on the implications of CERF and 'highroad development' for a disinvested community. Working with the Baseline Assessment team, this survey will select a disinvested community in the region and identify through representative sampling that community's priorities and concerns over climate change and employment.

In addition to circulating this report, a community consultation sharing and discussing many of the findings included in this report occurred on August 24, 2023. That consultation and a post-event survey solicited priorities for additional research to supplement understanding of interregional and intercounty inequities. That guidance was also be augmented by a regional team of area subject matter experts who will review the material assembled for the Baseline Assessment along with identified priorities from the community and assist data and analytical team in identifying near term research needs for the Baseline Assessment as well as regional analyses for the remainder of Phase One, as well as what might be lifted as proposals for Catalyst and/or Phase Two funding with a focus on building enduring and sustainable data and analytical capabilities in the NSJV. An example of such efforts includes comments from the community for the creation of an interactive online regional database, which residents and community-based organizations could utilize to assist with advocacy, grant applications, and planning. Development of such a database may be a function of the fledgling interinstitutional research collaboration initiated for this Baseline Assessment. In addition, this interinstitutional research collaborative may also provide a forum to share and showcase community research, including in online publications and through regional events. With that ambitious agenda hoped and planned for the region in the future, this Baseline Assessment is a starting point that will continue to be developed.

2 Stakeholder Analysis

The NSJV region represents an epicenter for the fusion of public health, environmental, and economic challenges. Even before the pandemic, the counties' age-adjusted per-capita mortality rate ranged from 11% to 20% higher than the state- wide rate. Over three-fifths of the region's population live in California's most burdened communities based on geographic, socioeconomic, public health, and environmental hazard criteria. Assessment of the region's environment has identified dry wells and sinking lands due to groundwater overdraft, nitrate contamination of groundwater, local air pollution, and a decline in aquatic, wetland, and terrestrial ecosystems as significant pressures across the region.

Despite being an active engine in the powerhouse that is the California economy, and despite its proximity to the State's tech epicenter to the west and political center to the north, the northern San Joaquin Valley lags the State in several key indicators. It is for this reason that the promise of CERF was met with such enthusiasm here – an enthusiasm that has driven the convening of hundreds of organizations and residents in just the past few months. The CERF program's explicit commitment to equity, community-led governance and the enfranchisement of historically marginalized communities was welcomed as a once-in-a-generation inflection point in the economic trajectory of our region.

To meet the opportunity of CERF, our region has quickly stood up a coalition of more than 200 partner organizations and more than 500 unique contacts – and growing. This new coalition of grassroots, government, workforce, philanthropy, labor, business, and educational organizations has formed as "North Valley THRIVE" (The High Road for an Inclusive, Vibrant Economy).

Before CERF, the NSJV region did not have a regional identity and most organizations who are part of this growing coalition had not had many opportunities to work together. The North Valley THRIVE leadership has been very intentional in creating transparency to ensure coalition members have ample opportunities to participate in any decisions made, and to create and solidify trusting relationships among its coalition members. One example of this is the way county coordinators were selected; the North San Joaquin Valley region released a request for qualifications for the County Coordinators role with eight organizations participating in the interview process. County Coordinators were selected through a democratic process where each organization that has been involved in the NSJV CERF development process was entitled to submit one vote. This process resulted in the following organizations selected:

- Merced County: Valley Onward in partnership with North Valley Labor Federation
- Stanislaus County: City Ministry Network in partnership with Debrief Methodologies
- San Joaquin County: San Joaquin Community Foundation.

Scope and Purpose

The region does not have a strong history of strategically aligning plans and resources across the tri-county region. A lack of inclusiveness and transparency created a culture of distrust and division that made any endeavor unlikely to be successful. Many past economic development efforts have suffered or failed to reach their full potential due to a lack of regional coordination and inadequate community participation. North Valley THRIVE is working to set an inclusive, sustainable table that could identify and foster economic development projects to raise the quality of life of all residents in the NSJV region.

The purpose of this effort has been to:

- Ensure that community voice and disadvantaged communities are centered in long-term strategic decision-making.
- Cultivate deeper and more strategic collaboration across the three counties.
- Ensure that the many investment and planning efforts affecting the region are aligned and fully leveraged to nurture sustainable, competitive, and resilient industries and career pathways that expand prosperity and increase equitable access to high quality employment opportunities at scale.
- Identify a set of community values which will be used to guide future economic development projects lifted by North Valley THRIVE.

2.1 Stakeholders involved in North Valley Thrive

Types of Engagement

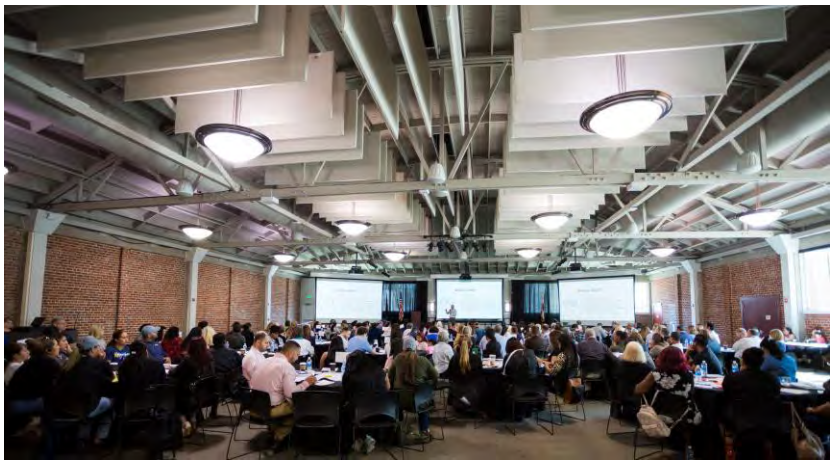
North Valley THRIVE has been very intentional about establishing relationships with diverse stakeholder groups and leaders including government entities, economic developers, non-profit leaders, resident groups, coalitions and consortia, environmental justice advocates, workforce boards, labor representatives and others. This work is being completed in person and virtually to ensure the needs of all parties are met and that community is being built through connections. It has also been provided in multiple languages to ensure that we are removing any barriers to true engagement.

1. In-Person Meetings with Community Groups

The NVT Convener has held 32 meetings with specific groups (CBOs) to create opportunities for coalition members to share space, connect with one another, and learn together is a priority for North Valley THRIVE. NVT believes creating trusting relationships among its coalition members will contribute to the creation of a regional identity.

2. Large Coalition Meetings

The Planning Phase started with a half day event on April 24th, 2023 in Modesto. This was the first opportunity for coalition members to meet in person. They received an update of the CERF process, met the democratically elected county coordinators and voted to select the logo and corporate identity for North Valley THRIVE. The 230 attendees included 30+ residents, nonprofit organizations, economic development entities, government, and education partners. To encourage participation North Valley THRIVE distributed over 100 $100 gift cards to nonprofit and residents who participated in the event. NVT also highlighted local small businesses by ensuring catering and other event related services were provided by local small businesses. Additional in person meetings are in October, February, and June in Stockton, Merced, and Modesto respectively.



3. Data Walk

On August 24, 2023 NVT hosted a SWOT Walk and Talk in the city of Stockton where coalition members had the opportunity to analyze the data presented by the research team and reflect on it to help the region identify its

priorities. This event had 70 attendees from the three counties and residents not affiliated to a nonprofit received a $50 gift card.

4. Online Meetings

These meetings were 1-2 hour meetings that were meant to provide updates on the project, share ways they could get involved and discussions on next steps. These meetings were open to all of the contacts and were recorded and put on the website. North Valley THRIVE met virtually on the following days: March 20th, June 7th, June 28th, July 14th, July 21st, Wednesday, August 23rd.

5. Newsletters

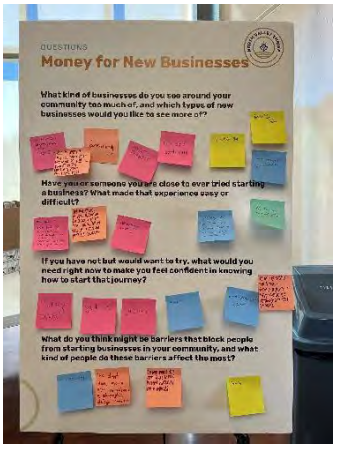
In order to keep our stakeholders informed, we ensured that we sent out newsletters with reminders for upcoming events and information on how they could get involved. These were sent via Constant Contact on May 9th, June 2nd, June 13th, June 21st, June 30th, July 11th, July 24th, August 8th, August 22nd

6. Community Conversations

The County Coordinators are working within their respective communities to connect with neighborhoods and populations that have traditionally faced disinvestment, marginalization, and negative economic outcomes. The Coordinators are working with community and faith-based organizations, schools, neighborhood groups, coalitions, youth programs, system involved, minority entrepreneurs, and more to help inform residents about CERF and invite them to participate by sharing their priorities, barriers faced, life experiences.

To eliminate barriers to participation, these Community Conversations are conducted at different times of the day that are convenient to participants. Food, childcare, and participation stipends of $50 are provided. Facilitation and outreach materials are provided in a culturally relevant manner which so far has included the following languages: English, Spanish, Persian, Vietnamese, and Punjabi. Through this process North Valley THRIVE has hosted 30 community conversations and received input from close to 600 participants.

To begin, County Coordinators considered demographic data and local intelligence to identify the most impactful mix of priority populations. Targeted populations have included AAPI Community, Artists/Culture Bearers, BIPOC Youth, Black/African American Community, Boomerang Young People, Caregivers, Commuters, Environmental Justice Orgs, Families with Young Children, Foster Youth, Individuals with Disabilities, Latinx Community, Labor/Union/Service Workers, Minority Entrepreneurs, Rural Communities, Seniors/Elders, Sikh Community, Systems Involved Residents, Undocumented/Immigrants/Farmworkers, LGBTQ+, as well as residents of high poverty neighborhoods. To increase the capacity of local nonprofit organizations and leverage trusted relationships with marginalized communities, North Valley THRIVE released a Request For Qualifications to local organizations serving these populations to help host these Community Conversations. Each partner organization was awarded a $3,000 contract to host a Community Conversation at their site or neighborhood.



The following Conversations have taken place to date:

Date	County	Population Focus	Partner Organization (awarded $3,000)
08/1/2023	Stanislaus	Rural Residents	Invest in Me
8/02/2023	Stanislaus	South Modesto Business Owner	SMBU
08/03/2023	Stanislaus	LGBTQ	MoPride
08/05/2023	Stanislaus	13-24 year-old unhoused youth	CHS/YNC
08/07/2023	San Joaquin	Boomerang Young Professionals	Central Valley Social Club
08/09/2023	Stanislaus	Unhoused Adults	Vine House
08/10/2023	Stanislaus	Immigrant/Undocumented	El Concilio
08/10/2023	Stanislaus	Refugees from Afghanistan, Syria, Ukraine	World Relief
08/14/2023	Stanislaus	System Impacted	Legacy Alliance Outreach
08/14/2023	San Joaquin	AAPI Community	Empowering Marginalized Asian Comm.
08/15/2023	Stanislaus	Refugees	The Center Church
8/15/2023	San Joaquin	Minority Entrepreneurs	Huddle
08/16/2023	Stanislaus	LGBTQ	LGBTQIA + Collaborative
8/16/2023	Stanislaus	Seniors	Bully Free Community
8/17/2023	Stanislaus	West Modesto low income families	Rev. Dr. MLK Jr Committee Inc
08/17/2023	Stanislaus	Underserved Latino Communities	United Community foundation
8/17/2023	Merced	Rural Community	Community Health Workers
08/20/2023	San Joaquin	Artists/Culture Bearers	Hatch
08/21/2023	Stanislaus	Family Units	Parent Resource Center
8/21/2023	Merced	Formerly Incarcerated	ACE Overcomes
8/22/2023	San Joaquin	Tracy Families	Sow a Seed Community Foundation
8/23/2023	San Joaquin	Undocumented/Immigrants/Farmworkers	El Concilio
8/24/2023	San Joaquin	BIPOC Youth	AAAWLC
8/26/2023	Merced	Child Care Providers	MCOE
8/29/2023	Merced	In Home Support Services	UDW
8/30/2023	Merced	LGBTQIA+	Merced Pride Center

7. Special Constituency Working Groups

The following stakeholder groups have been formed and are stewarded directly by the NVT Convener, Erick Serrato. They meet monthly or bi-monthly and include:

- Business and Industry: San Joaquin Partnership, Opportunity Stanislaus, and Merced County Department of Community and Economic development to ensure industry associations are aligned and engaged in the NSJV region CERF process.
- Government: County CEOs group which helps facilitate outreach to all cities in the region, Workforce Boards, and Council of Governments.
- Philanthropy: Comprised of the San Joaquin Community Foundation, Stanislaus Community Foundation, and Central Valley Community Foundation.

Stakeholder List and HRTC Formation

North Valley THRIVE currently includes 538 contacts that are kept informed about the progress of this project and of those contacts about 115 are actively participating (i.e attending meetings, being a part of a committee, joining our in-person events). See Appendix 2.A for details of stakeholders and their community category.

From this body, a Governance Committee was created, open to all of the active participants. We had 43 members show interest. These individuals came from all three regions and we had representation from community based organizations, county entities, community members and small business owners. These 43 people supported the design and development of the 29-seat HRTC, spent 4 weeks in design sessions to develop the right mix of representation, and was able to vote via Zoom polls. This list was then shared with the larger coalition group and we left space for public comment.

With the categorical seats of the HRTC set, we asked for volunteers from the Governance Committee to become a part of the selection committee. These individuals needed to be connected to the project, not be running for a seat on the HRTC and have the ability to meet in person and online to support the selection process. We were able to recruit 2-3 representatives from each County to sit on the Committee and we collaboratively came up with interview questions, a grading rubric and a timeline. The Selection Committee met August 30, 2023 to initiate a selection process that will be democratic and transparent, and will conclude by September 30, 2023.

Engagement Strategies

North Valley THRIVE's engagement strategy is tailored for the specific groups we are working with; government, industry, talent development, and philanthropy have regular in person meetings with the regional convener. The North Valley THRIVE Coalition Meets Monthly online and quarterly in person and the community engagement strategy is as follows:

- Leverage existing networks and trusted messengers: Lean on the experience of CBOs identified by the RFP process who are trusted messengers to communicate and convene successfully. Partner with existing networks, has helped NVT reach communities through existing relationships at the local level. Meet people when and where they already are gathering whenever possible.
- Customized outreach strategies with priority on groups hardest to each: Our county coordinators identified specific populations whose input is underrepresented and developed targeted, culturally appropriate strategies for those populations.
- Address language barriers: We have eliminated use of technical jargon and acronyms during community conversations and provided materials and facilitation in several languages including English, Spanish, Persian, Vietnamese, and Punjabi.
- Thoughtful selection of location of meetings and events: We have ensured engagement opportunities are easily accessible via public transit. We have selected "neutral" and safe spaces for particularly disenfranchised groups. These locations include community centers, churches, flea markets, coworking spaces, etc.
- Taking care of basic needs: We have provided food and childcare at in-person events. We have also compensated people for their time via stipends.
- Created feedback loops: To go beyond simply extracting data and insights from community members by ensuring

that community contributions are incorporated into decision-making, and that community members can engage in the monitoring and accountability of outcomes we have provided several options for participants to receive information from North Valley THRIVE and plan to continue relying on our partner organizations to relay information to their constituents.

The NSJV has demonstrated intentionality in enfranchising organizations that directly serve and/or advocate for the most vulnerable communities in the region. As part of it's 'community-first' regional engagement process, the NSJV first identified three community-facing organizations with deep connection in each of the three counties to serve as community liaisons ("County Coordinators). These three broadened their reach by including two additional organizations to share the work of incorporating community organizations into the work of the NSJV. Collectively these five are: Valley Onward and North Valley Labor Federation in Merced County; City Ministry and deBrief in Stanislaus County; and San Joaquin Community Foundation in San Joaquin County.

These five organizations then selected from a list of approximately thirty organizations (procured through a Request-for-Qualifications process) that had each identified a subregional community, such as the LGBTIA+, monolingual immigrant and refugee communities, parent and youth groups, co-working/young professionals, immigrant entrepreneurs, justice-involved populations, and others, in their respective county. Selections were supported by available demographic data. These organizations were granted $3,000 to co-host one of 29 community conversations that followed a prescribed agenda emphasizing personally held perspectives on their community/county's strengths and weaknesses, and reflections on potential economic investments.

In November 2023, the NSJV announced the launch of a new phase of this collaboration, this time more focused on opportunities found within 'sectoral themes' within the regional economy. Again, community-based organizations with direct ties to vulnerable communities will be funded for their investment of time and perspective across five facilitated sessions which explore the nexus between these sectoral themes (manufacturing and goods movement; health care and well-being; and agriculture products and byproducts) and the lenses of climate, job quality, land use, and equity.

2.2 Disinvested Communities

According to the Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST), the NSJV region has a high number of identified Disinvested Communities (DICs).[1] DICs are communities with an annual median household income that is less than 80% of the Statewide annual median household income. Severely disinvested communities are those incomes less than 60% of the State's median household income.[2] According to data accessed from the Climate and Economic Justice Screening Tool, of the 282 census tracts identified in the NSJV, 59% are considered disinvested. These communities are illustrated in Figure 2.2.1. Likewise, according to CEJST data, approximately 54% of the NSJV's total population lives in an identified DIC.[3]

Table 2.2.1 - Disinvested Community Percentages Identified Using the CEJST: [4]

Percentage of Census Tracts in DICs	Percent of Total Population in DICs
59%	54%

[1] Council on Environmental Quality. Climate and Economic Justice Screening Tool. Accessed 2023. https://screeningtool.geoplatform.gov/en/downloads#3/33.47/-97.5
[2] Adaptation Clearinghouse. California Disinvested Communities. Accessed 2023. https://www.adaptationclearinghouse.org/resources/california-disinvested-communities-mapping-tool.html
[3] Council on Environmental Quality. Climate and Economic Justice Screening Tool. Accessed 2023. https://screeningtool.geoplatform.gov/en/downloads#3/33.47/-97.5
[4] Council on Environmental Quality. Climate and Economic Justice Screening Tool. Accessed 2023. https://screeningtool.geoplatform.gov/en/downloads#3/33.47/-97.5

Within the California Jobs First initiative there are four criteria over which a community may be considered disinvested. The California Office of Environmental Health Hazard Assessment (OEHHA) under guidance of Senate Bill (SB) 535 identified four categories of disinvested communities, which they refer to as "Disadvantaged Communities (DAC)":

1) Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 (1,984 tracts).
2) Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores (19 tracts).
3) Census tracts identified in the 2017 DAC designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0 (307 tracts).
4) Lands under the control of federally recognized Tribes.

Under this definition some 128 census tracts are considered disinvested, these are listed in Appendix 2A.

A second basis drawn from Assembly Bill (AB) 1550, takes 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 Coderst that we Census tracts identified as 'disadvantaged' by the California Environmental Protection Agency. Under this definition some 119 census tracts are considered disinvested, these are listed in Appendix 2B.

A third basis takes areas defined as 'High poverty area' and 'High unemployment area' as designated by the California Governor's Office of Business and Economic Development California Competes Tax Credit Program. In the NSJV these areas consist of the following:

High Poverty Cities

Livingston (Merced County)	Merced (Merced County)

High Unemployment Cities

Atwater (Merced County)	Hughson (Stanislaus County)	Newman (Stanislaus County)
Ceres (Stanislaus County)	Livingston (Merced County)	Oakdale (Stanislaus County)
Dos Palos (Merced County)	Los Banos (Merced County)	
Gustine (Merced County)	Merced (Merced County)	

High Poverty County

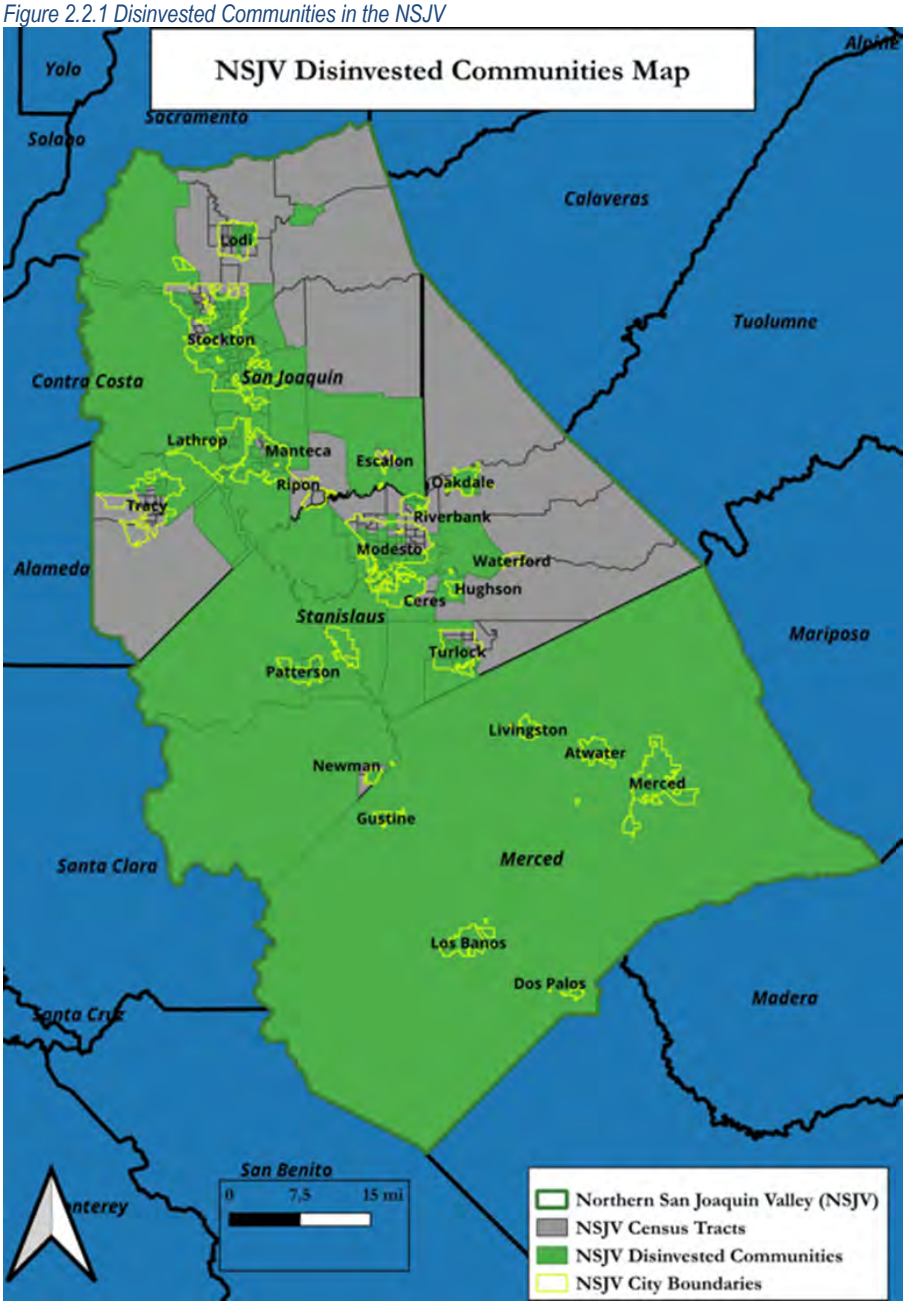
- Merced County

High Unemployment County

- Merced County

The final criteria under which a community may be considered disinvested is if it is a California Native American tribes as defined by the list maintained by the Native American Heritage Commission.

Figure 2.2.1 Disinvested Communities in the NSJV



2.3 HRTC/Consortia

The NSJV is completing the seating of its HRTC, a process that began in the summer through a deliberated Governance Process and Committee, continued with an open application period in October and November 2023, and is concluding with final selection of the HRTC ("Steering Committee") and its first meeting in January 2024. By design, participation in all aspects of the NSJV work has included a wide coalition of organizations that meet the HRTC categorical requirements (labor, community-based organizations, workforce development boards, government, Native American residents, environmental justice organizations, etc.), thus committing to an inclusionary process that is even more broad than the HRTC.

This broad coalition has informed the development of the analysis in various ways, including:

- Reflections during the NSJV community engagement process, which saw its team of County Coordinators collaborate with 29 community organizations to consider economic data points and potential investments;
- Quarterly NSJV update sessions (virtual) which have each included the presentation of key data points and invited reflection from attendees;
- Data Walk event (August 2023) in which organizations weighed-in on regional data organized in these themes of climate, health equity, workforce, and industry clusters;
- Working group discussions, including a working group of the three workforce development boards, to review important labor market data and hear from workforce board directors on what data is most important and urgent for them;
- Quarterly working group meetings with County municipal leadership to review data insights and the direction of data analysis.

Contents

3 Regional Socioeconomic Conditions

This section examines the socio-economic condition of the North San Joaquin Valley (NSJV) region. It provides a overview of key dimensions the region's development, across its economy (Section 3.1), its climate and environment (Section 3.2), and the condition of the region's public health (Section 3.3).

3.1 Economic Development Assessment

The section provides an initial analysis of the economic dynamics of the North San Joaquin Valley (NSJV). It covers various aspects including demographics, regional inequalities, economic structure and dynamics, job quality, economic shocks, and development opportunities. Key areas explored include population growth, migration patterns, income inequality, social protection, poverty, gender pay gap, business ownership, infrastructure, financial ecosystem, innovation, employment, human capital, and education. Additionally, it discusses the impacts of significant events like the Great Recession, COVID-19, and addresses economic development opportunities in areas such as the circular bioeconomy and health & well-being.

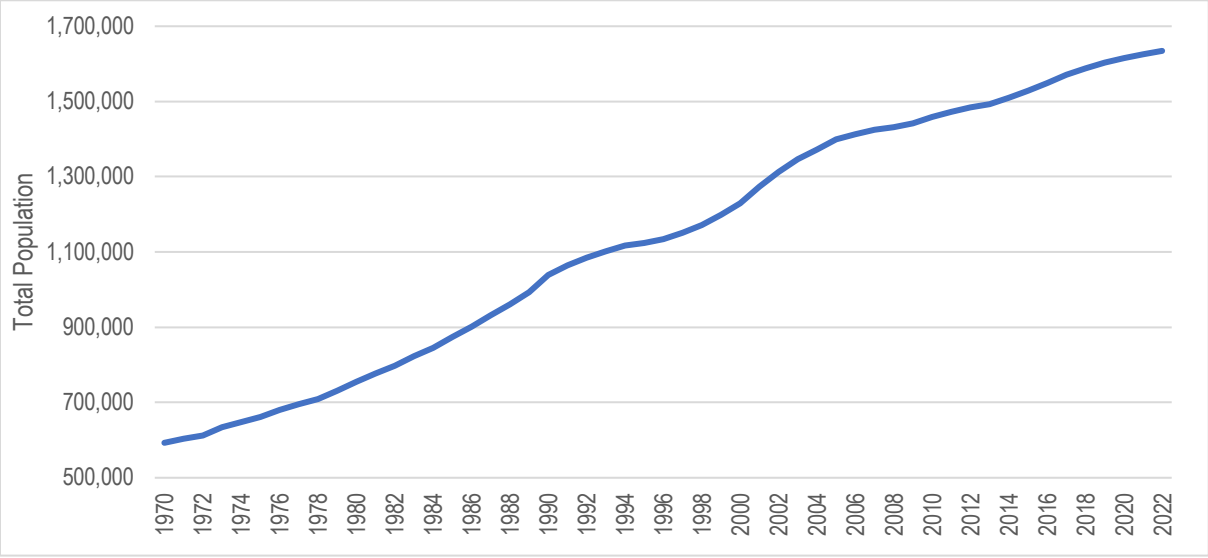
3.1.1 Demographics

This section focuses on the population dynamics of the North San Joaquin Valley (NSJV), covering San Joaquin, Stanislaus, and Merced counties. It details the population growth across decades, highlighting a slowdown in the 2010s but noting that the region's growth remained robust compared to the state. The section also discusses the significant in-migration from neighboring areas like the San Francisco Bay Area, driven by housing affordability and growth pressures. Additionally, it touches on educational attainment of migrants and the region's diverse demographic makeup, including a notable increase in the Hispanic population. The analyses underscore the importance of understanding these demographic shifts for future regional planning and development.

Population

The NSJV experienced rapid population growth for many decades. In the 1970s the region's population increased by 24% and then accelerated to 33% growth in the 1980s. While slowing somewhat in the 1990s and 2000s growth during those decades was 15% and 16% respectively.

Figure 3.1.1 Population of the NSJV 1970-2022



Source: Bureau of Economic Analysis, Population (CAINC1) Updated: November 16, 2023.

During the 2010s population growth across the region slowed further, recording just a 9% increase. However, the entire State of California shared the slowdown in growth during this period and at least compared to the State the NSJV's growth remained relatively robust.

Table 3.1.1 NSJV Population Growth by Decade

Decade	Growth Rate
1970s	24%
1980s	33%
1990s	15%
2000s	16%
2010s	9%
Source: Bureau of Economic Analysis, Population (CAINC1)	

In fact, the NSJV growth has led to its increasing significance as one of California's distinct regions. The region hosts several of the State's fastest growing communities. While this growth is associated with several factors explored in greater detail below, it's also important to recognize the NSJV exceptional growth seems to be tempering in recent years. Table 3.1.2 illustrates this slowdown as well as the geographic variation in population growth across the region.[1]

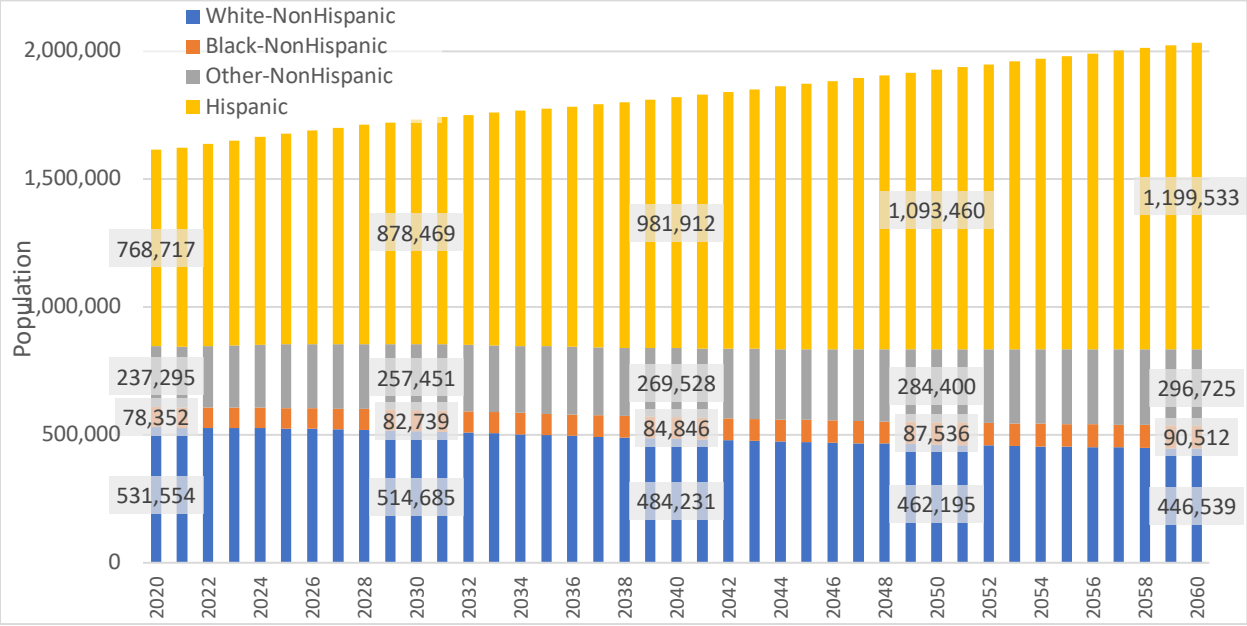
When examining the region's expected growth, Figure 3.1.2 shows that although the region's non-Hispanic White population is expected to continue to decline, many of its other populations are expected to continue growing. The growth in the region's Hispanic population is particularly notable in this regard, accounting for most of the region's population increase in coming decades.

[1] See Appendix 3.1.A for additional details on the NSJV's demographics.

Table 3.1.2 Population of the NSJV's Cities 2011-2022 and State-wide Size Rank in 2022

City Size CA Rank	City	County	Total Population in 2022	2011-2020 %	2021-2022 %
11	Stockton	San Joaquin	322,489	8.5%	-0.4%
19	Modesto	Stanislaus	217,880	7.9%	-0.4%
78	Tracy	San Joaquin	94,538	14.7%	1.0%
90	Merced	Merced	89,058	10.7%	1.0%
93	Manteca	San Joaquin	86,859	23.7%	2.2%
123	Turlock	Stanislaus	71,531	8.6%	-0.3%
135	Lodi	San Joaquin	66,570	8.7%	0.6%
186	Ceres	Stanislaus	48,386	7.0%	-0.8%
191	Los Banos	Merced	46,639	13.9%	1.0%
235	Atwater	Merced	31,652	11.1%	-1.1%
238	Lathrop	San Joaquin	31,331	43.5%	6.6%
277	Riverbank	Stanislaus	24,583	10.0%	-0.6%
279	Patterson	Stanislaus	24,370	12.5%	2.2%
281	Oakdale	Stanislaus	23,071	10.8%	-0.2%
324	Ripon	San Joaquin	15,979	9.7%	-1.1%
330	Livingston	Merced	14,410	13.3%	0.5%
354	Newman	Stanislaus	12,244	13.8%	-0.7%
383	Waterford	Stanislaus	8,872	4.8%	-0.8%
396	Hughson	Stanislaus	7,495	8.3%	0.0%
403	Escalon	San Joaquin	7,362	4.0%	-1.0%
416	Gustine	Merced	5,981	4.7%	-1.9%
418	Dos Palos	Merced	5,715	11.3%	-2.1%
Source: California Department of Finance Population Estimates (Report E-4) Released: May 1, 2023					

Figure 3.1.2 NSJV Population Projections 2022-2060 by Race and Ethnicity



Source: Center for Business and Policy Research NSJV Population Projections Released: March 2022.

A useful way to examine the changes the region's population has experienced, and to consider key influences on its future dynamics, is to examine the distinct experiences influencing the movement of people (migration) into and out of the region along with the net natural rate of change, which consists of the sum of new births and mortality of the region's population.

Migration

Domestic migration into the NSJV is characterized by a net inflow of migrants from other parts of California and a net outflow of residents from the region to other parts of the United States. This pattern is illustrated in Table 3.1.3 where data for the Internal Revenue Service provides an estimate of the region's migration activities. A significant dimension to the inflow of residents from other parts of California relates to in-migration from the neighboring San Francisco Bay Area to the NSJV as years of growth and limited development of new housing continues to pressure residents from those areas to proximate, but more affordable regions like the NSJV.

Table 3.1.3 NSJV Net Domestic Migration Trends

NSJV	2015	2016	2017	2018	2019	2020
Other California	5,616	11,231	16,440	11,791	8,104	12,652
Other USA	(1,542)	(2,873)	(5,276)	(5,122)	(1,542)	(7,880)
Net Domestic Migration	4,074	8,358	11,164	6,670	6,562	4,772
Source: Lightcast 2023.3, based on IRS Statistics of Income Division's (SOI) Migration Data						

Another important source of information about domestic migration comes from the U.S. Census Bureau's American Community Survey (ACS) program. In addition to further details on the follows of individuals into and out of the region, the ACS also reports details about socio-economic characteristics of the migrants. In terms of educational attainment of migrants, the ACS data suggests:

- In-State migrants 2018-2022 to the NSJV were more likely to have bachelor's degree and graduate or professional degree, but in 2013-2017 there was no clear difference in among in-state migrants having a graduate or professional degree.
- In-State migrants are also less likely to have less than a high school degree.
- Other-State migrants are also more likely to have bachelor's degree and graduate or professional degree.
- Other-State migrants are similarly less likely to have less than a high school degree.
- In 2018-22 international migrants were slightly more likely to have bachelor's degree and graduate or professional degree, but there was no clear difference in 2013-17.
- Interestingly, international migrants are less likely to have a high school degree, some college or an associate's degree and are more likely to have less than a high school degree.

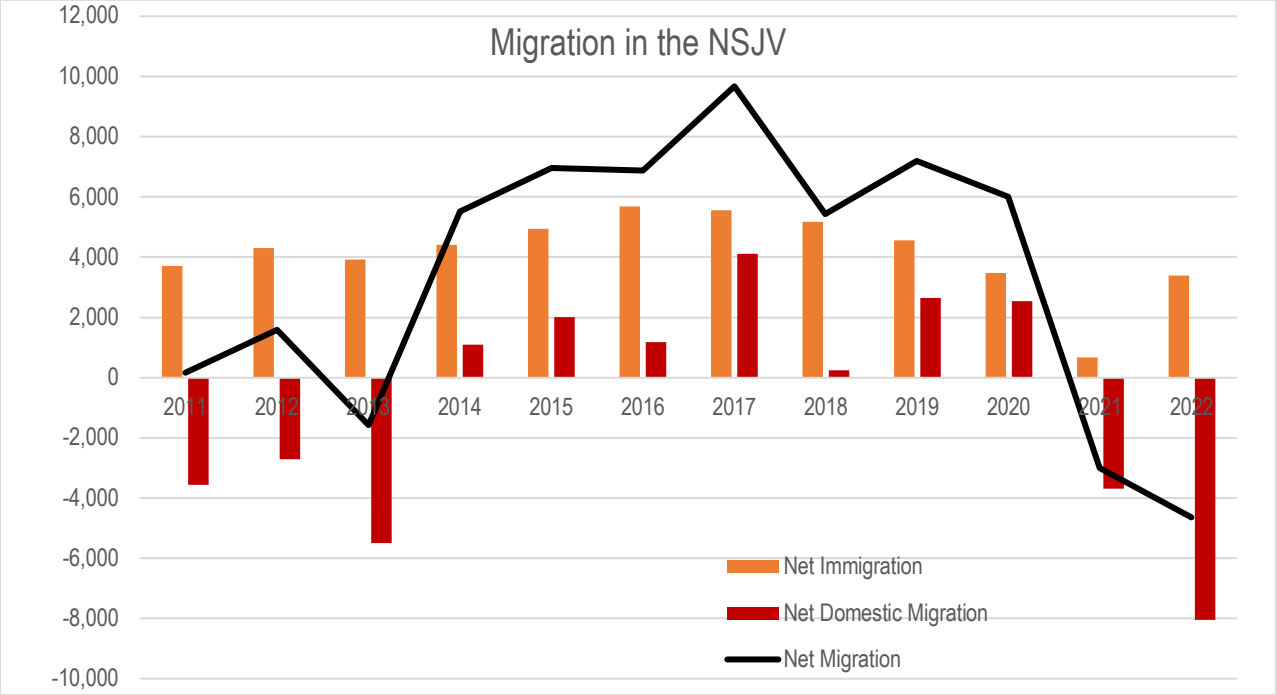
The significant, if somewhat variable, nature of migration to the NSJV is illustrated in Figure 3.1.3 where immigration and net domestic migration are shown along with their combined net migration trend. Particularly given the potential insights that could be provided by greater interrogation of the migrants' characteristics, further research into the forces driving these different in- and out-migrants seems important. For instance:

- Is there evidence that young residents are moving out of the area to pursue career or training opportunities?
- Are the migrants from neighboring regions still working in those areas and could that represent potential opportunities for business attraction and retention at an inter-regional (megaregional) level?
- What is driving out-of-state migrants from our region, affordability, job opportunities, health, or other concerns?

The COVID-19 pandemic has added further need to understand what is occurring with our region's migrants. Among these issues include whether the rise of remote and hybrid work models increase the NSJV's attractiveness to residents of more expensive communities in neighboring regions. At the same time the region is seeing significant inter-regional transportation investments moving seemingly forward such as high-speed rail, Valley Link, and Ace Rail service expansion. While these are discussed further in Section 3.1.5 they seemingly carry important

implications for the future of the region's migration.

Figure 3.1.3 NSJV Net Immigration and Domestic Migration Trends



Source: California Department of Finance Population Estimates (Report E-6) Released: January 2023

Another important consideration for understanding the influence of migration on the region is its very distinct geography as Table 3.1.1Table 3.1.4 illustrates. When county-specific data on net domestic migration it shows that Stanislaus has seen net domestic migration outflows for most of the past decade and these seem to be accelerating since the pandemic. Merced in contrast seems to have a more muted experience but a largely positive influx since the mid-2010s. San Joaquin County in contrast has seen significant net domestic in-migration since the mid-2010s but initial estimates are suggesting that these have turned negative in recent years.

Table 3.1.4 Net Domestic Migration 2011-2022, by NSJV and County

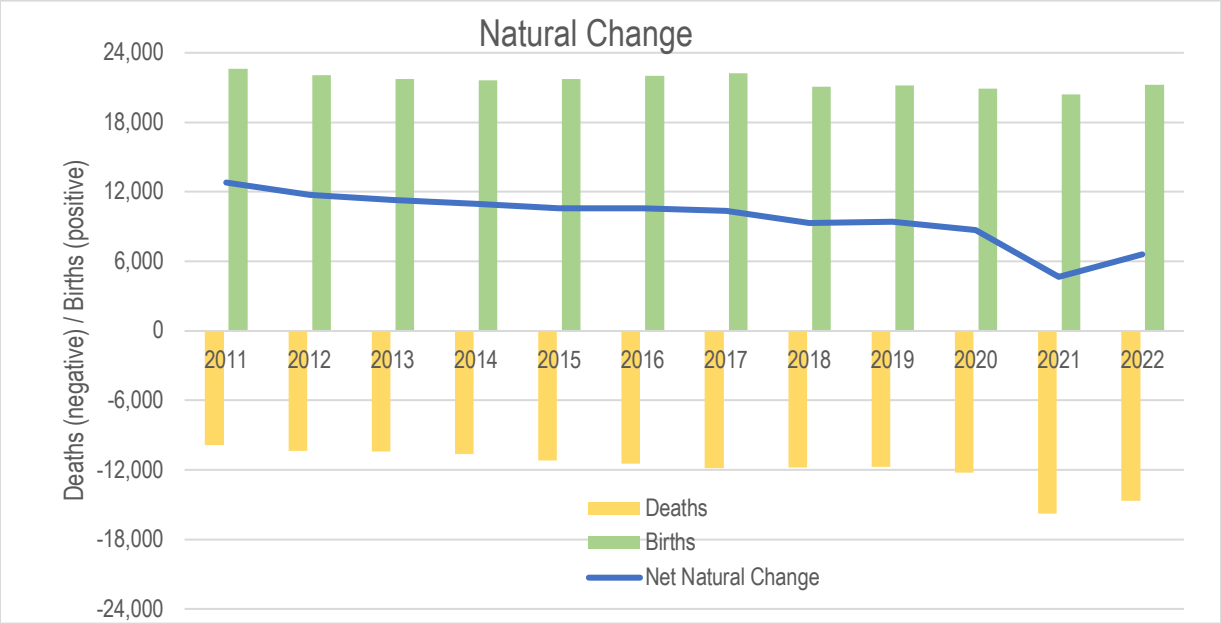
	NSJV	San Joaquin	Stanislaus	Merced
2011	-3,555	-786	-2,353	-416
2012	-2,709	-1,188	-783	-738
2013	-5,490	-1,653	-1,695	-2,142
2014	1,099	3,614	-1,587	-928
2015	2,015	3,680	-145	-1,520
2016	1,186	2,611	16	-1,441
2017	4,114	3,045	256	813
2018	249	2,565	-1,812	-504
2019	2,642	4,555	-2,514	601
2020	2,541	3,710	-1,617	448
2021	-3,675	-50	-3,028	-597
2022	-8,036	-3,340	-6,534	1,838

Source: California Department of Finance Population Estimates (Report E-6) Released: January 2023

Natural Change

The NSJV natural rate of change was declining prior to the COVID-19 pandemic when that decline accelerated amid rising fatalities. While the net natural change seems to be recovering, a slowing rate of child births and a maturing population appear likely to perpetuate the decline.

Figure 3.1.4 NSJV Net Natural Population Change 2011-2022

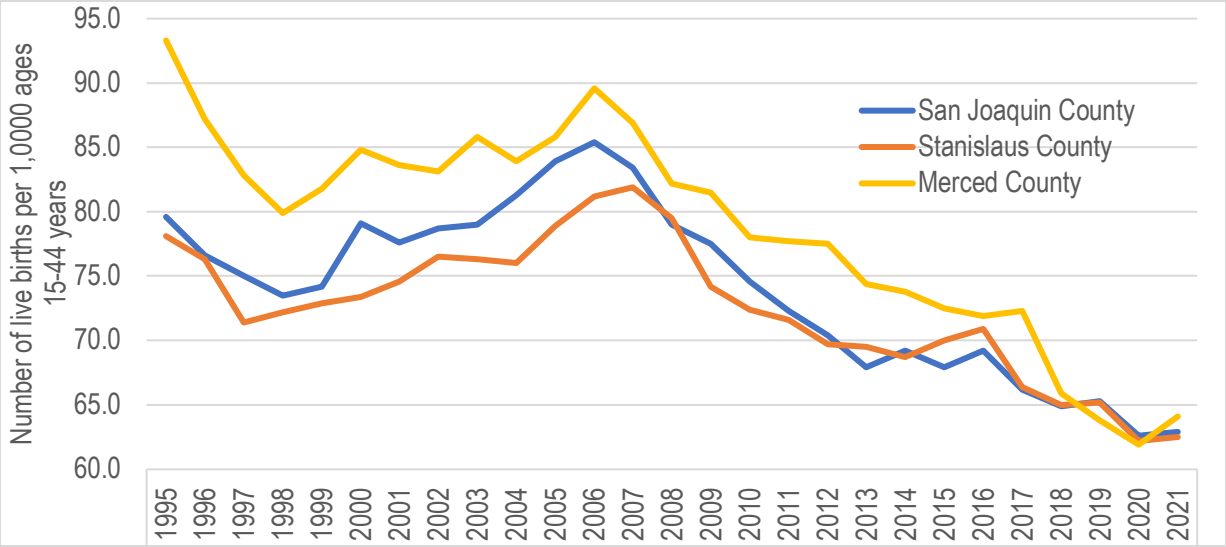


Source: California Department of Finance Population Estimates (Report E-6) Released: January 2023

Fertility

While data suggests that the relatively young, but aging NSJV population will continue to grow well into the future despite declining fertility rates the downward trend in fertility rates across the NSJV is apparent in Figure 3.1.5.

Figure 3.1.5 NSJV Fertility Rates by County 1995-2021



Source: Kidsdata.org, accessed February 2022.

As demonstrated in Table 3.1.5 below, the NSJV fertility rate is dropping in every age category. The fertility rate for

women of "Hispanic or Latino origin (of any race)" dropped at a much higher rate (-27.3%) than women of "White alone, not Hispanic or Latino" origin (-3.5%) between 2008-12 and 2018-20, which shows a closing gap between fertility rates. Additionally, the data shows that while fertility rates are dropping at higher rates for women below the poverty level and for women receiving public assistance, the fertility rates remain relatively high compared to the overall fertility rate for women in the NSJV, which means a disproportionate number of children are born into poverty. Supporting families with children may help avert a continuance or a worsening of child poverty and lower fertility rates, which, combined with drops in international migration and life expectancy, otherwise suggest that "governments may face resource challenges, with a smaller pool of workers likely suppressing income, sales, and other tax revenue sources."[2] Regardless, with the intergenerational impact of poverty well documented,[3] addressing these issues now presents an opportunity to support existing and future families by halting the violent cycle of poverty and its negative impact on public health and inequality. Given the observed disparities in the NSJV, it is important that the significant burdens placed on parents and caregivers (and their overall households), especially the disproportionate burden placed on BIPOC single mothers and children, be recognized and serious consideration to address these challenges be made to realize a more equitable, resilient, and sustainable future.

Table 3.1.5 NSJV Fertility Rates (women with births per 1,000 women) 2008-2022

	Rate per 1,000 women ages 15 to 50 years			Change in rate between 2008-12 & 2018-22
	2008-2012	2013-17	2018-22	
Women 15 to 50 years	68	59	54	-20.4%
15 to 19 years	30	12	10	-66.8%
20 to 34 years	128	103	95	-25.8%
35 to 50 years	24	31	29	17.7%
RACE AND HISPANIC OR LATINO ORIGIN				
Hispanic or Latino origin (of any race)	80	60	58	-27.3%
White alone, not Hispanic or Latino	51	55	49	-3.5%
POVERTY STATUS IN THE PAST 12 MONTHS				
Below 100 percent of poverty level	101	90	72	-28.3%
PUBLIC ASSISTANCE INCOME IN THE PAST 12 MONTHS				
Received public assistance income	157	138	117	-25.7%
Did not receive public assistance income	62	54	52	-16.2%
U.S. Census Bureau ACS S1301 5-Year Estimates.				

While the demographic cliff may present less of an issue in the NSJV due to forecasted population growth well into the future, [4] the data shows a significant disparity that needs attention as a matter of equity and social justice nonetheless. Households with children, particularly single parent, BIPOC households, experience some of the lowest levels of self-sufficiency in the NSJV.

Mortality

The impact of the COVID-19 pandemic on the NSJV has been significant as the region's large population of essential services jobs together with vulnerable populations and notable public health challenges combined to amplify its impacts. While some of the socio-economic impacts of the pandemic are discussed further in Section 3.1.5,[5] the

[2] See https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2022/12/the-long-term-decline-in-fertility-and-what-it-means-for-state-budgets.

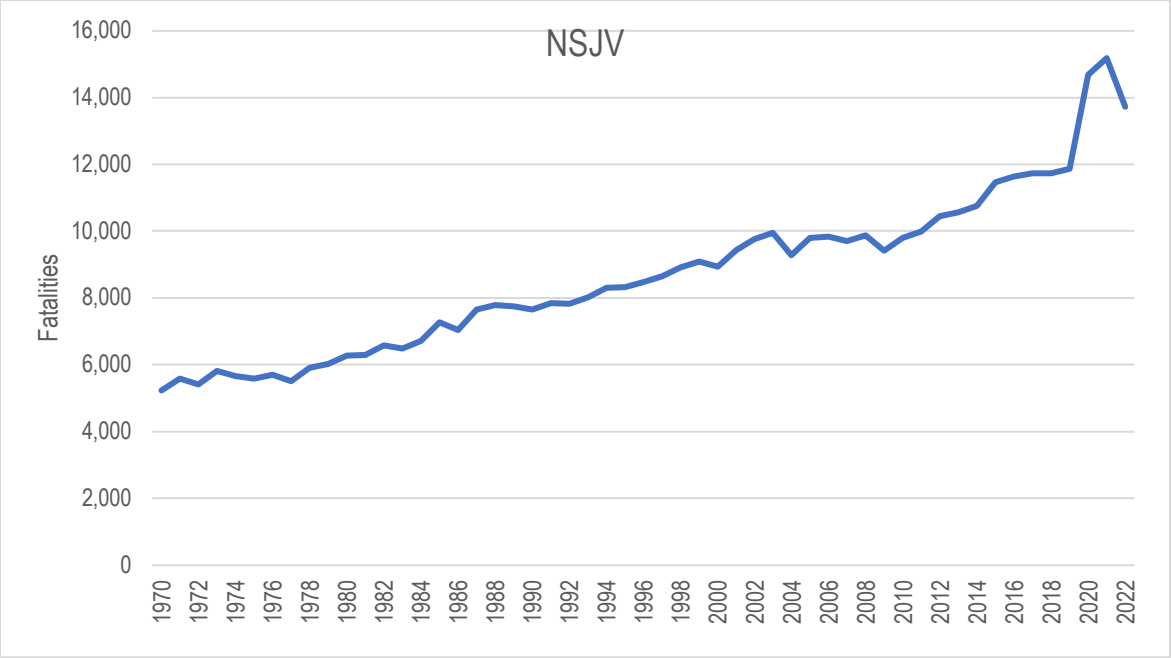
[3] See https://www.nccp.org/publication/childhood-and-intergenerational-poverty/, https://link.springer.com/chapter/10.1057/9781137316707_4, and https://poverty.umich.edu/files/2022/02/McInnis_Michelmore_Pilkauskas_IG_effects_of_EITC_March2022.pdf.

[4] See https://www.pacificcbpr.org/wp-content/uploads/2022/06/NSJV_Covid_19_CBPR_2022.pdf.

[5] For further details on the socio-economic impacts of the pandemic on the NSJV see:

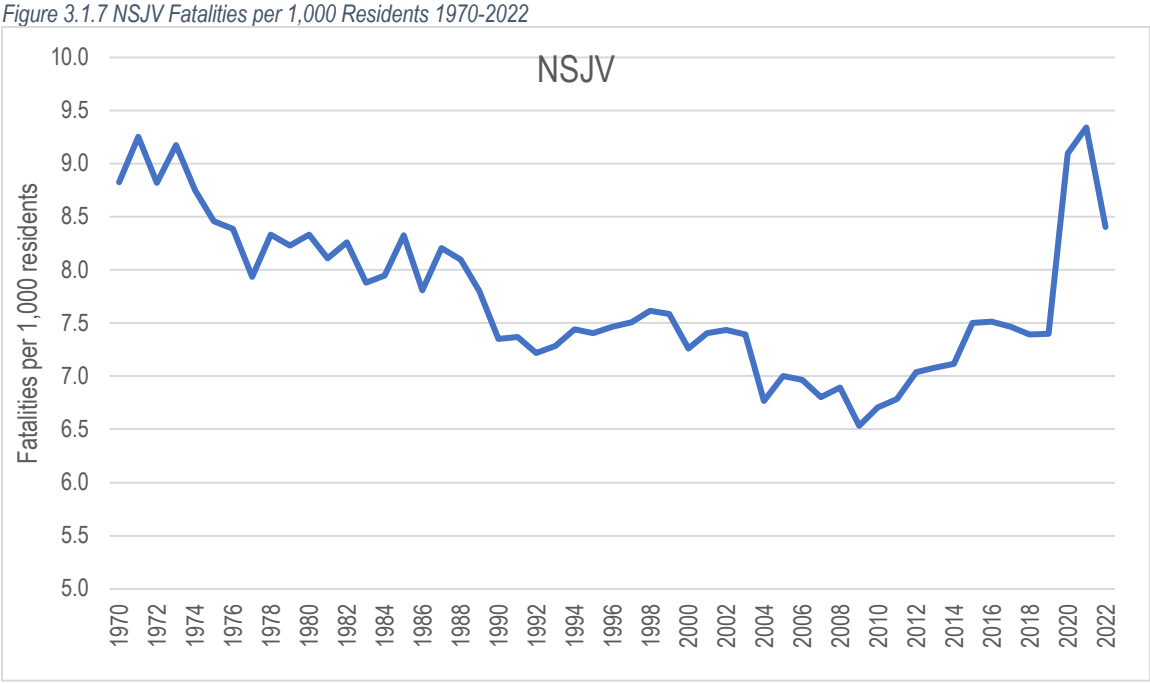
distinct impact that it had on fatalities across the NSJV is readily apparent in Figure 3.1.6. The young, but aging NSJV population (see the discussion of median age and population cohorts below) together with the region's public health challenges (See Section 3.3) suggest that even as the region recovers from the pandemic fatalities.

Figure 3.1.6 NSJV Fatalities 1970-2022



Source: California Department of Public Health Center for Health Statistics and Informatics.

Figure 3.1.7 NSJV Fatalities per 1,000 Residents 1970-2022



Source: California Department of Public Health Center for Health Statistics and Informatics and Bureau of Economic Analysis, Population (CAINC1) Updated: November 16, 2023.

https://www.pacificcbpr.org/econdev/regional/nsjv/nsjv-covid-19-impacts/

Characteristics

The NSJV has one of the youngest median ages in California, its median age is three years less than the age state-wide and 4.4 years less than the nation. However, the region's aging faster than either the state as whole or the nation. Table 3.1.6 shows that while the NSJV's median age increased by 6.3% between 2010 and 2020, the state-wide increase was 5.2% and national the increase was 3.5%. Among California Jobs First Region's while the NSJV had the third lowest median age, it had the fourth highest increase in median age.

Table 3.1.6 Median Age Across California Jobs First Regions 2010 - 2020

Region	2010	2020	% Change
Kern County	30.6	31.9	4.2%
CSJV	30.4	32.2	5.9%
NSJV	**31.8**	**33.8**	**6.3%**
Inland Empire	32.3	34.8	7.7%
Southern Boarder	34.3	35.9	4.7%
Los Angeles County	34.3	36.7	7.0%
California	34.9	36.7	5.2%
Central Coast	35.3	36.9	4.5%
Sacramento	36	38	5.6%
USA	36.9	38.2	3.5%
Orange County	35.7	38.3	7.3%
Bay Area	37.5	38.9	3.7%
North State	40	40.4	1.0%
Redwood Coast	39.8	41.5	4.3%
Eastern Sierra	46.4	49.2	6.0%
Source: JobsEQ - compiled 6/27/2023			

Table 3.1.7 shows that compared to the rest of the nation, the NSJV share of its population under 9 years is 21% greater (2022 Demographic Concentration). Similarly, its population share of 10 to 19 year olds is 23% higher. In terms of it older populations, the share of those in their fifties were 10% less than nationally, those in their sixties 19% less, and those 70 years and older 25% less.

Table 3.1.7 NSJV Population by Age Cohort 2002-2022

Demographic	2002 Population	2022 Population	Change	% Change	2002 Demographic Concentration	2022 Demographic Concentration
Under 9 years	222,565	234,236	11,671	5.2%	1.23	1.21
10 to 19 years	228,578	261,509	32,931	14.4%	1.21	1.23
20 to 29 years	178,661	224,670	46,009	25.8%	1.00	1.04
30 to 39 years	188,330	235,745	47,415	25.2%	0.97	1.04
40 to 49 years	185,836	205,138	19,302	10.4%	0.93	1.01
50 to 59 years	131,305	186,765	55,460	42.2%	0.86	0.90
60 to 69 years	79,439	160,077	80,638	101.5%	0.83	0.81
70 years and over	94,516	143,262	48,746	51.6%	0.80	0.75
Total	1,309,230	1,651,402	342,172	26.1%		
Source: Lightcast 2023.3, based on US Census Bureau's Population Estimates Program						

Table 3.1.8 shows the region's significant racial and ethnic diversity.

Table 3.1.8 NSJV Population by Race/Ethnicity

Demographic	2002 Population	2022 Population	Change	% Change	2002 Demographic Concentration	2022 Demographic Concentration
White, Hispanic	435,379	713,245	277,866	64%	2.70	2.59
White, Non-Hispanic	627,741	496,744	(130,997)	(21%)	0.70	0.51
Asian, Non-Hispanic	110,018	192,243	82,225	75%	2.15	1.93
Black, Non-Hispanic	61,707	81,099	19,392	31%	0.39	0.39
Two or More Races, Non-Hispanic	28,758	51,182	22,424	78%	1.72	1.29
Two or More Races, Hispanic	7,925	29,588	21,663	273%	3.18	2.90
American Indian or Alaskan Native, Hispanic	10,155	29,348	19,193	189%	3.63	3.05
Asian, Hispanic	6,539	18,910	12,371	189%	5.70	5.67
Black, Hispanic	6,681	18,255	11,574	173%	0.98	1.13
Native Hawaiian/Pacific Islander, Non-Hispanic	4,291	9,957	5,666	132%	2.44	3.18
American Indian/ Alaskan Native, Non-Hispanic	8,672	7,221	(1,451)	(17%)	0.88	0.59
Native Hawaiian or Pacific Islander, Hispanic	1,364	3,610	2,246	165%	2.89	3.06
	1,309,230	1,651,402	342,172	26.1%		
Source: Lightcast 2023.3, based on US Census Bureau's Population Estimates Program						

- Merced - Asian NH 38% slower than region
- San Joaquin - Asian NH 91% faster than region
- Stanislaus -Two NH > Black NH – overtook as Black NH 26% growth compared to 31% regionally.
- Stanislaus - Asian NH 45% slower than region

Table 3.1.9 NSJV Place of Birth and U.S. Citizenship Status (2017-2021)

PLACE OF BIRTH		U.S. CITIZENSHIP STATUS	
Total population	1,601,398	Foreign-born population	363,486
Native %	77%	Naturalized U.S. citizen %	48%
Foreign born %	23%	Not a U.S. citizen %	52%
U.S. Census Bureau ACS DP02 5-Year Estimates.			

- The share of foreign-born residents 23% in NSJV higher than the 14% nationally, but slightly less than the 27% rate state-wide.

Table 3.1.10 World Region of Birth of NSJV Foreign-Born Population (2017-2021)

WORLD REGION OF BIRTH OF FOREIGN BORN			
Foreign-born population	363,486	California	United States
Europe	4.5%	6.5%	10.8%
Asia	30.9%	40%	21.7%
Africa	1.3%	2%	5.5%
Oceania	1.7%	0.8%	0.6%
Latin America	61.1%	49.5%	50%
Northern America	0.5%	1.2%	1.8%
U.S. Census Bureau ACS DP02 5-Year Estimates.			

- The region of foreign birth varied somewhat across the NSJV counties, in Merced 76.7% were born in Latin America, but in Stanislaus 66.8% were born in Latin America, and in San Joaquin 51.2% were born in Latin America.
- In contrast, in San Joaquin 41.6% of those born overseas were born in Asia, but in Stanislaus 23.7% were born in Asia, and in Merced the Asian born share was 15.4%.

Table 3.1.11 NSJV Households by Type (2017-2021)

Total households	491,347
Married-couple household	51.7%
Cohabiting couple household	7.5%
Male householder, no spouse/partner present	15.9%
Female householder, no spouse/partner present	24.9%
U.S. Census Bureau ACS DP02 5-Year Estimates.	

- Households in the NSJV's are similar in their composition to that state-wide, the largest difference being the 2.2% difference in married-couple households with a 51.7% share in the NSJV compared to a 49.5% share state-wide.

Table 3.1.12 NSJV Households with Own Children by Type (2017-2021)

Total households with children of the householder under 18 years	177,339
Married-couple household	66.7%
Cohabiting couple household	11.1%
Male householder, no spouse/partner present	5.0%
Female householder, no spouse/partner present	17.1%
U.S. Census Bureau ACS DP02 5-Year Estimates.	

- Households with children of the householder present in the NSJV's were less likely to be married-couple households (66.7%) compared to the share state-wide (71.2%). In the NSJV the share of cohabiting couple households with children of the householder present were 2.5% higher than state-wide and the share of (male and female) households with no spouse/partners present were 2% higher than state-wide.

Table 3.1.13 NSJV Population with a Disability (2017-2021)

	% with a disability
Total Civilian Noninstitutionalized Population	12%
Under 18 years	4%
18 to 64 years	11%
65 years and over	40%
U.S. Census Bureau ACS DP02 5-Year Estimates.	

- In term of the NSJV's disabled population, overall its 12% share is similar to the 11% state-wide and 13% nationally. However, the region's rate of individuals with a disability for the population 65 years and older (40.2%) is substantially higher than the 33% rate state-wide and nationally.

Table 3.1.14 NSJV Grandparents and their Grandchildren (2017-2021)

Grandparents living with own grandchildren under 18 years	53,672
% of grandparents living with own grandchildren under 18 years and child's parent not present	6.1%
% of households with grandparents living with grandchildren	7.1%
of the grandparents living with grandchildren % responsible for grandchildren	21.2%
% of grandparents living with own grandchildren under 18 who are in the labor force	43.8%
% of under 18s living with a grandparent holder	11.0%
of the under 18s living with a grandparent holder % with grandparent responsible	29.1%
U.S. Census Bureau ACS DP02 5-Year Estimates.	

- In terms of the share of households with grandparents living with their grandchildren, the 7.1% rate in the NSJV is higher than 5.4% state-wide and much higher than the 3.8% nationally. However, the region's 21.2% of grandparents responsible for the grandchildren they are living with is similar to the 20.9% rate state-wide and significantly lower than the 31.8% rate nationally. Similarly, the 6.1% of the NSJV's grandparents living with their grandchildren but the child's parent is not present is significantly lower than the 12.4% nationally, but slightly higher than the 5% rate state-wide.
- Some of the greater frequency of grandparents living with grandchildren in the NSJV and in California appears to be related to housing affordability as the NSJV's 11% share of grandchildren living with a grandparent who owns or rents the residence (defined as the "householder" by the U.S. Bureau of Census) is equal to the state-wide rate, but higher than the 8% nationally. While this rate is higher, the percentage of these households in which the grandparent is responsible for the grandchild is 29.1% in the NSJV which is similar to the 30.6% state rate and lower than the 44.3% rate nationally.
- The role of grandparents as caregivers to their grandchildren is important given the distinct financial, housing and health circumstances of older Americans.

Table 3.1.15 NSJV School Enrollment (2017-2021)

Population 3 years and over enrolled in school	460,224
Nursery school, preschool	4.9%
Kindergarten	5.0%
Elementary school (grades 1-8)	43.8%
High school (grades 9-12)	22.8%
College or graduate school	23.6%
U.S. Census Bureau ACS DP02 5-Year Estimates.	

- Despite having a relatively young population, the NSJV has a lower rate of preschool enrollment (4.9%) than state (5.4%) and country (5.8%) as a whole, this may reflect a regional need for additional preschools. Across the region Merced had the lowest share (4.6%) and San Joaquin had the highest share (5%).
- Another notable difference in the region's school enrollment is the percentage of the population enrolled in college or graduate school, where the NSJV's 23.6% is far below the state-wide rate of 30.4%. Across the region Merced had the highest rate in the region (26.1%), probably a result of its relatively small population and its hosting of UC Merced. Stanislaus had the second highest rate at 23.2% and San Joaquin the lowest at 22.8%. This also appears to be an area requiring further analysis, one potential area that has been identified in previous conversation has been the lack of public higher education institution in San Joaquin County.[6]

Table 3.1.16 NSJV Disconnected Youth & Children in Single Parent Families (2021)

Number of Disconnected Youth[2]	2,459
% of all 16-19 year olds	2.5%
Number of Children in Single Parent Families	152,228
Children in Single Parent Families as a % of all children	36.2%
* Disconnected Youth are 16–19-year-olds who are not in school, not high school graduates, and either unemployed or not in the labor force. Source: Lightcast 2023.3, based on US Census Bureau's annual ACS Survey	

- Between 2011 and 2019 the number of disconnected youth declined across the NSJV and each of its counties, but in both 2020 and 2021 the number of disconnected youth rose.
    - Suggests another dimension of the Pandemics impacts.
- Among the region's counties, San Joaquin had the highest number and share of disconnected youth throughout this period.

[6] See for instance: https://calmatters.org/economy/2018/08/how-a-cal-state-campus-would-help-stockton-comeback/

- Regionally the share 16–19-year-olds who are disconnected declined from 4.0% in 2011 to 2.5% in 2022, during this period the region's rate averaged 0.6% higher than the state-wide rate, and while it was slightly higher than the national rate between 2011 and 2016 since 2018 its been slightly less than the national rate.
- San Joaquin County's share of disconnected youth was the highest in the region every year between 2011 and 2022, during this period it averaged 1.3% higher than the state-wide rate and 0.7% higher than the national rate.
- Across the period from 2011 to 2021 Stanislaus and Merced recorded similar rates of disconnected youth with both having a 2021 rate of 1.8%, marked lower than San Joaquin's 2021 rate of 3.4%.
- Regionally, the share of children living in single parent families was 3.2% higher than the statewide share and 2.2% higher than the national share in 2021.
- Between 2011 and 2021 the number of children in the NSJV rose by 13,625 children.
- In 2021 Merced county had the highest share of children living in single parent families (41.7%), followed by San Joaquin (35.6%), and Stanislaus (34.6%).

3.1.2 Regional Inequalities

Inequities can exist in many forms. In this section we examines regional inequalities in the North San Joaquin Valley (NSJV), focusing on income disparities and the role of social protection programs. It discusses self-sufficiency, particularly highlighting the challenges residents face in meeting basic needs without assistance. It uses the Gini Index to illustrate income dispersion and compares this with other counties in California. The review also explores household income distribution across quintiles, indicating disparities in income shares. Furthermore, it highlights the importance of government social protection programs in mitigating economic challenges and structural inequalities, describing various forms of social benefits such as unemployment insurance, SNAP benefits, Medicaid, and others. The section also discusses communication inequalities and language justice in the NSJV. It highlights the challenges faced by residents who speak languages other than English, emphasizing that nearly half of the NSJV population speaks a non-English language at home.

Income Inequality

The Gini Index for the NSJV counties is reported in Table 3.1.17 below. The Gini coefficient summarizes the dispersion of income across the entire income distribution. The Gini coefficient ranges from zero, indicating perfect equality (everyone receives an identical share of income), to one, indicating perfect inequality (where only one recipient or group receives all the income).[7] Between the 2007 and 2021 period covered in the table, the coefficients have been relatively stable ranging from 0.46 in Merced to 0.44 in Stanislaus. Looking at the most recent period between 2017-2021 these measures were lower than some of the most unequal counties in California like San Francisco (0.51), Marin (0.51), and Los Angeles (0.50), but higher than some of the most equal counties like San Benito (0.41), Lassen (0.40), and Mono (0.39). Throughout this period income inequality as measured by the Gini coefficient was lower across the NSJV's counties than the state-wide (0.49) and national rates (0.48) in 2017-2021.

Table 3.1.17 Gini Index of Income Inequality in the NSJV

	2007-2011	2012-2016	2017-2021
Merced County	0.46	0.46	0.46
Stanislaus County	0.44	0.45	0.44
San Joaquin County	0.44	0.45	0.45
Source: U.S. Census Bureau ACS B19083 5-Year Estimates			

Another indicator of equality of income distribution across a region is the shares of aggregate household income across equal shares of the population of households. In the table [x] the share of aggregate household income in each NSJV county is reported across five equal shares (quintiles) of the population of households. Accordingly, if

[7] For further details about the Gini Index see: https://www.census.gov/topics/income-poverty/income-inequality/about/metrics/gini-index.html

each household quintile held an equal share of income to their population, they would have a 20% (1/5th) share. While this shows that each of the three lowest quintiles have income shares less than their share of the population of households (less than 20%) these details make comparisons complicated. As a result, the ratio of the income held by the highest quintile of households by the lowest quintile of households is also reported. While this ratio ranged from 14.5 in Merced to 12.7 in Stanislaus, all these values were less than the national and state-wide ratios, which were 17.8 and 16.6 respectively in 2017-2021.

Table 3.1.18 Distribution of Household Income in the NSJV

Percentage Share of Income by Quintile	Lowest Quintile	Second Quintile	Third Quintile	Fourth Quintile	Highest Quintile	Ratio Top/ Bottom
Merced County	3.4	9.1	14.9	22.5	50.0	14.5
Stanislaus County	3.8	9.5	15.5	23.6	47.7	12.7
San Joaquin County	3.4	9.3	15.5	23.7	48.0	14.0
Source: U.S. Census Bureau ACS B19082 5-Year Estimates						

In Appendix 3.1.B the top/bottom ratios are reported for each of the 27 census county-subdivision (CCD) across the NSJV along with a couple of other measures of income inequality. The first of these additional measures examines inequality among the highest income households, which takes the ratio of the income held by the top 20% of households to the income held by the top 5% of households. The second assesses income share in the other middle 60% as a measure of distribution among the middle households.

In terms of the five CCDs with the lowest ratios between the top and bottom quintiles:

- Patterson CCD, Stanislaus County (8.5)
- Thornton CCD, San Joaquin County (9.0)
- Tracy CCD, San Joaquin County (9.2)
- Waterford CCD, Stanislaus County (9.6)
- Newman CCD, Stanislaus County (9.8)

In terms of the five CCDs with the highest ratios between the top and bottom quintiles:

- Merced CCD, Merced County (18.0)
- Planada-Le Grand CCD, Merced County (16.6)
- Oakdale CCD, Stanislaus County (16.5)
- Escalon CCD, San Joaquin County (15.8)
- Dos Palos CCD, Merced County (15.8)

Social Protection

The significance of government social protection for communities in the NSJV cannot be overstated, especially in the face of economic challenges such as those reviewed in Section 3.1.5 below and the ongoing impacts of structural inequalities that are described throughout the assessment. While a range of social programs - The role of government social benefit payments here is critical in providing a safety net for the most vulnerable populations and in fostering a more resilient and inclusive economy.

The North San Joaquin Valley, characterized by its agricultural dominance, has long faced economic challenges, including high rates of poverty and unemployment. These challenges are often exacerbated by factors such as seasonal work patterns in agriculture, limited industrial diversification, and lower educational attainment levels compared to other regions in California. In this context, government social protection programs serve as essential lifelines, helping to mitigate the impacts of economic downturns and supporting families and individuals who struggle to meet basic needs.

Government social benefit payments in the region take various forms, including unemployment insurance,

Supplemental Nutrition Assistance Program (SNAP) benefits, Medicaid, Temporary Assistance for Needy Families (TANF), and disability benefits. These programs play a pivotal role in providing financial stability and access to essential services for low-income families and individuals. For example, unemployment benefits offer temporary financial assistance to those who have lost their jobs, helping to bridge the gap until they find new employment. Similarly, SNAP benefits enable families to afford nutritious food, which is crucial for health and well-being.

Beyond immediate financial assistance, these social protection programs have broader socio-economic impacts. By increasing the purchasing power of low-income households, they help stimulate local economies. When families spend these benefits on goods and services, they support local businesses, which can lead to job creation and economic growth. This is particularly important in the North San Joaquin Valley, where economic activity is heavily reliant on local spending.

Furthermore, government social protection programs have long-term benefits for the community, especially in terms of health and education outcomes. Access to Medicaid ensures that low-income families and individuals can receive necessary medical care, which is vital for maintaining a healthy workforce. Programs like TANF, which often include components for job training and childcare assistance, not only provide immediate financial support but also help recipients build skills and find employment, thereby reducing long-term dependence on aid.

Table 3.1.19 reports government social benefit paid to NSJV residents in recent years. These payments reflect the important role they played during the pandemic where a real increase of some 42% occurred between 2019 and 2020. This increase was most notable in unemployment insurance compensation, which rose by nearly $4.5 billion. As detailed in Appendix 3.1.B several other public support payments increased significantly during the pandemic. While many of these have tapered in 2022 and further in 2023, these remain important parts of the social welfare system.

Table 3.1.19 Annual Real (2022 US$) ('000s) Government Social Benefit Receipts in the NSJV

Description	2018	2019	2020	2021	2022
Current transfer receipts of individuals from governments	17,355,522	18,198,159	25,762,960	26,641,768	20,121,853
Education and training assistance	439,490	462,732	485,631	460,643	456,115
Income maintenance benefits	1,956,730	1,976,538	2,272,343	3,166,788	3,086,402
Medical benefits	9,145,688	9,700,103	10,509,809	10,840,865	10,574,756
Other transfer receipts of individuals from governments	441,107	475,882	2,247,105	3,619,452	518,294
Retirement and disability insurance benefits	4,540,845	4,721,588	4,858,624	4,716,368	4,723,020
Unemployment insurance compensation	363,552	363,896	4,840,505	3,306,132	222,677
Veterans' benefits	468,110	497,419	548,942	531,520	540,589
Refundable tax credits	471,131	517,997	1,195,649	2,271,638	660,269

Source: Bureau of Economic Analysis, Personal Current Transfer Receipts (CAINC35) Updated: November 16, 2023.

In addition to the particularly acute need during the COVID-19 pandemic, these payments are higher in per capita terms to NSJV residents than state-wide and nationally. Given the disproportionate need of many of the NSJV's residents this higher rate is to be expected and reflects the crucial nature of government social protection across the NSJV. These provide a vital safety net for vulnerable populations, supporting economic stability during downturns, and contributing to the overall health and well-being of the community. Beyond their immediate financial assistance, these social benefit payments are investments in the social and economic fabric of the region, with far-reaching impacts on its future resilience and prosperity.

Poverty and Self-Sufficiency

In assessing the need of residents for assistance and to understand what scale of change is necessary to address this need a measure is needed. An initial starting point is to consider the "Official Poverty Measure", which is reported in Table 3.1.20 and Table 3.1.21 below. Over the period from 1989 to 2019 this measure shows a general

improvement in alleviation poverty as well as a reduction in the gap between the State and the NSJV during the 2010s for the total population estimated to be in poverty as well as that of children under the age of 18. In recent years there has not been much change in the share of the population experiencing poverty with around 14.2% of the population overall estimated to be experiencing poverty and about 18.8% of the population under 18 years of age experiencing poverty.

Table 3.1.20 Total Population and Children in Poverty 1989-2019 (Official Poverty Measure)

Poverty Percent, All Ages	1989	1999	2009	2019
California	12.7%	13.7%	14.2%	11.8%
NSJV	15.7%	17.1%	17.7%	14.0%
Poverty Percent, Age 0-17	**1989**	**1999**	**2009**	**2019**
California	21.3%	20.2%	19.9%	15.6%
NSJV	27.4%	24.2%	23.9%	18.6%
Source: U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE)				

Table 3.1.21 Total Population and Children in Poverty 2019-2022 (Official Poverty Measure)

Poverty Percent, All Ages	2019	2020	2021	2022
United States	12.3%	11.9%	12.8%	12.6%
California	11.8%	11.5%	12.3%	12.2%
NSJV	14.0%	14.0%	14.6%	14.4%
Poverty Percent, Age 0-17	**2019**	**2020**	**2021**	**2022**
United States	16.8%	15.7%	16.9%	16.3%
California	15.6%	14.6%	15.8%	15.3%
NSJV	18.6%	18.3%	19.4%	18.7%
Source: U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE)				

There is increasing recognition that the basket of goods contained in the Official Measure of Poverty is limited in capturing the broader assistance that individuals and families may require to achieve a living standard that addresses their needs. Given this need and recognizing its previous experience assessing self-sufficiency within the NSJV region, an assessment of regional self-sufficiency was sought from the Brookings Institution and Cities GPS. This assessment also formed the basis through which low-road and high-road jobs in the region were initially framed (Section 3.1.4). Details of both assessments should be consulted on the interactive platform that they provided:

https://www.canva.com/design/DAF1lO5sW7I/LBMkTSbGM7leP5HcOMmzow/view?utm_content=DAF1lO5sW7I#1

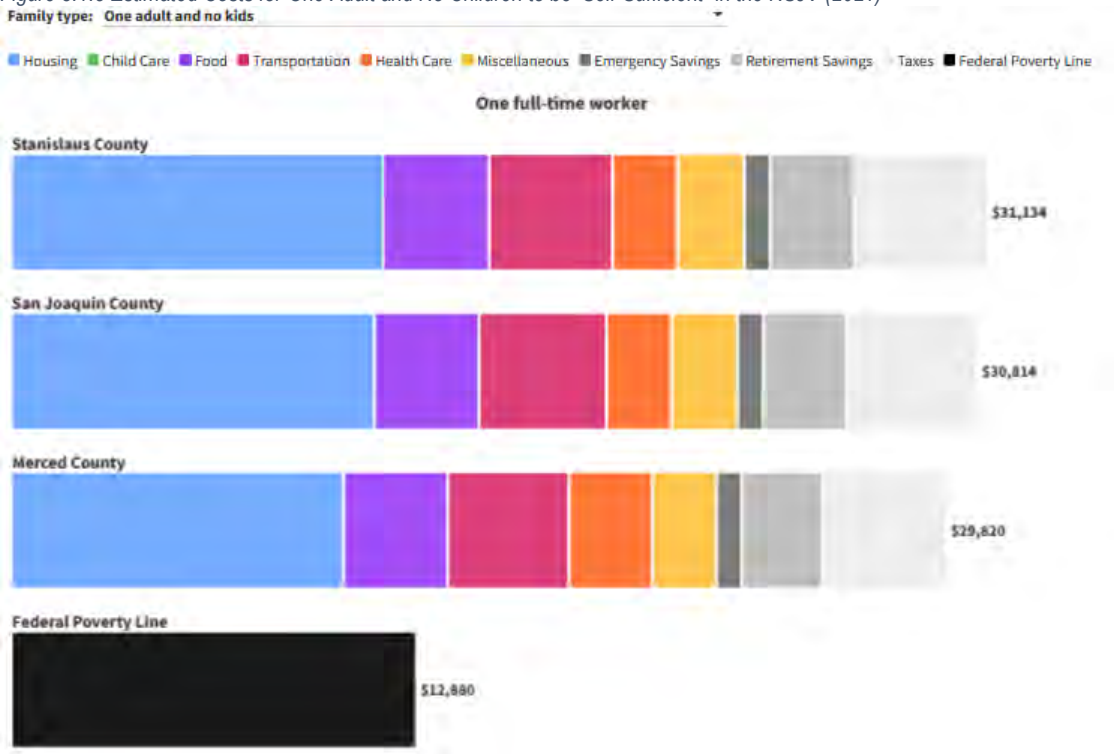
However, the remainder of this subsection provides a summary of their analysis based on the content they provided in the sections on Family Self-Sufficiency and Struggling Families in the interactive platform:

Families need high incomes to cover the basic costs of living in the region. The basic costs of raising a family vary by family as well as by place. This analysis estimates basic costs for families of different sizes and compositions for each of the North San Joaquin Region's three counties. These estimates reflect local costs (housing, food, childcare, etc.) as well as state-specific tax deductions and credits.

This analysis adds savings to families' basic costs to ensure that families can not only cover their basic needs but also are able to create financial security and stability. Emergency savings are taxable; retirement savings are not. Retirement savings are the lesser of 10% of pre-tax income or $6,500 per worker (the maximum contribution for IRAs). These basic family budgets reveal that the costs of raising a family in the region can be quite high. Due to the high cost of childcare, a family with two adult workers, a preschooler, and a school-aged child would need to make almost $87,000 in San Joaquin County. The same family would need $81,000 in Merced County.

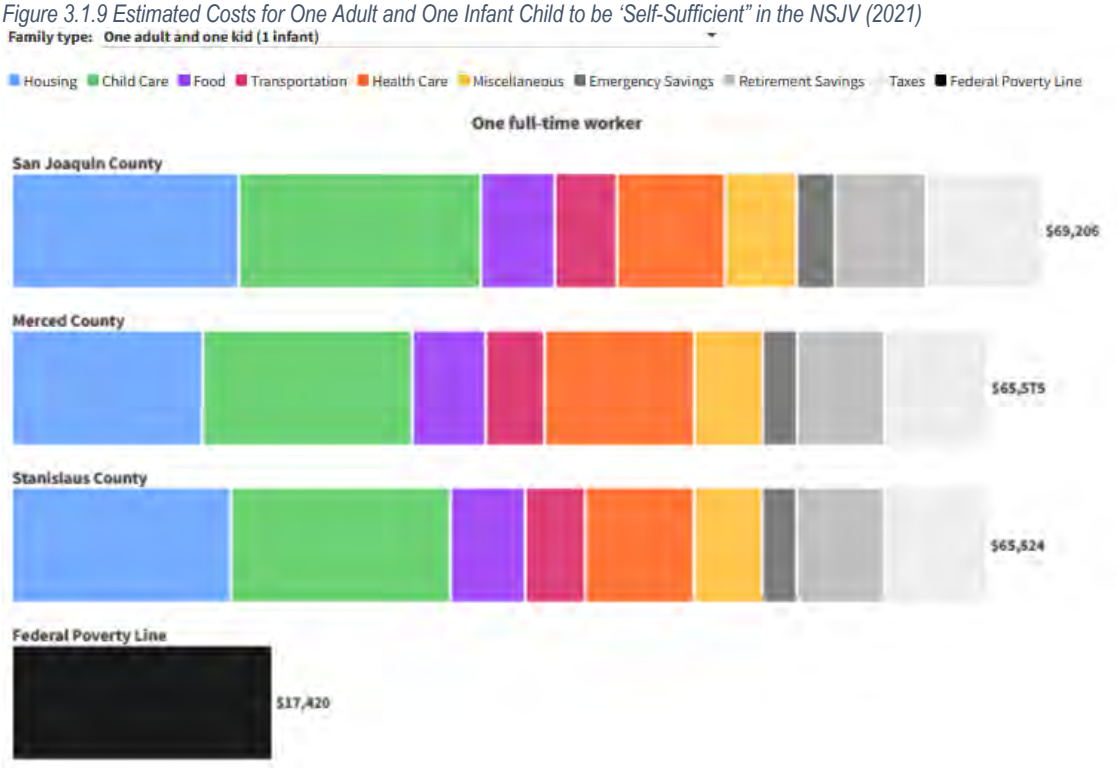
These "self-sufficiency" budgets are used to identify families that earn less than what they need to make ends meet. Therefore, this presents an alternative to federal poverty lines. This analysis considers the number and types of workers and families in the region who are struggling to attain sufficient personal incomes.

Figure 3.1.8 Estimated Costs for One Adult and No Children to be 'Self-Sufficient" in the NSJV (2021)



Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard for California, 2021. Brookings adds taxable emergency savings and non-taxable retirement savings to the self-sufficiency standard.

Figure 3.1.9 Estimated Costs for One Adult and One Infant Child to be 'Self-Sufficient" in the NSJV (2021)



Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard for California, 2021. Brookings adds taxable emergency savings and non-taxable retirement savings to the self-sufficiency standard.

Nearly one-half of the region's residents struggle to make ends meet.

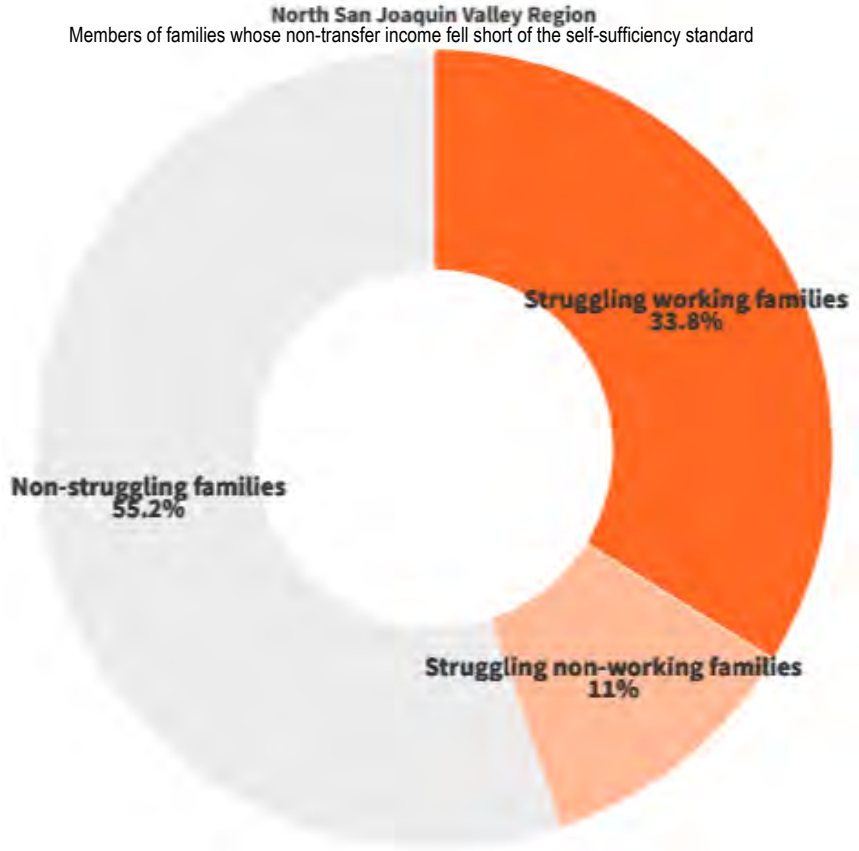
At least 44% of residents in the North San Joaquin Valley region belong to families whose income does not cover basic costs. Comparing county-based family budgets to Census Bureau data reveals that a considerable proportion of people in the region belong to nuclear families with incomes (excluding public assistance) that fall short of what it costs to make ends meet where they live (the orange segments of this chart).

Of that group, most residents belong to families with at least one adult worker. This means that 33% of the region's residents belong to families that are struggling or "striving" to make ends meet in their county of residence despite having adults who actively participate in the region's labor market.

The remainder of this group belongs to struggling non-working families. These non-working families are predominantly headed by people over the age of 65 who have presumably retired from the workforce.

These trends have variations across the region's counties. The share of people who belong to struggling or "striving" working families ranges from 32% in San Joaquin and Stanislaus counties to 42% in Merced County.

Figure 3.1.10 Share of NSJV population in families that struggles to make ends meet (2021)



Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

More than half of children in the North San Joaquin Valley belong to struggling families.

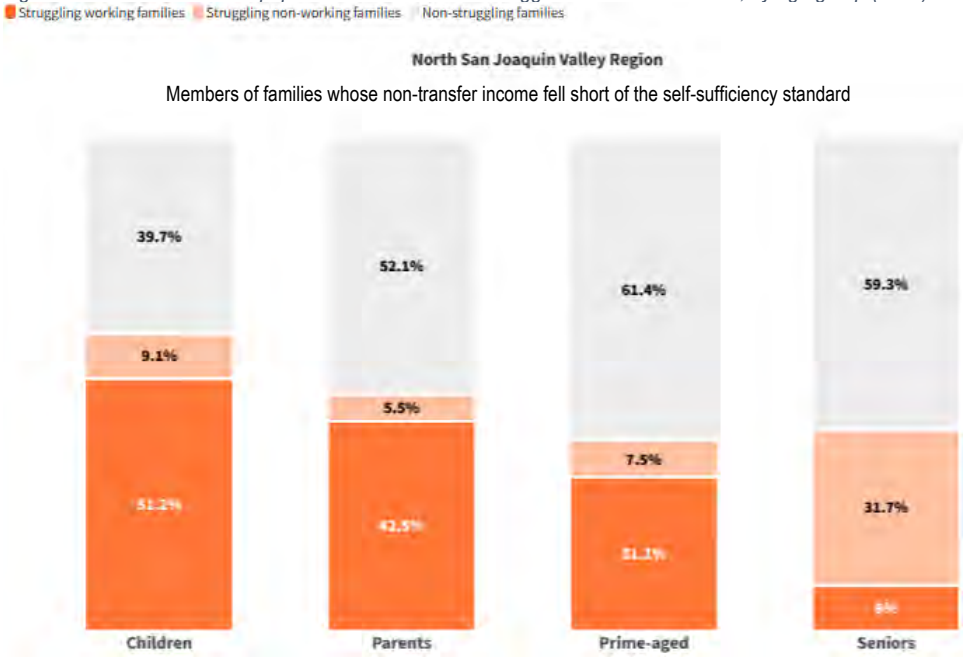
For the region as a whole, children represent the largest age group living in struggling families. Over 51% of the region's children are growing up in working families with incomes insufficient to cover basic needs. Another 9% belong to struggling families without an adult worker, bringing the total share of the region's children growing up in families with insufficient incomes to 60%.

San Joaquin and Stanislaus counties have almost identical outcomes for age groups, while Merced County lags even further. The proportion of children, parents, and prime-aged adults that struggle in Merced County exceed other parts of the region by 7 to 12 percentage points, suggesting a different set of underlying challenges and potential interventions.

Insufficient incomes are a multi-generational challenge for the region. Abundant research shows that children who grow up in resource-constrained families face myriad barriers to success as adults.

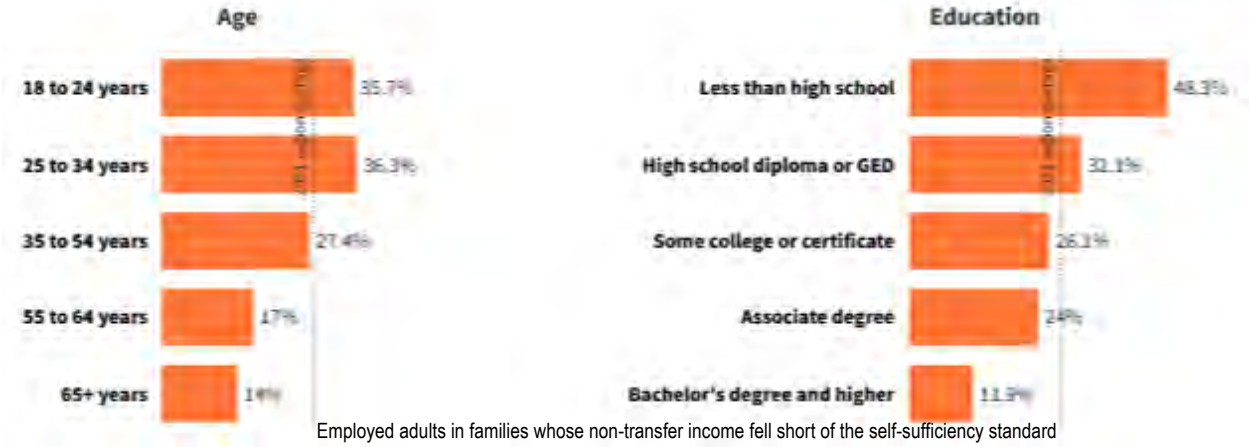
Helping workers heading struggling families with children find quality, family-sustaining jobs is key to addressing this long-term challenge. Strategies and programs to help prime-aged workers in struggling working families find better work opportunities can help current and future generations get ahead.

Figure 3.1.11 Share of NSJV population in families that struggles to make ends meet, by age group (2021)



Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

Figure 3.1.12 Share of NSJV workers in each group that struggle to make ends meet, by age and education level (2021)



Employed adults in families whose non-transfer income fell short of the self-sufficiency standard

Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

Figure 3.1.13 Share of NSJV workers in each group that struggle to make ends meet, by race/ethnicity and gender (2021)

Employed adults in families whose non-transfer income fell short of the self-sufficiency standard

Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

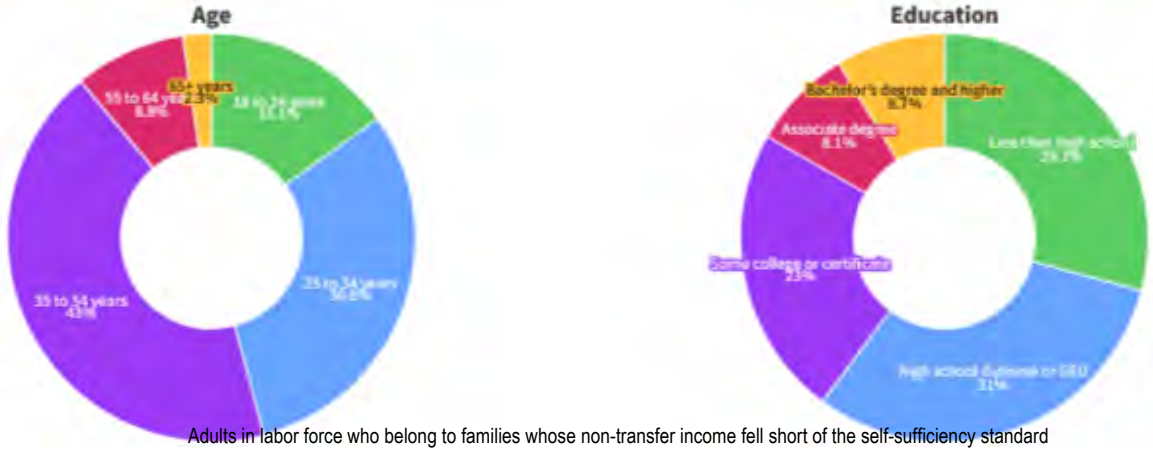
The share of workers that struggle to make ends meet varies by age, skill, and race.

Strategies and programs to assist striving workers should take educational attainment and demographic variation into account. Designing strategies and programs with the needs and priorities of target audiences in mind will increase the effectiveness of these interventions.

Prime-age workers are more likely to struggle to make ends meet if they are young or have less formal education. Age and education serve as proxies for labor market experience and skill. Workers with less of either tend to command lower wages. These factors combine and compound one another, making less educated younger workers more likely to earn less than they need compared to young workers with higher levels of educational attainment.

The likelihood of struggling to make ends meet also varies by non-labor market characteristics such as race, ethnicity, and gender. Though these characteristics should have no relevance in the labor market, they correlate with other barriers to education and economic success, including the multi-generational implications mentioned on the prior slide. However, economic outcomes for racial groups also are influenced by overall demographics; the region's Hispanic population is notably younger than white residents, so some of the difference in struggling status reflects a larger number of less experienced workers.

Figure 3.1.14 Share of all NSJV workers that that struggle to make ends meet, by age and education level (2021)



Adults in labor force who belong to families whose non-transfer income fell short of the self-sufficiency standard

Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

Figure 3.1.15 Share of all NSJV workers that that struggle to make ends meet, by race/ethnicity and gender (2021)

Adults in labor force who belong to families whose non-transfer income fell short of the self-sufficiency standard

Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

Large portions of struggling workers are young, mid-skilled, and people of color.

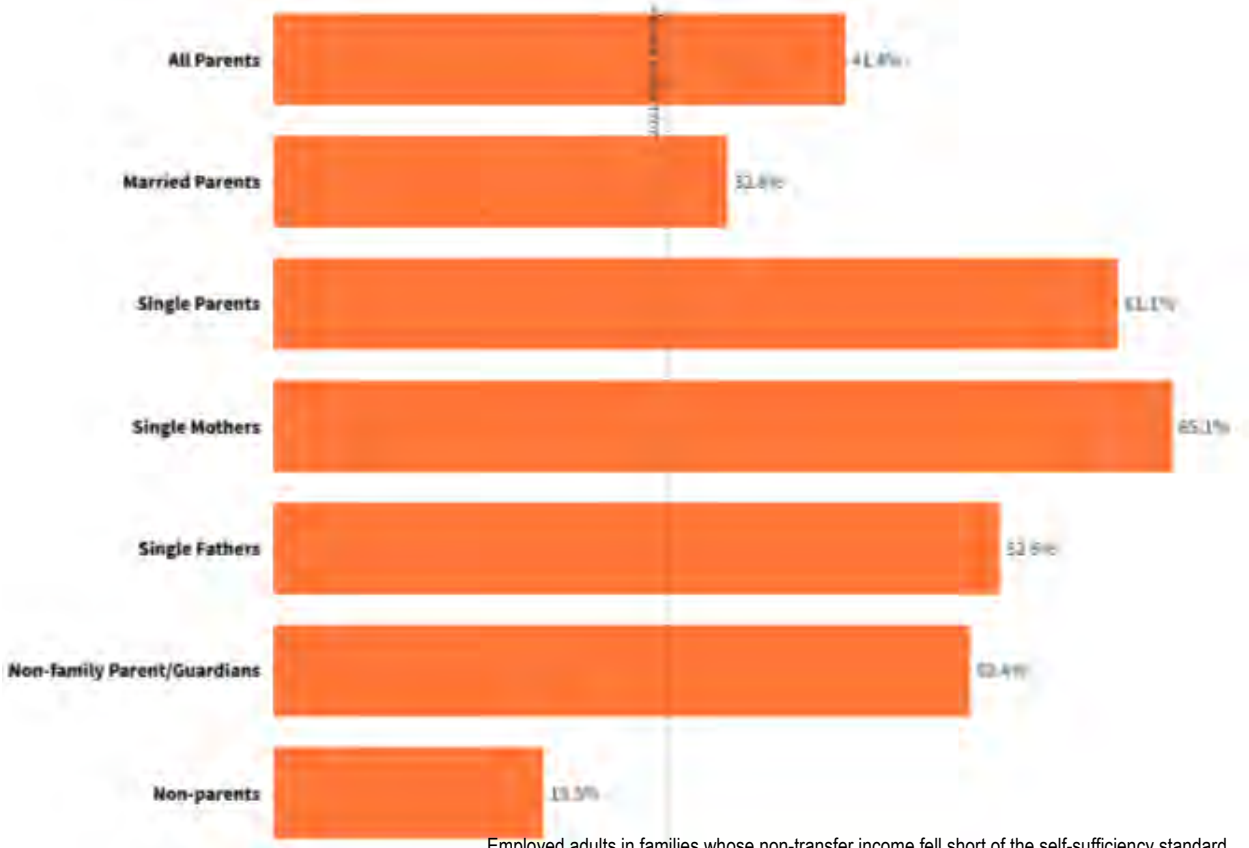
Close to 40% of struggling workers have some post-secondary education less than a bachelor's degree. Additionally, more than 30% have a high school diploma or equivalency. These are workers with education and skills that should enable them to find well-paid work. This suggests a challenge in the availability of quality jobs, not merely worker preparedness to access them.

Nearly three-quarters of struggling adults are at prime working age. While regions have similar challenges due to demographics, limited pathways to quality jobs for more experienced workers may be a factor.

Over half of struggling workers are people of color. At the subregional level, Merced County has a significantly larger representation of struggling workers who are Hispanic, younger, and less educated. These characteristics reinforce a difference in potential factors and responses compared to San Joaquin and Stanislaus.

A slightly larger portion of struggling workers are men. However, this may reflect that men in struggling families participate in the labor force at a higher rate than women, who tend to assume caretaking responsibilities. Factors like childcare costs influence the economic viability of taking jobs, where the income does not offset added expenses and scheduling constraints.

Figure 3.1.16 Share of all NSJV workers in each group that that struggle to make ends meet (2021)



Employed adults in families whose non-transfer income fell short of the self-sufficiency standard

Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

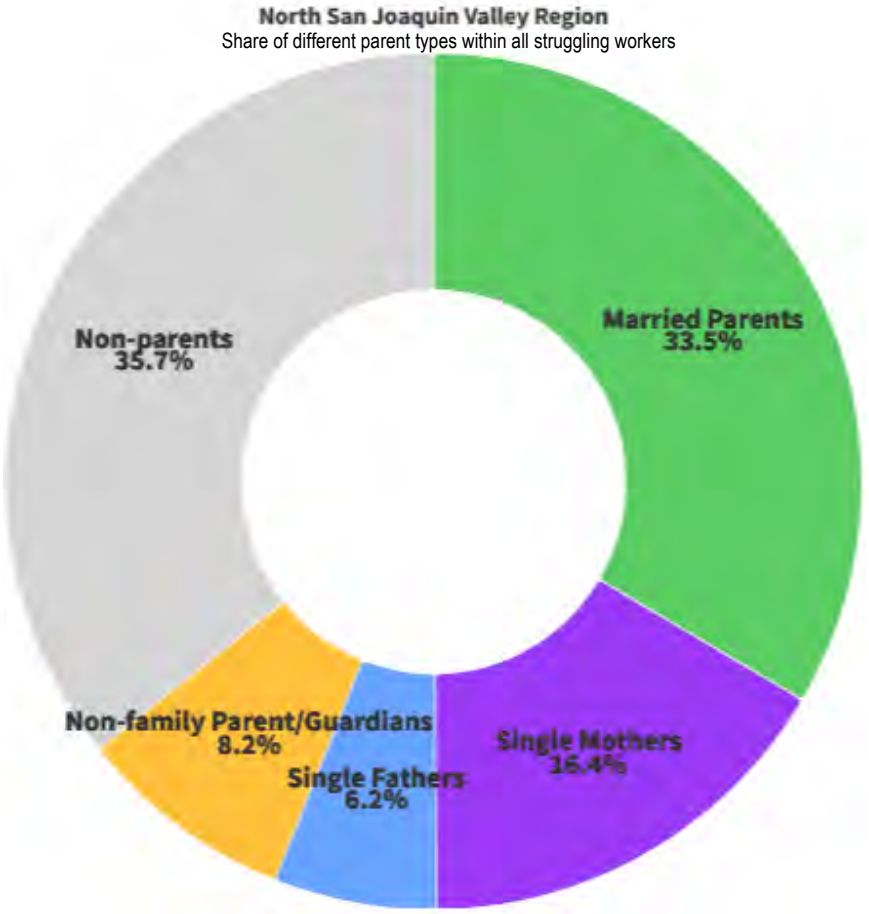
Single parents are twice as likely to struggle to make ends meet than married ones.

Region-wide, parents struggle at higher rates than the average adult. Providing for children stretches families' finances further, contributing to higher shares of struggling adults. Even married parents still face above-average odds of struggling to make ends meet, but struggle at nearly half the rate of single parents.

Single mothers are more likely to struggle than single fathers. The North San Joaquin Valley and its counties exhibit higher shares of single mothers struggling than single fathers. Structural gender dynamics may limit single mothers' income, contributing to this imbalance.

Non-family parents and guardians face similar challenges to single parents. Both non-family parents and guardians and single parents experience more difficulty making ends meet than the average married parent.

Figure 3.1.17 Composition of Struggling Workers in the NSJV (2021)



Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

Close to one-third of struggling working parents are raising children alone.

Married parents make up the majority of struggling parents. Despite lower struggling rates than other household types, married parents make up the majority of parents who struggle. This is likely driven by higher quantities of married households than single-parent or non-family households.

Single mothers greatly outnumber single fathers. For the entire region, the number of struggling single mothers is nearly three times the number of struggling fathers. This trend extends to the North San Joaquin Valley region's counties where only Stanislaus County observes a lower ratio of single mothers to single fathers. Still, single mothers nearly double single fathers for this "outlier."

The makeup of struggling parents varies between counties. Most counties exhibit high shares of married parents among their struggling parents. However, intra-regional shares of single parents range between 30% and 36% of a subregion's composition.

Gender Pay Gap

The data from the U.S. Census Bureau on women's earnings as a percentage of men's earnings in the North San Joaquin Valley (NSJV) presents a revealing snapshot of the gender pay gap in this region over two distinct periods: 2013-2017 and 2018-2022.

In San Joaquin County, there has been a noticeable improvement in the gender pay gap. Women's earnings as a percentage of men's increased from 69.2% in the 2013-2017 period to 72.3% in the 2018-2022 period, marking a 3.1% positive change. This indicates that the pay gap has narrowed, suggesting that efforts to address gender disparities in pay might be having an impact, or there may be changes in the types of employment women are engaging in within this county.

Conversely, Stanislaus and Merced Counties show different trends. In Stanislaus County, the percentage slightly decreased from 69.7% to 69.2%, a change of -0.5%. Merced County saw a more significant decline, from 70.4% to 68.0%, marking a 2.4% decrease. These shifts suggest that the gender pay gap has widened in these counties, indicating potential challenges in achieving pay equity.

Several factors could contribute to these regional disparities. For example, the types of industries predominant in each county, the availability of full-time versus part-time work, and differences in educational attainment and occupational choices between men and women in these areas could all influence the gender pay gap. Additionally, broader economic trends, such as the rise or fall of certain industries or overall economic health, can disproportionately affect women's earnings.

The data underscores the persistent challenge of achieving gender pay equity, not just in the NSJV but more broadly. Despite progress in some areas, as seen in San Joaquin County, other areas are experiencing stagnation or even regression. Addressing this requires a multi-faceted approach that includes policy changes, encouraging equitable hiring and promotion practices, supporting educational and professional development opportunities for women, and fostering a culture that values and compensates women's work equally to men's.

Table 3.1.22 Women's earnings as a percentage of men's earning in the NSJV

	San Joaquin County	Stanislaus County	Merced County
2018-2022	72.3%	69.2%	68.0%
2013-2017	69.2%	69.7%	70.4%
Change	3.1%	-0.5%	-2.4%
Source: U.S. Census Bureau ACS S2413 5-Year Estimates			

Language Justice and Communication Inequality

Communication inequalities create differences among social groups in their ability to generate, disseminate, and use information at the macro level and to access, process, and act on information at the individual level. While there are various means of interaction that can convey information and express emotions, language is a primary medium through which the process of communication occurs. While recognizing the multiple potential sources of communication barriers, such as social and cultural diversities, language barriers are major obstacles to communication between individuals and groups that hinders understanding and can contribute to conflict, frustrations, offense and violence.

Broadly speaking, language plays a crucial role in shaping individuals' access to opportunities, resources, and participation in society. The close connection between language, communication and the ability to participate fully in society can be highlighted in several critical ways:

Access to Information: Language is a vehicle for communication and accessing information. In communities where there is language inequity, certain groups may face barriers in accessing critical information, such as legal documents, educational resources, or healthcare materials. This lack of access can perpetuate existing social inequalities.[8]

Educational Opportunities: Language equity is closely linked to educational opportunities. In some cases, minority or marginalized groups may not have access to education in their native language, limiting their ability to fully engage in the learning process. This can contribute to disparities in educational outcomes and future opportunities.[9]

Cultural Expression: Language is intertwined with culture, and the suppression or devaluation of certain languages can be a form of cultural injustice. Social justice advocates often emphasize the importance of preserving and valuing diverse linguistic expressions as a way of respecting and promoting cultural diversity.[10]

Employment and Economic Opportunities: Proficiency in a particular language is often a requirement for certain jobs or career paths. Language barriers can hinder individuals from fully participating in the workforce, limiting their economic opportunities. Social justice efforts seek to address these barriers and promote equal access to employment.

Legal Rights and Civic Participation: Understanding and using language is essential for individuals to exercise their legal rights and participate in civic activities. Language barriers can prevent some groups from fully engaging in the democratic process, accessing legal services, or advocating for their rights.[11]

Representation and Power Dynamics: Language also plays a role in representation and power dynamics. In societies where certain languages are marginalized, those who speak those languages may also face marginalization in political, social, and economic spheres. Social justice advocates often aim to challenge and change these power imbalances.[12]

Languages Spoken in the NSJV

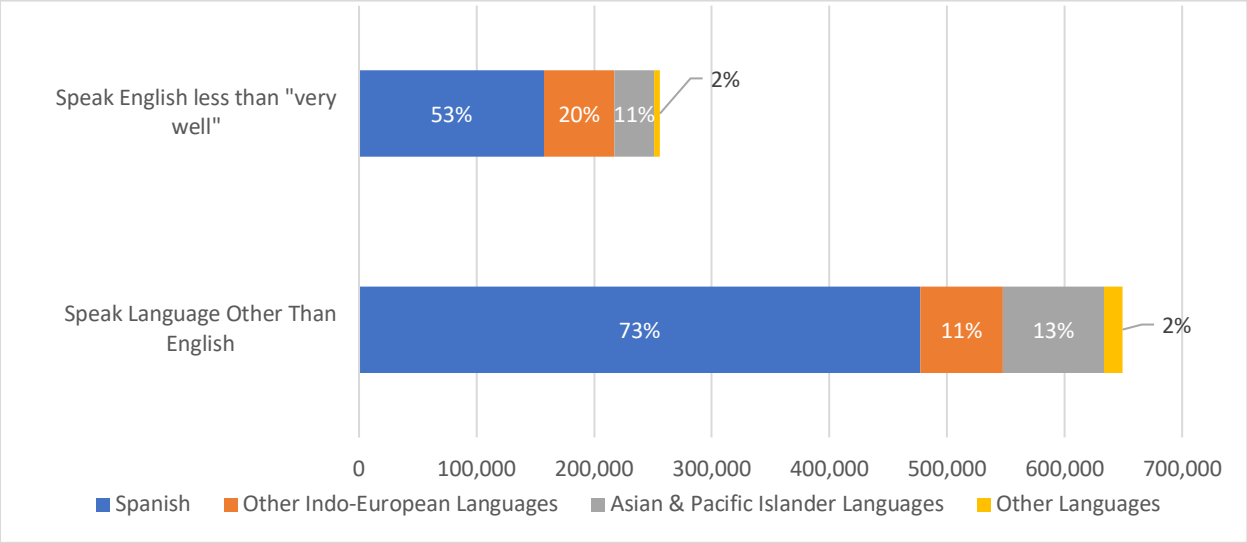
In this regard it's important to recognize that nearly half (44%) of residents in the NSJV speak a language at home other than English.

[8] Community Language Coop. Language Justice. https://communitylanguagecoop.com/language-justice/
[9] UNESCO. Enhancing Language Ability. https://www.unesco.org/en/articles/enhancing-language-ability-outcomes-international-conference-language
[10] Linguistic Justice Collaborative. Theoretical Framework. https://www.linguisticjusticecollaborative.com/what-roots-us/
[11] Center for Applied Linguistics. Voting Rights for Language Minorities. https://www.cal.org/cal_blog/voting-rights-for-language-minorities/
[12] Center for Applied Linguistics. Voting Rights for Language Minorities. https://www.cal.org/cal_blog/voting-rights-for-language-minorities/

Figure 3.1.18 below shows that regionally some 73% of the nearly 650,000 individuals that speak another language besides English at home speak Spanish, but that share varies from 83% in Merced to 64% in San Joaquin. In terms of other languages, Asian and Pacific Island languages are reportedly spoken by some 86,000 individuals across the NSJV but some 61,000 (72%) of these individuals reside in San Joaquin County.[13]

[13] Please see appendix for more details on language spoken at home and the population with constrained English speaking abilities.

Figure 3.1.18 Language Spoken at Home among the Population 5 years and over in the NSJV 2017-2021



Source: U.S. Census Bureau ACS DP02 5-Year Population Estimates.

While many services and significant resources are given to multi-lingual dissemination, it is important to recognize that there are over 250,000 individuals in the NSJV that self-report being able to speak English less than “very well”. While these populations are nearly proportional to the counties’ respective total populations it represents an important communication barrier, which are amplified further by other factors like differences in educational background, level of literacy and country or area of the language user.

Community Comment: Identified Communication Barriers in the NSJV

NSJV stakeholders and community members repeated highlighted these issues during community meetings and NV THRIVE events.

Many attendees stated that residents often don’t know what resources are out there or are available to them. Even when services and resources are accessible, the NSJV community noted that they are not always language accessible.

Attendees also noted that language vulnerability exists on a spectrum, and that not all NSJV residents experience this dynamic equally. For example, given the disproportionate barriers faced by undocumented and immigrant populations, special thought needs to be given to how information is communicated to these groups. Suggestions for how to do this effectively included the use of trusted messengers to better communicate with vulnerable communities, as well as exploring alternative means of communication like activities and connections made on social media.

Community members also mentioned that language and racial barriers can make traditional information access points like local chambers of commerce feel very unwelcoming.

Multiple attendees noted that when people have called to ask for assistance from small business programs, they were told they need to learn better English.

These are all examples of barriers and gaps that prevent NSJV residents from accessing the information they need to grow small businesses, pursue education and career opportunities, and feel empowered to participate fully in their communities.

Information Trust and Access

In an increasingly information intensive society, access to information is critical and information technology is critical in that regard. While Table 3.1.23 shows that households with a computer across the NSJV at 94% is near the state-wide (95.2%) and national (95.7%), there are a variety of additional barriers to ensuring residents can effectively engage with and utilize those resources. Broadband access is among those factors, and in this regard the NSJV's 88.3% of households with a broadband internet subscription is near the state-wide (90.4%) and national (91%) levels.

Table 3.1.23 Computer & Internet Access in the NSJV 2017-2021 in the NSJV

Total households	
With a computer	94.0%
With a broadband Internet subscription	88.3%
Source: U.S. Census Bureau ACS DP02 5-Year Population Estimates	

While recognizing the importance of communication and information infrastructure, it has accompanied unprecedented growth in information with at least two fundamental challenges. One is a need to translate scientific information in a usable format and language that can be understood and used by different audiences through appropriate channels. This challenge is compounded by the large number of channels and actors, which make it difficult to control the interpretation of information as it cascades through different segments of society.
During NSJV THRIVE meetings, community participants noted that beyond language barriers, another challenge they face is often information overload. Multiple websites all have so much information people are overwhelmed. Especially when related to accessing small business assistance services, NV THRIVE residents noted that they needed more handholding and even emotional support in navigating resources. According to residents, trying to run a business is already difficult and so many people are on the verge of giving up given barriers in information access and interpretation.

A second and equally, if not more, important challenge is that we need to ensure that the information is available to all of those who need it, regardless of their social class, cultural, geographic, and individual backgrounds. This latter need is a particular challenge, given the profound information inequalities that characterize our society. While the number of channels through which information, particularly through subscription telecommunication services, increases, it also comes at a price that requires recurring expenditures and investment to obtain those services. (Viswanath, 2006). Throughout multiple NV THRIVE meetings community members noted issues such as a fundamental breakdown in communication about existing programs and services. While existing programs and services might have openings or availability that government agencies are unable to fill, communities themselves feel that no one ever comes to them to talk about these services. During these meetings, community comments also identified the need to provide increased business assistance for non-profits as well. Many nonprofit groups know the community side but are still having trouble accessing help with business or administrative side as well as assistance in applying for county/state/federal programs and aid.

Identified barriers in information access and clarity also included aspects of education: Parents noted they often had trouble finding information for their students (scholarships, which classes to take, how to prep for which schools). This was especially hard for non-English speakers in the NSJV region. Given these barriers the NSJV faces matching educational attainment to the skill sets required by key regional industries, such disconnects will be critical to understand and address as NV THRIVE moves forward.

Ultimately, community members stated repeatedly that they want more civic engagement, more communication and more conversations. People wanted to be continued to be invited to the table, to know what is happening in their community and be able to provide input important issues impacting them and the places they live.

Social Mobility

Social mobility is the change in a resident's socio-economic situation. It is associated with the degree to which people have the same chances to do well in life regardless of their background or other circumstances beyond their control.[14] As such it is an important factor contributing to a vibrant society. While social mobility is particularly important given the extent of disinvested communities across the NSJV,[15] we have not been able to identify regionally specific research on social mobility in the NSJV. However, the Opportunity Atlas has extensive local (neighborhood level) data on social mobility, and we believe it provides useful reference to begin understanding key features of social mobility in the NSJV.[16]

Intra-generational Mobility

Intra-generational mobility considers the change in a person's socio-economic situation throughout their lifetime. While detailed summaries of county-level data are reported in Appendix 3.1.B, some significant findings include:

- Among the NSJV's racial/ethnic populations, Asians and White populations are the most likely to have completed higher education qualifications but details vary across genders and level of qualification.
- Incarceration rates are disproportionately higher among men, with Black, Chicano/Hispanic/Latino, and Native American males experiencing the highest rates.
- Race/ethnicity is similarly a significant influence on the likelihood of reaching the top individual or household income quintile (top 20%).

Inter-generational Mobility

Inter-generational mobility considers the change in a person's socio-economic situation in relation to their parents. Among the indicators on inter-generational mobility available from Opportunity Insights, a more complete review can be found in Appendix 3.1.B but a selection of findings include:

- In terms of the impact of spending one more year in the NSJV during childhood, evidence suggests that it tends to reduce individual and household income at the age of 26 years, but that experience varies by gender, parent's income quartile, and county:
    - For households with parents in the 25th percentile of the national income distribution spending one more year of childhood in San Joaquin County results in a 0.13% drop in household income at age 26 relative to the national mean. Similarly, the drop in Merced was 0.04%, but in Stanislaus it resulted in a 0.19% increase in household income at age 26.
    - For households with parents in the 75th percentile of the national income distribution spending one more year of childhood in Merced County results in a 0.21% drop in household income at age 26 relative to the national mean. Similarly, the drop in Stanislaus was 0.19%, but it was just a 0.07% reduction in San Joaquin County and among boys it actually resulted in a 0.15% increase in household income at age 26.
    - Given these diverse inter-generational impacts on economic mobility in the NSJV, further interrogation and analysis of the socio-economic opportunities available to households of different incomes and the influence of gender could frame valuable policy insights.
- In terms of life expectancy, the difference in life expectancy across income quartiles after adjusting for race can be seen in Table 3.1.24.
    - It shows that while men's life expectancy across the lowest two income quartiles averages 3.7 years less than women's across the highest two income quartiles that difference is only 2.1 years.
    - In San Joaquin County, compared to women in the top quartile women's life expectancy in the

[14] For a discussion of social mobility see https://www.oecd.org/stories/social-mobility/

[15] See Section 2.2 for details of the NSJV's disinvested communities.

[16] The Opportunity Atlas is a free online resource that can be accessed at: http://www.opportunityatlas.org/ It is produced by the Opportunity Insights research and policy institute and the U.S. Census Bureau. Opportunity Insights mission is to develop scalable policy solutions that empower families throughout the United States to rise out of poverty and achieve better life outcomes: https://opportunityinsights.org/

bottom quartile is 6.3 years less and for men the difference is 7.7 years less for those in the lowest quartile.

Table 3.1.24 Influence of Income on Life Expectancy in the NSJV (race adjusted)

Life expectancy across income quartiles by County and Gender		1st Quartile (bottom 25%)	2nd Quartile (middle 25-50%)	3rd Quartile (middle 50-75%)	4th Quartile (top 25%)
Merced County	Female	82.4	83.5	83.5	87.7
	Male	78.0	79.8	82.5	84.4
San Joaquin County	Female	80.4	82.7	83.6	86.7
	Male	76.7	79.0	81.6	84.4
Stanislaus County	Female	81.9	82.2	84.2	87.1
	Male	77.8	79.7	82.7	84.5
Source: The Health Inequality Project: "The Association Between Income and Life Expectancy in the United States, 2001-2014" (2017)					

Business Ownership

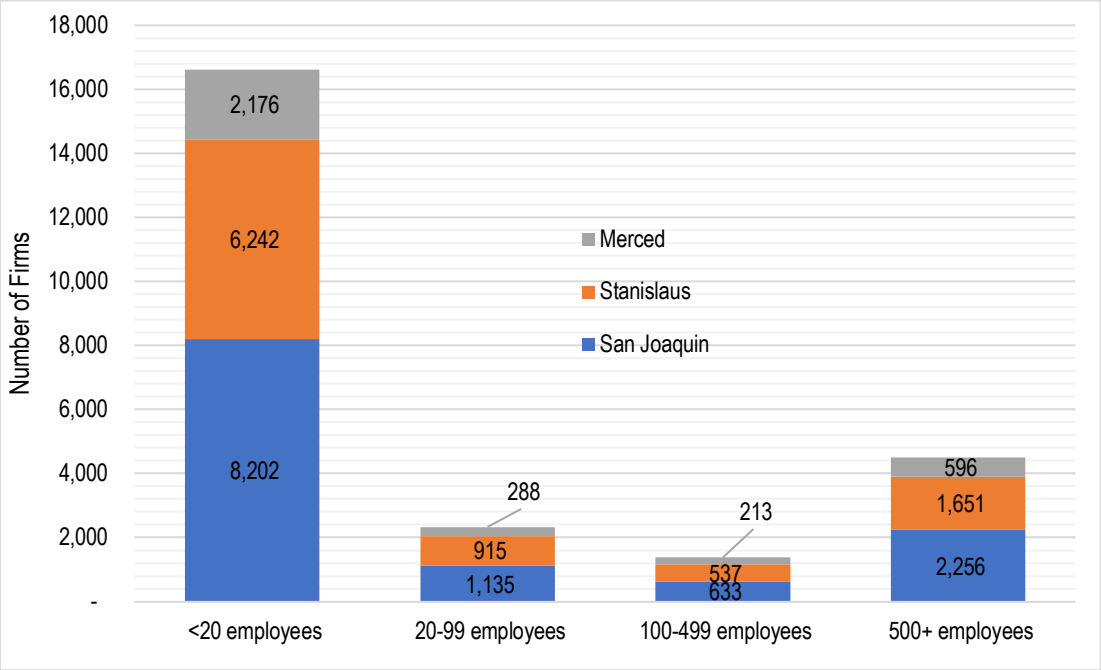
Table 3.1.25 below demonstrates the number of employer firms in the NSJV while showing an inequity with regard to the concentration of control of such firms among males. Indeed, of the 19,034 employer firms in the NSJV, only 17% are controlled equally by females and males, with 61% controlled by males and only 22% controlled by females. Focusing on the 367,638 employees in the NSJV employer firms, only 15% of employees are at employer firms controlled equally by females and males, with 51% of employees at firms controlled by males and 34% of employees at firms controlled by females. Looking at income distribution through the annual payroll of nearly $18 billion, a slightly disproportionate amount of the annual payroll, 52%, goes to employees at firms controlled by males, with 34% of the payroll going to employees at firms controlled by females and only 14% of the annual payroll going to employees at firms controlled equally by females and males. Looking at average payroll amount per employee, firms controlled by males post the highest average payroll amount per employee, $49,781, firms controlled by females post the next highest amount at $47,923 (below the overall average of $48,445), and firms controlled equally by females and males post the lowest average payroll amount per employee, $45,036. Thus, there are a disproportionate number of male-controlled employer firms in the NSJV, and those firms employ more employees (although less than their proportion of firms would suggest) and pay more per employee on average. Interestingly, male-controlled firms have less employees on average, 16, than the overall average of 19 employees per NSJV firm, as well as much less than the average of 30 employees per female-controlled firm and slightly less than the average of 17 employees per firm controlled equally by females and males.

Table 3.1.25 Characteristics of NSJV Businesses by Gender of Owners

	Number of employer firms	Number of employees	Annual payroll ($1,000)	Emp/Firm	Payroll/Emp
Total	19,034	367,638	17,810,182	19	48,445
Female	22%	34%	34%	30	47,923
Male	61%	51%	52%	16	49,781
Equally male/female	17%	15%	14%	17	45,036
	100%	100%	100%		
Source: U.S. Census Bureau Statistics of U.S. Businesses					

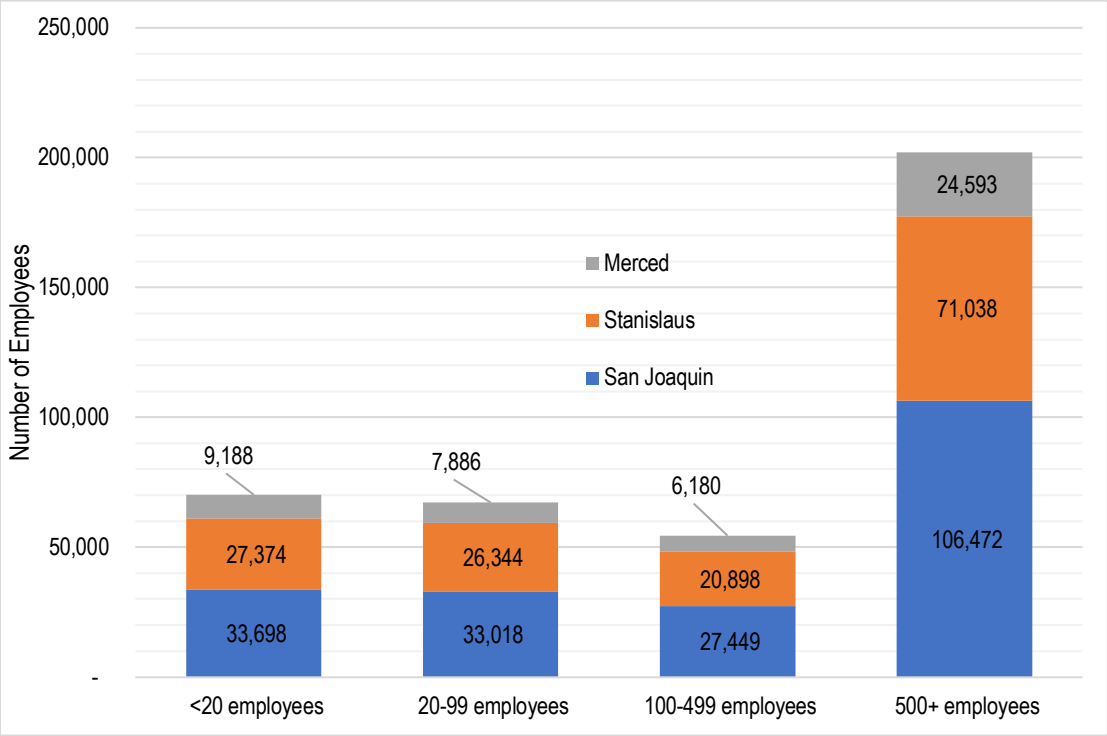
The structure of business ownership by size of firms and number of employees is another dimension of skewed distributions. Figure 3.1.19 shows that the vast majority of firms, over 16,000 firms, in the NSJV are businesses with 20 or fewer employees. However, Figure 3.1.20 shows that most employment, some 200,000 jobs, occur in firms that have 500 or more employees.

Figure 3.1.19 Number of NSJV Establishments in 2020 by Employment Size



Source: U.S. Census Bureau Statistics of U.S. Businesses

Figure 3.1.20 NSJV Establishments' Employment in 2020 by Employment Size



Source: U.S. Census Bureau Statistics of U.S. Businesses

3.1.3 Economic Structure and Dynamics

This subsection provides an analysis of the economic activities in the NSJV region. It examines aspects such as real GDP trends, trade flows, infrastructure development, and housing concerns. The assessment delves into regional innovation and entrepreneurship by assessing business startups, closures, and patent activities. It also discusses the financial ecosystem, housing affordability, and regional price disparities. Furthermore, it explores income growth, employment trends, and human capital in the NSJV, highlighting the dynamics of regional income, job growth, and sector-specific employment concentrations. It emphasizes the low proportion of jobs requiring a bachelor's degree at entry-level and examines job and industrial similarities, commuting patterns, and educational attainment, underscoring educational and regional development challenges.

Gross Regional Product

Table 3.1.26 provides data on various industries in terms of their earnings, property income, and taxes for the year 2022. The dataset includes a range of sectors, each with specific financial figures associated with them:

- Manufacturing: Shows significant economic activity with earnings amounting to approximately $4.71 billion and property income reaching nearly $4.91 billion in 2022. The sector also contributed around $657 million in taxes.
- Government: A major economic component, the government sector reported earnings of about $9.17 billion. Interestingly, the property income for this sector was considerably lower, at around $885 million.
- Health Care and Social Assistance: This is the NSJV's third largest sector with $7.95 billion in GRP, earnings of $6.48 billion and property income of $1.34 billion. Taxes paid by this sector amounted to roughly $183 million, reflecting its significant role in the economy.
- Transportation and Warehousing: With earnings of about $5.23 billion and property income of approximately $723 million, this industry forms an essential part of the economic structure. It contributed around $151 million in taxes in 2022.
- Retail Trade: This sector earned around $3.22 billion and had property income of about $1.25 billion. Notably, the retail trade sector contributed significantly to tax revenue, with approximately $1.32 billion in taxes.

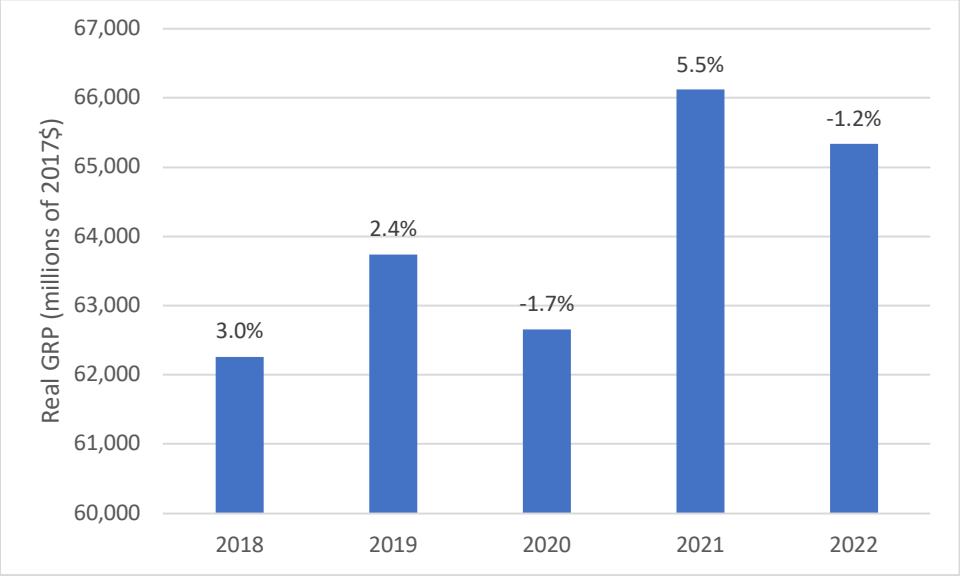
Table 3.1.26 Gross Regional Product of the NSJV by Industry (2022)

Industry	2022 Earnings	2022 Property Income	2022 Taxes	2022 Subsidies	2022 GRP
Manufacturing	$4,714,613,898	$4,908,626,399	$657,191,617	($23,053,122)	$10,257,378,793
Government	$9,167,343,842	$885,285,397	$0	($2,732,165)	$10,049,897,074
Health Care and Social Assistance	$6,478,056,234	$1,337,654,537	$183,446,932	($49,835,477)	$7,949,322,225
Transportation and Warehousing	$5,233,760,817	$723,796,015	$151,525,186	($22,003,144)	$6,087,078,874
Retail Trade	$3,223,235,470	$1,247,515,187	$1,315,874,876	($15,879,092)	$5,770,746,440
Wholesale Trade	$1,868,819,891	$1,689,720,980	$1,635,484,298	($8,137,893)	$5,185,887,276
Agriculture, Forestry, Fishing and Hunting	$3,064,580,783	$1,486,854,648	$228,487,170	($96,566,439)	$4,683,356,163
Construction	$3,048,785,514	$662,273,228	$56,006,453	($24,252,810)	$3,742,812,385
Accommodation and Food Services	$1,572,122,616	$884,404,847	$389,527,529	($78,064,598)	$2,767,990,393
Finance and Insurance	$1,531,302,663	$1,048,748,000	$76,795,871	($982,990)	$2,655,863,544
Real Estate and Rental and Leasing	$1,559,098,096	$626,295,988	$277,598,327	($18,620,569)	$2,444,371,842
Administrative and support, waste management and remediation services	$1,783,710,583	$442,580,801	$64,597,726	($5,958,585)	$2,284,930,525
Professional, Scientific, and Technical Services	$1,427,523,902	$359,336,359	$58,344,927	($8,141,174)	$1,837,064,013
Utilities	$458,323,274	$882,579,304	$256,756,503	($554,313)	$1,597,104,768
Other Services (except Public Administration)	$1,264,749,267	$74,455,800	$142,175,117	($10,437,311)	$1,470,942,873
Management of Companies and Enterprises	$642,359,398	$36,242,551	$18,873,052	($156,612)	$697,318,389
Information	$216,017,059	$416,139,947	$60,967,837	($1,246,545)	$691,878,298
Educational Services	$353,529,397	$29,911,540	$17,177,523	($2,093,590)	$398,524,870
Arts, Entertainment, and Recreation	$220,384,093	$62,150,948	$67,234,414	($3,653,945)	$346,115,510
Mining, Quarrying, and Oil and Gas Extraction	$15,443,652	$45,917,042	$12,478,912	($102,700)	$73,736,906
Other Vectors	$0	$7,655,969,517	$1,254,319,001	($25,424,848)	$8,884,863,671
	$47,843,760,448	$25,506,459,035	$6,924,863,269	($397,897,923)	$79,877,184,830

Source: Lightcast 2023.3

These figures on the economic landscape of the NSJV demonstrate that manufacturing, government, and health care are notable for their high earnings, while the retail trade sector stands out for its substantial contribution to tax revenue.

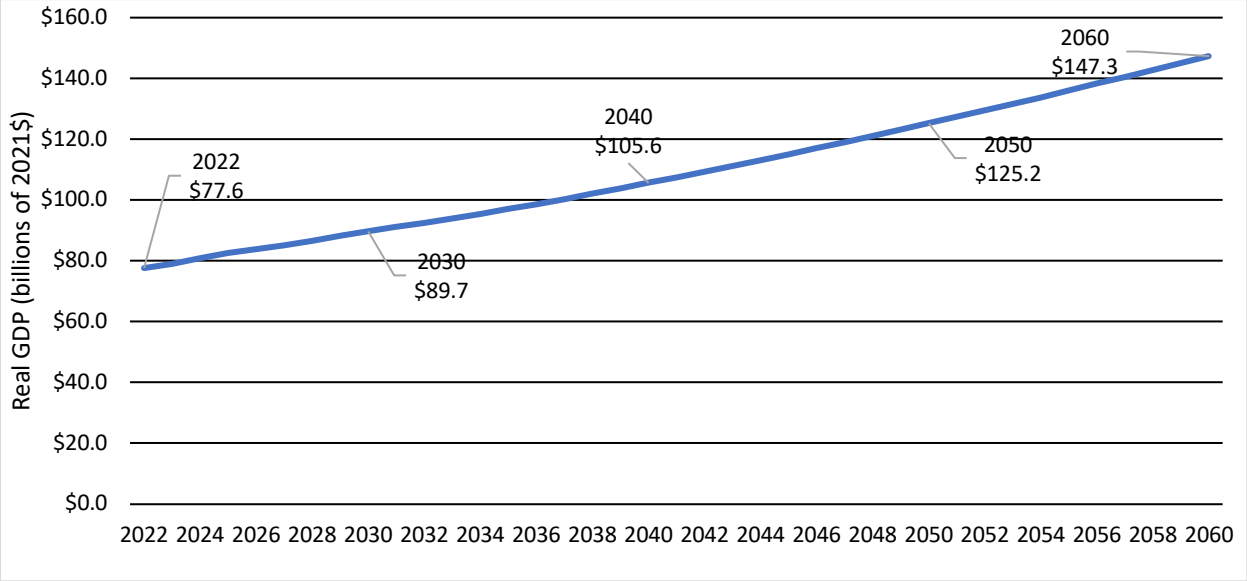
Figure 3.1.21 NSJV Real GDP (millions of 2017$) (2018-2022)



Source: Bureau of Economic Analysis, Real GDP by County (CAGDP9) Updated: December 7, 2023.

Figure 3.1.21 reports trends in Real GDP growth, it shows the impact of the pandemic on the NSJV in 2020 with a 1.7% contraction in 2020 followed by 5.5% growth in 2021 as restrictions eased. Details in Appendix 3.1.C show that economic growth in the region was led by San Joaquin County which saw 7.7% real growth between 2018 and 2022, in contrast Merced County experienced 1.1% real growth in this period, and Stanislaus saw only slightly better with 2.8% growth.

Figure 3.1.22 NSJV Real GDP (millions of 2021$) Forecast



Source: Center for Business and Policy Research NSJV Population Projections Released: March 2022.

Figure 3.1.22 shows a forecast that real regional GDP is expected to grow by some 1.9 times 2022 levels by 2060, which, in terms of GDP per capita, equates to a level in 2060 1.5 times that of 2022. Growth is expected to average 1.9% per year in the period from 2022 to 2030. That growth will slow to 1.7% annually during the 2030s and 2040s. It will then slow further to 1.6% during the 2050s as population and employment growth slow.

Trade Flows

Trade flows are an important indicator of economic connectedness and market areas. The tables below show the value of trade from the NSJV to other parts of California and other States by industry. Appendix 3.1.C reports trade flows by California County and State of Origin/Destination.

Table 3.1.27 NSJV Exports to Other California Counties by Industry (2022)

31-33 - Manufacturing	$14,837,740,178
48-49 - Transportation and Warehousing	$5,657,653,367
11 - Agriculture, Forestry, Fishing and Hunting	$2,225,257,370
42 - Wholesale Trade	$857,534,231
44-45 - Retail Trade	$731,301,731
56 - Administrative & Support, Waste Management & Remediation Services	$428,360,393
72 - Accommodation and Food Services	$324,520,320
81 - Other Services	$234,065,550
52 - Finance and Insurance	$203,189,030
62 - Health Care and Social Assistance	$127,343,323
23 - Construction	$106,859,747
54 - Professional, Scientific, and Technical Services	$93,555,902
51 - Information	$81,037,855
9A - Government Enterprises	$73,053,644
53 - Real Estate and Rental and Leasing	$38,290,260
21 - Mining, Quarrying, and Oil and Gas Extraction	$29,638,060
71 - Arts, Entertainment, and Recreation	$26,483,059
61 - Educational Services	$18,560,233
22 - Utilities	$2,378,504
55 - Management of Companies and Enterprises	$1,248,084
Source: IMPLAN Input-Output Model Estimates	

Table 3.1.28 NSJV Exports to Other States by Industry (2022)

31-33 - Manufacturing	$8,320,758,837
11 - Agriculture, Forestry, Fishing and Hunting	$2,198,930,334
42 - Wholesale Trade	$1,380,310,894
62 - Health Care and Social Assistance	$589,114,834
22 - Utilities	$235,206,712
72 - Accommodation and Food Services	$160,367,091
48-49 - Transportation and Warehousing	$150,101,003
93 - Non-NAICS	$101,205,822
56 - Administrative and Support and Waste Management and Remediation Services	$95,418,163
44-45 - Retail Trade	$88,378,745
54 - Professional, Scientific, and Technical Services	$52,246,582
9A - Government Enterprises	$12,189,683
Source: IMPLAN Input-Output Model Estimates	

Infrastructure

Regional infrastructure is an important historic and contemporary asset for the NSJV. The NSJV's infrastructure's development has played a pivotal role in shaping its economic and social landscape. Historically, the region's growth and prosperity have been closely tied to the evolution of its infrastructure, which facilitated agricultural development, urbanization, and connectivity to larger markets.

In the early days, the development of water infrastructure was crucial. The construction of irrigation systems transformed the North San Joaquin Valley from a semi-arid region into one of the most productive agricultural areas in the world. This shift not only boosted the agricultural economy but also supported population growth and urban development. Additionally, the development of transportation infrastructure, including roads and later highways, was vital. Roads like State Route 99 and Interstate 5 played significant roles in connecting the region's agricultural centers to the rest of California and beyond, enabling efficient movement of goods and services.

In later decades of the 20th Century the expansion of rail and port infrastructure further propelled the region's economic growth. The Port of Stockton, for example, became an essential asset, providing a vital link for exporting commodities and importing necessary goods. In contemporary times, the importance of infrastructure in the North San Joaquin Valley continues to be paramount. Emerging opportunities such as the Castle Commerce Center in Merced County represent further development of these assets. However, it is important to recognize the context in which these assets are being developed and, in this regard, Table 3.1.29 highlights the critical challenge all businesses in California face in terms of comparatively high business costs. According to this estimate of business costs from IHS Markit, out of 381 Metropolitan Statistical Areas (MSA) in the U.S.A. Merced (Merced County) ranked 45th highest, Modesto (Stanislaus County) ranked 27th, and Stockton-Lodi (San Joaquin County) ranked 26th most expensive. While this does represent a challenge in terms of national cost competitiveness, it does suggest that compared to many other regions across California the NSJV may have advantageous cost competitiveness.

Table 3.1.29 Business Cost Index, Total, US Average = 100 (2022)

Rank	Metropolitan Statistical Area	Total	Labor	Real Estate
2	San Francisco-Oakland-Hayward, CA (MSA)	126.4	115.6	225.3
3	San Jose-Sunnyvale-Santa Clara, CA	123.5	110.9	246.9
4	San Diego-Carlsbad, CA	121.7	112.1	194.1
7	Los Angeles-Long Beach-Anaheim, CA (MSA)	117.2	110.7	133.1
8	Salinas, CA	116.6	109.7	138.0
9	Santa Maria-Santa Barbara, CA	116.4	109.0	145.0
10	Oxnard-Thousand Oaks-Ventura, CA	116.1	110.3	119.5
12	Santa Cruz-Watsonville, CA	115.7	108.5	139.7
13	Napa, CA	115.3	110.3	104.0
15	Santa Rosa, CA	114.3	108.9	108.5
17	San Luis Obispo-Paso Robles-Arroyo Grande, CA	113.7	108.6	101.0
19	Vallejo-Fairfield, CA	113.5	107.6	113.0
20	Sacramento--Roseville--Arden-Arcade, CA	111.8	105.5	114.6
24	Riverside-San Bernardino-Ontario, CA	109.1	103.4	98.7
26	Stockton-Lodi, CA	108.2	103.4	81.9
27	Modesto, CA	108.1	102.5	95.6
34	Chico, CA	107.0	101.4	92.8
37	Yuba City, CA	106.1	99.6	104.3
39	Redding, CA	105.9	99.9	94.2
43	Bakersfield, CA	105.3	99.3	93.8
44	Fresno, CA	105.2	99.9	82.6
45	Merced, CA	105.0	99.3	88.5
50	Visalia-Porterville, CA	104.4	97.8	100.1

Source: IHS Markit

As infrastructure continues to be a key driver of the region's economic health, quality of life, and future prospects increasing awareness is recognizing the need to better manage environment challenges and opportunities with region as is discussed further in Section 3.2. Given the region's agricultural reliance, sustainable water management remains a critical issue, as do evolving growing conditions particularly given predicted impacts from climate change. Renewable energy infrastructure, such as solar and wind farms, also plays a growing role in the region's economic and environmental strategies, aligning with California's ambitious renewable energy goals.

Transportation and Goods Movement

As mentioned above, transportation and goods movement infrastructure in the NSJV has played a pivotal role in regional economic vitality, connectivity, and growth. While historically it has served as a critical hub for agricultural production, and it is increasingly important in the Northern California Megaregions distribution and logistics network.[17]

The NSJV's agricultural economy heavily relies on efficient transportation infrastructure to move products from fields to markets. The region is one of the most productive agricultural areas in the world, and the ability to transport goods quickly and efficiently is crucial for maintaining the freshness of produce and meeting market demands. This necessitates not only well-maintained roadways but also sophisticated logistics and distribution systems. The presence of robust transportation infrastructure enables farmers and agribusinesses to reach broader markets, both domestically and internationally, enhancing economic opportunities and regional competitiveness.

Moreover, the NSJV is strategically positioned as a central point in the Northern California Megaregion, making it an ideal location for distribution centers and logistics operations. The region's transportation network, including major highways like Interstate 5 and State Route 99, provides vital links between the San Francisco Bay Area, the Sacramento region, and Southern California. This connectivity is essential for the movement of goods across the state and beyond, highlighting the need for continuous investment and upgrades in transportation infrastructure to handle the growing traffic and to facilitate efficient goods movement.

The transportation infrastructure also plays a significant role in attracting and retaining businesses in the region. Companies, especially those in manufacturing and logistics, often prioritize locations with reliable and accessible transportation networks. Improved transportation infrastructure can lead to increased investment in the region, job creation, and overall economic growth.

In addition to roadways, other components like railways, airports, and ports also play a significant role in the region's transportation and goods movement infrastructure. The Port of Stockton, for example, is a critical asset, providing an alternative to the congested ports of Los Angeles and San Francisco for certain types of cargo.

Industrial and Commercial Property

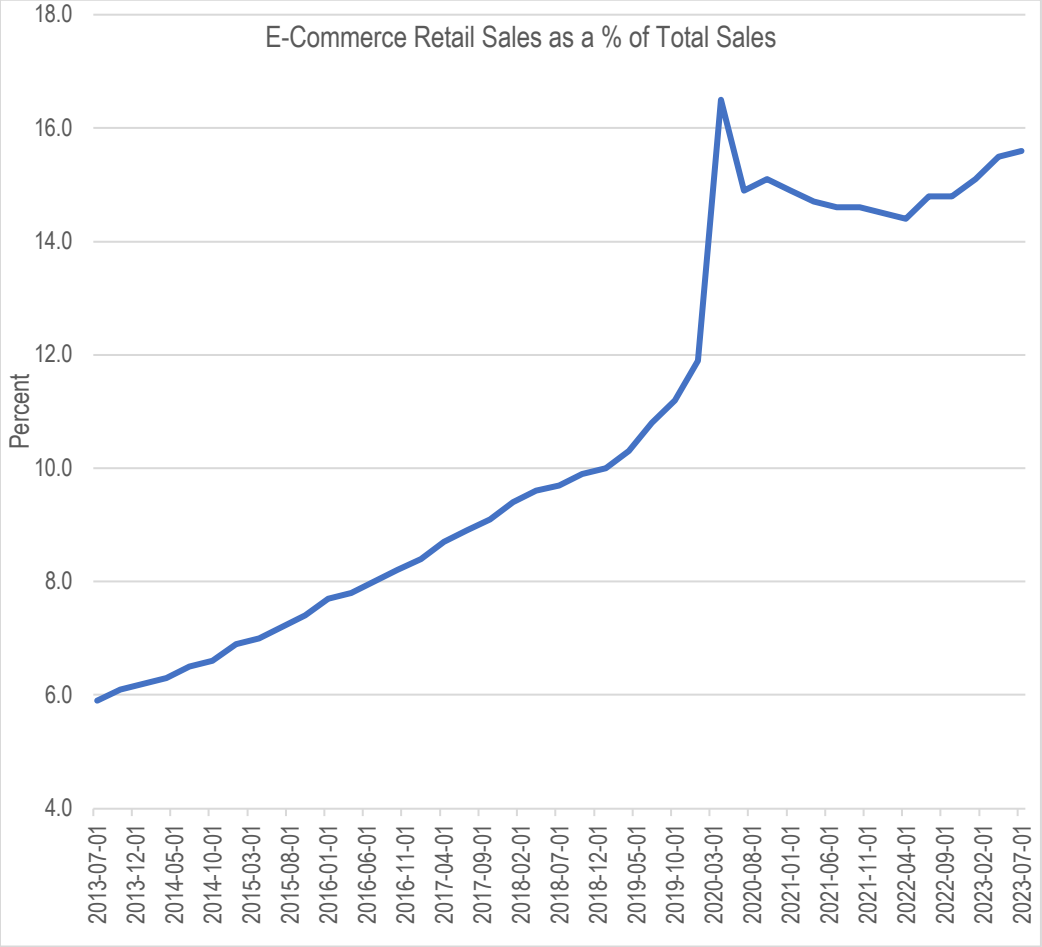
The industrial and commercial property market in the NSJV has been traditionally driven by its agricultural roots, with a significant portion of industrial properties dedicated to processing, packaging, and distributing agricultural products. Additionally, as discussed above, the region's strategic location in the heart of California makes it an attractive hub for distribution and logistics operations. This has led to an increased demand for warehouse and distribution centers, particularly those that can serve the larger Northern California market, including the San Francisco Bay Area and Sacramento. The growth of e-commerce has further fueled this demand, with companies seeking large distribution centers for efficient logistics and supply chain management.

Moreover, the North San Joaquin Valley has seen a gradual diversification of its industrial base. Light manufacturing, food processing, and renewable energy sectors are increasingly contributing to the industrial landscape. This diversification is supported by local economic development policies aimed at attracting a wider range of industrial tenants and investments to the region.

[17] See for example the Bay Area Council Economic Institute Report: http://www.bayareaeconomy.org/report/the-northern-california-megaregion/

On the commercial property front, the market is influenced by local economic factors and the consumer base. Retail spaces, office buildings, and mixed-use developments reflect the needs and growth of the local population. The retail market, in particular, has been undergoing changes with shifts in consumer behavior and the impact of online shopping. This trend is clearly seen in Figure 3.1.23 which shows e-commerce sales growth as a share of total sales. However, while this has created challenges, locally it has been an important force in the region's growing role as an inter-regional distribution hub.

Figure 3.1.23 E-Commerce Retail Sales as a Percent of Total Sales Q3-2013 to Q3-2023

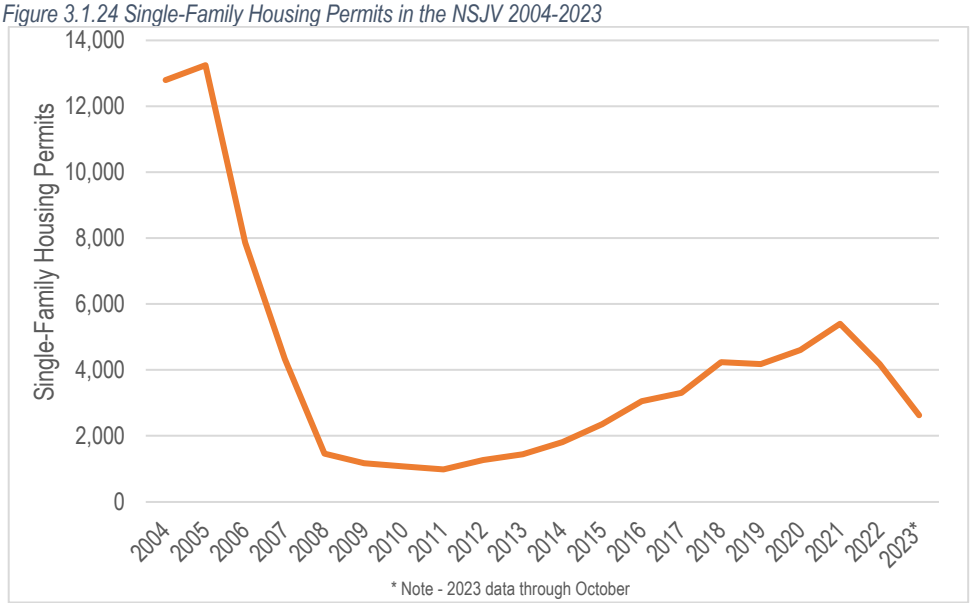


Source: U.S. Census Bureau , E-Commerce Retail Sales as a Percent of Total Sales (ECOMPCTSA)

Housing

While California state government consistently passes legislation to address a growing housing affordability crisis,[18] and the City of Stockton in the NSJV is one of thirty cities recognized with a Prohousing Designation from the California Department of Housing and Community Development (HCD),[19] housing remains a significant issue in much of California. As seen in Figure 3.1.24, the number of permits for single-family in the NSJV declined significantly within the past year, further from the peak over the last two decades around 2004.[20]

Figure 3.1.24 Single-Family Housing Permits in the NSJV 2004-2023



Source: U.S. Census Bureau Building Permits Survey

This decline in housing permits in the NSJV comes at a time when recently completed Regional Housing Needs Allocations (RHNA), as displayed in Table 3.1.15 below, show a significant need for new housing in order to alleviate extreme shortages, to reduce unaffordability, and to address inequities in access to housing. Indeed, HCD most recently determined that the NSJV requires 109,683 additional housing units by around 2030 to 2032.

Table 3.1.30 7th Cycle Regional Housing Needs Allocation in the NSJV

	Very-Low Income	Low Income	Moderate Income	Above-Moderate Income	Total
Merced County	5,516	3,780	3,930	9,394	22,620
San Joaquin County	13,293	8,344	9,231	21,851	52,719
Stanislaus County	8,410	5,821	6,132	13,981	34,344
NSJV Total	27,219	17,945	19,293	45,226	109,683
Source: California Department of Housing and Community Development					

Looking at the inadequacy of the inventory of housing in the NSJV, the Unsold Inventory Index provides a depiction of supply and demand for housing in the NSJV by displaying the amount of months it would take to sell all active housing listings in an area. Reflecting a strong demand and low supply, the unsold inventory index was 2.6 months in San Joaquin County, 2.5 months in Stanislaus County, and 2.7 months in Merced County in October 2023. Numbers

[18] See, e.g., https://www.gov.ca.gov/2023/10/11/governor-newsom-signs-package-to-streamline-housing-and-expand-tenant-protections-in-california/.
[19] See https://www.hcd.ca.gov/planning-and-community-development/prohousing-designation-program.
[20] See Appendix 3.1.C for details of multi-family housing permits, which have largely followed those of single-family permits.

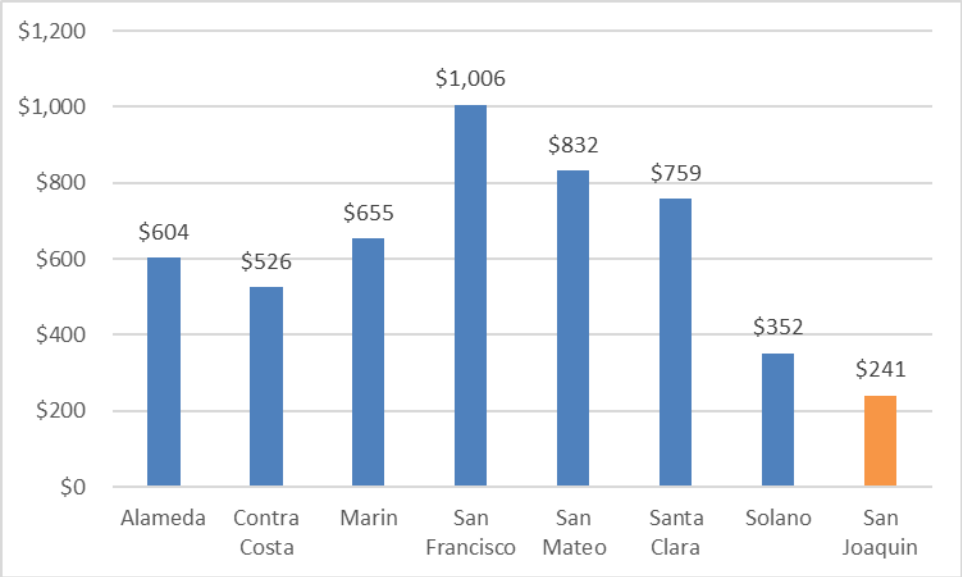
of 3 to 4 months or below are considered a very competitive market with strong demand and scarce supply, which favors sellers. Thus, with numbers regularly below 4 months, market conditions are tightening, which decreases housing affordability and accessibility in the NSJV.

Table 3.1.31 Population per Housing Unit in California and the NSJV in 2023

	Population	Housing	Persons per Housing Unit
Merced County	285,337	91,465	3.12
San Joaquin County	786,145	262,955	2.99
Stanislaus County	545,939	185,622	2.94
NSJV Total	1,617,421	540,042	2.99
California	38,940,231	14,707,698	2.65
Source: California Department of Finance Population and Housing Estimates (Report E-1 & E-1H) Released: May 1, 2023			

With 2.8 people per housing unit and a national average of 2.4, California ranked number 49 out of 50 states in terms of the number of housing units per capita in a recent report from the McKinsey Global Institute.[21] Looking at more recent figures, California now posts a slightly lower number of 2.7 people per housing units, but still well above the national average.[22] Looking at Table 3.1.31 above, each NSJV county posts people per housing unit ratios well above even that of California as a whole, which suggests an even greater need for additional housing in the NSJV than in California as a whole.

Figure 3.1.25 Median Home Price Per Square Foot (October 2023)



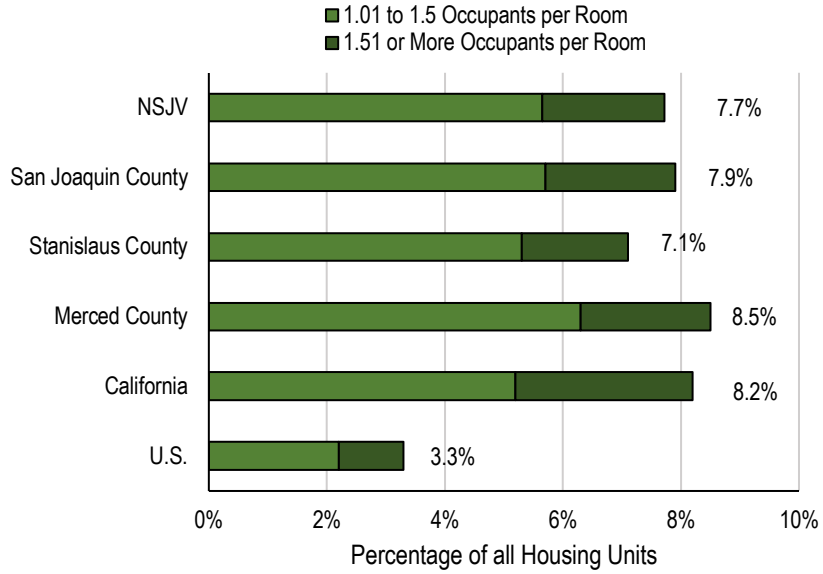
The NSJV offers affordable housing and easy access to the Bay Area's economic centers. Median owner-occupied housing unit values are far lower than any Bay Area county.

[21] See https://www.mckinsey.com/~/media/mckinsey/industries/public%20and%20social%20sector/our%20insights/closing%20californias%20housing%20gap/closing-californias-housing-gap-full-report.pdf.
[22] See https://dof.ca.gov/forecasting/demographics/estimates-e1/.

Table 3.1.32 Cost-Burdened Households in the NSJV (2016-2020)

Geography	Percentage of owners with mortgage spending more than 30% of income on housing	Percentage of renters spending more than 30% of income on housing
NSJV	**35%**	**52%**
Merced County	33%	48%
Stanislaus County	36%	52%
San Joaquin County	34%	54%
U.S.	27%	49%
California	38%	54%
Source: U.S. Census Bureau American Community Survey DP04, 5-Year Estimates		

Figure 3.1.26 High Occupancy Housing



Source: U.S. Census Bureau American Community Survey DP04, 5-Year Estimates

Financial Ecosystem

Table 3.1.33 Population per Housing Unit in California and the NSJV in 2023

Value ($M) Risk Capital Investment (2014-2023**)						
	NSJV	San Joaquin	Stanislaus	Merced	Central Valley	Sacramento
Total	228.4	136.0	31.1	61.2	872.6	12,078.4
Venture Capital	37.7	20.1	17.7	0.0	296.9	3,072.9
Seed	31.5	21.9	9.6	0.0	33.3	348.1
Angel Investors	1.4	0.9	0.5	0.0	8.2	42.3
SBIR/STTR Grants	149.0	84.4	3.4	61.2	527.1	8,590.4
Acceleration	8.8	8.8	0.0	0.0	7.1	24.6
**As of November 22, 2023	Source: Pitch Book					
Note: SBIR - Small Business Innovation Research and STTR - Small Business Technology Transfer						

Table 3.1.34 Population per Housing Unit in California and the NSJV in 2023

Deal Count Risk Capital Investment (2014-2023**)						
	NSJV	San Joaquin	Stanislaus	Merced	Central Valley	Sacramento
Total	97	59	24	14	186	824
Venture Capital	10	7	3	0	15	194
Seed	8	5	3	0	19	138
Angel Investors	11	6	5	0	6	59
SBIR/STTR Grants	64	37	13	14	124	324
Acceleration	4	4	0	0	22	109
**As of November 22, 2023	Source: Pitch Book					
Note: SBIR - Small Business Innovation Research and STTR - Small Business Technology Transfer						

Sacramento County and the Central San Joaquin Valley (Madera, Fresno, Kings, and Tulare counties) offer useful comparisons for the NSJV's venture capital investment. For the 5-year period from 2018 to 2022, the NSJV had only a quarter (25.5%) of the total venture capital investment of the Central San Joaquin Valley and just 2.5% of Sacramento County's total. Still, 2020 and 2021 were encouraging years for the NSJV as it attracted $52 million and $48 million, respectively. Most of the NSJV's venture activity occurs in San Joaquin County, though Merced County and Stanislaus County have occasionally had substantial annual totals.

Between 2018 and 2022, the NSJV had only a quarter (25.5%) of the total venture capital investment of the Central San Joaquin Valley and just 2.5% of Sacramento County's total.

Figure 3.1.27 Venture capital deal totals (in $millions), NSJV, Central SJV, and Sacramento County, 2014-2022

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Merced County	0.42	1.56	23.65	4.35		0.24	18.25	12.77	
San Joaquin County	16.33	10.74	12.73	13.48	13.54	10.79	31.80	20.56	5.92
Stanislaus County	2.66	0.57	0.35	0.01	2.61	7.00	1.95	15.08	0.78
NSJV	**19.41**	**12.87**	**36.73**	**17.84**	**16.15**	**18.03**	**52.00**	**48.41**	**6.70**
Central SJV	12.23	120.18	25.80	61.47	52.40	106.62	173.05	189.01	32.77
Sacramento County	154.85	1522.5	3,823.57	748.03	771.69	791.04	360.22	3,252.52	405.38

Source: PitchBook

The NSJV had 56 venture capital deals between 2018 and 2022, 46% of the number of deals in the Central San

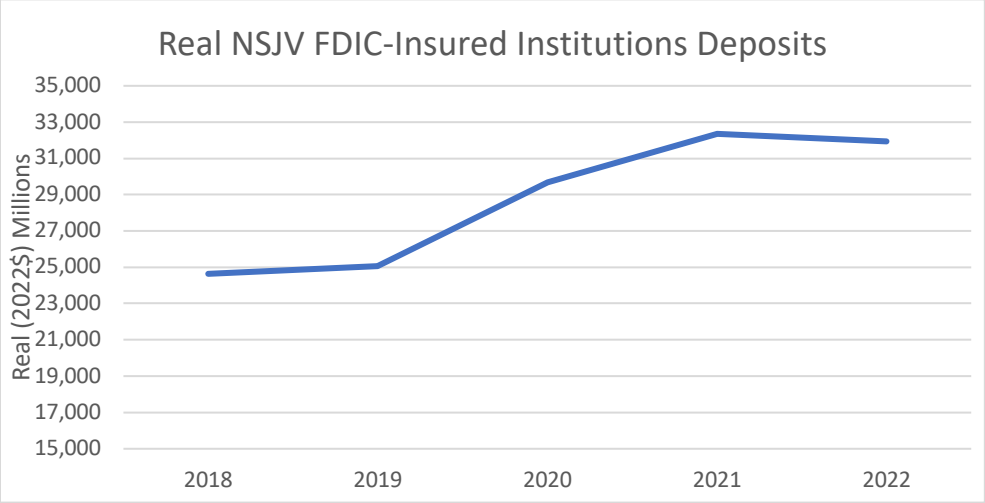
Joaquin Valley (122), and 10% of the number of deals in Sacramento County (561).

Figure 3.1.28 Venture capital deal totals, NSJV, Central SJV, and Sacramento County, 2014-2022

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Merced County	1	3	1	2		1	2	4	
San Joaquin County	4	9	6	9	3	6	12	8	5
Stanislaus County	2	2	5	1	3	1	4	5	2
NSJV Total	**7**	**14**	**12**	**12**	**6**	**8**	**18**	**17**	**7**
Central SJV	11	24	19	24	28	23	27	33	11
Sacramento County	58	104	100	99	95	108	110	145	103

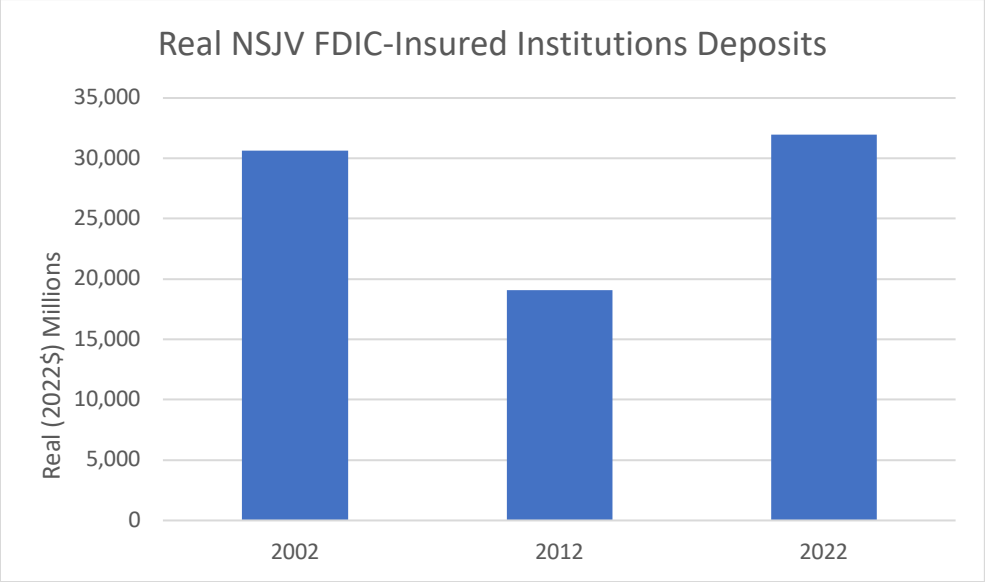
Source: PitchBook

Figure 3.1.29 Real FDIC-Insured Deposits in the NSJV (2018-2022)



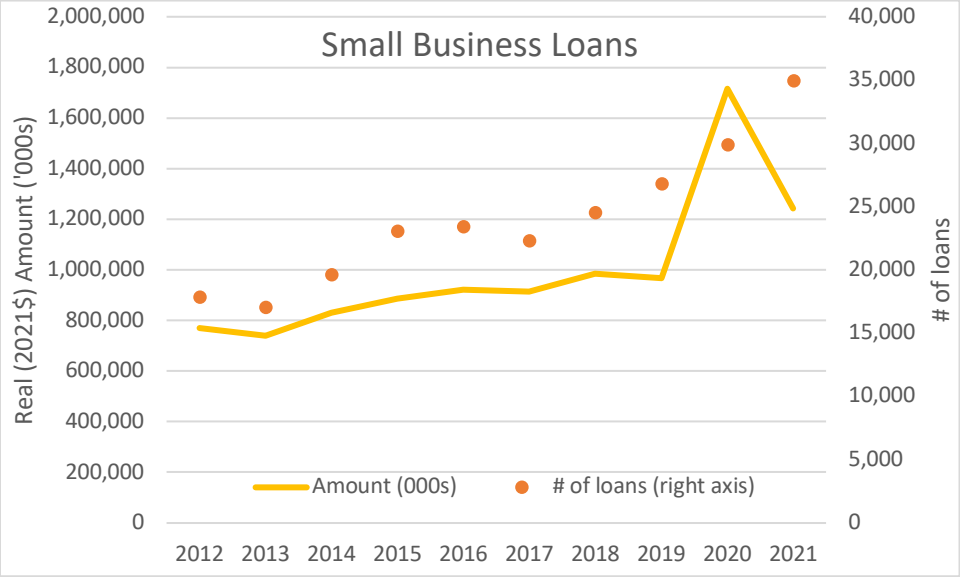
Source: Federal Deposit Insurance Corporation (FDIC)

Figure 3.1.30 Real FDIC-Insured Deposits in the NSJV (2018-2022)



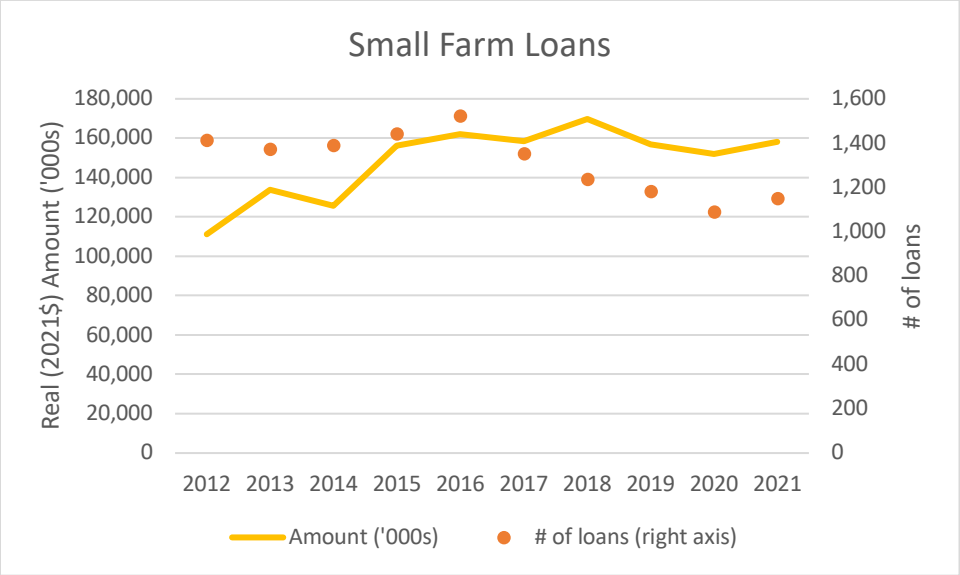
Source: Federal Deposit Insurance Corporation (FDIC)

Figure 3.1.31 Small Business Loans in the NSJV (2012-2021)



Source: Federal Financial Institutions Examination Council (FFIEC)

Figure 3.1.32 Small Farm Loans in the NSJV (2012-2021)



Source: Federal Financial Institutions Examination Council (FFIEC)

Innovation & Entrepreneurship

The research considers several aspects of business dynamism to show what potential the NSJV and its industries may have for future growth. An analysis of the U.S. Census Statistics of U.S. Businesses describes patterns of business startups in comparison with business closures in the NSJV's industry sectors. The research also presents findings from the National Science Foundation on patent activity and trends.

Business Starts and Exits

According to the U.S. Census, between 2,000 and 2,200 businesses started yearly in the NSJV between 2016 and 2020. The analysis compares startup intensity in the NSJV to the state by dividing the number of business "starts" by the population. The measure is an indicator of the amount of entrepreneurial activity taking place in the region. Accounting for the population growth, the startup intensity dipped between 2016 and 2017 in the NSJV and slightly increased after 2018. The data suggests that on a per capita basis, the NSJV creates about 100 fewer new businesses annually than the state.

Table 3.1.35 Business starts per 100,000 residents, NSJV and California, 2016-2020

Region/Year	2016	2017	2018	2019	2020	5-year average	Difference NSJV-CA
NSJV	135.6	126.2	127.9	137.9	139.7	133.4	-98.7
California	235.0	228.4	220.6	230.5	246.2	232.1	

Source: U.S. Census Statistics of U.S. Businesses

The analysis made the same per capita comparison by industry sector. (The data is not detailed enough to analyze industry clusters, so industry sectors are used instead.) The data shows that the differences in startup intensity vary by industry sector. Still, the NSJV trails the state in all but 2 categories: Transportation and Warehousing and Agriculture, Forestry, Fishing, and Hunting. The most significant gap is in Professional, Scientific, and Technical Consulting Services, where there are, on average, about 27 more new businesses per capita than in the NSJV.

Construction, retail, hospitality, health care, and transportation account for the largest numbers of business starts in the NSJV. Over a 5-year period, the region had just under 60% the rate of the state's startup intensity on a per capita basis.

The analysis also compares the number of new businesses to those that closed during the year. (The study is not a per capita measure.) The analysis makes the following comparisons: (a) businesses that started as a percentage of all companies (establishments), compared to (b) the number of businesses that closed as a percentage of all companies. The industry sectors in Exhibit X with the most significant positive percentages have more businesses that started than closed as a percentage of all businesses. Similar to the previous exhibits, the analysis compares the NSJV to California.

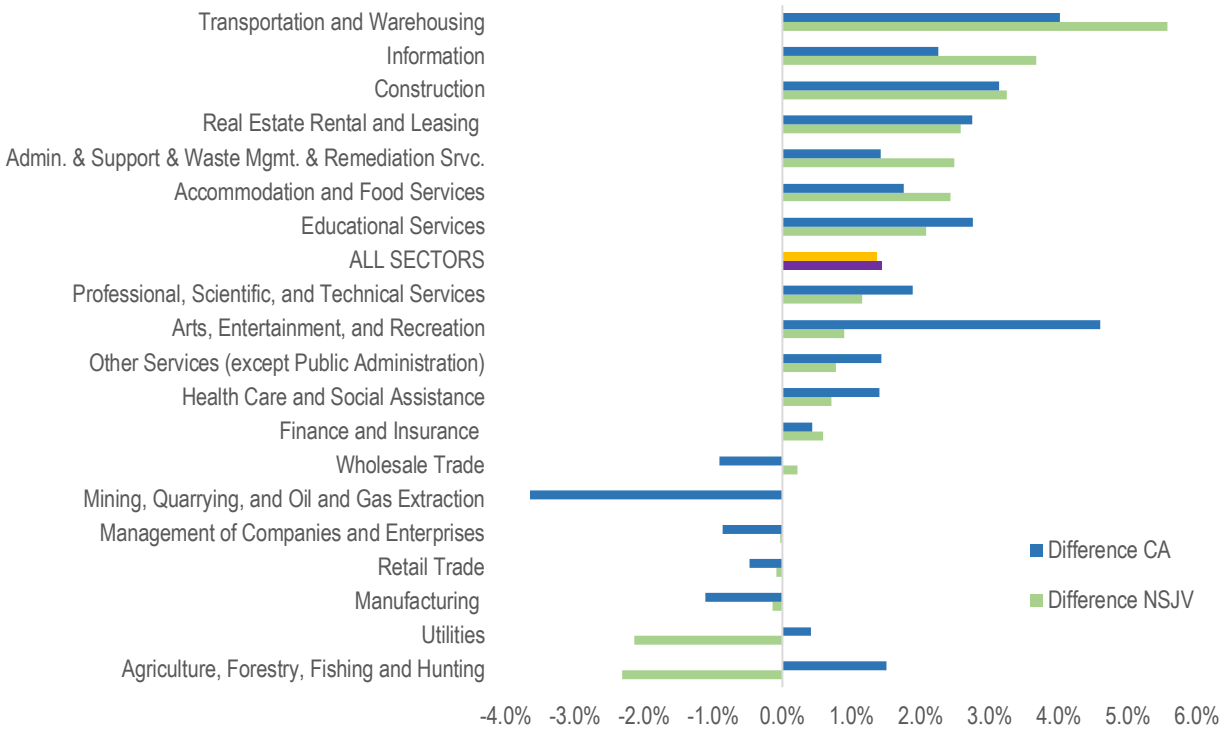
The NSJV had the most significant net gain (as a percentage of the total) in Transportation and Warehousing, Information, Construction, Real Estate Rental, and Leasing. The NSJV had an approximate parity in starts and closures in manufacturing, a positive result compared to the state, which had net business reductions. The NSJV saw more businesses close than start in Agriculture, Forestry, and Fishing and Hunting and Utilities. The net losses in the latter two sectors were more significant than at the state level (again as a percentage of all businesses).

Table 3.1.36 Business starts per 100,000 residents, NSJV and California, by Industry 2016-2020

NAICS	Description	NSJV	California	Difference NSJV:CA
23	Construction	18.6	24.0	-5.3
44-45	Retail	16.0	20.7	-4.7
72	Accommodation & Food Services	14.2	22.4	-8.2
62	Health Care & Social Assistance	13.7	23.2	-9.6
48-49	Transportation & Warehousing	12.2	8.9	3.3
81	Other Services (exc. Public Administration)	12.2	18.2	-6.0
54	Professional, Scientific & Technical Services	9.6	36.4	-26.7
56	Admin.& Suppt. & Waste Mgmt. & Remedn.	8.5	12.7	-4.2
53	Real Estate Rental & Leasing	8.0	15.0	-7.0
52	Finance and Insurance	6.3	11.3	-4.9
42	Wholesale Trade	4.5	11.3	-6.8
31-33	Manufacturing	3.6	6.8	-3.1
71	Arts, Entertainment & Recreation	1.8	7.9	-6.1
51	Information	1.7	7.8	-6.0
61	Educational Services	1.4	3.9	-2.5
11	Agriculture, Forestry, Fishing &Hunting	0.9	0.5	0.3
55	Management of Companies & Enterprises	0.2	0.8	-0.6
21	Mining, Quarrying & Oil & Gas Extraction	0.0	0.1	-0.1
22	Utilities	0.0	0.2	-0.2
	Total	**133.4**	**232.1**	**-98.7**

Source: U.S. Census Statistics of U.S. Businesses

Figure 3.1.33 Difference, births-deaths (as a % of all establishments in each sector), NSJV and California, 5-year avg. 2016-2020

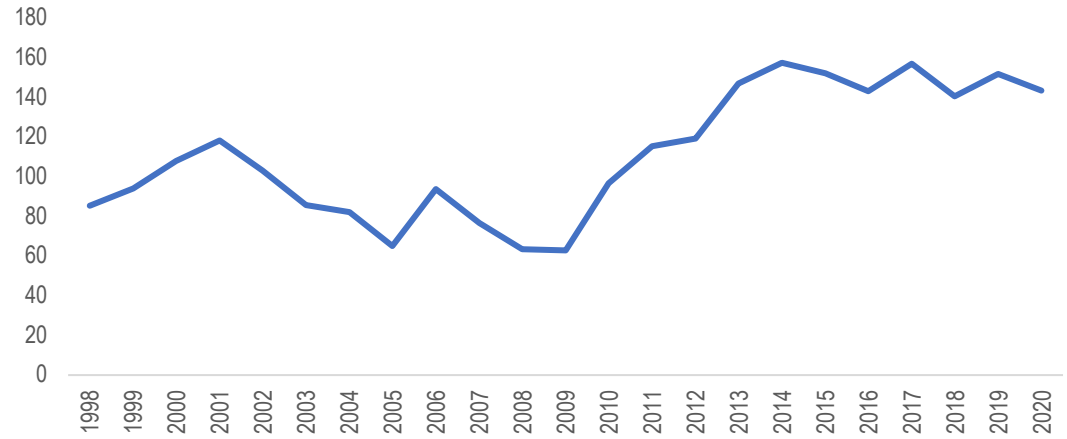


Source: U.S. Census Statistics of U.S. Businesses

Patent Activity

The NSJV's patent activity increased after 2009 (**Error! Reference source not found.**). Regional entities registered a high of 158 patents in 2014. The region has not had fewer than 140 patents annually since 2012.

Figure 3.1.34 Total Utility Patents, NSJV, 1998-2020



Source: National Science Foundation, National Center for Science and Engineering Statistics

An analysis of the concentration of patents by technical field compared to the nation reveals the region has specializations in several areas. (The data combines more than 20 years of patent data.) The region has concentrations of patents in Medical Technology, Civil Engineering, Other Special Machines, Chemical Engineering, and Handling. The data indicates several technical fields have larger numbers of patents but lack specialization. These include Computer Technology, Digital Communication, Electrical Machinery, Semiconductors, and Audio-Visual Technology. The colored bars in Exhibit X indicate those technical fields where the NSJV's patent location quotient surpasses 1.0 (the national average).

The data suggests the NSJV has more patent specialization in several key technical fields, including Basic Materials Chemistry, Chemical Engineering, Civil Engineering, Environmental Technology, Food Chemistry, Furniture, Handling, Machine Tools, Medical Technology, and Other Special Machines.

Table 3.1.37 Top Fields of Patents in the NSJV by number 1998-2020

	Number	NSJV %	Regional Concentration
Computer technology	237	9.26%	0.69
Medical technology	217	8.49%	1.12
Digital communication	179	6.98%	0.88
Civil engineering	132	5.15%	1.75
Transport	131	5.10%	1.35
Other special machines	126	4.91%	1.68
Chemical engineering	125	4.89%	2.81
Handling	123	4.79%	2.56
Electrical machinery, apparatus, energy	112	4.37%	0.92
Semiconductors	108	4.20%	1.04

Source: National Science Foundation, National Center for Science and Engineering Statistics

The analysis in Table 3.1.38 displays the NSJV's patent concentration relative to the national average, suggesting where the NSJV's patent activity may reflect regional specializations. Chemical Engineering, Handling, and Civil

Engineering have significant patent totals and location quotients. Several of the categories of patents with higher location quotients do not rank at the top of the NSJV's total patents for the more than 20-year period measured. Food Chemistry has a location quotient of 2.7, and 54 patents. Basic Materials Chemistry has a location quotient of 1.9 and has 75 patents. Machine Tools has a location quotient of 1.5 and 62 patents. Environmental Technology has a location quotient of 1.4 and 36 patents.

Table 3.1.38 Top Fields of Patents in the NSJV by concentration 1998-2020

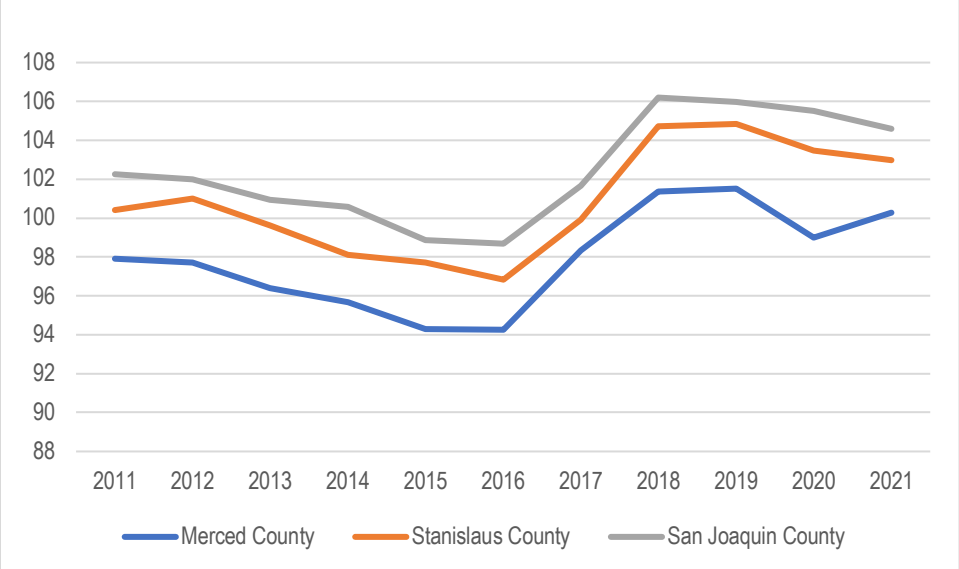
	Number	NSJV %	Regional Concentration
Chemical engineering	125	4.89%	2.81
Food chemistry	54	2.11%	2.71
Handling	123	4.79%	2.56
Basic materials chemistry	75	2.91%	1.88
Civil engineering	132	5.15%	1.75
Other special machines	126	4.91%	1.68
Machine tools	62	2.41%	1.45
Environmental technology	36	1.39%	1.41
Transport	131	5.10%	1.35
Other consumer goods	59	2.31%	1.23

Source: National Science Foundation, National Center for Science and Engineering Statistics

Prices and Inflation

Regional price parities (RPPs) measure the differences in price levels across states and metropolitan areas for a given year and are expressed as a percentage of the overall national price level. Allows comparisons of buying power across the 50 states and the District of Columbia, or from one metro area to another, for a given year. Price levels are expressed as a percentage of the overall national level.[23] These estimates suggest that compared to the nation as a whole costs in San Joaquin County are 5% higher, costs in Stanislaus County are 3% higher, and costs in Merced County are similar. Appendix 3.1.C reports a series of goods/services specific indices.

Figure 3.1.35 Regional Price Parities (all items, NSJV, 2011-2022



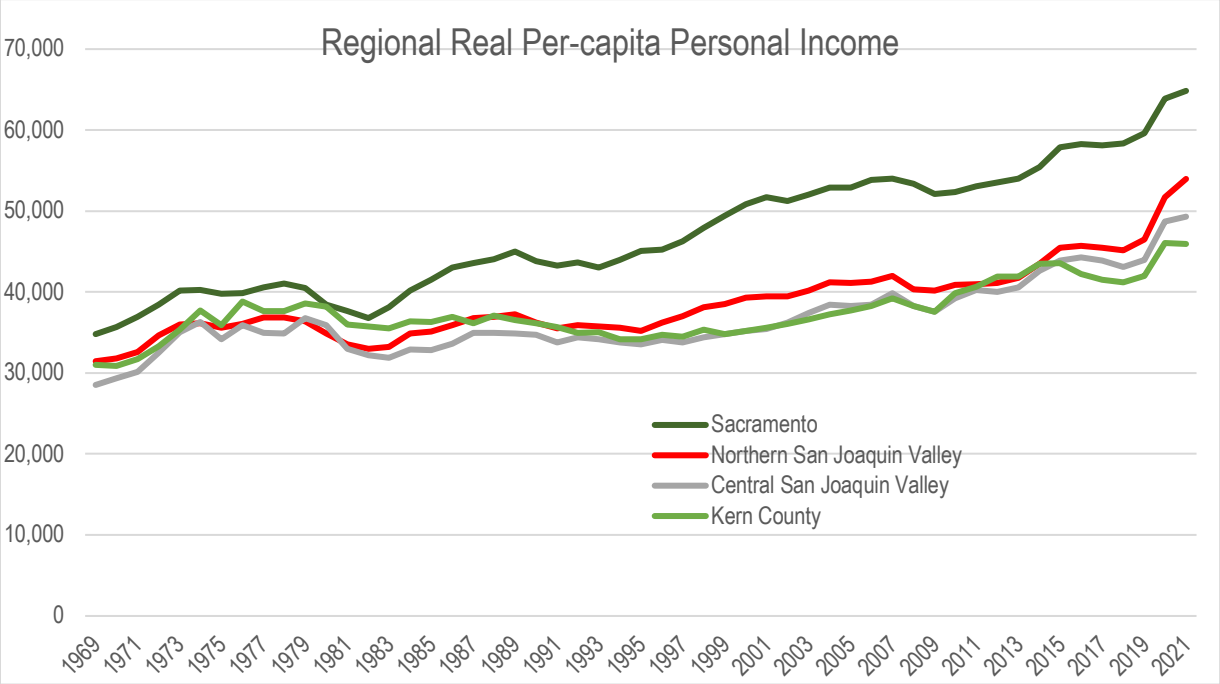
Source: Bureau of Economic Analysis, Regional Price Parities by MSA (MARPP) Updated: November 16, 2023.

[23] For further details see: https://www.bea.gov/resources/learning-center/what-to-know-prices-inflation

Income

Income is an important measure of a community's standard of living. As was discussed in Section 3.1.2 a range of stimulus programs expanded unemployment benefits, food assistance and housing assistance, deferred student loan payments, and provided direct cash payments to support income and reduce some of the financial impacts of the COVID-19 pandemic. The data in Figure 3.1.36 suggests that, at least in aggregate, these programs were successful in preventing significant declines in real per-capita personal income. Details in Appendix 3.1.C show that in 2021 the NSJV ranked ninth among the California Jobs First regions in terms of real per-capita income, but it ranked second only to the San Francisco Bay Area in terms of real per-capita income growth over the period from 2017 to 2021. That growth was largely led by San Joaquin County which experienced real per-capita personal income in growth of $11,360 (25%) between 2017 and 2021, which was significantly greater than $6,170 (13%) growth in Stanislaus County, and the $5,320 (13%) growth in Merced County.

Figure 3.1.36 Regional Real (2021$) Per Capita Personal Income



Source: Bureau of Economic Analysis, Personal Income and Employment (CAINC4) Updated: August 9, 2023.

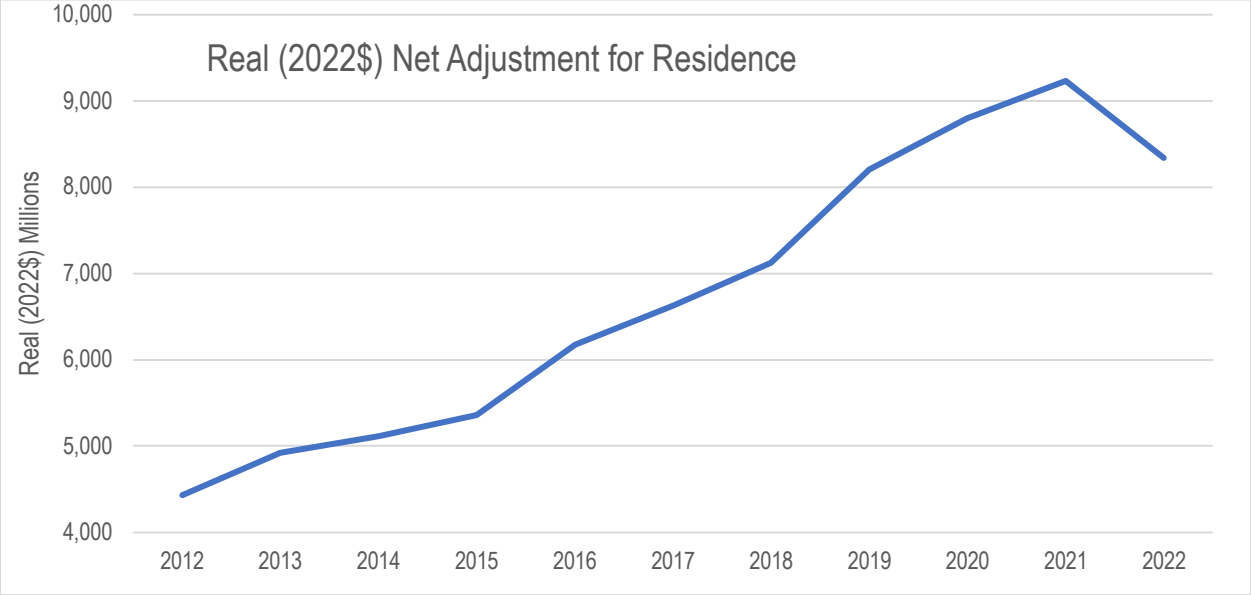
While further research is needed to understand the dynamics driving this distinct growth in personal income an important component appears to be linked to growing inter-regional linkages, which seems to be reflected in the "net adjustment for residence" component of income. This component is shown in Figure 3.1.37 and consists of the difference between inflows of earnings (payments to workers that reside in an area but work outside that area) and outflows of earnings (payments to workers that work in an area but reside outside that area). Given the nature of this component of income, it is linked to evolving patterns of intra- and inter-regional commuting, which is discussed further in the subsection on Commuting below.

In real terms, between 2012 and 2022 each of the NSJV's counties has seen significant growth in their inflow of earnings:

- Merced County experienced real (2022$) growth in its inflow of earnings of $1.0 billion, or a 69% increase.
    - Based on commuter data it seems that this growth in inflows of earnings may be associated with the significant number of intra-regional out-commuters to Stanislaus County as well as inter-regional commuters to Santa Clara County along with smaller numbers of commuters to Madera, San Joaquin and Fresno counties.

- Stanislaus County experienced real (2022$) growth of inflow of earnings of $1.4 billion, or a 39% increase.
    - Based on commuting data it seems that this growth in inflows of earnings may be associated with the significant number of intra-regional out-commuters to San Joaquin and a lesser extent Merced as well as inter-regional commuters to Alameda County.
- San Joaquin County experienced real (2022$) growth of inflow of earnings of $3.04 billion, or a 69% increase.
    - Based on commuter data it seems that this growth in inflows of earnings may be associated with the significant number of inter-regional in-commuters to Alameda as well as Contra Costa, Santa Clara, and Sacramento, and intra-regional commuters to Stanislaus along with inter-regional commuters San Francisco and San Mateo counties.
- Notably real inflows increased every year in each county during this period except between 2021 and 2022 both Stanislaus County (-1.9%) and San Joaquin County (-7.2%) experienced a decline. This recent decline may be related to changing commuting and migration patterns and as such is an area that deserves additional interrogation.

Figure 3.1.37 Net Adjustment for Residence



Source: Bureau of Economic Analysis, Gross Floss of Earnings (CAINC91) Updated: November 16, 2023.

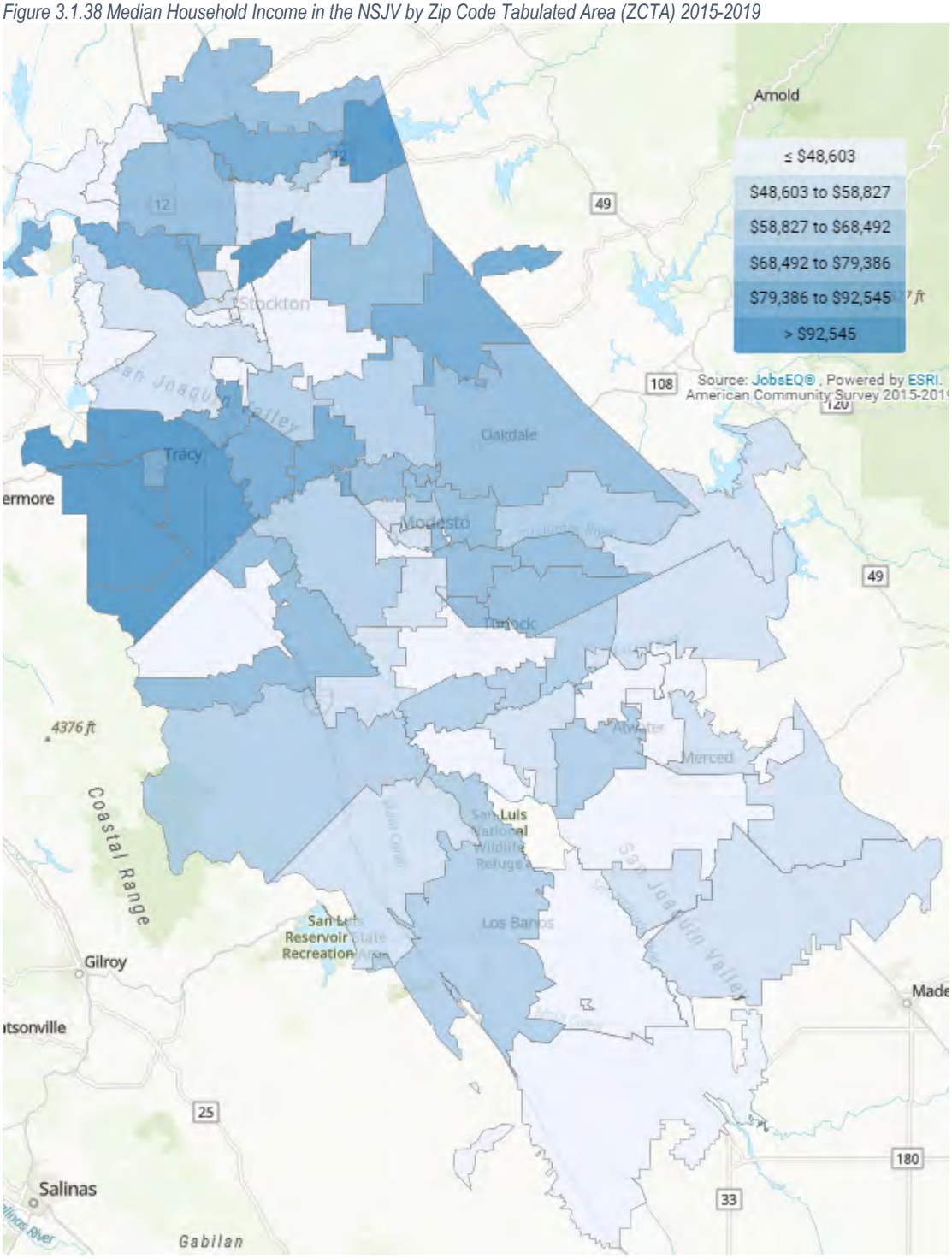
While each county has also seen increasing outflows of earnings between 2012 and 2022, given the growth in the net adjustment for residence it is natural that these were significantly less than the growth in inflows:

- Merced County experienced the smallest real (2022$) growth in its outflow of earnings, $0.1 billion, a 7% increase.
    - Based on commuting data it seems that this moderate growth in outflows of earnings may be associated with in-commuters from Stanislaus and a lesser extent Madera and Fresno counties.
- San Joaquin County experienced real (2022$) growth in its outflow of earnings equal to $0.7 billion, a 17% increase.
    - Based on commuting data it seems that this growth in outflows of earnings may be associated with the significant number of intra-regional in-commuters from Stanislaus County as well as inter-regional commuters to Sacramento County and to a lesser degree Contra Costa County.
- Stanislaus County's experience was distinct as during this period real (2022$) outflows of earnings grew by of $1.2 billion, a 59% increase accounting for 83% of its growth in inflows and contributing a muted increase in net adjustment for residence.
    - Based on commuting data it seems that this growth in outflows of earnings may be associated with

the significant number of intra-regional in-commuters from Merced and San Joaquin counties.

Given that small number of very wealthy individual could skew the earnings data it is necessary to be cautious with associating too much certainty to the source of these income flows, but given that the region's net adjust for residence totaled $8.4 billion in earnings in 2022, equivalent to 24% of all wages and salaries paid within the region, this appears to be a very significant dimension to NSJV's residents standard of living.

Figure 3.1.38 Median Household Income in the NSJV by Zip Code Tabulated Area (ZCTA) 2015-2019

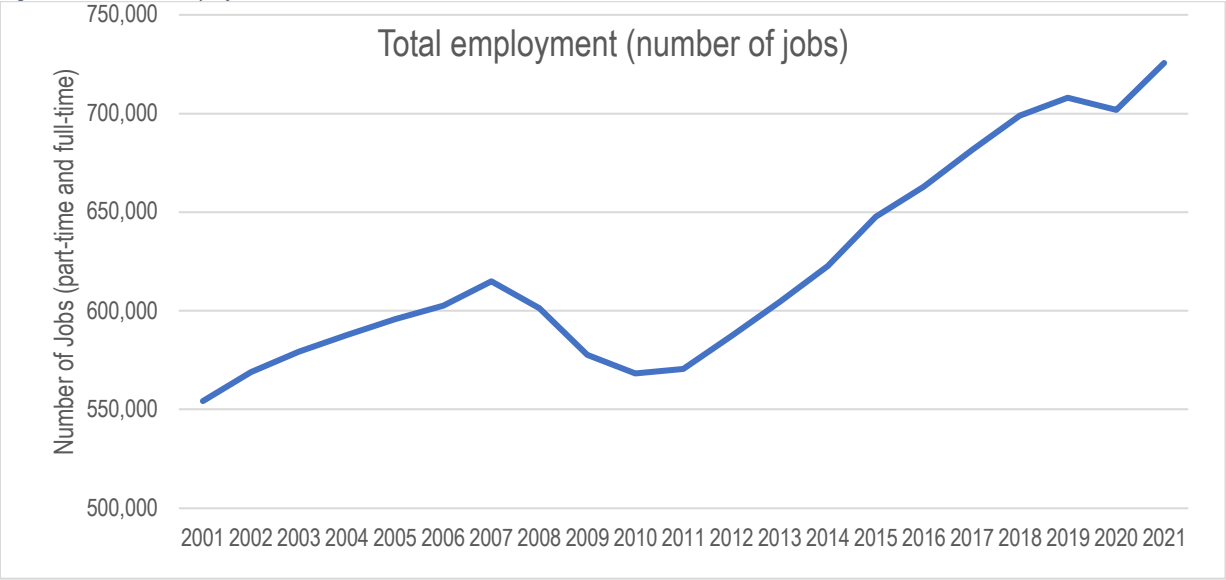


Source: Jobs EQ based on U.S. Census Bureau American Community Survey, B19013 5-year estimates

Employment

Employment in the NSJV has been relatively robust and appears well positioned to continue to grow.

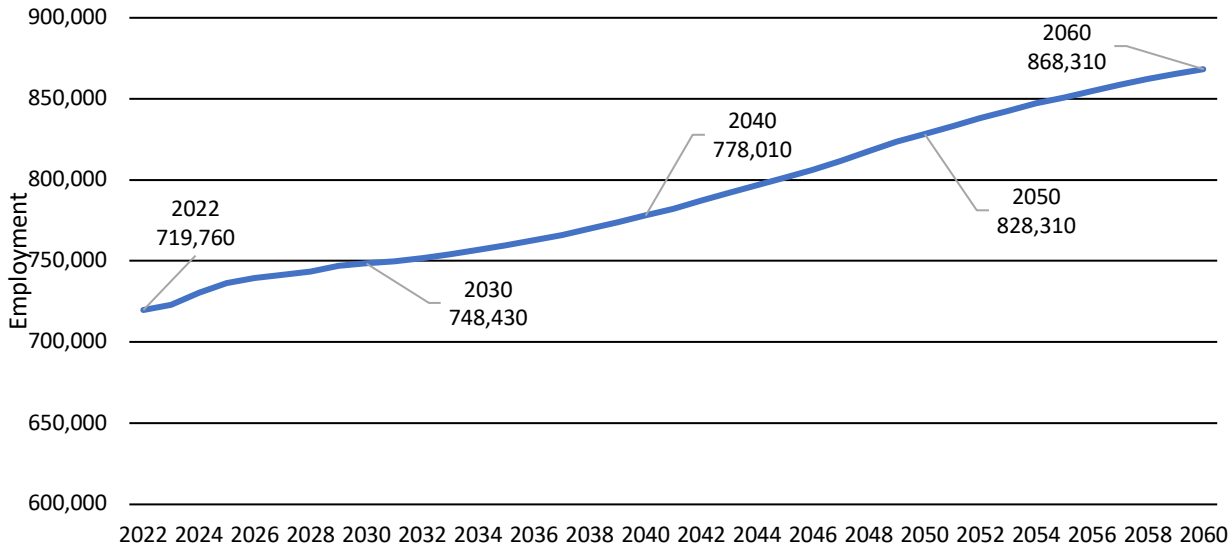
Figure 3.1.39 Total Employment



Source: Bureau of Economic Analysis, Total Full-time and Part-Time Employment (CAEMP25N) Updated: November 16, 2022.

The CBPR employment forecast for the three counties of the NSJV is reported in Figure 3.1.40, it foresees 2.3% employment growth between 2022 and 2025, followed by 1.6% growth between 2025 and 2030. Longer-term employment is forecast to grow by 3.4% in the 2030s, 5.8% in the 2040s, and 4.5% in the 2050s, with total regional employment in excess of 868,000 in 2060.

Figure 3.1.40 NSJV Employment Forecast



Source: Center for Business and Policy Research NSJV Population Projections Released: March 2022.

Table 3.1.39 Employment in the NSJV by Sector (2012-2022)

Description	2022	Change 2012-2022	% Change	Regional Concentration
Transportation and warehousing	90,243	58,037	64%	2.2
Health care and social assistance	88,824	17,378	20%	1.0
Local government	75,785	11,790	16%	1.5
Retail trade	75,349	9,144	12%	1.1
Manufacturing	58,108	8,964	15%	1.2
Accommodation and food services	52,966	16,653	31%	1.0
Other services (except government and government enterprises)	41,183	7,766	19%	1.0
Construction	40,376	15,577	39%	0.9
Administrative and support and waste management and remediation services	40,025	9,018	23%	0.8
Real estate and rental and leasing	31,962	8,439	26%	0.7
Farm employment	27,866	903	3%	3.0
Finance and insurance	27,315	7,259	27%	0.6
Professional, scientific, and technical services	25,209	3,870	15%	0.4
Wholesale trade	22,596	263	1%	0.9
Forestry, fishing, and related activities	22,308	2,247	10%	6.4
State government	10,881	2,353	22%	0.6
Educational services	9,117	492	5%	0.5
Arts, entertainment, and recreation	8,787	1,014	12%	0.5
Management of companies and enterprises	4,814	483	10%	0.5
Federal civilian	4,572	-992	-22%	0.4
Information	3,642	-921	-25%	0.3
Utilities	2,600	710	27%	1.2
Military	2,346	-88	-4%	0.3
Mining, quarrying, and oil and gas extraction	374	-396	-106%	0.1
Total employment (number of jobs)	767,247	179,963	23%	

Source: Bureau of Economic Analysis, Total Full-time and Part-Time Employment (CAEMP25N) Updated: November 16, 2023.

While aggregate employment in the NSJV has been relatively strong, the composition and geography of that growth has some aspects that appear of potential concern. In order to interrogate some of these features, two analyses of the regions are informative. The first examined the concentration of employment using a comparison of local sectoral shares to the shares in both the state and nation (location quotients). While details of this analysis are in Appendix 3.1.C,

Table 3.1.40 reports the results of the national concentrations ranking private sectors by concentration. This showed that at a regional level only four sectors had a concentration more than 1.10 during the period 2012 to 2022:

- Farm employment
- Forestry, fishing and related agriculture industries
- Manufacturing
- Transportation and warehousing

With the exception of manufacturing, all three counties exhibited national concentration rates greater than 1.1 through this period. The exception with manufacturing being San Joaquin County which had a national concentration between 0.89 and 0.98 between 2012 and 2022. This analysis also showed a significant concentration in health care and social assistance in Stanislaus County. It also showed a small but significant concentration in the utilities sector in San Joaquin County, but not in the other counties.

Table 3.1.40 Employment Concentration (location quotient) in the NSJV compared to the USA by Sector

NSJV	2022
Forestry, fishing, and related activities	6.39
Farm employment	3.01
Transportation and warehousing	2.18
Manufacturing	1.19
Utilities	1.19
Retail trade	1.07
Health care and social assistance	1.04
Accommodation and food services	0.99
Other services (except government and government enterprises)	0.98
Construction	0.94
Wholesale trade	0.93
Administrative and support and waste management and remediation services	0.85
Real estate and rental and leasing	0.75
Finance and insurance	0.58
Arts, entertainment, and recreation	0.55
Educational services	0.52
Management of companies and enterprises	0.45
Professional, scientific, and technical services	0.44
Information	0.26
Mining, quarrying, and oil and gas extraction	0.10
Federal civilian	0.43
Military	0.35
State government	0.57
Local government	1.49
Source: Bureau of Economic Analysis, Total Full-time and Part-Time Employment (CAEMP25N) Updated: November 16, 2023.	

In order to further disentangle the forces driving high-level employment growth across the region we conducted a dynamic shift-share analysis of employment between 2012 and 2022.The results of the competitive effect is of particular interest as it measures the difference between growth rates of an industry nationally and the growth rate of that industry in a particular area. In this case we analyzed each of the counties and aggregated them to find the overall regional effect. These are show in Table 3.1.41 according to the sectors competitive effect at a regional level, among initial implications of this analysis are the following:

- While transportation and warehousing has the largest competitive effect (20,207) in the region, it has been dominated by growth of the sector in San Joaquin County (19.978), with a small contribution by Stanislaus (344), and a slightly negative effect in Merced (-115).
- Similarly, while health care and social assistance also had one of the largest competitive effects (4,758) in the region, it was dominated by the growth of the sector in Stanislaus County (3,340), with both Merced (752) and San Joaquin (666) contributing significantly less.
- Another sector with disproportionate contributions was manufacturing (5,117) which was led by growth in San Joaquin (3,723) and Merced (1,093), while despite its significant employment concentration (lq) Stanislaus' competitive employment effect only contributed 375 jobs.
- Construction (6,588) is also interesting as the contribution by San Joaquin County (3,773) compared to that of Stanislaus (1,896) and Merced (919) may suggest given the relatively static housing market discussed previously, that industrial construction associated with the transportation and warehousing sector drove this growth.

These findings are an important starting point and frame the cluster analysis that follows in Section Four. Among other significant issues that will be further investigated moving forward is the relatively stagnant nature of the

Stanislaus County jobs market and the potential for rapid changes in concentrated areas of employment growth like that seen in San Joaquin County's transportation and warehousing sector.

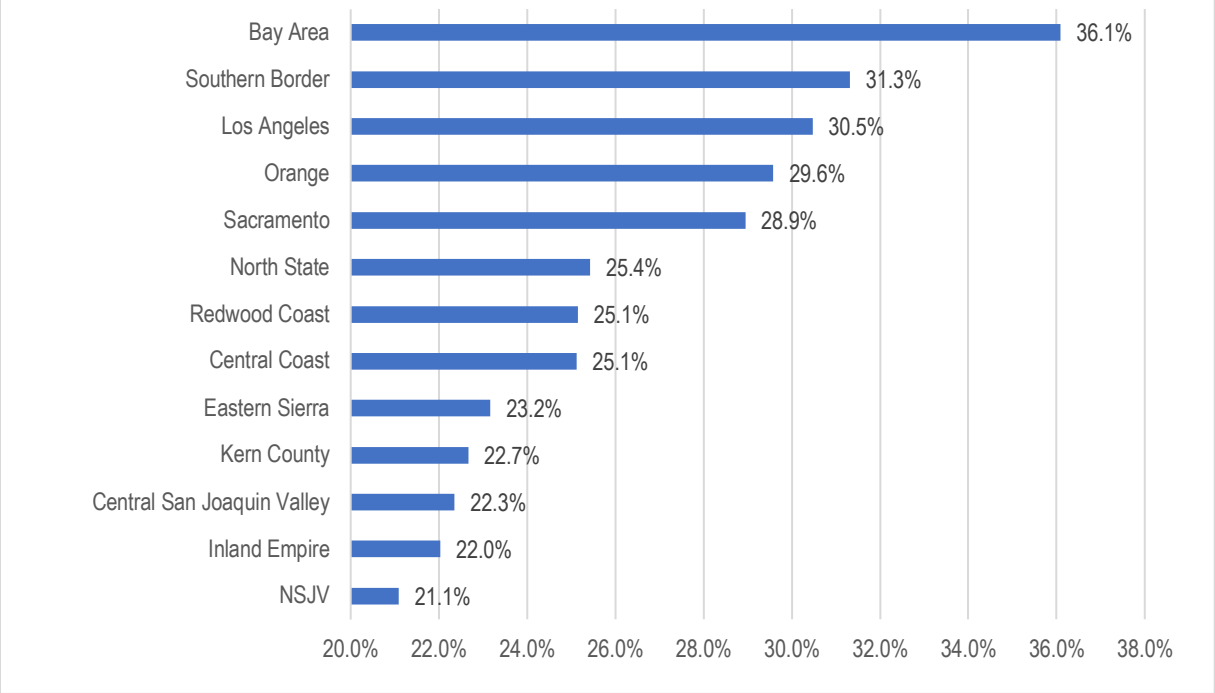
Table 3.1.41 Competitive Employment Effect in the Dynamic Shift-Share Analysis in the NSJV

	Competitive Effect			
	NSJV 2012-2022	San Joaquin 2012-2022	Stanislaus 2012-2022	Merced 2012-2022
Transportation and warehousing	20,207	19,978	344	-115
Local government	10,641	5,572	3,830	1,239
Accommodation and food services	9,634	4,824	3,476	1,334
Construction	6,588	3,773	1,896	919
Manufacturing	5,117	3,723	375	1,019
Health care and social assistance	4,758	666	3,340	752
Retail trade	3,750	1,276	1,380	1,093
Other services (not govt & govt enterprises)	3,615	1,787	1,134	695
Administrative and support, waste management and remediation services	2,864	3,821	-363	-594
State government	2,401	2,112	673	-384
Farm employment	1,551	-148	364	1,335
Utilities	599	314	128	156
Finance and insurance	518	645	-453	327
Forestry, fishing, and related activities	317	-1,447	448	1,316
Military	136	70	32	33
Arts, entertainment, and recreation	131	286	-310	154
Mining, quarrying, and oil and gas extraction	-170	-117	-49	-3
Educational services	-890	-575	-554	239
Management of companies and enterprises	-950	-341	-436	-173
Federal civilian	-1,048	-879	-136	-33
Wholesale trade	-1,427	-100	-612	-714
Information	-1,579	-1,096	-292	-191
Professional, scientific, and technical services	-2,347	24	-1,655	-715
Real estate and rental and leasing	-2,532	-646	-1,607	-279
Source: Bureau of Economic Analysis, Total Full-time and Part-Time Employment (CAEMP25N) Updated: November 16, 2023.				

Job Knowledge Intensity

Given the region's recognition that it needs to increase the number of jobs that support self-sufficiency (Section 3.1.2) we examined the knowledge intensity of employment opportunities in the NSJV. Among the indicators we examined, the data in Figure 3.1.41 demonstrates an aspect of the challenge facing the region – limited higher paying, more knowledge intensive employment opportunities. The figure reports data from across the California Jobs First regions and their respective proportions of the entry level requirements for those employed in their region. In order to identify higher level requirements, we compared data on what share of jobs each region has that require a bachelor's degree or higher at an entry level position. The results of that assessment shows that the NSJV has the lowest proportion of jobs requiring a bachelor's degree for an entry level position out of the 13 regions across the state. This is a key challenge and needs to be addressed as the region seeks to address many of its other challenges.

Figure 3.1.41 Percent of Jobs with Bachelor's Degree or Higher Required for Entry Level Position



Source: Jobs EQ – Q3 2023 data.

Regional Job Proximity

The concept of job proximity, in terms of industry similarity and occupational similarity, revolves around the idea of how closely related different jobs are based on their industry context and the nature of the work performed. This concept is crucial in understanding labor market dynamics, employee mobility, and economic development strategies.

Industry Similarity: When discussing job proximity in terms of industry similarity, it refers to how closely aligned different jobs are in terms of the industries they belong to. For example, jobs in the technology sector, such as software development, data analysis, and network security, share a high degree of industry similarity. They operate within the same broader economic and market context, often requiring similar foundational knowledge about technology trends, market needs, and industry-specific challenges. Industry similarity is significant for workers considering a career change within the same field, as it often means a smoother transition due to familiar industry dynamics, jargon, and business practices.

Occupational Similarity: On the other hand, occupational similarity pertains to how similar jobs are in terms of the skills, tasks, and activities they involve, regardless of the industry. For example, a project manager in a construction

firm and a project manager in a software company share a high occupational similarity. They both require skills in team coordination, project planning, resource management, and communication, even though they operate in vastly different industries. Occupational similarity is a key factor in job mobility, as it allows professionals to transition between different industries while leveraging their existing skill sets. It is also vital for workforce development programs that aim to re-skill workers for different industries without completely starting from scratch.

Table 3.1.42 Occupational Similarity Across the NSJV

OCC	2003 Jobs	2008 Jobs	2013 Jobs	2018 Jobs	2022 Jobs
Stan-SJC	98.4%	98.2%	97.7%	96.5%	95.3%
Stan-Merced	95.0%	95.4%	94.8%	94.7%	94.5%
Merced-SJC	95.0%	94.9%	94.0%	93.2%	91.8%

Source: CBPR based on IMPLAN data.

- By 2022 Occupational Similarity between Stanislaus County and San Joaquin County had decreased 3.1% from its 2002 level.
- By 2022 Occupational Similarity between Merced County and San Joaquin County had decreased 3.2% from its 2002 level.
- By 2022 Occupational Similarity between Merced County and Stanislaus County decreased slightly by 0.5% from its 2002 level.

Table 3.1.43 Industrial Similarity Across the NSJV

Industry	2002 Jobs	2007 Jobs	2012 Jobs	2017 Jobs	2022 Jobs
Stan-SJC	95.1%	95.9%	95.6%	94.1%	90.9%
Stan-Merced	91.5%	92.1%	92.0%	91.3%	92.2%
Merced-SJC	91.0%	90.7%	90.7%	89.2%	86.8%

Source: CBPR based on IMPLAN data.

- By 2022 Industrial Similarity between Stanislaus County and San Joaquin County had decreased 4.3% from its 2002 level.
- By 2022 Industrial Similarity between Merced County and San Joaquin County had decreased 4.2% from its 2002 level.
- By 2022 Industrial Similarity between Merced County and Stanislaus County had increased slightly by 0.7% from its 2002 level.

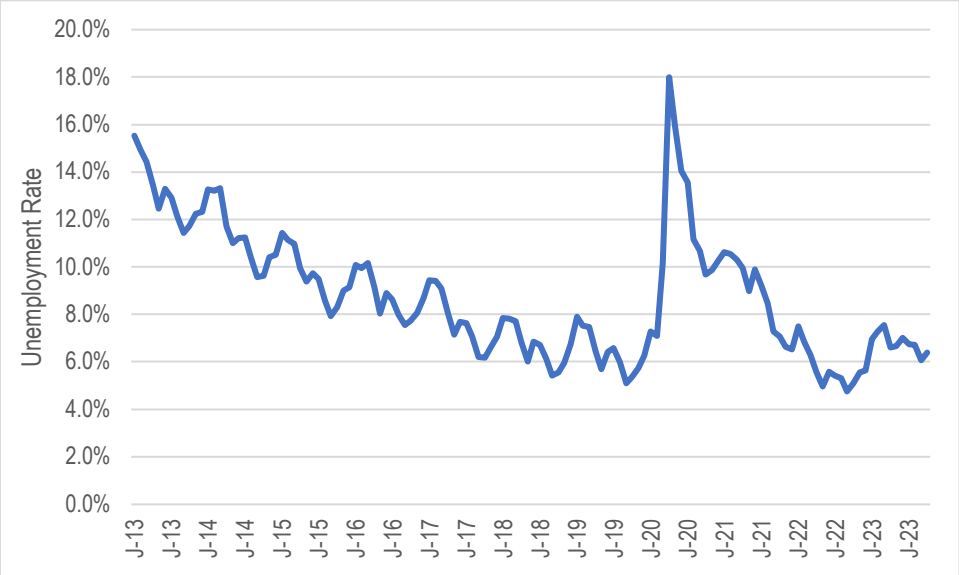
Understanding job proximity in these two dimensions informs strategies for regional economic development, workforce training programs, and addressing skills gaps.

Labor Force

Key regional labor force issues:

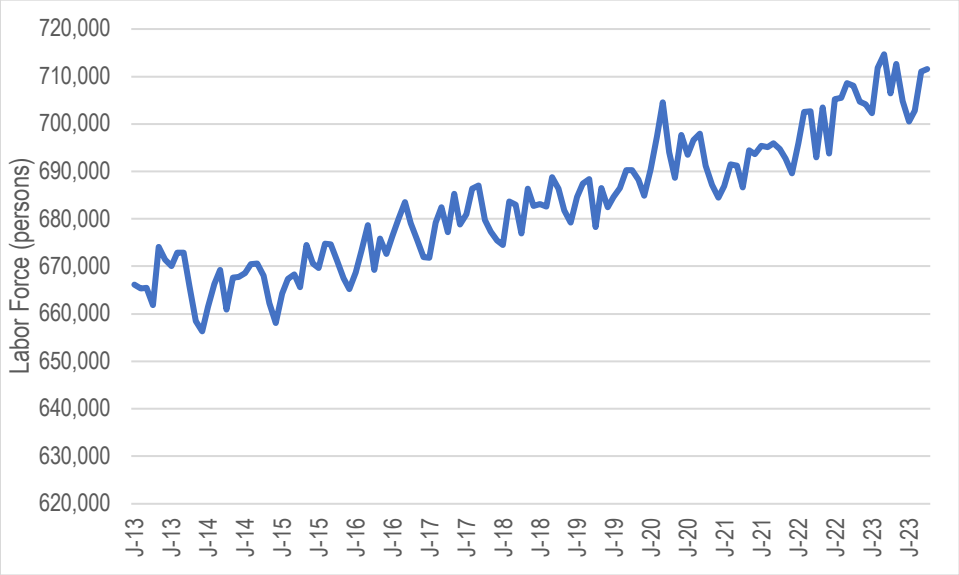
- Prior to the pandemic the region was approaching historically low levels of unemployment.
- By the latter part of 2022 those historic low levels were again reached but throughout 2023 relatively higher levels of unemployment have occurred.

Figure 3.1.42 The NSJV Unemployment Rate January 2013- October 2023



Source: U.S. Bureau of Labor Statistics Local Area Unemployment Statistics

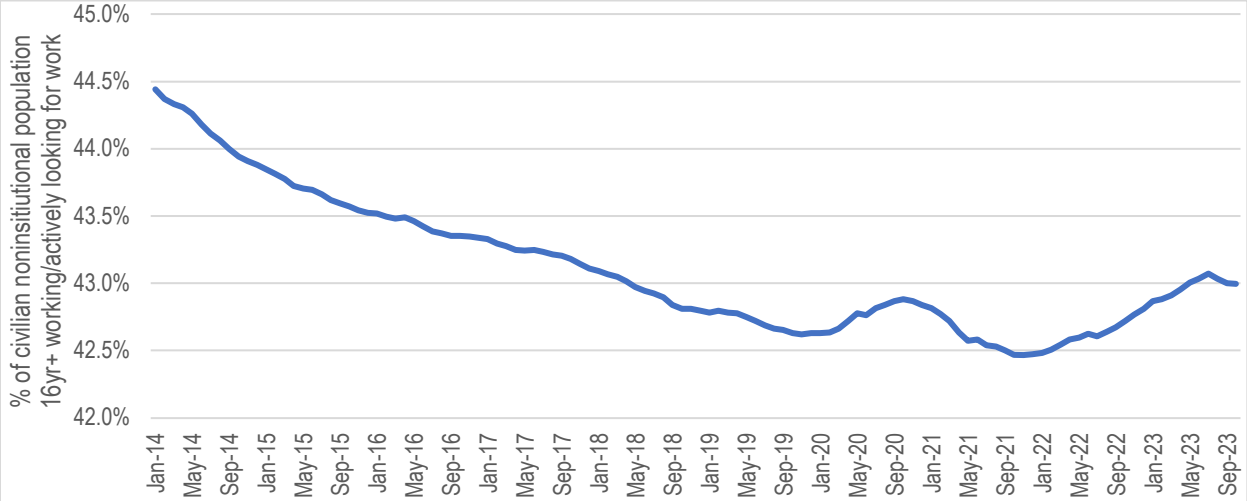
Figure 3.1.43 The NSJV Labor Force January 2013- October 2023



Source: U.S. Bureau of Labor Statistics Local Area Unemployment Statistics

Prior to the pandemic labor force participation had been in steady decline, but throughout 2022 and the early part of 2023 that trend seemed to reverse itself. Nonetheless, initial data from the second half of 2023 suggests that the declining trend in labor force participation may be returning.

Figure 3.1.44 Labor Force Participation Rate NSJV 2014-2023 (12-Month Moving Average)



Source: CBPR estimate based on U.S. Bureau of Labor Statistics Local Area Unemployment Statistics and Bureau of Economic Analysis, Population (CAINC1).

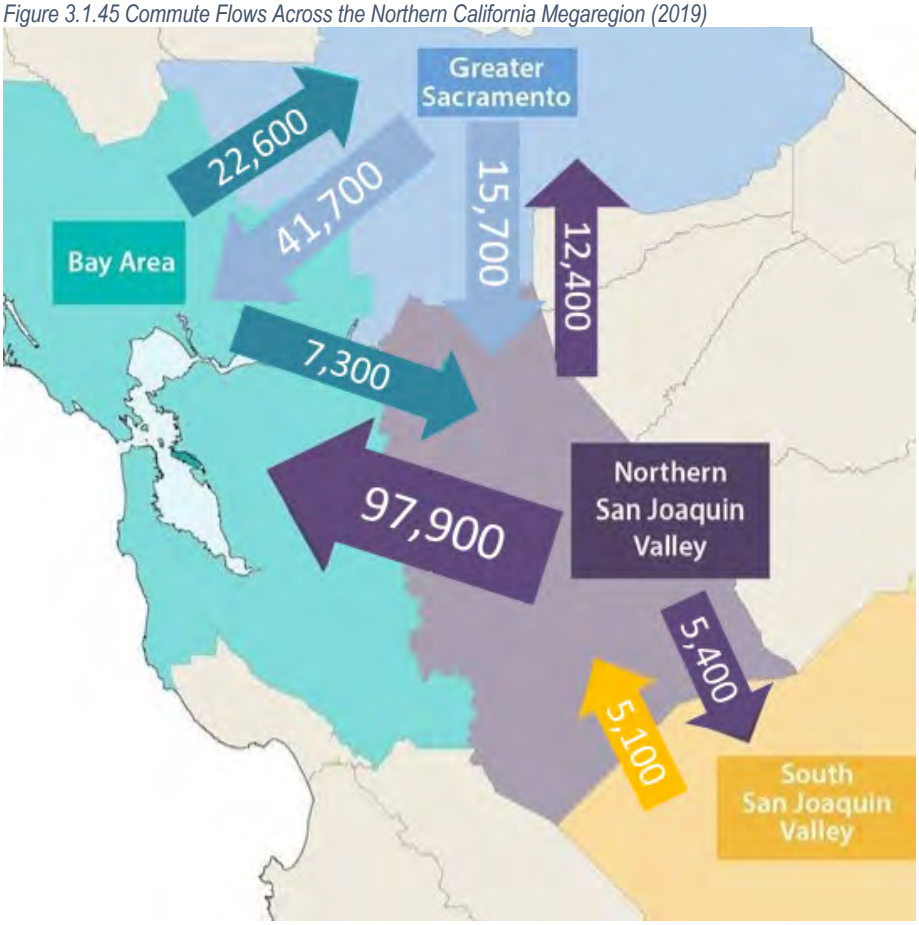
Commuting

Previous analyses have identified the large and rapidly expanding number of inter-regional commuters with the San Francisco Bay Area. This is a critical area and influence on the NSJV's development dynamic.

Table 3.1.44 Commuting Patterns

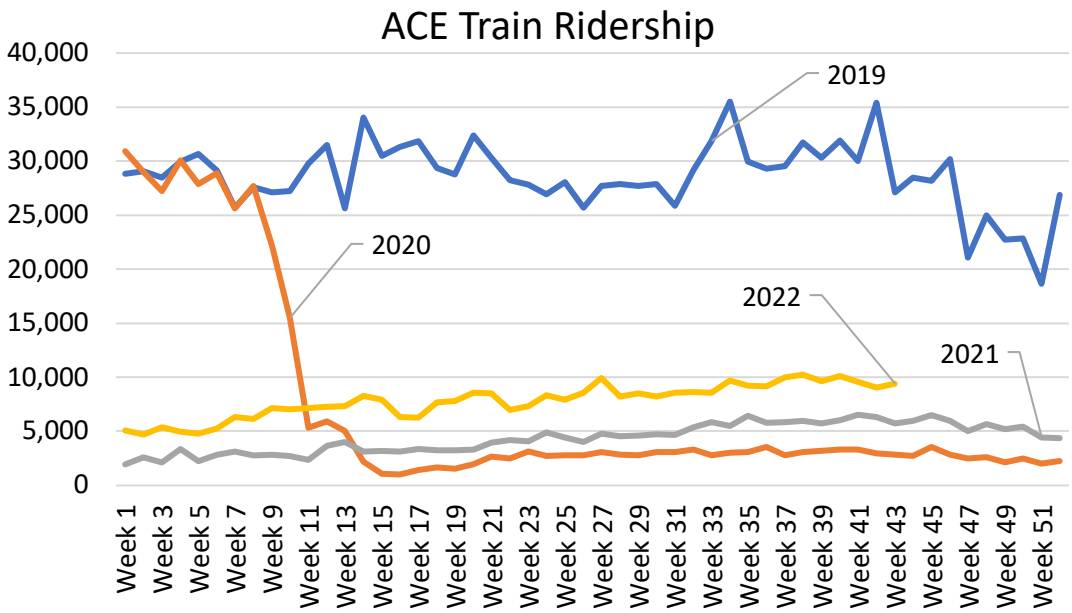
Total Employed Population	—	327,537
Worked in Region of Residence	74.1%	242,765
Worked Outside Region of Residence	25.9%	84,772
Worked in State of Residence	99.9%	327,217
Worked Outside State of Residence	0.1%	320
In-Commuters	—	56,014
Out-of-State In-Commuters	—	1,010
Net Commuting	—	-28,758
Source: Jobs EQ – Q3 2023		

Figure 3.1.45 Commute Flows Across the Northern California Megaregion (2019)



Source: CBPR analysis of American Community Survey 1-year public-use microdata sample, 2019.

Figure 3.1.46 Altamont Corridor Express (ACE) Ridership (2019-2022)



Source: ACE Train Board Reports

Human Capital

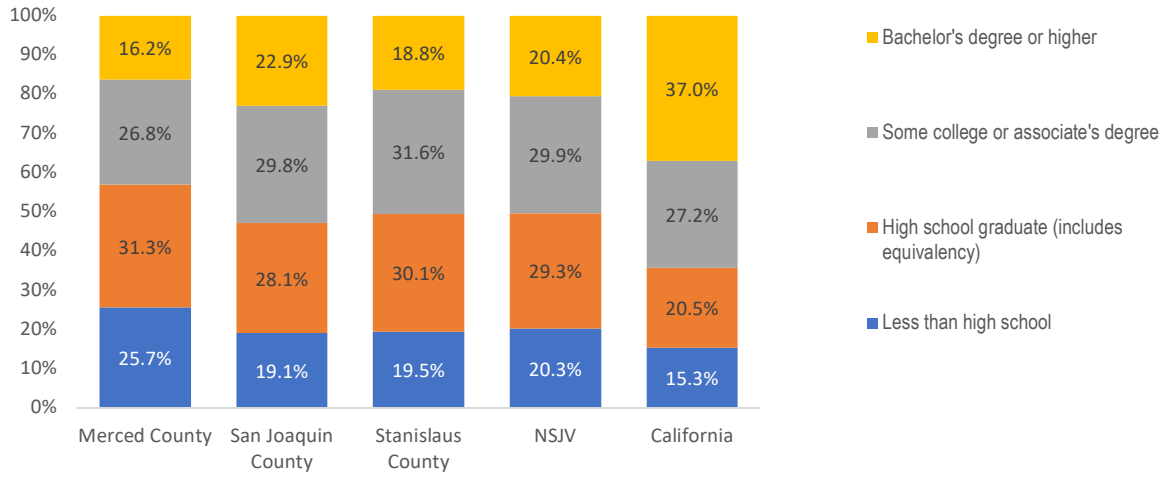
Despite the relatively high costs of living in the region, the NSJV has a comparatively low level of formal education attainment.

Table 3.1.45 Educational Attainment of NSJV's Resident Population

Population 25 years and over	1,002,836	Attainment Concentration
Less than 9th grade	12.0%	2.5
9th to 12th grade, no diploma	9.5%	1.7
High school graduate (includes equivalency)	28.8%	1.1
Some college, no degree	23.2%	1.2
Associate's degree	8.5%	1.0
Bachelor's degree	12.3%	0.6
Graduate or professional degree	5.8%	0.4
Source: JobsEQ - compiled 6/27/2023		

A fifth (20.4%) of NSJV's working-age population has attained a bachelor's degree or higher compared to nearly 4 out of 10 in California (37.0%). Exactly half of the NSJV's population (49.6%) has a high school diploma or less, compared with 35.8% of the state's population. The share of the population with some college or an associate's degree is similar. Merced County has a slightly lower share (16.2%) of the population with a bachelor's degree or higher. Merced County has the highest share of the population that has a high school diploma or less (57.0%).

Figure 3.1.47 Residential educational attainment, population 25 years and over, NSJV and California, 2022

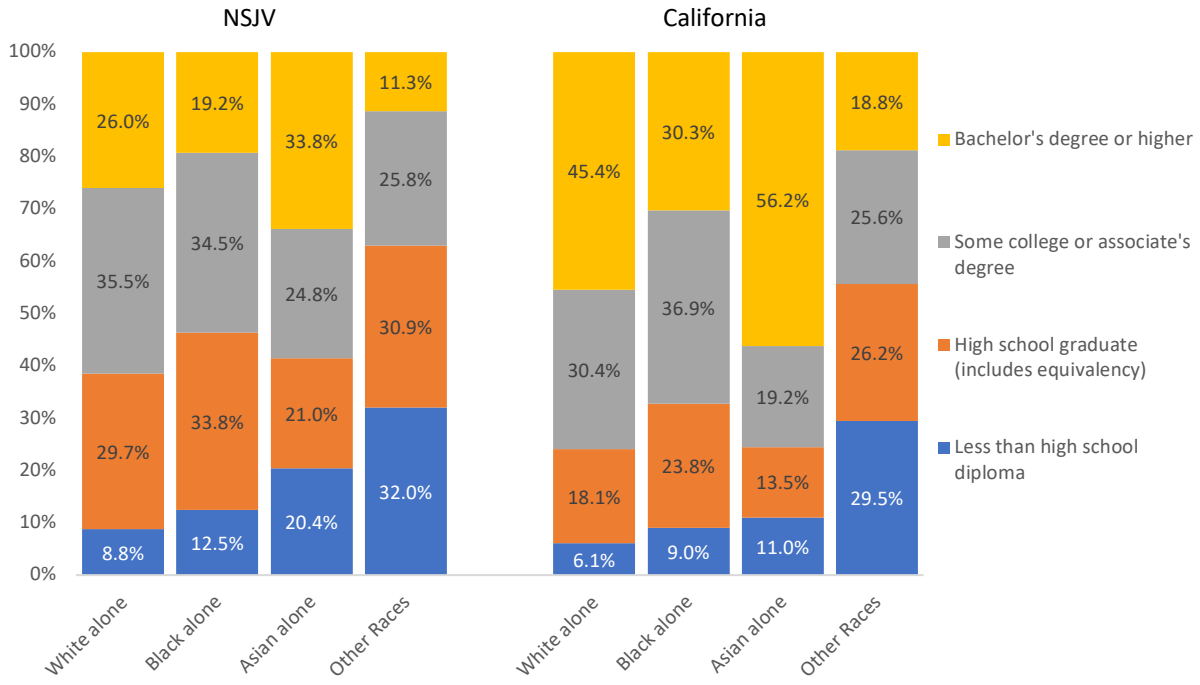


Source: U.S. Census Bureau American Community Survey, 1-year estimates, 2022

Every racial group in the NSJV has significantly lower bachelor's and above degree attainment rates than the state. In the NSJV, Whites have nearly 20 percentage points lower share of the working-age population with a bachelor's degree or higher than the state. Asians have a 22 percentage points lower share than the state. For African Americans, the figure is 11 percentage points lower. The differences are not made up by those with some college and associate degrees but by those workers with a high school diploma or less.

Compared to the state, every racial and ethnic group in the NSJV has a significantly lower rate of bachelor's degree attainment.

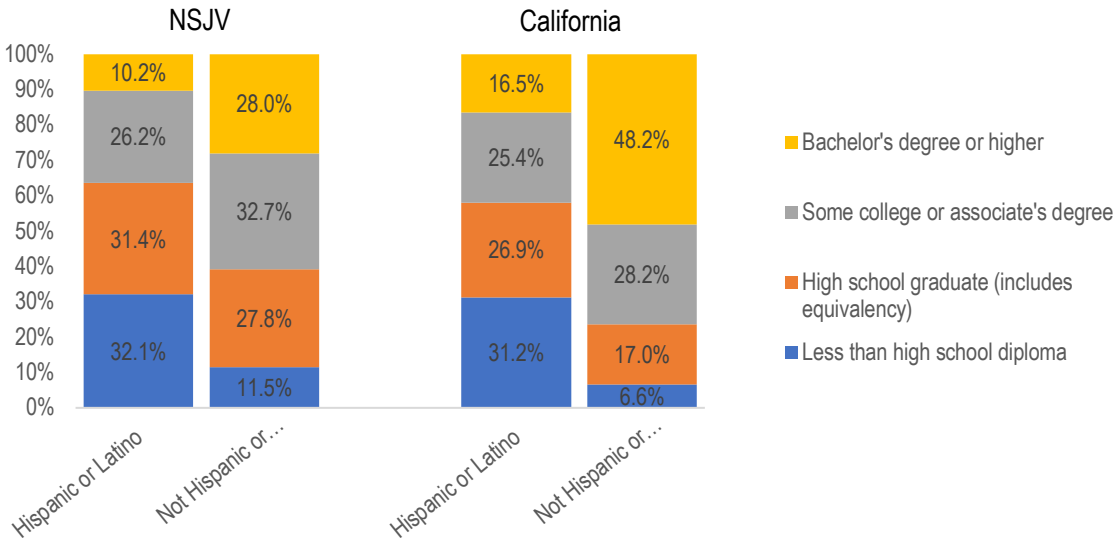
Figure 3.1.48 Educational attainment by race, NSJV, and California, 2022



Source: U.S. Census Bureau American Community Survey, 1-year estimates, 2022

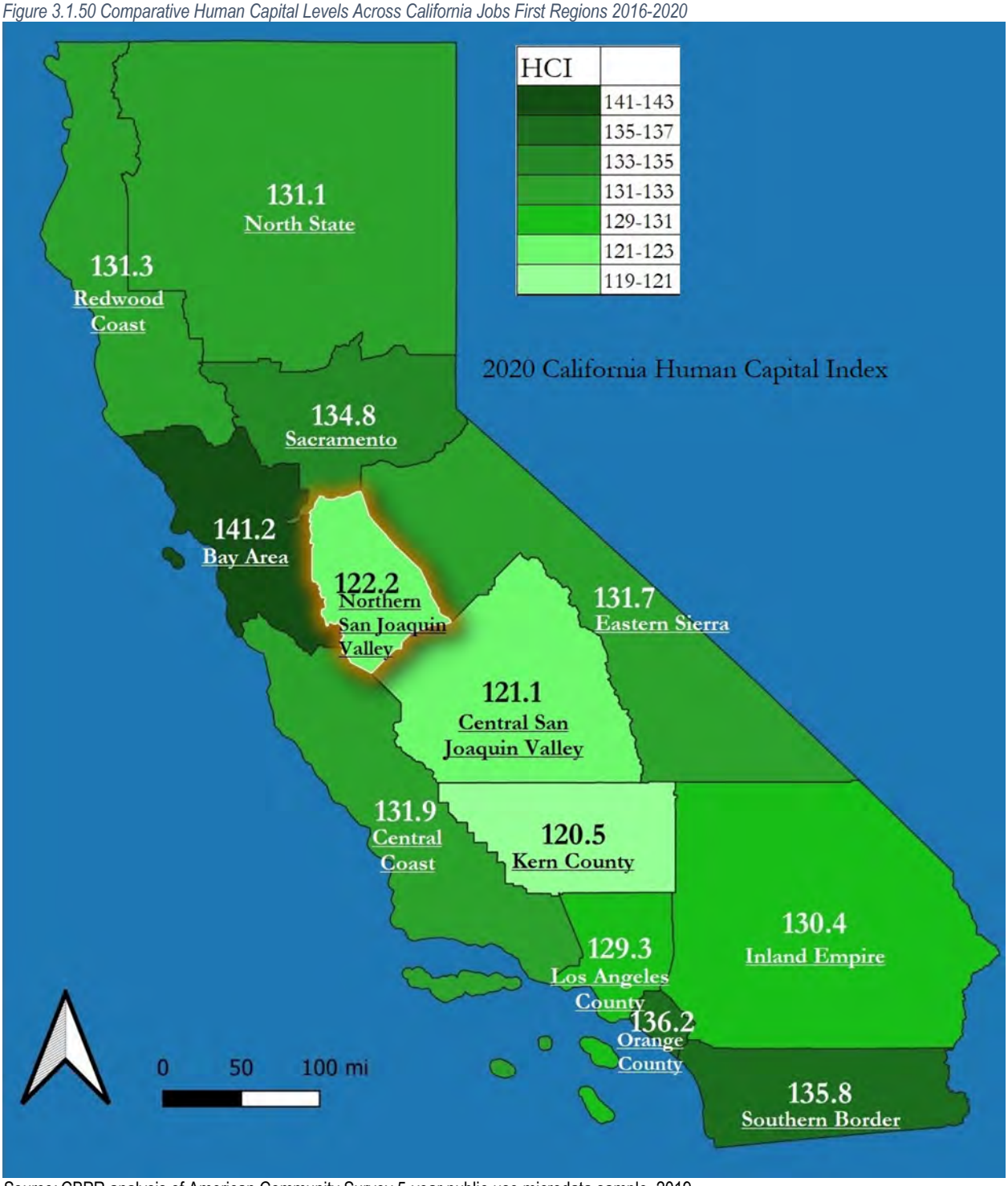
The data suggests that Latinx workers have the lowest level of bachelor's degree attainment of any racial or ethnic group. Compared to the state, the NSJV's Latinx population has a 6 percentage point lower rate of educational attainment of bachelor's degrees or higher (10.2% in the NSJV versus 16.5% at the state level). Within the NSJV, they attain bachelor's degrees or above at a rate 18 percentage points lower than people from other ethnic groups (10.2% versus 28% for not Hispanic or Latino).

Figure 3.1.49 Educational attainment, Hispanic or Latino, NSJV, and California, 2022



Source: U.S. Census Bureau American Community Survey, 1-year estimates, 2022

Figure 3.1.50 Comparative Human Capital Levels Across California Jobs First Regions 2016-2020



Source: CBPR analysis of American Community Survey 5-year public-use microdata sample, 2019.

Education and Training System

The NSJV higher education system is driven by its three community colleges, California State University – Stanislaus, University of California – Merced, and the University of the Pacific.

Table 3.1.46 Population per Housing Unit in California and the NSJV in 2023

Institution	Completions (2021)	Growth % YOY (2021)	Market Share (2021)	IPEDS Tuition & Fees (2021)
San Joaquin Delta College	3,076	31.3%	17.0%	$1,288
Merced College	2,930	(6.1%)	16.2%	$1,180
California State University-Stanislaus	2,857	2.3%	15.8%	$7,644
Modesto Junior College	2,817	(8.9%)	15.6%	$1,274
University of California-Merced	2,074	21.8%	11.5%	$13,657
University of the Pacific	2,040	10.7%	11.3%	$52,352
UEI College-Stockton	429	16.6%	2.4%	N/A
Teachers College of San Joaquin	307	(15.4%)	1.7%	$5,666
Humphreys University-Stockton and Modesto Campuses	231	2.2%	1.3%	$14,580
San Joaquin Valley College-Modesto	222	(27.9%)	1.2%	N/A
Paul Mitchell the School-Modesto	198	65.0%	1.1%	N/A
Carrington College-Stockton	189	(10.8%)	1.0%	N/A
Milan Institute-Merced	168	9.1%	0.9%	N/A
California College of Barbering and Cosmetology	136	37.4%	0.8%	N/A
Sierra College of Beauty	72	(15.3%)	0.4%	N/A
Xavier College School of Nursing	72	12.5%	0.4%	N/A
North Adrian's College of Beauty Inc	70	2.9%	0.4%	N/A
Adrian's Beauty College of Turlock	50	(5.7%)	0.3%	N/A
DeHart Technical School	49	25.6%	0.3%	N/A
California Beauty School	45	(22.4%)	0.2%	N/A
Stellar Career College	28	(52.5%)	0.2%	N/A

Source: Lightcast Q3 - 2023

Table 3.1.47 Population per Housing Unit in California and the NSJV in 2023

Institution	Completions (2006)	Completions (2011)	Completions (2016)	Completions (2021)
San Joaquin Delta College	1,980	3,426	2,933	3,076
Merced College	546	793	1,415	2,930
California State University-Stanislaus	1,742	1,844	2,182	2,857
Modesto Junior College	1,535	1,588	2,226	2,817
University of California-Merced	2	448	1,298	2,074
University of the Pacific	1,571	1,699	1,750	2,040
Humphreys University-Stockton and Modesto Campuses	156	238	230	231
Teachers College of San Joaquin			238	307
Other Institutions	1,998	3,675	1,976	1,728
Total NSJV	9,530	13,711	14,248	18,060

Source: Lightcast Q3 - 2023

Given the critical importance of building the NSJV's human capital, moving forward North Valley Thrive will be coordinating its efforts analyzing the region's education system in co-ordination with its Regional K-16 Education

Collaborative *WE Will!* The Northern San Joaquin Valley K-16 Regional Partnership.

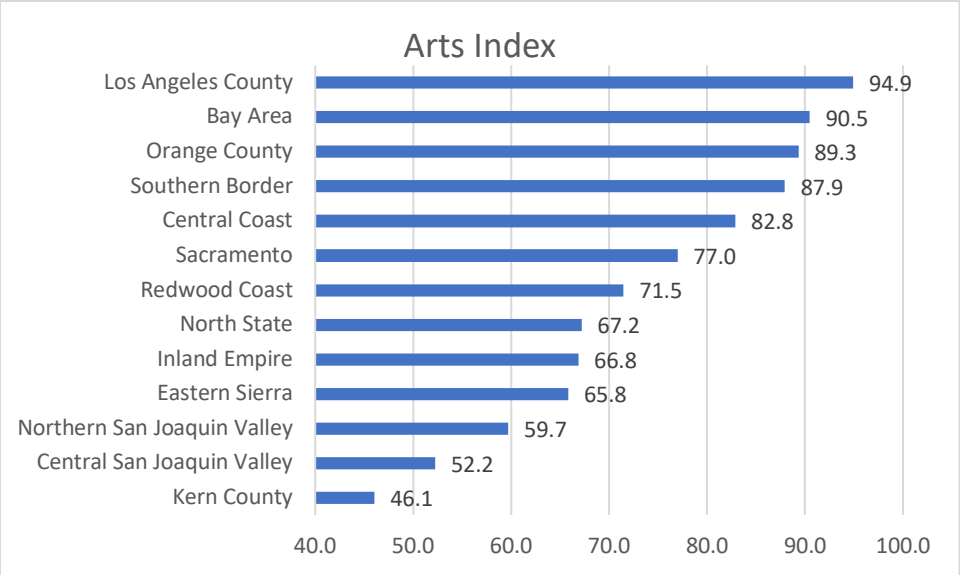
Table 3.1.48 Population per Housing Unit in California and the NSJV in 2023

Award Level	Completions (2006)	Completions (2011)	Completions (2016)	Completions (2021)
Award of less than 1 academic year	15.5%	12.3%	7.9%	7.8%
Award of at least 1 but less than 2 academic years	9.9%	11.3%	15.9%	15.4%
Associate's Degree	37.5%	44.4%	36.5%	36.7%
Award of at least 2 but less than 4 academic years	1.5%	1.2%	0.3%	0.1%
Bachelor's Degree	24.4%	20.1%	28.6%	30.0%
Postbaccalaureate certificate	0.0%	0.0%	1.4%	0.0%
Master's Degree	4.0%	4.8%	5.1%	6.0%
Post-masters certificate	0.0%	0.0%	0.0%	0.0%
Doctor's Degree	7.3%	5.8%	4.3%	4.0%
Source: Lightcast Q3 - 2023				

Amenities

SMU DataArts' Arts Vibrancy Index provide scores for every county across the nation on measures of Arts Dollars, Arts Providers, Government Support, Socio-economic and Other Leisure characteristics.[24]

Figure 3.1.51 Educational attainment, Hispanic or Latino, NSJV, and California, 2022



Source: SMU DataArts Arts Vibrancy Index.

Table 3.1.49 The Arts Vibrancy Index for the NSJV in 2022

	Arts Providers	Arts Dollars	Government Support	
San Joaquin County, CA	66	55	44	58.85
Stanislaus County, CA	70	83	53	74.15
Merced County, CA	19	51	28	34.3
Source: SMU DataArts Arts Vibrancy Index.				

[24] For further details see: https://culturaldata.org/what-we-do/arts-vibrancy-index/

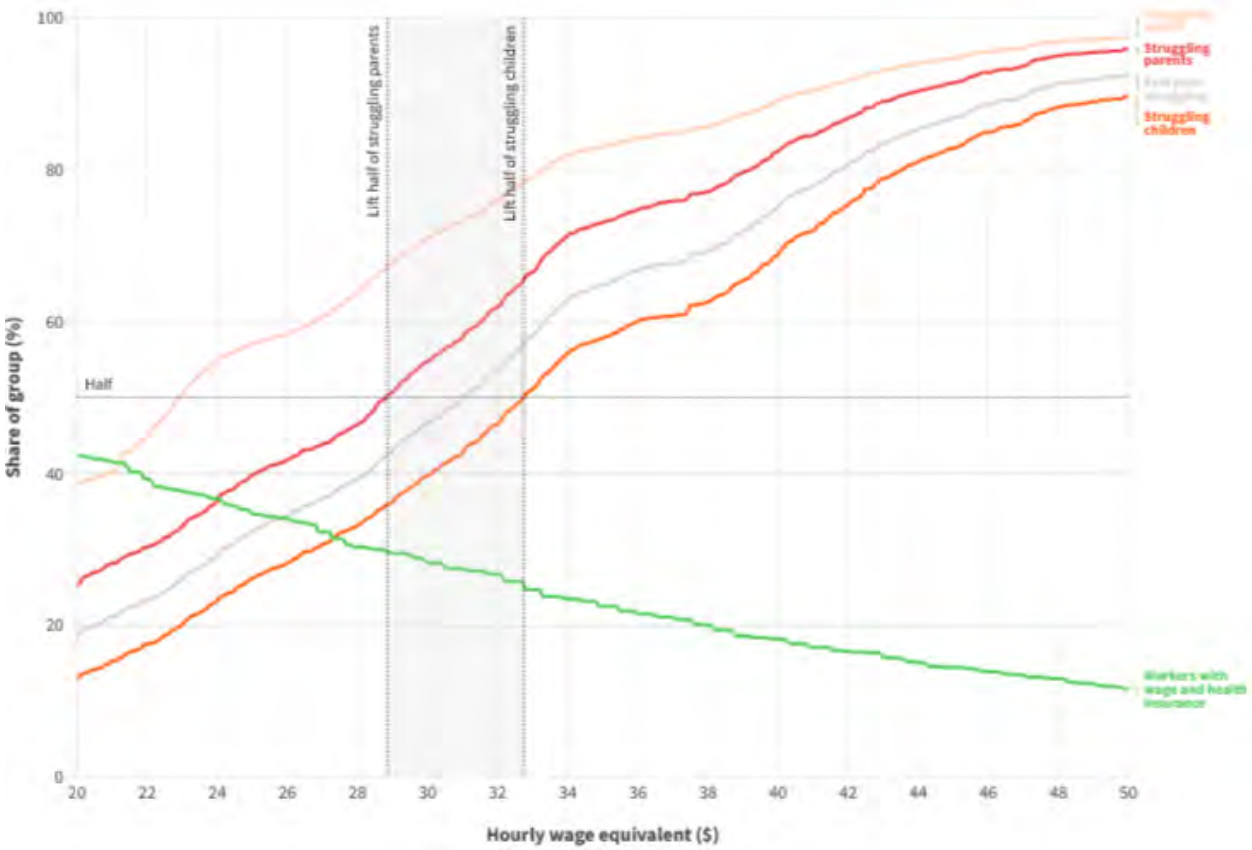
3.1.4 Low-Road and High-Road Jobs

Building on the assessment of regional self-sufficiency (Section 3.1.2) provided by Brookings Institution and Cities GPS. This assessment builds on that to provide an initial framing of low-road and high-road jobs in the region and identify major low- and high-wage industries and occupations in the region. Details of both assessments should be consulted on the interactive platform that they provided:

https://www.canva.com/design/DAF1lO5sW7I/LBMkTSbGM7leP5HcOMmzow/view?utm_content=DAF1lO5sW7I#1

The remainder of this subsection provides a summary of their analysis based on the content they provided in the sections on Opportunity Jobs in the interactive platform:

Figure 3.1.52 Share of population that would be "self-sufficient" at each wage level (2019-2021)



Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample, 2019 – 2021.

Families need high earnings to be self-sufficient in the North San Joaquin Valley. Making half of the region's struggling parents self-sufficient would require a wage of $28.90 per hour or $58,956 per year, on average. However, this varies from $28.60 in Stanislaus County to $29.50 in Merced County.

Making half of the North San Joaquin Valley region’s struggling children belong to self-sufficient families would require a wage of $32.80 per hour or an annual wage of $66,912. This differs within the region, as this threshold ranges from $32.20 in Stanislaus County to $33.10 in Merced and San Joaquin.

Within this wage range, 24.7% to 29.6% of the region's resident workers currently qualify as holding a "quality job."

The wage curve quality jobs are also prone to regional variation, affecting the ability of families to make ends meet.

Thresholds vary across subregions due to differences in costs of living and family composition. While total self-sufficiency budget requirements are bigger in Stanislaus County, particularly driven by housing and childcare expenses, the wage threshold for Merced County is higher due to larger and younger families.

Identifying "opportunity jobs" in the North San Joaquin Valley region...

This analysis identifies "quality jobs" that provide a livable wage and benefits, as well as "promising jobs" that offer pathways to them.

- Quality jobs:
  - Pay a livable wage on an annualized basis
  - Provide employer-sponsored health insurance (a proxy for employee benefits)
  - Are likely to continue to provide pathways to another quality job
- Promising jobs:
  - Do not currently pay a livable wage or offer benefits
  - Provide career pathways to a quality job within the next 10 years

Together, these represent “opportunity jobs” that would enable self-sufficiency and financial stability — now or in the near future — for a majority of children currently in struggling working families.

Quality Jobs

Table 3.1.50 Wage threshold for making the families of half of struggling children self-sufficient

	Annual Wage
San Joaquin	$67,524
Stanislaus	$65,688
Merced	$67,524
NSJV*	$66,900
* Average used to identify "quality jobs" in the regional	
Source: Brookings and Cities GPS analysis of University of Washington Self-Sufficiency Standard and American Community Survey 1-year public-use microdata sample data.	

“Quality jobs” are defined as enabling half of children in struggling working families to achieve self-sufficiency.

- As a policy choice, regional leaders defined “quality jobs” as those that would enable financial stability for a majority of children currently in working families struggling to make ends meet. Using the wage curves to balance aspirations for workers with feasibility in the economy, leaders set the wage floor for “quality jobs” at $30.80 per hour, or $66,900 per year.

- This regional wage standard represents an average across the three counties. The equivalent wage targets for Merced and San Joaquin counties are only a few hundred dollars higher than the regional average. The wage for Stanislaus County is a little over $1,200 lower.

- Adopting a regional wage standard encourages cooperation among the three counties. By setting a common target and definition for quality jobs, the region's leaders can more easily work together to develop strategies and programs that create a more inclusive economy. The economic characteristics of the counties are very similar in performance, industry mix, and workforce. Despite small differences between counties, a common metric makes a big statement about shared goals and simplifies analysis.

Opportunity Jobs

About two-in-five of the North San Joaquin Valley's jobs are opportunity jobs.

Just under one-quarter of the region's jobs are "quality jobs". These 137,000 jobs currently pay livable wages, provide employer-sponsored health insurance, and are durable or lead to another quality job.

A further 16.5% of the region's jobs are "promising jobs". These 95,000 jobs do not meet criteria for "quality jobs" today but will lead to a quality job in the future. Using data that covers career transitions made by wage-and-salaried workers across all industries and occupations, this analysis models career pathways available to incumbent workers based on their current occupation and educational attainment. 16.5% of the region's jobs are held by workers who will follow career pathways to a quality job within 10 years.

Together, these two types of jobs comprise "opportunity jobs". They represent about 40% of available jobs, but higher performing regional economies can reach at least 50%.

The proportions of opportunity jobs vary among counties in the region. Stanislaus County's economy concentrates opportunity jobs to a greater degree Merced County, reflected in the higher numbers of self-sufficient children and working families.

Table 3.1.51 Share of jobs that are opportunity jobs in the NSJV

	Share
Quality Jobs	23.8%
Promising Jobs	16.5%
Other Jobs	59.7%
Source: Brookings and Cities GPS analysis of Lightcast estimates and American Community Survey 1-year public-use microdata sample.	

The region needs over 200,000 more quality jobs to reduce by half the number of children in struggling working families. To meet policy ambitions, the region would need to more than double the number of quality jobs available in the economy. Currently, about 137,000 jobs meet quality standards across the three counties. Nearly 205,000 more quality jobs are needed, through creation of new jobs or upgrading existing jobs -- 97,000 in San Joaquin, 68,000 in Stanislaus, and 39,000 in Merced.

Growing or transitioning such a large portion of the region's job base is not a realistic near-term objective, but still directionally valuable. The necessary increase in quality jobs represents roughly 30% of current regional employment. At minimum, the magnitude of the challenge highlights that job creation efforts must be centered on quality over counts, but also spurring new jobs will not be sufficient. Improving existing jobs must be pursued, such as spurring productivity gains that add value to what workers contribute, enabling employers to offer more benefits through collective action, or lowering primary costs like childcare or housing so that current wages go further.

Table 3.1.52 NSJV Quality Jobs Gap

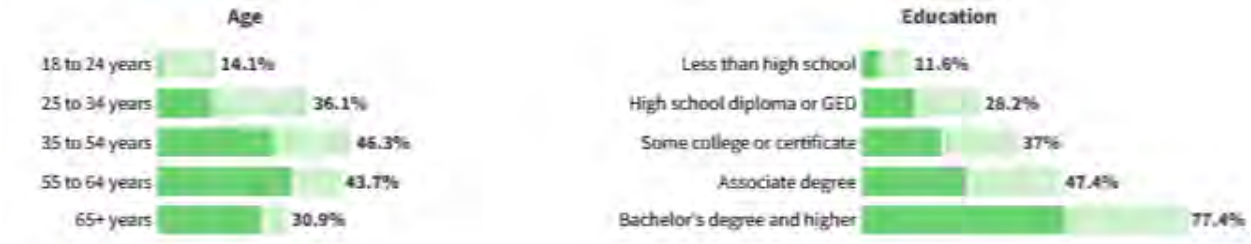
	Quality Jobs Gap
San Joaquin	96,766
Stanislaus	68,558
Merced	39,344
Total NSJV	204,668
Calculated as the number of struggling workers that did not hold a quality job in 2021	
Source: Brookings and Cities GPS analysis of Lightcast estimates and American Community Survey 1-year public-use microdata sample.	

Workers' likelihood of having a quality job varies depending on their characteristics.

There are wide disparities between workers based on age and education. Gaps along these dimensions in the likelihood of workers holding a quality job largely correlate to levels of experience and education. Unsurprisingly, higher levels of educational attainment significantly impact having a quality job, with the most notable gains from a Bachelor's degree compared to a certificate or Associate degree.

Large disparities also exist between workers based on race and gender, not reflecting labor market considerations. Counties perform differently by race, with Stanislaus showing smaller gaps, but Hispanic workers consistently hold fewer opportunity jobs. Qualifications or experience do not account for all differences among demographic groups. Accessing quality jobs may be attributable to hiring based on social networks, familiarity with or preferences for educational and career options based on lived experience, and bias.

Figure 3.1.53 Share of workers in the NSJV that hold an opportunity job, by age and education level (2021)



Source: Brookings and Cities GPS analysis of Lightcast estimates and American Community Survey 1-year public-use microdata sample.

Race and gender gaps endure even among workers with the same level of education. Comparisons among peers show clear differences that tend to narrow at higher levels of educational attainment. However, Hispanic women consistently lag, even when earning Bachelor's degrees. Prior research in Stanislaus County indicated childcare responsibilities and fields of study may be a factor, but data suggests a focus of further research and responses for Hispanic women.

Figure 3.1.54 Share of workers in the NSJV that hold an opportunity job, by race/ethnicity and gender (2021)

Source: Brookings and Cities GPS analysis of Lightcast estimates and American Community Survey 1-year public-use microdata sample.

Some industries concentrate opportunity jobs, while in others they are scarce.
Atypical to most regional economies, tradable sectors do not offer a higher proportion of opportunity jobs, The overall value of tradable sector value likely is diluted by the scale of agriculture and food industries in the region, in which quality jobs represent less than 15% of their total employment (second exhibit).

Economic opportunity varies notably among the region's industries.

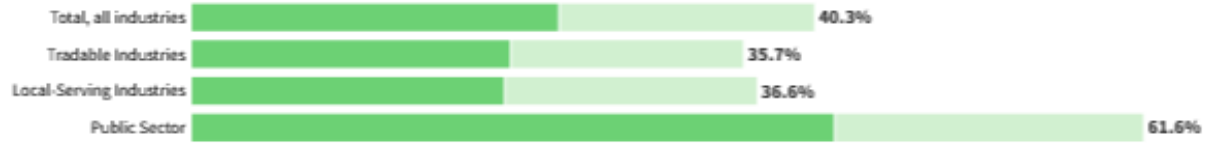
Some sectors are particularly opportunity-rich. Utilities, Headquarters, Government Administration, Finance, Professional Services, Information, Education, and Construction.

Other major industries offer considerably fewer opportunity jobs in comparison to their total jobs, including

agriculture, hospitality, arts and recreation (particularly recreation), retail, and other local services (e.g., personal services).

However, subsectors within industries differ in providing opportunity jobs, informing a more tailored focus for economic and workforce development efforts. In manufacturing, electronics and machinery manufacturing exceed average regional shares, while food lags. In logistics, freight and inland port activities concentrate quality jobs versus warehousing. In healthcare medical centers concentrate quality jobs, but home health services do not,

Figure 3.1.55 Share of opportunity jobs among the North San Joaquin Valley region's industries (2022)



Source: Brookings and Cities GPS analysis of Lightcast estimates and American Community Survey 1-year public-use microdata sample.

Many opportunity-rich industries provide relatively few jobs.

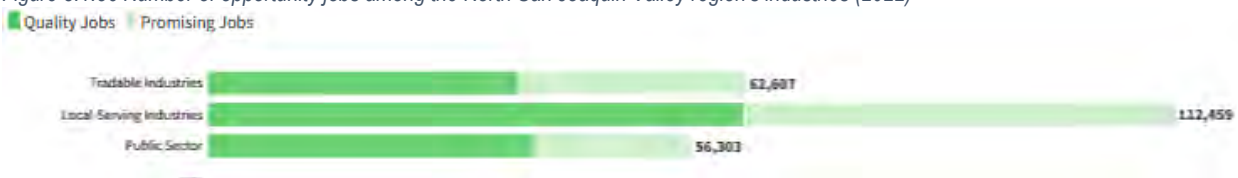
The most opportunity-rich sectors often produce few of the region's jobs. Industries such as Utilities, Headquarters, Professional Services, and Information have the highest concentrations of opportunity jobs, yet provide only a few thousand jobs altogether.

Differences within industries help explain some demographic disparities. Women and racial or ethnic minorities are more likely hold jobs in service- and care-related industries where opportunity is relatively scarce. Men are more likely to find work in professional or blue-collar industries where opportunity is more prevalent.

While the counties share many economic similarities, the industry mix and sources of opportunity jobs differ and influence performance within the region. Despite the small share of opportunity jobs within the sectors, agriculture and manufacturing contribute a large proportion of quality jobs to the Merced economy. Specialized freight and logistics strengths in San Joaquin plays a more prominent role in quality job creation,

Improving value-add and job quality in major employment industries is needed to close the region's opportunity jobs gap. Robust growth in sectors that concentrate quality or promising jobs must be complemented by enhancing competitiveness and value-add in sectors like agriculture and manufacturing.

Figure 3.1.56 Number of opportunity jobs among the North San Joaquin Valley region's industries (2022)



Source: Brookings and Cities GPS analysis of Lightcast estimates and American Community Survey 1-year public-use microdata sample.

Assets to Address Wage Disparities

Addressing wage disparities in California's North San Joaquin Valley requires leveraging the region's unique assets and opportunities. This area, known for its rich agricultural heritage, strategic location, and growing industrial base, has several key assets that can be utilized to mitigate wage gaps and foster economic equality.

Agricultural Foundation: The region's strong agricultural sector provides a solid economic foundation. By promoting value-added agricultural industries, such as food processing and agri-tech, there are opportunities to create higher-paying jobs within the agricultural sphere. Investing in agricultural technology can also lead to more skilled positions in farming, offering higher wages compared to traditional labor-intensive farming roles.

Strategic Location: The North San Joaquin Valley's central location in California makes it an ideal hub for distribution and logistics. This geographic advantage can attract more businesses to the area, particularly in the warehousing and transportation sectors, potentially creating more jobs and competitive wages.

Educational Institutions: The presence of adult education, community colleges and universities in the region are significant assets. These institutions can play a crucial role in addressing wage disparities by providing vocational training and higher education opportunities, enabling residents to acquire the skills needed for higher-paying jobs.

Economic Development Initiatives: Local government and economic development agencies can implement initiatives focused on attracting diverse industries to the region. By broadening the industrial base beyond agriculture and warehousing, there is potential for more varied and higher-paying employment opportunities. See Section 3.1.6 for a discussion of some initial directions for consideration.

Public-Private Partnerships: Collaboration between the public sector, private businesses, and non-profits can lead to programs that specifically aim to reduce wage gaps. These partnerships can focus on workforce development, job training programs, and support for small businesses, especially in underserved communities.

Investment in Infrastructure: Improving transportation, communication, and climate resilient infrastructure can make the region more attractive to a wider range of businesses, especially those offering higher-wage positions. Better infrastructure can also improve the quality of life, making it easier to attract and retain skilled workers.

Community-Based Programs: Initiatives aimed at supporting specific groups that are often affected by wage disparities, such as women, minorities, and the youth, can be crucial. These programs can focus on mentorship, skills training, and job placement services.

In conclusion, the North San Joaquin Valley's assets, from its agricultural base to its strategic location and educational institutions, offer multiple avenues to address wage disparities. A concerted effort that combines these assets with targeted economic and workforce development strategies can lead to more equitable economic growth in the region.

3.1.5 Economic Shocks and Shifts

This subsection briefly examines some impacts of major economic disruptions and dynamics that have been important influences on the socioeconomic conditions reviewed in preceding subsections. It covers the Great Recession and Subprime Mortgage Crisis, detailing their profound effects on real estate, unemployment, and social challenges in NSJV. It also explores the repercussions of the COVID-19 pandemic on public health and the regional economy, highlighting the vulnerabilities of essential workers. Additionally, it addresses issues like displacement, gentrification, and climate gentrification, considering the implications of investments like the High-Speed Rail and other infrastructure on the NSJV's intra- and inter-regional development.

The Great Recession and Subprime Mortgage Crisis

The Great Recession, which officially lasted from December 2007 to June 2009, was the most severe economic downturn since the Great Depression of the 1930s. Its impact was deeply felt in the NSJV particularly as a result of the subprime mortgage crisis.

The NSJV experienced a dramatic real estate boom in the early 2000s as the building permit data Section 3.1.3 alluded to. Driven by relatively affordable housing prices compared to the San Francisco Bay Area, the region attracted many new residents. This influx led to a surge in housing demand, causing a significant increase in home prices and construction activities. However, the growth was unsustainably fueled by subprime mortgages, which were offered to borrowers with poor credit histories and a high risk of default.

As interest rates began to rise and housing prices started to fall in 2006 and 2007, many homeowners in the NSJV found themselves unable to afford their mortgage payments, especially those with adjustable-rate mortgages. This led to a sharp increase in foreclosures, causing a cascade of problems. Property values plummeted, leaving numerous homeowners with properties valued far less than the mortgages they owed, a situation known as being "underwater."

The impact on the local economy was devastating. The construction industry, which had been a major driver of employment during the boom, collapsed. Unemployment rates soared as businesses related to real estate and construction, including many small businesses, either significantly downsized or closed altogether. This created a ripple effect, impacting various sectors such as retail, services, and local government revenues.

Moreover, the foreclosure crisis brought about social challenges. Many families lost their homes, leading to increased demands on social services and exacerbating issues like homelessness and poverty. The decline in property values also eroded the tax base, resulting in reduced funding for public services, including education, healthcare, and public safety.

The NSJV's economy was slower to recover than other parts of California and the United States. The recovery process was hindered by the magnitude of the housing market collapse and the region's heavy reliance on agriculture and low-wage industries, which provided limited growth prospects.

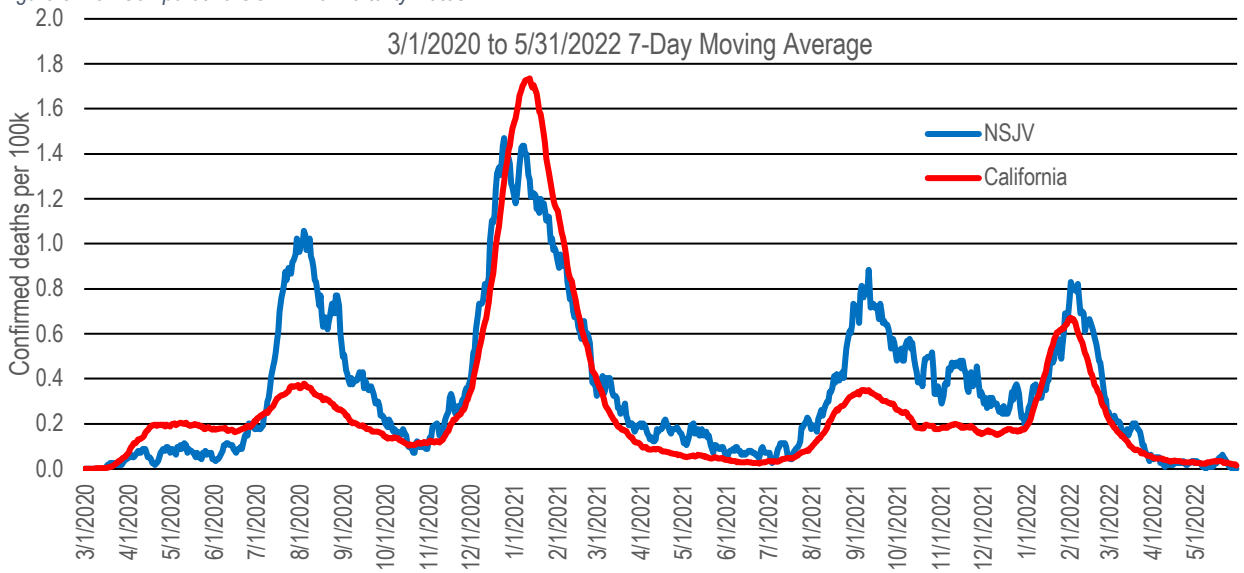
The Great Recession and the subprime mortgage crisis had a profound and lasting impact on the NSJV. It highlighted the vulnerabilities of an economy overly dependent on housing and construction, and it brought to the forefront the need for economic diversification and sustainable growth strategies. The crisis also underscored the importance of responsible lending practices and the risks associated with speculative real estate investments. In this context especially some caution and temperance for the large growth and vitality of sectors like that of transportation and warehousing seems warranted.

Essential Services and the COVID-19 Pandemic

One of the most profound impacts of the pandemic in the NSJV was on public health.[25] The region experienced higher rates of COVID-19 fatalities compared to the rest of California. Between February 1, 2020, and May 31, 2022, about 4,730 people in the NSJV succumbed to the virus, equating to a rate of 290 fatalities per 100,000 residents. This rate was 28 percent higher than the per capita fatality rate in California as a whole. This severe impact was particularly noticeable during the late summer of 2020 and again in the latter part of the summer of 2021, coinciding with the prevalence of the Delta variant.

A key factor contributing to the disproportionate impact of the pandemic in the NSJV was the region's high concentration of essential industries. Many workers in these sectors, such as agriculture and logistics, could not telecommute and thus faced greater risks of exposure to COVID-19. This led to heightened levels of worker distress and higher infection rates among these essential workers. Unlike the adjacent San Francisco Bay Area, which saw more significant economic impacts but fewer health impacts, the NSJV's essential worker cluster meant that while the region had comparatively fewer negative economic impacts, it suffered more severe health consequences due to the pandemic.

Figure 3.1.57 Comparative COVID-19 Mortality Rates



Source: California Health and Human Services Agency.

Inter- and Intra- Regional Growth

A growing regional challenge seems to be emerging around intra- and inter-regional growth dynamics. Some dimensions of this are:

Displacement and Gentrification in the NSJV

The Urban Displacement Project (UDP) defines gentrification as, "a process of neighborhood change that includes economic change in a historically disinvested neighborhood – by means of real estate investment and new higher-income residents moving in – as well as demographic change – not only in terms of income level, but also in terms of changes in the education level or racial make-up of residents." [26] According to the UDP, lower income communities are often on the losing end of this trade. As more investments go into a community or neighborhood, it becomes

[25] For further details on the COVID-19 Pandemic's impact on the NSJV see: https://www.pacificcbpr.org/econdev/regional/nsjv/nsjv-covid-19-impacts/

[26] Urban Displacement Project. Gentrification Explained. Urbandisplacement.org/gentrification-explained

more expensive to live within, and long-term lower income residents may be forced out. Thus, even though economic investment in an area might be positive, lower income residents are unable to stay to benefit from new investments in housing, healthy food access, or transit infrastructure.[27]

Displacement significantly affects both community well-being and health. Specifically, evictions have shown a correlation with a higher chance of facing homelessness later on, leading to housing insecurity like overcrowding and heightened challenges in securing new rental accommodations due to having an eviction history. Additionally, this situation adversely affects mental health and escalates visits to emergency rooms.[28]

Threat of Climate Gentrification

These dynamics hold true in the context of climate investments and adaptation efforts as well. Even investments that improve neighborhood quality while reducing climate risks and can cause increases in housing costs or other basic needs. This can lead to residential displacement in the form of both ecological and climate gentrification.[29] For instance, the introduction or improvement of green amenities—such as parks, greenways, community gardens, and sustainable infrastructure—in a neighborhood leads to increased property values and living costs, which can in turn price out existing lower-income residents. This phenomenon is often an unintended consequence of urban greening efforts aimed at creating healthier and more sustainable environments. [30]

Well-intentioned climate investments may not only leave a community's most vulnerable residents behind, but also force them into even riskier locations. These areas may be further from city centers, have fewer amenities, or be more vulnerable to negative environmental impacts. The specific destinations of displaced residents can vary widely depending on the local housing market, availability of affordable housing, and social networks that might influence relocation decisions. In the context of climate gentrification, as wealthier individuals and investors seek areas perceived to be less vulnerable to climate change impacts (such as those with significant climate investments), low-income residents may find themselves pushed into areas that are more susceptible to risks such as flooding, pollution burden, heat islands, or other environmental hazards. These areas are less likely to be equipped with the infrastructure needed to cope with climate change impacts, further exacerbating the vulnerability of these populations.[31]

Gentrification in the Context of NSJV Planned Investments

California's planned High-Speed Rail (HSR) represents an example of a regional investment that raises the potential of gentrification and displacement within the NSJV.[32] When completed, the HSR will link urban coastal areas of the Bay Area and Southern California with the San Joaquin Valley via high-speed rail. After completion, the HSR will connect key agricultural communities of the San Joaquin Valley — such as Merced, Fresno, Kings/Tulare and Bakersfield — with the coastal cities of San Francisco and Los Angeles. The project has the potential to not only decrease greenhouse gas emissions through reduction of mobile emissions, and open up new job potential throughout the Central Valley, but will also work to make place more accessible for all riders. For instance, cities like Fresno will suddenly be just an hour and a half away from both San Francisco and Los Angeles, rather than up to three hours away by car. [33]

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[27] Urban Displacement Project. Gentrification Explained. Urbandisplacement.org/gentrification-explained

[28] "Displacement in San Mateo County, CA: Consequences for Housing, Neighborhoods, Qualify of Life, and Health," Marcus, Justine and Zuk, Miriam; 2017

[29] Anguelovski, I., Connolly, J. J. T., Pearsall, H., Shokry, G., Checker, M., Maantay, J., Gould, K., Lewis, T., Maroko, A., & Roberts, J. T. (2019). Why green "climate gentrification" threatens poor and vulnerable populations. Proceedings of the National Academy of Sciences of the United States of America, 116(52), 26139–26143. https://doi.org/10.1073/pnas.1920490117

[30] Keenan, J. M., Hill, T., & Gumber, A. (2018). Climate gentrification: From theory to empiricism in Miami-Dade County, Florida. Environmental Research Letters, 13(5). https://doi.org/10.1088/1748- 9326/aabb32

[31] Keenan, J. M., Hill, T., & Gumber, A. (2018). Climate gentrification: From theory to empiricism in Miami-Dade County, Florida. Environmental Research Letters, 13(5). https://doi.org/10.1088/1748- 9326/aabb32

[32] Related projects such as Valley Link and ACE Rail expansion are also potentially significant forces in this regard.

[33] SPUR. How Cities Can Make the Most of California's High Speed Rail Investment. 2022. https://www.spur.org/news/2022-05-19/how-cities-can-make-most-californias-high-speed-rail-investment

However, research indicates that the development of HSR systems can have both positive as well as negative impacts on urban development and regional systems, possibly resulting in gentrification and displacement for certain communities. The potential positive effects include urban regeneration of station-adjacent areas, which can act as a catalyst for additional development, giving momentum to pre-existing urban dynamics or spurring new commercial development and major buildings in central cities, as well as brownfield redevelopment in peripheral cities. HSR can also facilitate decentralization and sprawl from metropolitan centers or concentration to them, depending on key variables such as station centrality, city size, and the extent of the HSR network. [34]

However, the positive impacts are not universal, and can be unevenly distributed among cities, with some experiencing adverse economic effects. Negative effects include physical adverse outcomes such as the destruction of historic buildings, the creation of 'a sea of parking lots', and the negative externalities of noise, pollution, and traffic congestion around station areas. There can also be a 'barrier effect' where railway infrastructure segregates the station from adjacent neighborhoods. Economically, there can be land speculation and decreased housing affordability, although some argue that housing values may decrease in station-adjacent areas, indicating a need for more research to understand these differential effects in the context of the NSJV region. Moreover, the building of an HSR network may lead to regional and economic imbalances, strengthening first-tier cities at the expense of second-tier cities or cities bypassed by the train.[35]

[34] Anastasia Loukaitou-Sideris, Dana Cuff, Timothy Higgins and Orly Linovski. Built Environment (1978-), Vol. 38, No. 1, Railway Station Mega-Projects and the Re-Making of Inner Cities in Europe (2012), Document pp. 54;59;60 Alexandrine Press. https://www.jstor.org/stable/23289700
[35] Anastasia Loukaitou-Sideris, Dana Cuff, Timothy Higgins and Orly Linovski. Built Environment (1978-), Vol. 38, No. 1, Railway Station Mega-Projects and the Re-Making of Inner Cities in Europe (2012), Document pp. 54;59;60 Alexandrine Press. https://www.jstor.org/stable/23289700

3.1.6 Economic Development Opportunities

This sub-section covers some initial areas of opportunities to advance the socio-economic development of NSJV region, these include:

- Circular Bioeconomy: Emphasizes developing a bioeconomy leveraging the region's agricultural strengths and focusing on renewable biological resources conversion into products like biofuels, bioplastics, and biochemicals.
- Make-It! Ship-It!: Focuses on enhancing manufacturing and shipping capabilities by integrating modern technology and efficient shipping strategies for sustainable, equitable production.
- Building Health & Well-being: Covers healthcare, behavioral health, childcare, elder care, and home health services, highlighting the significance of these professions in the region.
- Farming and Fostering the Land: Aims to enhance farming practices for sustainability and equity, including advanced technologies and sustainable agricultural practices.
- Socio-Cultural and Inter-Regional Amenities: Leverages the region's cultural diversity and geographical location to develop tourism and hospitality, enhancing local ammenities and cultural exchange.

Circular Bioeconomy[36]

This sectoral theme is concerned with building on the region's historic manufacturing and shipping strengths to develop highroad economic opportunities. Leveraging existing highroad manufacturing activities, efforts seek to develop a significant economic development opportunity, leveraging the region's agricultural strengths while addressing sustainability and environmental concerns. The NSJV, known for its fertile land and agricultural productivity, is an ideal location for developing a bioeconomy that focuses on the production of renewable biological resources and their conversion into valuable products, such as biofuels, bioplastics, and biochemicals.

This sectoral theme may lead to the creation of new industries and job opportunities, particularly in biotechnology and sustainable manufacturing. By utilizing agricultural waste and by-products, the strategy promotes a circular economy where waste materials are repurposed, reducing environmental impact and creating additional revenue streams for farmers and agribusinesses.

The development of a bioeconomy in the NSJV could also attract significant investment in research and development, fostering partnerships between academic institutions, private sector companies, and government entities. This collaborative approach would drive innovation in sustainable practices and technologies, positioning the region as a leader in green industry and sustainable agriculture.

Furthermore, the sectoral theme aligns with California's ambitious environmental goals, contributing to carbon neutrality and waste reduction targets. By integrating sustainable practices into the region's economic framework, the NSJV could set a precedent for how agricultural regions worldwide can transition to a more sustainable and economically resilient future.

Make-It! Ship-It!

This sectoral theme is concerned with building on the region's historic manufacturing and shipping strengths to develop highroad economic opportunities. Leveraging existing highroad manufacturing activities, efforts seek to develop sustainable production that integrates modern technology with traditional manufacturing processes while incorporating efficient shipping strategies. Through this focus, our region will develop an augmented advanced manufacturing strategy. While a guiding principle will be to create higher value products by reconceiving their design and production to enhance productivity and reduce environmental impacts, this work will also recognize and actively respond to the need to equitably build residents' skills in this transition.

[36] This is a description of an opportunity area that is being actively developed in the NSJV. For further details on these efforts please see: Beam Circular https://www.beamcircular.org/ and CBIO https://www.cbioinnovation.org/

Building sustainable, equitable, and efficient manufacturing in this manner will promote a transition from traditional manufacturing activities to processes that are augmented by robotics and other equipment to enhance the precision, consistency, and speed of production. As a regional economic development strategy, these advanced manufacturing opportunities will be purposefully considered to work with and augment activities that are less easily changed from traditional manufacturing processes. Building a community of practice in this manner will not only promote workforce training, it will involve the integration of shipping. This inclusive consideration of shipping will allow regional supply chains and distribution networks to greater integrate production to reduce shipping times and costs and thereby enhance the competitiveness of this regional industry while advancing equity and sustainability goals.

Building regional logistics capabilities will leverage the entry level opportunities of the region's transportation and warehousing industry to expand employment in areas that require more specialized skills and thereby grow the number of family-sustaining jobs in the region. These positions will also increase regional efficiencies, reduce costs, and ensure more timely deliveries. Moreover, purposeful development of more eco-friendly and sustainable shipping methods will further expand good job opportunities as well as create further potential efficiencies. The idea being that as shipping becomes more integrated with advanced technology and sustainable practices, it will not only provide better-paying jobs but also expand equitable career pathways to family-sustaining employment.

Building Health & Well-being

This sectoral theme encompasses a wide range of activities centered around providing care and support services to individuals of all ages, with a particular focus on health, behavioral health, and child/elder care. It not only addresses the physical and emotional well-being of NSJV residents but also offers promising career pathways to advance equity.

Healthcare Professionals: The carrying economy includes a broad spectrum of healthcare roles, such as doctors, nurses, nurse practitioners, physician assistants, and allied health professionals. These positions are critical for delivering medical care and ensuring the overall health of patients.

Behavioral Health Specialists: As awareness of mental health issues grows, so does the demand for behavioral health specialists, including psychologists, therapists, counselors, and social workers. They provide crucial support for individuals dealing with mental health challenges.

Childcare Providers: Childcare professionals, including early childhood educators and daycare workers, play a vital role in nurturing and educating young children, creating a strong foundation for their development.

Elder Caregivers: With an aging population, the need for elder caregivers, both in-home and within long-term care facilities, is on the rise. These professionals offer essential assistance and companionship to seniors.

Home Health Aides: Home health aides provide crucial in-home care services to individuals who need assistance with daily tasks, enabling them to maintain independence and dignity.

Occupational Therapists and Physical Therapists: These professionals help people regain or improve their physical and cognitive abilities after illness, injury, or surgery.

Administrative and Support Roles: The carrying economy also offers administrative and support roles in healthcare settings, such as medical billing and coding specialists, healthcare administrators, and patient advocates.

Technology and Innovation: As technology plays an increasing role in healthcare, there are opportunities for IT professionals, data analysts, and software developers to contribute to the industry's growth and efficiency.

The carrying economy is not only about well-paying and stable job opportunities that make a meaningful impact on people's lives. It also encompasses innovative delivery of these services as well as considerable resources to connect residents to existing services and ensure available resources are fully utilized. With the ongoing need for these services, career prospects in this sector are promising, offering higher pay as well as a sense of fulfillment and job security to those who choose to pursue them.

Farming and Fostering the Land

This sectoral theme seeks to build on the concentrated agricultural and farming activities in the NSJV region to create more equitable, higher-value job opportunities and knowledge intensive, sustainable business activities that minimize negative externalities while maximizing benefits to disinvested communities. In building these opportunities, attention will be given to historic and ongoing inequities and barriers created by skill requirements that would traditionally limit much of the established agricultural workforce from accessing these family-supporting jobs. For instance, to advance equity with the transition to work as an agricultural technologist implementing advanced technologies like drones, artificial intelligence, and precision farming tools, traditional agricultural workers require a comprehensive and robust workforce development pathway providing considerable systemic investment in their skills development. Similarly, changing many existing agricultural practices to sustainable agricultural practices will require increasing the supply of sustainability managers in agriculture while also transforming business models to give more considerate evaluation of the broad impacts of operations and the food systems that they supply.

In addition to enhancing established farming practices to advance equity and sustainability goals while promoting environmental justice, creating pathways to family-sustaining jobs, and maximizing benefits to disinvested communities, this working group will also consider broader stewardship of the region's land and environment. A sample of potential activities in this context include floodplain restoration, groundwater recharging, and development of conservation easements. For instance, floodplain restoration can enhance biodiversity, improve water quality, and mitigate the impacts of climate change by increasing flood resilience. In terms of equitable job opportunities, in addition to environmental scientists and ecologists to plan and design, as well as civil engineers and landscape architects to implement, there are opportunities for local communities in eco-tourism, education, and conservation efforts. Likewise, groundwater recharge basins can have an important role in relieving water stress, improving water quality for residents, and limiting land subsidence. Carefully and consultatively developed conservation easements may simultaneously preserve biodiversity, maintain ecosystems and protect water sources while also enhancing the quality of life of residents and promoting environmental stewardship.

Socio-Cultural and Inter-Regional Amenities

Leveraging a region's diverse socio-cultural assets in tandem with its central location to world-class mountain and ocean-side experiences presents a unique and multifaceted opportunity for robust economic development. By embracing and celebrating the rich tapestry of cultures, traditions, and talents within the region, businesses can tap into a vibrant labor pool and create authentic, culturally immersive tourism and hospitality offerings. The central location provides accessibility and convenience, making the region a natural hub for travelers seeking both alpine adventures and coastal escapes. This geographical advantage can stimulate investment in infrastructure, transportation, and services, bolstering local economies through increased tourism, improved connectivity, and a thriving hospitality industry. Moreover, fostering cultural exchange and collaboration can drive innovation and creativity, attracting businesses and entrepreneurs who recognize the value of a diverse and dynamic community. Together, these elements can create a sustainable and prosperous economic ecosystem, while preserving and celebrating the region's unique cultural and natural heritage.

3.2 — Climate and Environment Assessment

The climate and environment baseline assessment examines the disproportionate impacts of climate change on disinvested communities in California's Northern San Joaquin Valley (NSJV) region. Research indicates that the greatest immediate climate and environmental threats facing the NSJV remain 1) extreme heat and rising temperatures, 2) drought and changing precipitation cycles (including groundwater overdraft and drinking water access for unincorporated communities), 3) flooding as a result of more severe storms, snowmelt runoff and proximity to vulnerable rivers and levees, and 4) pollution burden including PM2.5 and ozone exposure, as well as proximity to pesticides, hazardous waste facilities and superfund sites.

Key Findings

The majority of the NSJV is considered disinvested. Fifty-four percent of the total population make less than 80% of the Statewide annual median household income. The Northern San Joaquin Valley (NSJV) region in California has historically faced underinvestment, particularly in disinvested communities. Many of these communities have experienced issues like brown tap water, indicating inadequate infrastructure and environmental neglect. Across the NSJV, communities have highlighted the lack of access to safe places for recreation and natural spaces, as well as limited park space and spending on parks per person. This further highlights the historic underinvestment many of these communities face on a daily basis. This underinvestment has contributed to the disproportionate impacts of climate change and environmental hazards on these communities, exacerbating their vulnerability to health risks and economic challenges. As such, many of these disinvested communities are particularly vulnerable to the adverse effects of climate change, further emphasizing the need for targeted interventions and improved communication strategies to address these historic underinvestment issues.

Disinvested communities in the NSJV face a higher burden of health risks associated with climate change and environmental hazards. These include:

Heat Stress: Rising temperatures are expected to increase the frequency and intensity of heat waves, which can lead to heatstroke, dehydration, and respiratory problems, especially for agricultural and field workers, or in jobs in factories or manufacturing. Community conversations have indicated that rising temperatures are already changing workhours and making working conditions hazardous throughout the NSJV.

Air Pollution: The poor air quality in the NSJV, exacerbated by the region's geography, poses severe health risks to its residents. Fine particulate matter (PM2.5) and ozone from vehicle traffic, agricultural production and pesticides, and wildfires contribute to respiratory infections, asthma, and heart conditions. Disinvested communities, lacking adequate indoor air filtration and often working outdoors, face increased health risks, further straining limited healthcare resources.

Water Pollution: Many communities in the NSJV also experience exposure to contaminants, pesticides and fertilizer runoff in their drinking water supplies. Many unincorporated communities in the NSJV lack access to potable water and sewer systems, leading to increased exposure to water contaminants such as nitrates, arsenic, and pesticide runoff. This lack of access to clean water and adequate sewer systems exposes residents to numerous environmental hazards and public health concerns, further impacting already vulnerable populations in the region. Additionally, the San Joaquin Valley has some of the highest rates of water contamination per person in the state, with nitrate contamination being one of the most widespread causes of water contamination. Socially and economically vulnerable populations throughout the region are burdened with disproportionately higher lack of access to clean and safe drinking water, leading to additional economic burdens on these communities. This underscores the urgent need for prioritizing clean water access and water justice for the most vulnerable communities in the NSJV.

Flood Vulnerability: The Northern San Joaquin Valley (NSJV) region in California faces significant flood vulnerability due to its proximity to floodplains, rivers, and vulnerable levees. Disinvested communities in the NSJV (primarily minority and lower-income) are less likely to have the resources to respond to or recover from severe flooding events, exacerbating their vulnerability. Hazard communication to these vulnerable communities is often insufficient due to language barriers or cultural differences, leaving them at a higher risk of exposure and with limited preparation capacity. Such communities are often without full ability to advocate for the needs of their communities with local and regional policy makers. The lack of consolidated information and real-time alert systems further compounds communication barriers during flood events. Additionally, the region experiences periods of severe drought, impacting transportation infrastructure, agriculture, and groundwater basins. While the NSJV is not expected to see drastic changes in annual average precipitation in the next 50-70 years, longer drought periods are anticipated. This will further increase the region's vulnerability to other climate hazards such as wildfires, as well as the amount of dust in the air, contributing to poor air quality. The impact of flooding and drought on agriculture and the status of groundwater basins further exacerbate the region's vulnerability. These findings underscore the urgent need for targeted interventions and improved communication strategies to address the flood vulnerability and climate-related challenges in the NSJV.

Climate change also poses significant economic challenges to the NSJV region, including:

Reduced agricultural productivity: Rising temperatures and changes in precipitation patterns are expected to reduce crop yields and livestock production. This will have a significant impact on the region's economy, which is heavily reliant on agriculture.

Drought and water scarcity: Climate change is expected to exacerbate water scarcity in the NSJV, which is already a chronic groundwater overdraft. This will lead to higher water prices, competition for water resources, and increased land fallowing across the NSJV region. Because the majority of the NSJV population relies on groundwater for drinking water supplies, residents run the risk of more wells drying up and increased levels of pollution to remaining water supplies.

Damage to infrastructure: Extreme weather events, such as floods and wildfires as well as extreme heat are expected to become more frequent and intense due to climate change. This will damage infrastructure, such as roads, bridges, and power lines, and disrupt essential services.

Disinvested communities in the NSJV are particularly vulnerable to these economic challenges. They often have limited resources to adapt to climate change and are more likely to experience job losses and economic hardship.

Ultimately, the Climate and Environment assessment finds that health, environmental, and socio-economic consequences of climate change are often highly correlated, and that the lowest income and most highly vulnerable population in the NSJV experience the greatest impacts. For example, air pollution can exacerbate respiratory illnesses, which can lead to poorer health, increased rates of healthcare costs and lost productivity. Drought and increased water scarcity can contribute to food insecurity, and result in increased contamination levels in regional drinking water, which can have a negative impact on health and well-being for residents throughout the three county regions. Communities struggling with access to clean water may be forced to purchase expensive alternatives, causing additional economic burdens. Extreme weather events can also damage homes and businesses, which can lead to economic hardship and displacement.

Significantly, of the 13 California Jobs First Regions in California, the NSJV ranks between 10th and 13th on a list of 17 issues and indicators such as drinking water contaminants, groundwater threats, lead exposure and pesticide exposure (see Public Health: Table 3.3.1.B - Integrated Thematic Indicator Table with Interregional Ranking). Addressing the impacts of climate change and fostering environmental sustainability while at the same time encouraging industry development and job growth will require a comprehensive and coordinated approach that considers the health, environmental, and socio-economic needs of disinvested communities throughout the NSJV.

Inclusion of Community Comments

In review of the draft Baseline Assessment submitted August 2023, the State requested the inclusion of additional details and examples illustrating regional vulnerability, as well as an explanation of how short-term and long-term climate change impacts will affect people and the economy in the NSJV region. As such, incorporated throughout the climate and environmental assessment are highlighted community comments detailing how many NSJV residents experience the impacts of climate change and environmental pollution burden in their communities and daily lives. All comments included in the climate and environment section are direct quotes from NSJV residents and CBOs and come from two primary sources. First, comments were gathered at multiple events hosted across the three-county region and were recorded by NV THRIVE county coordinators. In the report that follows, these comments are associated with the specific CBO who made the statement.

Second, comments were recorded by the data and research team during the August 24, 2023 Data Walk. This event invited all participating NV THRIVE stakeholders and CBOs to an event where the research team presented many of the findings of the initial baseline assessment and asked participants to engage with the research findings and identify potential gaps. In the report that follows, these comments are associated with the Data Walk event, but not the individual author of each statement.

3.2.1 — Environmental Exposure and Social Vulnerability in the NSJV

Research from the Environmental Protection Agency (EPA) on climate change and social vulnerability indicates that already disinvested communities are more at risk to climate and environmental threats. This is due to the intersection of multiple dynamics, including but not limited to unique combinations of social, economic, historical and political factors that limit the ability of communities and individuals to respond to, recover from, and adapt to climate and environmental threats.[1] Disinvested communities are more likely to experience higher pollution burdens, have access to fewer resources, and experience adverse public health outcomes. While not exclusive, such impacts can range from increased occurrence of respiratory illnesses and higher rates of cancers to lower birth weights and decreased life expectancy.

As discussed in the baseline assessment overview, a significant portion of census tracts in the NSJV falls into a DIC designation.

Data from the U.C Davis center for Regional Change also suggests that environmental hazards tend to be clustered around populations that are already experiencing extremely high levels of social vulnerability. Because the residents living in these areas are often simultaneously struggling with negative public health conditions, they often find themselves with the fewest resources to respond to this concentration of environmental hazards. [2]

This often means a higher economic burden for such communities, as well as a higher likelihood of experiencing adverse and serious public health concerns as a result. For instance, if residents are forced to live in poor housing because of lack of a sustainable wage, they likely also experience elevated exposure to air pollutants because living and working without air conditioning might mean no indoor air filtration. Lower income communities are also more likely to be located next to pollution sources such as highways or factories, further increasing the exposure to environmental hazards. This is often correlated with increased rates of respiratory disease such as asthma.

In context, such vulnerable populations also often have elevated levels of political, social or economic barriers and stressors from both a community and individual perspective. This might mean challenges in accessing basic human necessities such as adequate health care or healthy food. As a result, pollution exposure has a greater impact on health or well-being. For populations that have higher concentrations of not fluent English speakers or non-citizens, access to and effective conversations with elected officials can be difficult or very limited, meaning that these communities have reduced agency to advocate for their interests or take policy action that might reduce pollution sources in the immediate environment.[3]

These are dynamics repeatedly confirmed during conversations and meetings that the NSJV THRIVE county coordinators have conducted with communities, non-profits and community business organizations throughout the NSJV. Participants across the three-county region have stressed that not only are they dealing with disproportionate pollution burden and serious health conditions as a result, but that they are often unable to access good health care or doctors for quality treatment. At one meeting, residents even spoke about how traveling outside their county for health care saved their lives, because the care they were receiving close to home failed to properly monitor and address their health conditions.

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[1] EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. U.S. Environmental Protection Agency, EPA 430-R-21-003. Appendix B. www.epa.gov/cira/social-vulnerability-report

[2] UC Davis Center for Regional Change. Land of Risk and Land of Opportunity. 2011. P 16. https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/FINAL-Land%20of%20Risk-Land%20of%20Opportunity%20-2.pdf

[3] UC Davis Center for Regional Change. Land of Risk and Land of Opportunity. 2011. P 16. https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/FINAL-Land%20of%20Risk-Land%20of%20Opportunity%20-2.pdf

It is important to note that communication barriers and lack of access to information can also contribute to vulnerability for marginalized groups. During these same regional community conversations (as well as during the August 24th 2023 Data Walk), participants noted that during emergent hazards such as high flood events in the NSJV, many communities felt that information was not communicated effectively or in culturally relevant ways. Because many of these residents and communities struggle with lack or broadband or internet as well as language barriers, accessing information and data online can be a barrier. Because of an additional lack of trust in government, participants stressed the need to communicate risk through trusted community partners, something they noted to be lacking in current hazard communications. This places disinvested communities in a position of even greater vulnerability to environmental hazards because they may not have clear and trusted channels to rely on for information or communication about actions they should take. For a map of identified linguistic isolation percentiles in the NSJV, please reference Figure 3.3.10: NSJV Linguistic Isolation Levels CalEnviroScreen Percentile Map in the Public Health section.

Community Comment and Experience: Vulnerability and Pollution Exposure Summary

During the Data Walk held August 24th, 2023, multiple participants discussed the ways social vulnerability limited their ability to address climate and environmental threats and concerns. Participants noted that because so many people in their communities are already barely making ends meet, it may feel unrealistic for them to make changes or adopt adaptation measures that require any kind of upfront cost.

In this way, available mitigation measures or environmentally friendly alternatives in the region might already feel inaccessible to vulnerable communities, even when residents are willing and interested in making changes. Examples included accessing household climate adaptations like solar installation or heat hardening, as well as ZEV purchases. Participants noted that even when subsidies are available, it can feel like there are too many hoops to jump through.

Key here is that fact that when NVJV communities and residents are constantly in survival mode, they cannot adequately respond to environmental hazards they find themselves facing.

Identified Research Gaps and Call for Future Analysis – Social Vulnerability

The draft baseline assessment identified the need to build out a more detailed understanding of community vulnerability to environmental hazards and exposure. Ideally, this should include building out case studies highlighting the lived experience of disinvested communities throughout the NSJV, and centering these narratives in the design and planning of proposed projects and job development.

While not yet completed at the time of the baseline assessment, the data and research team are currently in the process of conducting a census tract level survey of climate and environmental hazards, exposures, and lived experience, with the goal of having data collection and results completed by March 2024.

For a complete overview of all identified data and research gaps related to this issue, please reference Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

See Appendix 3.2 A for a more complete profile of census tract level variations in vulnerability across the NSJV.

3.2.2 Regional Profile and Land Use

The North San Joaquin Valley (NSJV) covers approximately 4,920 square miles at the northern end of California's Central Valley. The region spans the width of the Valley, reaching from the Western coastal ranges to the foothills of the Sierra Nevada mountains in the East. Major rivers include the Stanislaus, Calaveras, Tuolumne, as well as the San Joaquin with its two tributaries, the Merced and Chowchilla. Additionally, the region contains multiple waterways that are part of the expansive Delta waterway system that extends from the Pacific Ocean to as far inland as the City of Stockton. The NSJV possesses a significant system of natural resources and protected areas, and houses nationally protected natural areas and wildlife refuges. This includes the Merced National Wildlife Refuge and the San Luis National Wildlife Refuge, as well as the San Joaquin River National Wildlife Refuge in Stanislaus County. Other natural areas also include the Great Valley Grasslands State Park in Merced County, which is significant because it preserves one of the few remaining examples of native grasslands in the Central Valley.[4] Acres of total protected open space in the NSJV are indicated below in Table 3.2.2.

Table 3.2.2 - Acres of Protected Open Space

Area	Protected open space	Open space per capita	Percent of total area
Merced	106,348	0.399	8.6%
San Joaquin	18,288	0.026	2.1%
Stanislaus	55,144	0.104	5.8%
NSJV	179,780	0.119	5.8%

Figure 1-Data for this indicator was obtained from the California Protected Areas Database, and the Census Bureau's American Community Survey (ACS). The acreage of open space obtained from the California Protected Areas Database for each county was divided by the population obtained from the ACS to arrive at open space per capita.

The NSJV region is predominantly agricultural, and a significant portion of the region's economy comes from the export and growth of agricultural goods. Other key industries include transportation logistics and manufacturing; major state transportation arteries in the region include Interstate 5, and Highways 99, 33, 165 and 59 running north to south, with Highways 4, 12, 26, 88, 120, 132, 140 and Interstates 205 and 580 running primarily east to west.

Patterns of future and expected drought — as well as changes and advances to technology — are likely to alter and reshape agriculture and land use throughout the NSJV, making land use and sustainable transitions a critical component of all future development in the three-county region. The requirements of the Sustainable Groundwater Management Act will lead to drastic changes in groundwater use and availability, which will alter land use and management strategies throughout the NSJV. Data from the Public Policy Institute of California estimates that broadly, throughout the entire San Joaquin Valley, between 500,000 and 1 million acres could come out of regular irrigated agricultural production by 2040 [5]. Such transitions will significantly impact the agricultural economy of the NSJV during the initial transitional period, and could negatively impact regional air quality without careful and strategic region wide planning. An uncoordinated "patchwork" of land brought out of production could increase airborne dust for neighboring communities, increasing existing public health concerns related to air quality such as asthma or even Valley Fever.[6]

Based on the Center for Business and Policy Research's 2018 review of the NSJV Table 3.2.3 below indicates current available data on total land converted to urban use in the three-county region.

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[4] California Department of Parks and Recreation. Great Valley Grasslands State Park. https://www.parks.ca.gov/?page_id=559
[5] Public Policy Institute of California. 2022. Land Transitions and Dust in the San Joaquin Valley. https://www.ppic.org/publication/land-transitions-and-dust-in-the-san-joaquin-valley/
[6] Public Policy Institute of California. 2022. Land Transitions and Dust in the San Joaquin Valley. https://www.ppic.org/publication/land-transitions-and-dust-in-the-san-joaquin-valley/

Table 3.2.3 - Land Converted to Urban Use in the NSJV

Area	2004 – 2006	2010 – 2012	2014 – 2016
Merced	1,959	437	2,142
Stanislaus	1,765	369	1,481
San Joaquin	4,497	2,295	1,806
NSJV	8,221	3,101	5,429

Figure 2-Data for this indicator was obtained from the California Department of Conservation, Farmland Mapping and Monitoring Program. The data presented in this table shows the net farmland lost to urban development. That is, the amount of farmland converted to urban use, minus the amount of urban land converted to farmland.

For remaining farmland, growers face additional choices given the landscape of future water availability in the NSJV. For instance, soils that are tilled less often will produce less dust and help improve air quality, which could help retain more water to help reduce flooding. At the same time, it may be hard to convince growers to change such practices, as more heavily tilled soil can produce more crops. More incentives and support from local government on these issues could be critical to successful development of these changing dynamics. [7]

Moving forward with sustainable land transitions in the NSJV might also include encouraging farmers losing productive land to consider other land uses, such as incentives for renewable energy projects or regional floodplain restoration efforts.

Climate Change and Redefining Growing Regions in the San Joaquin and Central Valley

Research indicates that not only will climate change impact heat and drought patterns throughout California's agricultural heartland, but will also redefine agricultural growing regions and create opportunities to grow new varieties of crops. Throughout the San Joaquin Valley, as farmers face changing climate patterns many are investing in new or alternative crops that excel in warmer temperatures. This also includes breeding more sustainable crops and varieties to better tolerate drought, heat, humidity and other components of a more unpredictable climate.[8]

For instance, near the town of Lindon in San Joaquin County, farmers have replaced some stone fruit and nut trees with olives. While grown in California, olives have traditionally been a minor crop as they prefer highly Mediterranean climates. With warming temperatures year-round, such crops are now excelling in more Northern regions like the NSJV. Likewise, many farmers in the Central Valley are increasingly bringing in crops like avocados and agave, which are generally grown in more tropical climates further to the south (most of California's avocados are grown between Santa Barbara and San Diego).[9]

Outside of the San Joaquin Valley, other examples include growers in Santa Cruz who are trying exotic tropical crops like lucuma, which is native to South American regions and excels in mild winters. Other growers along the coast are attempting plants like tropical dragonfruit, while in wine country like Sonoma and Napa Valley many wineries are locating new vineyards in coastal valleys or hillsides to avoid the extreme heat of traditional inland growing areas. [10]

Redefining the type of crops grown by farmers in the San Joaquin Valley will likely become increasingly critical as the region moves forward into a more erratic growing season. For instance, fruit and nut trees in the Valley are some of

[7] LA Times. 2023. The Central Valley is Ground Zero for Climate Change. https://www.latimes.com/environment/story/2023-10-25/central-valley-california-is-ground-zero-for-climate-change
[8] CalMatters. Bland, Alastair. 2023. Mangoes and Agave in the Central Valley. https://calmatters.org/environment/climate-change/2023/05/california-farmers-climate-change/
[9] CalMatters. Bland, Alastair. 2023. Mangoes and Agave in the Central Valley. https://calmatters.org/environment/climate-change/2023/05/california-farmers-climate-change/
[10] CalMatters. Bland, Alastair. 2023. Mangoes and Agave in the Central Valley. https://calmatters.org/environment/climate-change/2023/05/california-farmers-climate-change/

the most vulnerable to climate change, especially in the face of increasingly warming winters. This vulnerability is particularly problematic as approximately three-quarters of the nation's fruits and nuts are grown in California. While summer heat and drought also present challenges to these crops, warmer winters can be especially damaging. During warm winters, male plants may bloom and release pollen too late, meaning female flowers have already opened. This decreases pollination and results in less fruit. Some of this can be mitigated by grafting additional male varieties with different blooming schedules into the groves so that regardless of when female plants bloom, there is always pollen available. Crop scientists are also working to breed more resilient species of walnuts, pistachios and stone fruits, selecting for disease, heat and drought tolerance. [11]

Ultimately, while climate change presents numerous challenges for agriculture throughout the NSJV, the warming climate may also mean that growers and farmers are able to produce new crops that have historically been unable to thrive in Northern California Regions. Exploring new varieties of drought resistant crops may be another method for farmers to adapt crops to new cycles of increasingly warming winters and dry summers.

Identified Research Gaps and Call for Future Analysis – Regional Profile and Land Use

The data and research team note that future research is needed to build out a complete analysis of current land uses in the NSJV. This will allow the NV THRIVE team to better map regional potential for sustainable land transitions and alternative land uses. To this end, land use and sustainable land transitions have already been identified as key focus areas for future NV THRIVE working groups, and is a priority area for job growth and strategic change region wide.

Such analysis should also continue to examine changing crop patterns and growing regions throughout the NSJV to identify opportunities for investment in alternative crop varieties that could most benefit the agricultural economy of the region.

While not yet completed at the time of this report, the North Valley THRIVE research team is working with a team of researchers at Stanislaus State University (part of the research team) to develop a geospatial property inventory tool that would provide a comprehensive and efficient solution for viewing property information, tracking land use, and conducting spatial analysis of publicly owned properties in the NSJV. This tool would provide the Data and Research Working groups with a strong foundation for informed land-use planning and decision-making and serve as the basis for regional climate action and conservation strategies such as open space protection and floodplain restoration, as well as job growth and creation in these sectors.

For a complete overview of all identified data and research gaps related to this issue, please reference Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

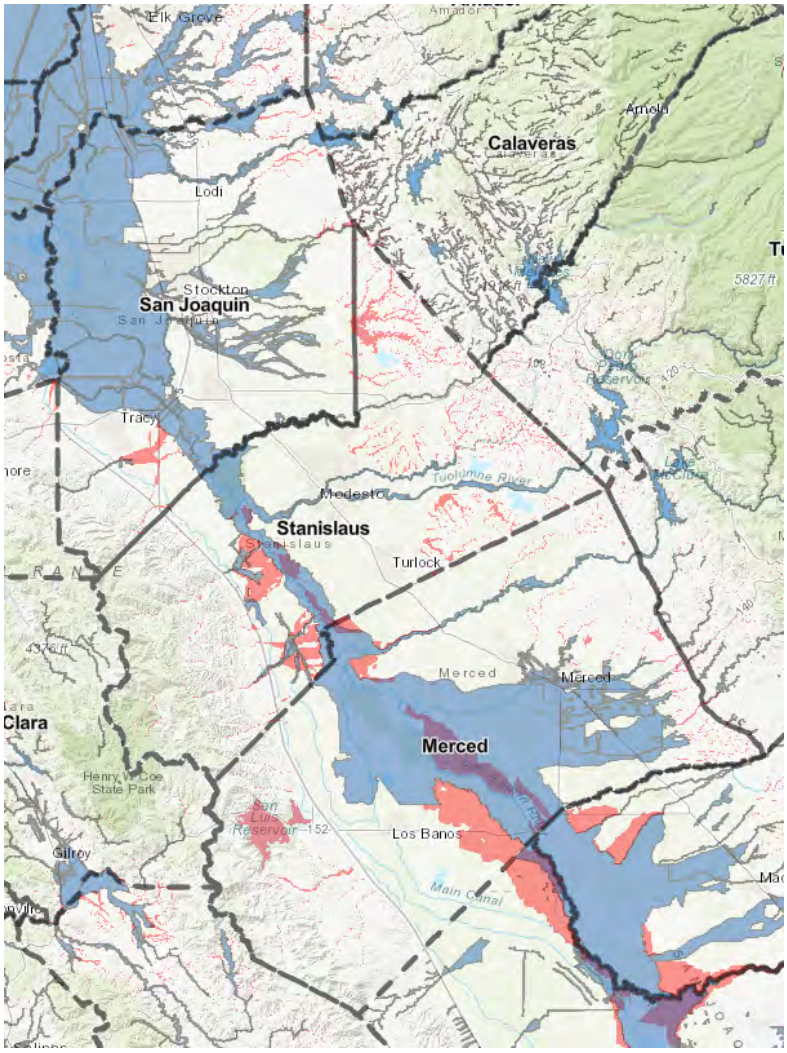
[11] CalMatters. Bland, Alastair. 2023. Mangoes and Agave in the Central Valley. https://calmatters.org/environment/climate-change/2023/05/california-farmers-climate-change/

3.2.3 — Environmental Hazards and Climate Exposure: Impact on Disinvested Communities, Occupational Hazards, and Industry

Flood Vulnerability and Changing Precipitation Cycles

By nature of geography, the NSJV is vulnerable to patterns of both extreme precipitation and extreme drought. Warm heavy to moderate rainfall is possible throughout the region from January – March. Known as the "pineapple express" or atmospheric rivers, these weather events can release massive amount of water over the region in a short period of time, overwhelming rivers and levee systems.

Figure 3.2.1 - Department of Water Resources: 100-year floodplains in the NSJV



Additionally, melt from heavy snowfall in the Sierra Mountain Range cause the river levels in the NSJV to rise significantly. In both instances, this can lead to flooding throughout the complex levee system and river system in the NSJV.[12] All three counties have roads and low-lying communities which – in times of severe winter storms or flooding – remain highly vulnerable to flooding due to proximity to floodplains, major waterways and vulnerable levees and dams. As indicated in Figure 3.2.1, many parts of the NSJV are surrounded by 100-year floodplains, making a large part of the region highly vulnerable to flood events.

According to CAL- ADAPT's regional climate snapshot tool, a review of historic and projected precipitation data through the end of the century indicates that California is not expected to see drastic changes in annual average precipitation in the next 50-70 years. However, this precipitation will be likely to occur in the form of a shorter wet season and more intense storms. [13] This pattern will cause both longer drought periods and more severe rain events through end of century. Longer periods of drought will increase the vulnerability of soil and ground to erosion and run off during heavy rain or flood events.

According to Risk Factor's County Flood Threat Assessment, many properties in the NSJV remain vulnerable to such flooding despite adaption measures already in place. This assessment in depicted below in Table 3.2.4. Of the three

[12] County Level Hazard Plans for San Joaquin, Stanislaus and Merced Counties.
[13] Cal-Adapt. Local Climate Change Snapshot for Stanislaus County. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot

counties in the NSJV, San Joaquin county has the highest level of vulnerability to flooding due to both the number of properties at risk of severe flooding in the next 30 years, as well as the percent of total properties at risk.

Table 3.2.4 Current Flood Vulnerability in the NSJV[14]

County	Percentage of Vulnerability	Percent of Total Properties
San Joaquin	**30,287** properties that have a greater than **26% chance** of being severely affected by flooding in the next 30 years.	64%
Stanislaus	**29,289** properties that have a greater than **26% chance** of being severely affected by flooding in the next 30 years.	30%
Merced	**28,065** properties that have a greater than **26% chance** of being severely affected by flooding in the next 30 years.	56%

Ultimately, many areas in the NSJV are highly vulnerable to flooding due to their proximity to the Delta, major rivers, and regional floodplains. See Figure 3.2.2 for a depiction of all identified flood zone in the NSJV. As noted in the Stanislaus Multi-jurisdictional Hazard Mitigation Plan, most flood conditions result from heavy, prolonged rain or rapid snow thaw. Flooding could involve extensive life and property loss, interruption of transportation and communications systems, significant loss and damage to agricultural land, and interruption of government infrastructure. While Stanislaus County has a comparatively lower flood risk compared to the rest of the NSJV, key areas remain highly vulnerable in high precipitation or run off events. This includes areas along the Tuolumne River near Modesto and the San Joaquin River near Patterson [15]

Major dams in Stanislaus County may also be at high risk of hydrological failure during major flooding events. Many key reservoirs in California are over 50 years of age on average. This means that often, they were constructed with

Community Comment: Flood Risk and Communication Barriers

Residents across the three-county region repeatedly stressed that vulnerability to flooding and the need for infrastructure repair were key concerns. While large scale flooding can pose serious threats to infrastructure and residents, it is important to note that even without large scale damage, many residents in the Valley regularly experience "nuisance flooding" in ways that negatively impact their daily lives. Comments and experiences included the following:

"A lot of flood issues because no drainage"

"Floods in places of no sidewalks" - This is a recurring theme in unincorporated areas of the county… no sidewalks on rainy days cause kids to walk through layers of mud on their way to school.

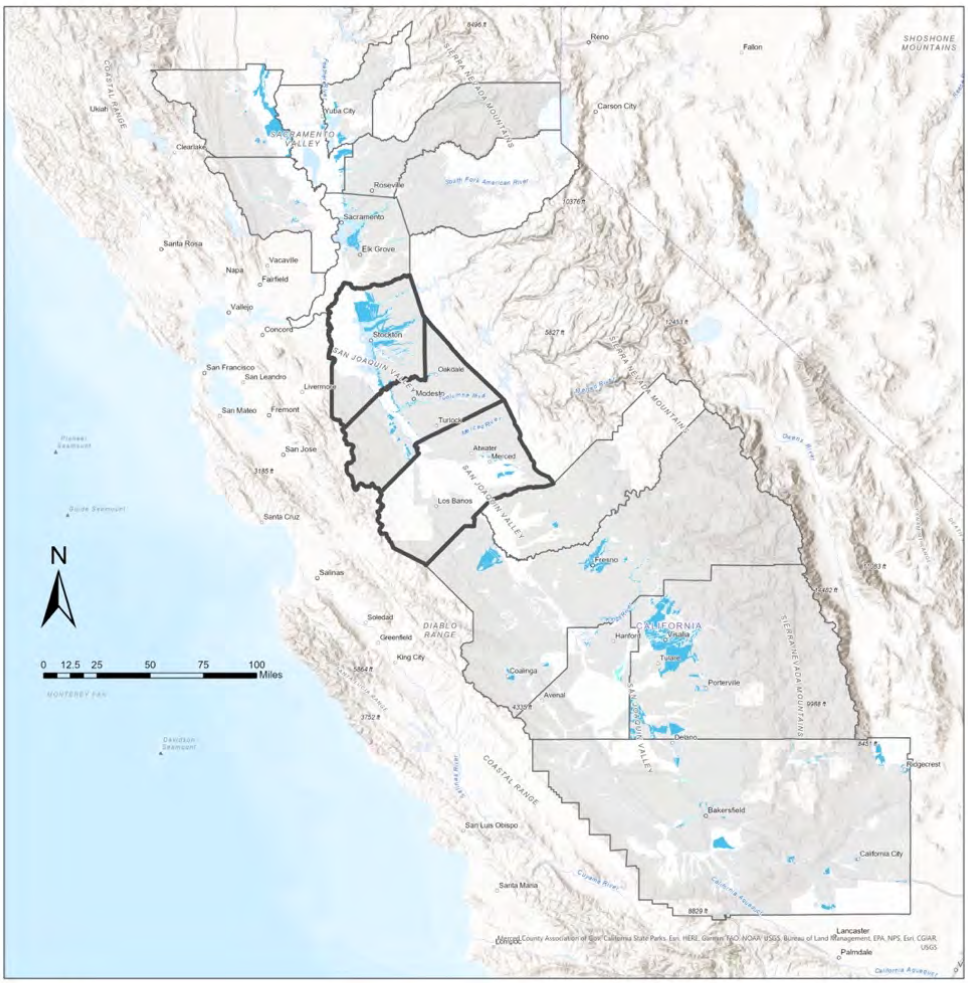
-The Center Church - Small Vendors / Start Up Business of South Modesto

"There's always problems with roads and water."
-Invest In Me - Youth from Patterson

[14] Risk Factor. Flood Risk Overview. San Joaquin, Stanislaus and Merced Counties. Accessed 2023. https://riskfactor.com/county/san-joaquin-county-ca/6077_fsid/flood
[15] Stanislaus County. Local Hazard Mitigation Plan. 2016. P 87-88. https://stanoes.com/pdf/lhmp/2017-lhmp.pdf

limited flood hazard assessments and data records. Research published in 2019 by the Journal of Advancing Earth and Space Sciences found that such dams are highly vulnerable to future flood events caused by the warming climate. Don Pedro Dam on the Tuolumne River in Stanislaus County was one of four dams statewide that the study identifies as most at risk of flood hazard and hydrological failure due to increasing temperatures through end of century.[16]

Figure 3.2.2 – Flood Zones in the NSJV[17]



Flood Zones

Zone Subtype

- Floodway
- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard Contained in Channel
- 1% Depth Less Than 1 Foot
- Area with Reduced Flood Risk Due to Levee
- Area of Minimal Flood Hazard
- <Null>

- North Central Valley
- Counties

Source: Federal Emergency Management Agency (FEMA). https://www.floodmaps.fema.gov/NFHL/status.shtml

Notes: "Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

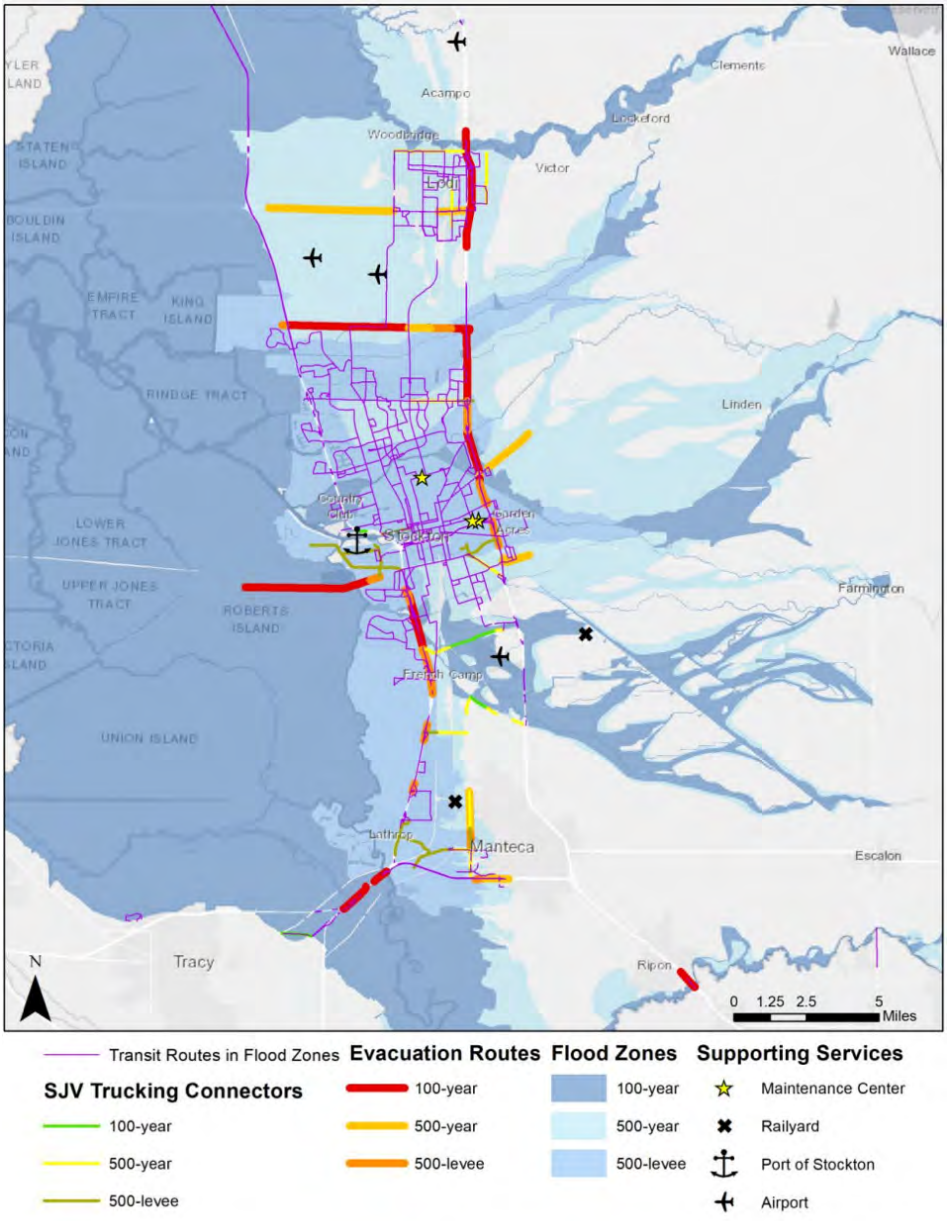
[16]Mallakpour, et al. Climate-Induced Changes in the Risk of Hydrological Failure of Major Dams in California. Advancing Earth and Space Sciences. 2019. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018GL081888

[17] Flood zone map created by Dongni Ma, University of California, Berkeley MLA Candidate, with supervision from Professor Zoé Hamstead, Department of City & Regional Planning.

Key Flood Risk in San Joaquin County

Given the proximity to the Delta, San Joaquin County maintains the greatest flood risk of the three-county region. In the San Joaquin Council of Governments 2020 Climate Adaptation Report, the county notes particular overlapping vulnerabilities in the Stockton and Delta region that make the area particularly at risk compared to the rest of the NSJV region.

Figure 3.2.3 Key Flood Risk Areas in the City of Stockton, San Joaquin County[18]



Depicted in Figure 3.2.3, vulnerabilities include a low level of service evacuation routes and main transit routes located in the 100- and 500-year floodplains. Key assets located in these floodplains also include the Port of Stockton, the airport, and the Stockton railyard.[19]

[18] San Joaquin Council of Governments Climate Adaptation Report. 2020. P39. https://www.sjcog.org/DocumentCenter/View/5355/SJCOGAdaptationReport_4220?bidId=

[19] San Joaquin Council of Governments Climate Adaptation Report. 2020. P35-38. https://www.sjcog.org/DocumentCenter/View/5355/SJCOGAdaptationReport_4220?bidId=

Despite being inland, parts of San Joaquin County also remain vulnerable to sea level rise due to it's proximity to the Delta waterways. Regional analysis from Climate Central predicts approximately 2.9 feet of rise locally by 2100, from a 1992 baseline. Their analysis translates this to 34 percent multi-year risk of at least one flood exceeding 3 feet from 2016 to 2030, a 93 percent risk by from 2016 to midcentury, and a 100 percent risk by 2100. Under high-end projections, Climate Central predicts that these chances increase to 50, 100, and 100 percent. Further, their research indicates a 100 percent risk of at least one flood exceeding 6 feet by the end of the century . [20] The inundation depth of sea level rise in San Joaquin County under a high emissions scenario is depicted below in Figure 3.2.4.

Sea Level Rise and Saltwater Intrusion

The San Joaquin Delta is characterized by a water salinity gradient – seasonal and daily salinity levels are influenced by the balance of fresh water and ocean water flowing into and out of the Delta. Multiple forces impact these fluctuating salinity levels, including climate (such as tidal forces and rainfall/drought) as well as hydrology and human actions (such as agricultural run-off, water diversions, and reservoir operations). Freshwater flows in the Delta are typically monitored so that the Delta remains fresh throughout the year, ensuring that salinity remains at levels appropriate for human and agricultural uses. As such, a system of levees as well as saltwater intrusion and drought barriers have been constructed to minimize excess salinity. Rising sea levels increase flooding hazards for both levees and intrusion barriers.[21] Further, beyond flood risk itself, sea level rise can work to push salt water further inland. This impacts freshwater supplies beyond the Delta itself, and can have numerous impacts on municipal, industrial, agricultural, and ecological water uses throughout the NSJV region.[22]

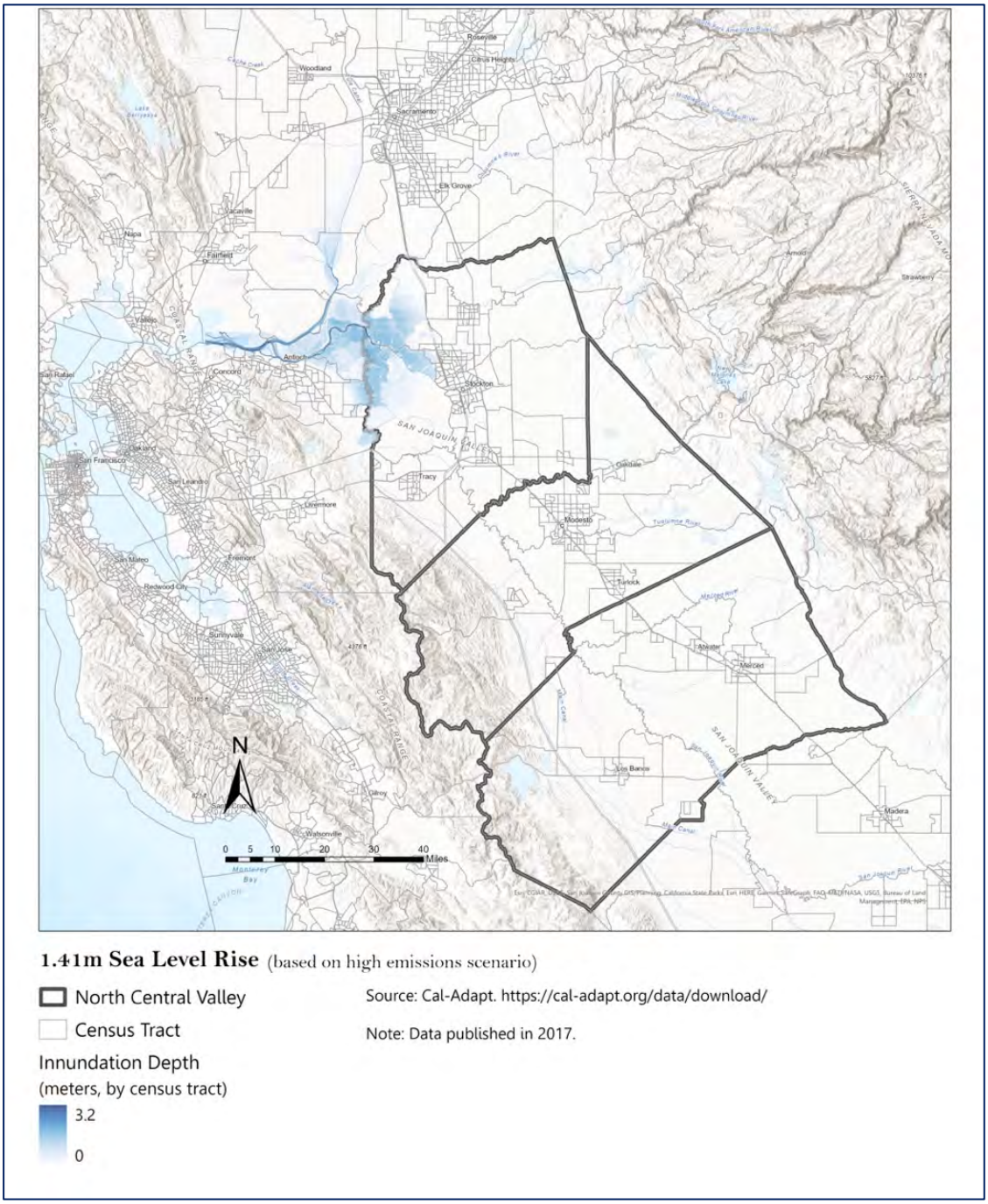
Identified Research Gaps and Call for Future Analysis

Preliminary research indicates that sea level rise and increased flood risk caused by climate change could negatively impact the salinity of the Delta and cause saltwater intrusion for surrounding and inland areas. Future research should examine how rising seas, increased drought and saltwater intrusion will impact freshwater access for communities throughout the NSJV.

For a complete overview of all identified data and research gaps related to this issue, please reference Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

[20] Climate Central (2016). Sea level rise and coastal flood exposure: Summary for San Joaquin County, CA. Surging Seas Risk Finder file created July 21, 2016. Retrieved from http://ssrf.climatecentral.org.s3-website-us-east1.amazonaws.com/Buffer2/states/CA/downloads/pdf_reports/County/CA_San_Joaquin_Countyreport.pdf
[21] Delta Council. Salinity Management Workshop. https://deltacouncil.ca.gov/pdf/science-program/2022-04-26-27-salinity-management-workshop-delta-salinity-primer.pdf
[22] Department of Water Resources. Saltwater Intrusion. https://water.ca.gov/Water-Basics/Drought/Saltwater-Intrusion-and-Drought-Salinity-Barriers

Figure 3.2.4 – Severe Storm Event: Sea Level Rise in the Delta and San Joaquin County [23]



[23] Projected sea level rise map created by Dongni Ma, University of California, Berkeley MLA Candidate, with supervision from Professor Zoé Hamstead, Department of City & Regional Planning.

Case Study: Vulnerable Levee Systems and Flood Risk in the City of Stockton[24]

Certain cities in San Joaquin County are highly vulnerable to flooding due to not just proximity to rivers and waterways, but also due to systemic underinvestment in levee repair and maintenance. The city of Stockton and its surrounding suburbs sits at the mouth of the San Joaquin River, and is home to over 800,000 people. It is both one of the diverse cities in California, as well as one of the most economically distressed. Decades of underinvestment have resulted in a network of leak prone and vulnerable levees as the City's primary means of flood protection. Researchers warn that a major rain event has strong potential to overflow or burst these levees; in such a case, much of Stockton could be buried under at least 10-12 feet of water. The worst of this damage will be experienced by Stockton's communities of color, who make up over 80% of the total population. Climate change will further stress this vulnerable system of levees, as more severe storms and rain events are expected through end of century.

Flood protection for cities in the NSJV has never been fully equal — when the system of levees protecting the region were first developed at the end of the nineteenth century, they were constructed in ad hoc fashion by farmers and ranchers all trying to protect their own lands and property. Economically wealthy areas ended up with better defenses as these initial networks were managed by local districts rather than by a centralized agency. As levee systems have developed and expanded in years since, cities like Stockton fell behind in infrastructure investments as local authorities struggled to find the funding for important repairs and updates.

According to leadership at the Central Valley Flood Protection Board, some of this is due to the priorities of regional leadership — the focus on securing water for agricultural irrigation rather than river management has deprioritized big flood mitigation funding, and left many levees and the communities around them highly vulnerable to damage.

New Funding for Levee Repairs in the Stockton Area

Stockton is currently working to address these needed infrastructure investments and seek alternative funding sources for levee repair. In June 2023, the San Joaquin Area Flood Control Agency (SJAFCA) Board of Directors adopted its Levee Construction and Maintenance Assessment, which asked approximately 94,000 properties to take on increased costs for levee maintenance. Under this annual property assessment, properties will also take on the local cost share for 23 miles of levee improvements along the San Joaquin and Calaveras Rivers. San Joaquin County reports that 58 percent of the weighted vote was in favor of the assessment. This assessment is expected to bring in approximately $1.4 billion in levee improvements to North and Central Stockton. For every $1 invested by Stockton property owners, they will also receive $9 in Federal and State funding. Construction is set to begin next year on the first segment of the project, which will target the dryland levee on Tenmile Slough adjacent to the Brookside community. This levee is considered one of the most vulnerable and is unlikely to hold up to a combination of high water and wind wave action. According to a San Joaquin County press release, additional components of the project will include improvements to Fourteen Mile Slough, the east bank of the San Joaquin River adjacent to the Van Buskirk community, both banks of the Calaveras River, and Mosher Slough. The entire project is expected to take 10 years to complete. [25]

[24] Grist Online. Bittle, Jake. 2023. California's Next Flood Could Destroy One of It's Most Diverse Cities. https://grist.org/extreme-weather/stockton-california-storm-flooding-atmospheric-river-central-valley-levees/
[25] San Joaquin County. 2023. Stockton Property Owners Say Yes to $1.4 Billion in Levee Improvements. https://www.sjgov.org/press-releases/press-release-detail/2023/06/21/stockton-property-owners-levee-improvements

Riverian Management and Flood Prevention in Merced County

Large areas of Merced County are at risk of being inundated by a 100-year flood event. The City of Merced, City of Atwater, and unincorporated areas of the County are predominantly inundated by the 100-year floodplain and have the greatest percentages of total loss from a 100-year flood event. The county estimates total structural exposure is approximately $4.4 billion. The county's Hazard Plan also notes that development in the 500-year floodplain is typically not regulated, thus a large flood event could be extremely damaging in the County and City of Merced.[26]

Case Study: Riparian Management and Inadequate Flood Control in Merced County

Research also illustrates that riparian management and inadequate stream channel maintenance in the NSJV may play a significant role in both flood risk and management throughout the region. During January 2023, California was hit by a string of significant atmospheric rivers which caused devastating flooding for communities throughout the NSJV. In Merced County, these floods destroyed businesses, farmland and homes after water backed up in clogged water channels and streams and broke through, spilling over creek banks and levees. In the small town of Planada (just East of the City of Merced on the 140), almost every home sustained flood damage after Miles Creek overflowed. A recent 2023 lawsuit blames the California's Department of Fish and Wildlife (CDFW), alleging that CDFW stood in the way of needed stream channel maintenance permit requests going back to 2018, preventing Merced agencies from being able to conduct required flood control on rivers and waterways in the region. As the overseer for all natural waterways in the State, CDFW requires all agencies to obtain permit agreements flood maintenance work on any of these waterways. The lawsuit states that the CDFW allowed permit requests to drag on for years, citing emails going back to 2018. [27]

According to the lead counsel for the plaintiffs suing CDFW, "I've seen the records, I've seen how they stalled and delayed it. I have hired engineers, hydrologists, and they tell me straight away that if these channels were cleaned like they should have been, there would have been very little, if any, flooding in January of 2023." [28]

Review of over 30 regional General Plans, Climate Action Plans, and Local Hazard Mitigation Plans has indicated that many of the communities located near floodplains, rivers and vulnerable levees are often primarily minority and lower income. These communities are less likely to have the resources to respond to or recover from severe flooding events.

Further, as noted by participants at the August 24th CERF Data Walk attended by close to 100 regional stakeholders, hazard communication to many vulnerable communities in the NSJV may often feel insufficient or unclear to communities themselves. Barriers in communication of potential or emergent risk are often due to language barriers or cultural differences, meaning that the most flood vulnerable communities in the NSJV continue to experience the highest levels of risk both in terms of exposure as well as preparation capacity.

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[26] Merced County. Local Hazard Mitigation Plan. 2016. P 117.. https://web2.co.merced.ca.us/pdfs/oes/MercedCounty-MJHMP-2021-2016.pdf
[27] SJV Water. Vad, Jesse. 2023. Merced Agencies Sought Approval to Clear Streambeds for More than Five Years. https://sjvwater.org/merced-agencies-sought-state-approval-to-clear-streambeds-for-more-than-five-years-before-last-winters-floods-now-theyre-suing/
[28] SJV Water. Vad, Jesse. 2023. Merced Agencies Sought Approval to Clear Streambeds for More than Five Years. https://sjvwater.org/merced-agencies-sought-state-approval-to-clear-streambeds-for-more-than-five-years-before-last-winters-floods-now-theyre-suing/

Community Comment: Flooding, Hazard Mitigation and Communication Barriers

During the Data Walk held on August 24th, 2023, community members also highlighted regional flooding as a Key Concern for Many Communities Across the NSJV.

This included identification of vulnerable levees and dams, hazard communication challenges and the need for floodplain restoration as key components of addressing flooding in the NSJV. Particular challenges included hazard and risk communication around flooding, specifically for non-English speaking communities. Participants also recognized that the need to restore floodplains and repair aging levees represents a strong opportunity for regional job creation and growth:

Infrastructure Vulnerability and Flood Threat:
- "Dam infrastructure a significant risk for communities"
- "Dam infrastructure on Stanislaus River - VERY vulnerable to flooding and a big storm. Re: Don Pedro dam and New Melones dam."
- "Communities aren't designed to handle floods"
- "Potential for drought and flooding curtailing agriculture"

Hazard Communication Challenges:
- "Residents aren't informed on how to prepare for flooding"
- "Hazard Mitigation Communication:

-Workers and hazard mitigation [how do they get hazard communications?]
-Underserved communities: services are there but info is not.
-Information access: language barriers in communicating risk.
-How do you get information out? What if people have no phone or other way to access alerts?"

- "Outside of immediate events, not a lot of communication with many communities."
- "Never had anyone describe/inform what a levee was or why it was important."

Data Walk participants specifically highlighted communication barriers and vulnerabilities during flood events in the regions: "**When communities try to get information, it is often not consolidated**. Participants suggested a **real time alert system that could update like a traffic map or google maps**. This platform could crowd source real time data to tell people which areas or streets to avoid".

As one participant noted, the "best sources of information are people in their own neighborhoods."

Identified Research Gaps and Call for Future Analysis

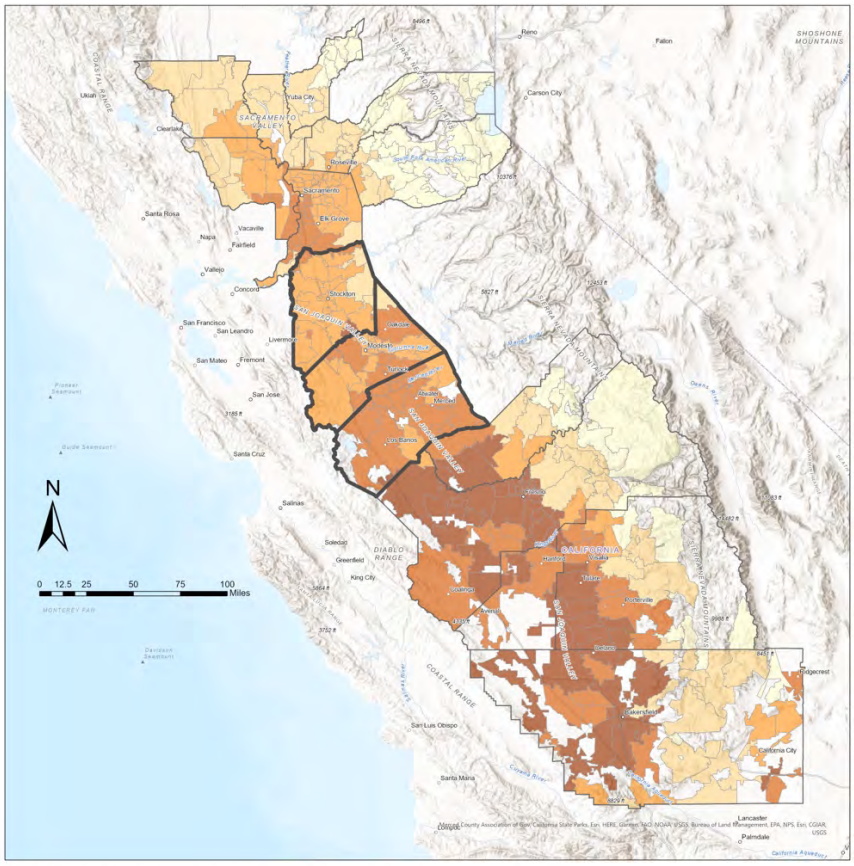
The draft baseline assessment identified the need to develop a comprehensive understanding of riparian and natural resource management in the NSJV. This includes an understanding of existing permitting processes and potential administrative barriers related to natural resource management and flood control throughout the three-county region.

For a complete overview of all identified data and research gaps related to this issue, please reference Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

Drought in the NSJV

Historically – as in other parts of the San Joaquin Valley – the NSJV also experiences periods of severe drought, generally followed by moderate periods of recovery.[29] As noted above, according to CAL-ADAPT the NSJV is not expected to see drastic changes in annual average precipitation in the next 50-70 years, however this precipitation will be likely to occur in the form of a shorter wet season, longer dry periods, and more intense storms. Projected dry spells for the NSJV are indicated below in Figure 3.2.5. Even under the most severe high emissions model, end of century models indicates a maximum of 0.1-inch increase or decrease change in annual precipitation for San Joaquin, Stanislaus and Merced Counties.[30] However, the NSJV can expect to experience longer periods of severe drought through end of century.

Figure 3.2.5 – Dry Spell Projections for the NSJV[31]



[29] See County Level Hazard Plans as noted below for more detail.

[30] Cal-Adapt. Local Climate Change Snapshot for Stanislaus County. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot

[31] Dry Spell Projection map created by Dongni Ma, University of California, Berkeley MLA Candidate, with supervision from Professor Zoé Hamstead, Department of City & Regional Planning.

Longer drought periods will impact the NSJV region in several ways. Increased drying and shrinking of the ground under roads can cause asphalt cracking which can damage transportation infrastructure and cause transit delays. Drought can also increase the vulnerability of soil and ground to erosion during heavy rain or flood events. In turn, erosion can increase dust and exacerbate existing air quality issues. It is also possible that drought could lead to lower surface water levels in some parts of the Delta, which could impact the ability of some ships to use stationary docking. Finally, increased drought also increases regional vulnerability to other climate hazards such as wildfires, which become more likely during periods of increased heat and less rain or snowfall.[32]

Impact to Agriculture and Status of Groundwater Basins in the NSJV

Additionally, drought and precipitation changes pose significant threat to agriculture throughout the NSJV region. Drought means less surface water available for regional irrigation; the transition to groundwater sustainability under the Sustainable Groundwater Management Act[33] will require further constraints throughout the NSJV. This is further exacerbated by climate change and increased environmental regulations. Ultimately, these water restraints will result in reduced water availability for irrigated lands. Agriculture in areas where groundwater basins are overdrafted will be less able to draw on surface water supplies and will be at increased risk of land fallowing. This could cause significant socioeconomic losses for the region in the absence of mitigation measures such as flexible water trading and expanding water supply options.[34] Not only will this mean increased land fallowing throughout the NSJV region, but without strategic and targeted efforts, this could also mean a decreases in available jobs for field and farmworkers in many areas across the three counties.

Groundwater Basins in the NSJV

In March of 2023, the Department of Water Resources (DWR) announced decisions for groundwater sustainability plans (GSPs) for 12 critically overdrafted groundwater basins in Central California. Of the 12, plans for six basins are recommend for approval with recommended corrective actions for the basins to remain in an approved status. The remaining six basins were deemed inadequate and are transitioning from DWR's oversight to the State Water Board for State intervention under the Sustainable Groundwater Management Act (SGMA). Adopted in 2014, SGMA requires local groundwater sustainability agencies (GSAs) in medium- and high-priority groundwater basins, which includes 21 critically overdrafted basins, to develop and implement GSPs.[35]

According to the Department of Water Resources, recently approved basins in the NSJV included Eastern San Joaquin Subbasin in San Joaquin County and Merced Subbasin in Merced County. Two NSJV subbasins were deemed inadequate and are transitioning to DWR oversight. This includes the Chowchilla Subbasin in Madera and Merced counties and Delta-Mendota Subbasin in San Joaquin, Stanislaus, Merced, Fresno, Madera, and San Benito counties.[36]

The primary groundwater subbasins in the NSJV, California are detailed below in Table 3.2.6.

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[32] San Joaquin Council of Governments Climate Adaptation and Resiliency Study. April 2020. P 54. https://www.sjcog.org/DocumentCenter/View/5355/SJCOGAdaptationReport_4220?bidId=

[33] California Department of Water Resources. Sustainable Groundwater Management Act. https://water.ca.gov/programs/groundwater-management/sgma-groundwater-management

[34] Escriva-Bou, Alvar; Hanak, Ellen; Cole, Spencer; Medellin-Azuara, Jose. Public Policy Institute of California. Policy Brief: The Future of Agriculture in the San Joaquin Valley. https://www.ppic.org/publication/policy-brief-the-future-of-agriculture-in-the-san-joaquin-valley/

[35] CA Department of Water Resources. California Advances Groundwater Sustainability with Release of Decisions for Management Plans in Critically Over drafted Basins. https://water.ca.gov/News/News-Releases/2023/March-23/California-Advances-Groundwater-Sustainability-with-Release-of-Decisions-for-Management-Plans

[36] CA Department of Water Resources. California Advances Groundwater Sustainability with Release of Decisions for Management Plans in Critically Over drafted Basins. https://water.ca.gov/News/News-Releases/2023/March-23/California-Advances-Groundwater-Sustainability-with-Release-of-Decisions-for-Management-Plans

Table 3.2.6 - Primary Groundwater Subbasins in the NSJV

County	Subbasin	GSP Managing Entity
San Joaquin	Stockton Subbasin	Part of the Eastern San Joaquin Subbasin/Eastern San Joaquin Groundwater Authority
San Joaquin	Tracy Subbasin	Banta-Carbona Irrigation District GSA Byron-Bethany Irrigation District GSA City of Lathrop GSA City of Tracy GSA County of San Joaquin GSA Stewart Tract GSA
San Joaquin	Eastern San Joaquin Subbasin	Eastern San Joaquin Groundwater Authority
San Joaquin	Delta-Mendota Subbasin (partially overlaps with San Joaquin County)	San Luis & Delta-Mendota Water Authority
Stanislaus	Turlock Subbasin	West Turlock Subbasin GSA and East Turlock Subbasin GSA
Stanislaus	Modesto Subbasin	Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA) Groundwater Sustainability Agency
Merced	Chowchilla Subbasin	Chowchilla Water District GSA, Madera County GSA - Chowchilla Subbasin, County of Merced GSA, and Triangle T Water District GSA

The majority of groundwater basins in the NSJV are considered to be in critical overdraft. For a complete map of all Critically Overdrafted Groundwater Basins, please refer to Appendix 3.2.B.

Based on a review of all primary groundwater sustainability plans and key water management plans for the NSJV, the primary concerns facing the main groundwater subbasins in San Joaquin County, Stanislaus County, and Merced County, California include the following:

Groundwater overdraft: One of the significant concerns in these areas is the unsustainable extraction of groundwater, leading to a negative groundwater balance. Over pumping can result in long-term declines in groundwater levels and reduction in water availability.

Water quality: Contamination of groundwater with pollutants, such as agricultural chemicals, industrial waste, and urban runoff, is a major concern. Ensuring the quality of groundwater resources is crucial for drinking water supplies, agricultural irrigation, and ecosystem health.

Land subsidence: Excessive groundwater pumping can cause land subsidence, which is the sinking or settling of the Earth's surface. Subsidence can damage infrastructure, such as levees, canals, roads, bridges, and buildings, and can also impact the capacity of aquifers to store water. Subsidence can also increase a region's vulnerability to flooding in low lying areas.

Surface water-groundwater interaction: Managing the interaction between surface water and groundwater is important for maintaining a sustainable water supply. Surface water diversions, irrigation practices, and groundwater pumping can affect the availability and flow of both surface water and groundwater.

Regulatory compliance and groundwater management: Implementing effective groundwater management practices and complying with regulatory frameworks, such as the Sustainable Groundwater Management Act (SGMA) in California, is essential. It involves coordination among stakeholders, setting sustainable groundwater pumping limits, and developing long-term management plans.

Ecosystem impacts: Groundwater plays a crucial role in supporting natural ecosystems, including wetlands, rivers, and streams. Unregulated groundwater extraction can lead to reduced base flow, habitat degradation, and impacts on native plant and animal species.

These concerns highlight the importance of regional sustainable groundwater management practices, monitoring programs, and collaborative efforts among stakeholders to protect and ensure the long-term viability of groundwater resources in these subbasins.

Water Quality and Access in the NSJV

According to a report from the California Water Board, of the eight counties in the San Joaquin Valley, five of them — San Joaquin, Stanislaus, Merced, Fresno, Madera, Kern, Kings, and Tulare — have some of the highest rates of water contamination per person in the state.[37] Significantly, according to a 2019 PPIC report the San Joaquin Valley has more than half of all public water systems that are out of water-quality compliance in California, even though it has only 10% of the state's population.[38] This presents a serious concern for many communities throughout the region. Drinking water contamination can cause many serious health problems for users, including nervous or reproductive system impacts, gastrointestinal illnesses, and chronic diseases such as cancer.[39] For the San Joaquin Valley, nitrate contamination is one of the most widespread causes of water contamination. While it occurs naturally in low levels throughout the region, human activities — often related to agriculture operations such as the use or improper disposal of animal manure or fertilizers — as well as wastewater treatment discharge, can increase nitrates in water systems to levels dangerous to human health.

Significantly, research from U.C. Berkeley has demonstrated that smaller water systems and community water systems (CWSs) serving larger percentages of Latinos and renters receive drinking water with higher nitrate levels.[40] This suggests that socially and economically more vulnerable populations throughout the region also find themselves

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[37] California Water Boards. Water and Health in the Valley. https://www.waterboards.ca.gov/public_notices/petitions/water_quality/docs/a2239/overview/Documents/AR-Docs%20(296).pdf

[38] PPIC. Water and the Future of the San Joaquin Valley. 2019. P 8. https://www.ppic.org/wp-content/uploads/water-and-the-future-of-the-san-joaquin-valley-overview.pdf

[39] California Water Boards. Water and Health in the Valley. https://www.waterboards.ca.gov/public_notices/petitions/water_quality/docs/a2239/overview/Documents/AR-Docs%20(296).pdf

[40] Balazs, C. (2010). Just Water? Social Disparities in Nitrate Contaminated Drinking Water in California's Central Valley.

burdened with disproportionately higher lack of access to clean and safe drinking water. Because groundwater basins in the NSJV are critically overdrafted, residential wells are often quicker to go dry as larger surrounding agricultural wells pump groundwater at deeper depths. For many households, digging a deeper well can be prohibitively expensive and out of reach. According to data from the California Natural Resources Agency's Dry Well Reporting System, in the three county NSJV region 467 wells have been reported dry since 2005, 450 of which were residential/household wells. [41]

Lack of access to safe water also imposes additional economic burdens on communities throughout the San Joaquin Valley. When residents do not have safe access to clean water from either their city, community water system or domestic well, they are forced to spend additional money to purchase safe water. This "replacement cost" can result in a substantial financial burden for those who are already struggling to make ends meet. For example, the California Water Commission has calculated that many residents throughout the Valley spend up to 10 percent of their income on water, as they are effectively forced to buy safe bottled or vended water in addition to existing monthly water bills.[42] The EPA has established criteria for determining what is an "affordable" household cost for water; the agency considers potable water affordable if it costs less than 2.5% of small community median household income (MHI).[43]

In context, it is critical to consider the concept of "Cumulative risk and impact" contaminated drinking water has on regional residents. According to the National Environmental Justice Advisory Committee, this concept is "a matrix of physical, chemical, biological, social and cultural factors which result in certain communities and sub-populations being more susceptible to environmental toxins, being more exposed to toxins, or having compromised ability to cope with and/or recover from such exposure." [44] The National Academy of Sciences has also noted that compound stressors like socioeconomic factors and chemicals released from toxic land uses can amplify the impact of any singular pollution source. [45] For residents of the San Joaquin Valley (including the NSJV), communities are exposed to multiple sources of pollution. This includes exposure to other other drinking water pollutants, such as pesticides and arsenic (a known human carcinogen), but also through exposure to high levels of ozone, airborne particulate matter and other GHG emissions.

As shown in Figure 3.2.6, according to CalEnviroscreen4.0 (CES) the majority of the three county NSJV region is in the 90—100th percentile in terms of drinking water contamination, meaning they experience some of the highest water pollution in the State of California. To make this determination, the CES indicator combines information about 14 contaminants and 3 types of water quality violations that are sometimes found when drinking water samples are tested.

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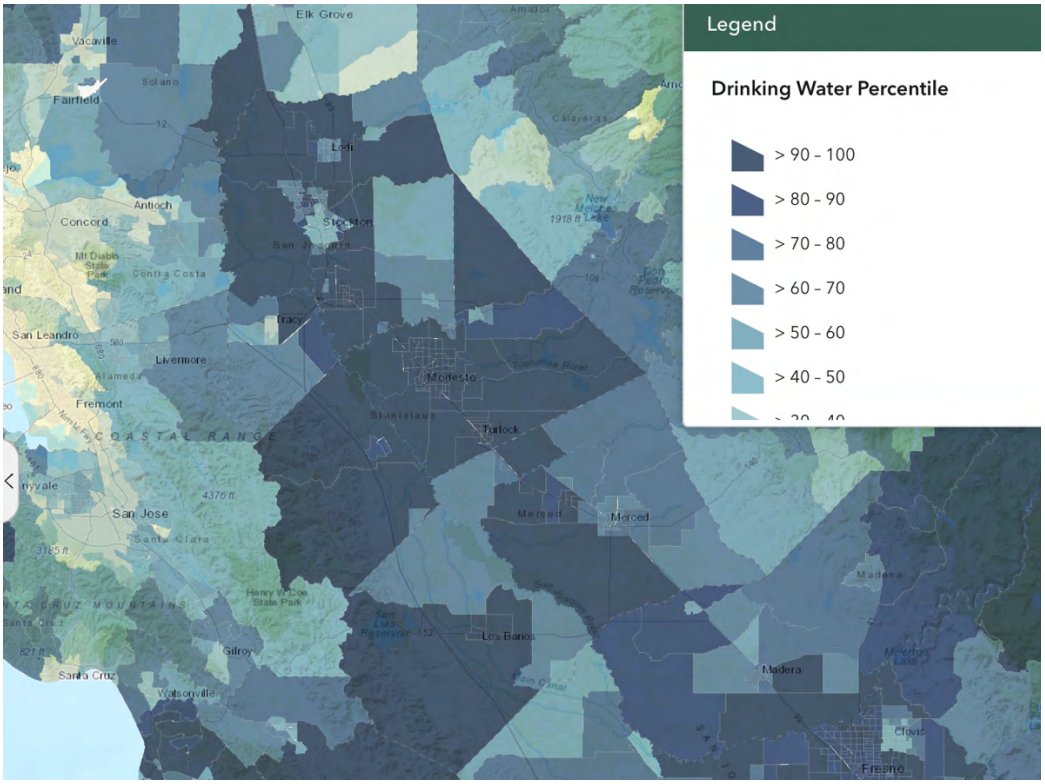
[41] California Natural Resources Agency. Dry Well Reporting System. https://data.cnra.ca.gov/dataset/dry-well-reporting-system-data
[42] California Water Boards. Water and Health in the Valley. P13. https://www.waterboards.ca.gov/public_notices/petitions/water_quality/docs/a2239/overview/Documents/AR-Docs%20(296).pdf
[43] American Water Works Association. Affordability Assessment Tool. P 6. https://www.awwa.org/Portals/0/AWWA/ETS/Resources/AffordabilityAssessmentTool.pdf
[44] National Environmental Justice Advisory Committee. Cumulative Risks and Impacts Group. (2004). Ensuring Risk Reduction in Communities With Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts. Washington: U.S. Environmental Protection Agency Environmental Protection Agency. P11. https://www.epa.gov/sites/default/files/2015-02/documents/nejac-cum-risk-rpt-122104.pdf
[45] California Water Boards. Water and Health in the Valley. P14. https://www.waterboards.ca.gov/public_notices/petitions/water_quality/docs/a2239/overview/Documents/AR-Docs%20(296).pdf

Figure 3.2.6 - Drinking Water Contamination in the NSJV[46]



According to the Healthy Places Index, the NSJV is ranked in the 3.4 percentile for the "Drinking Water Contaminants" indicator—the NSJV's second lowest performing indicator when compared to the rest of California's counties. For additional information regarding the impact of drinking water contamination and public health concerns for communities throughout the NSJV, please refer to Figure 3.3.19: HPI Clean Environment Indicators in the Public Health Section.

Disinvested Unincorporated Communities and Water Access in the NSJV

In addition to existing and future agricultural water demands, urban water demands will also grow as cities in the NSJV seek to attract new talent and grow existing regional industry. Many city water systems in the NSJV region also rely on groundwater as their primary water supply. Additionally, smaller water systems in the region serving more disbursed rural populations also rely on groundwater, as do residents of counties and unincorporated communities who rely primarily on domestic wells. These domestic wells tend to be shallower, and more vulnerable to lowering groundwater levels. [47] This makes counties in the San Joaquin Valley (including San Joaquin, Stanislaus and Merced) particularly vulnerable to drinking water contamination: groundwater is the primary source of drinking water for 90% of the residents of the San Joaquin Valley. [48]

The issue of access to water and reliance on domestic wells and smaller water systems is particularly acute for disinvested unincorporated communities in the NSJV region. Disinvested unincorporated communities are places

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[46] CalEnviroscreen 4.0 Indicator Map. Drinking Water Contamination. https://experience.arcgis.com/experience/ed5953d89038431dbf4f22ab9abfe40d/page/Indicators/?views=Drinking-Water-Contaminants
[47] PPIC. Groundwater and Urban Growth in the San Joaquin Valley. September 2021. https://www.ppic.org/publication/groundwater-and-urban-growth-in-the-san-joaquin-valley/
[48] California Water Boards. Water and Health in the Valley. P 4. https://www.waterboards.ca.gov/public_notices/petitions/water_quality/docs/a2239/overview/Documents/AR-Docs%20(296).pdf

outside of city and limits that often lack the most basic features of a safe, healthy, sustainable neighborhood—potable drinking water, sewer systems, safe housing, public transportation, parks, sidewalks, and streetlights. Historically, these communities are primarily made up of minorities – African American, Latino, and an increasing number of Southeastern Asian populations.[49] As unincorporated communities are generally governed by counties (who are not set up to provide services to denser urban areas) these communities are without the representation of a city council and underserved in access to key public resources such as drinking water systems and wastewater management systems. Critically, due to their lack of official recognition many unincorporated communities are often quite literally left off the map as not all unincorporated communities are large enough or established enough to be considered a census designated place. This means that in such communities, the data collection by the US Census Bureau – which serves as a foundation for demographic analysis — is less likely to occur, further isolating these communities from the decision-making process as well as much needed public services.[50]

Disinvested Unincorporated Community Locations in the NSJV

While locating such communities is critical, considering respective proximity to nearby cities or other communities is also key in determining options disinvested unincorporated communities (DUCs) have to improve infrastructure and services to residents. Communities directly adjacent to a city with existing service infrastructure (fringe communities) or a neighborhood surrounded by a city itself (island communities) face different challenges than a community located ten miles away (legacy communities). In some cases, fringe and island communities may have neighbors that have access to city services that they are cut off from or may even have infrastructure running underneath their homes.[51]

A 2018 study from the U.C. Davis Center for Regional Change updated a 2013 foundational mapping effort by Policy Link, which examined and mapped disinvested unincorporated communities in the San Joaquin Valley using 2000 census data. Specifically, this study mapped DUCs in relationship to existing water infrastructure, providing a more complete picture of both most vulnerable DUC's as well as the potential to access existing water resources. [52]

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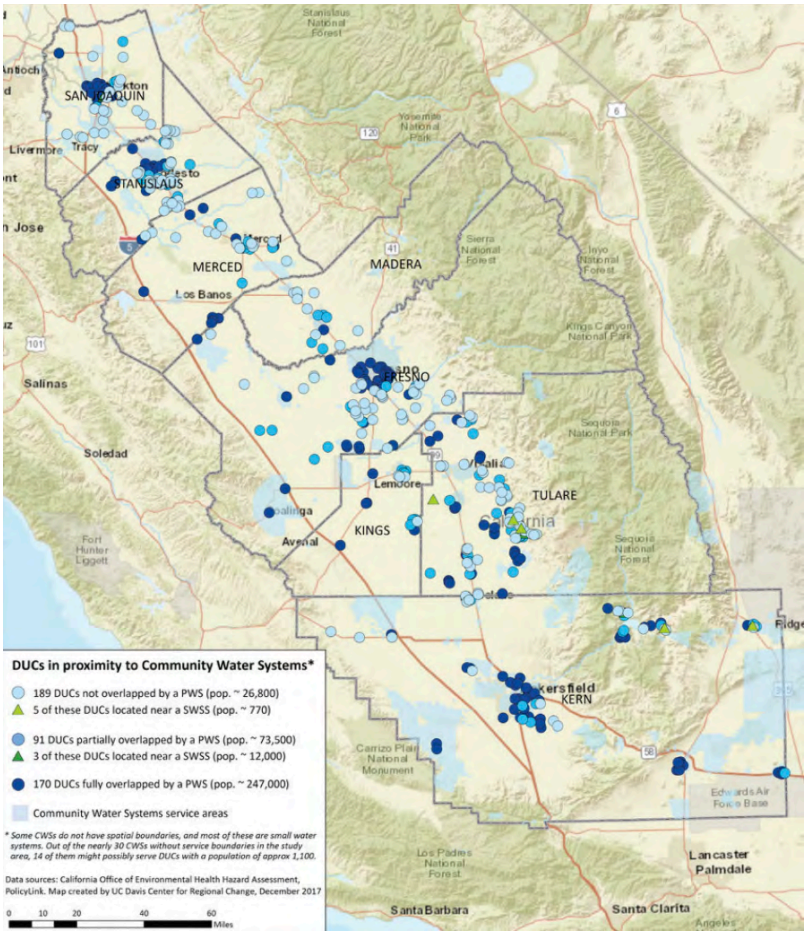
[49] Policy Link. CA Unincorporated Communities. 2013. P 9.
https://www.policylink.org/sites/default/files/CA%20UNINCORPORATED_FINAL.pdf
[50] Policy Link. CA Unincorporated Communities. 2013. P 13.
https://www.policylink.org/sites/default/files/CA%20UNINCORPORATED_FINAL.pdf
[51] Policy Link. CA Unincorporated Communities. 2013. P 23 -24.
https://www.policylink.org/sites/default/files/CA%20UNINCORPORATED_FINAL.pdf
[52]U.C. Davis Center for Regional Change. 2019. London et al. The Struggle for Water Justice: A Focus on Disinvested Unincorporated Communities. https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/The%20Struggle%20for%20Water%20Justice%20FULL%20REPORT.pdf
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/ucd.pdf

Figure 3.2.7 - DUCs and Access to Community Water Systems in San Joaquin Valley, CA[53]



As shown in Figure 3.2.7, of the approximately 450 DUC's in the San Joaquin Valley, 189 DUC's are not overlapped by a public water system (PWS). Five of these are located near a State Small Water Systems (SSWS).

SSWS provide piped water to the public for human consumption that has at least five but no more than 14 service connections. They are not legally considered to be a public water system due to system and population size. A SSWS "does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year".[54]

Significantly, SSWS, domestic wells and other self-supplied residences are not subject to state water regulations. As such they are often at high risk of exceeding healthy drinking water standards, due to the likelihood of contaminants in groundwater and lack of consistent oversight. [55]

Ninety-one DUC's in the San Joaquin Valley are partially overlapped by a PWS, with three located near SWSS. 170 DUC's are fully overlapped by a PWS. As such, approximately 58 percent of all DUC's are partially or fully overlapped by an existing PSW.

Disinvested Unincorporated Communities in the NSJV

As shown in Figure 3.2.8, the Northern San Joaquin Valley contains approximately 150 located DUC's. Approximately 72 DUC's in the NSJV are not overlapped by a CWS (indicated by light blue dots), while 32 DUC's partially overlapped by a CWS (indicated by medium blue dots). Approximately 46 DUC's in the NSJV are fully overlapped by a CWS (indicated by dark blue dots).

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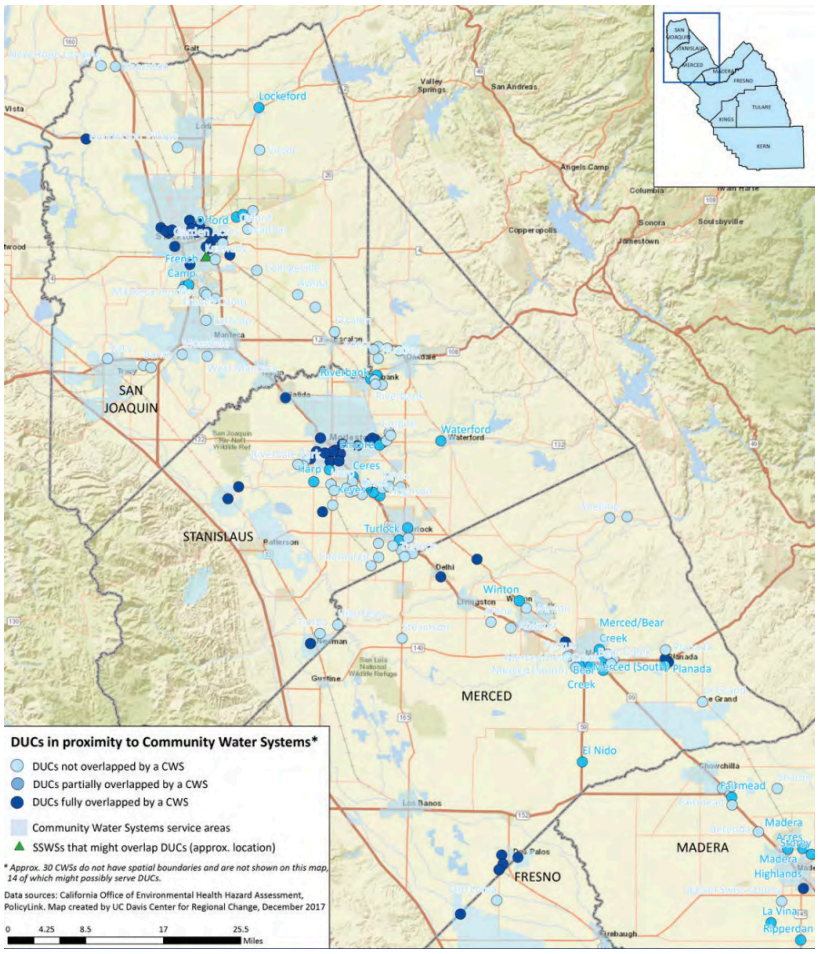
[53] U.C. Davis Center for Regional Change. 2019. London et al. The Struggle for Water Justice: A Focus on Disinvested Unincorporated Communities. P-17-18. https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/The%20Struggle%20for%20Water%20Justice%20FULL%20REPORT.pdf

[54] U.C. Davis Center for Regional Change. 2019. London et al. The Struggle for Water Justice: A Focus on Disinvested Unincorporated Communities. P 7. https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/The%20Struggle%20for%20Water%20Justice%20FULL%20REPORT.pdf

[55] CA State Water Resources Control Board. 2023. https://www.waterboards.ca.gov/safer/ssws_dw.html

Figure 3.2.8 - DUCs in Proximity to Community Water Systems in the NSJV [56]



Ultimately, approximately **52 percent of all DUC's in the NSJV** are partially or fully overlapped by an existing PWS. This illustrates that slightly more than half of the DUC's within the region may have opportunity to access existing water infrastructure. Conversely, for 48 percent of all DUCs in the NSJV, lack of direct proximity to existing service infrastructure is a significant barrier.

Research to date indicates that unincorporated communities (DUCs), disinvested communities (DICs) and water users who rely primarily on domestic wells for their water supply will be some of the most drought vulnerable communities in the NSJV. Additionally, climate change and longer periods of extreme drought will further deplete groundwater resources in the NSJV, stressing water access for communities that are already struggling.

What Happens When Communities Lack Access to Reliable, Clean and Affordable Water Supplies

Passed in 2012, California's Assembly Bill (AB) 685 made California the first state in the Nation to legally recognize the human right to water. The human right to water means that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.[57] While AB 685 has been a useful tool to better advocate for water accessibility and safety,[58] for many unincorporated communities in the NSJV, this right has been largely symbolic and unrecognized. Disinvested unincorporated communities in the NSJV not connected to city water systems often lack basic access to both potable water and sewer systems. This lack of access has numerous impacts on already under resourced communities. Lack of access to clean water and adequate sewer systems means that households cannot meet basic sanitation needs, exposing residents to numerous environmental hazards and public health concerns. This includes increased exposure to water contaminants such as nitrates, arsenic, and pesticide runoff, as well as exposure to improperly treated sewage or waste. Notably, when clean water is unavailable through existing city infrastructure, many households must resort to

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[56] U.C. Davis Center for Regional Change. 2019. The Struggle for Water Justice: A Focus on Disinvested Unincorporated Communities. P-17-18. https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/The%20Struggle%20for%20Water%20Justice%20FULL%20REPORT.pdf

57 AB 685, 2011-2012 Leg. Reg. Sess. (Cal. 2012) (codified at Cal. Water Code § 106.3 (West 2012)).

58 Cal Matters. 2022. 10 Years Later, California's Promise of Human Right to Water Remains Unfulfilled. https://calmatters.org/commentary/2022/12/water-human-right-law-california/

expensive and burdensome alternatives such as purchasing bottled water or paying to truck water into their communities.[59]

Given this reality for a significant number of communities in the NSJV, it is important that future development in the region consider both how industry operations will impact these communities, in addition to prioritizing clean water access and water justice for many of these most vulnerable communities in the NSJV. The principles of water justice attempt to frame structural inequities by considering three key components of justice: [60]

- **Distributional:** who is and isn't getting equitable access.
- **Procedural:** who is and isn't included meaningfully in decision making.
- **Recognitional:** whose experiences and knowledge is and isn't respected as valid.

For disinvested and unincorporated communities in the NSJV, adequately addressing water instability and ensuring that future development includes their communities and prioritizes their needs will require a consideration of such principles as criteria in all future project and efforts in the three-county region.

Community Comments: Water Access and Quality

Residents across the three county NSJV region also noted concern about water access as well as the safety and quality of their water. Comments and experiences included the following:

Multiple organizations identified water quality as one of the most negative features of their community.

When asked, "Why is it important to attract new business" organizational responses stated that **"**To bring more jobs to improve the water quality" was a key motivation.

- **Valley Improvement Projects - Families in Riverbank/Empire/Waterford.**

County coordinators across the three-county region noted that many residents reported that it was not unusual for water from their taps to be brown when it came out of the faucets, with little done by community leaders to address or fix the problem.

59 ACLU of Northern California. Cador and Salceda. A Survey of Efforts to Achieve Universal Access to Water and Sanitation in California. 2018. https://www.aclunc.org/sites/default/files/SurveyReport.pdf

60U.C. Davis Center for Regional Change. 2019. London et al.P 22-23 The Struggle for Water Justice: A Focus on Disinvested Unincorporated Communities. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/ucd.pdf

Identified Research Gaps and Call for Future Analysis

The draft baseline assessment identified the need to develop a comprehensive understanding of ground water sustainability, water resources, water use, and potential impacts of water sustainability strategies in the NSJV. This should include a closer examination of water access for identified DUCs, and the protections afforded them by approved Groundwater Sustainability Plans.

While beyond the scope of this report, the data and research team have noted the components required by such future analysis and have flagged this issue as a priority for future research development and capacity building.

For a complete overview of all identified data and research gaps related to this issue, please reference Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

Air Quality and Greenhouse Gas Emissions

As detailed in Valley Air's 2022 Annual Report, due to the region's topography and surroundings, the NSJV is frequently impacted by high pressure, strong inversion, and high heat conditions. As such, even external from the impacts of climate change, the North San Joaquin routinely experiences some of the most polluted air in California. Due to the NSJV's unique geography, air pollutants are often trapped in an inversion layer between the Sierra Nevada Mountains to the East and the Coastal Range to the West. Often, the air pollution experienced in the NSJV originates not just locally, but also from surrounding regions such as the Bay Area and Sacramento before settling in the Valley. Major sources for such pollutants include vehicle traffic and agricultural production year-round, as well as wildfires and agricultural burning in the summer and fall. The range of pollutants from these sources contain fine particulate matter (often called PM2.5) as well as ozone. PM2.5 is considered particularly dangerous as it can pass into the bloodstream and has been linked to many serious and fatal public health conditions including asthma, respiratory infections and irritations as well as heart conditions.[61] Additionally, studies have shown that PM 2.5 can also cross placental barriers and affect babies in utero.[62] Communities in the NSJV who do not have adequate indoor air filtration or who work outside are at increased risk for developing these conditions.[63]

As indicated in Figure 3.2.9, according to CalEnviroScreen's mapping analysis of PM2.5 concentration in the North San Joaquin and remainder of the Central Valley, the southern end of the valley tends to experience a higher concentration of these pollutants.[64] However, an examination of the same area using the Environmental Equity Axis Tool indicates that residents of the NSJV region experience only marginally less pollution burden than southern regions of the valley when examined in the context of existing social vulnerabilities.[65] Additionally, while all regions in the NSJV struggle with poor air quality, air pollution tends to be worse in the southern sections of the NSJV. This is due in part to the effect of the Delta breeze, which can work to clear airborne pollutants but rarely extends further

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[61] Union of Concerned Scientists. Climate Change Threatens Already Poor Air Quality in California's Central Valley. https://blog.ucsusa.org/carly-phillips/climate-change-threatens-already-poor-air-quality-in-californias-central-valley/

[62] Kirtan Kaur, Corina Lesseur, Maya A. Deyssenroth, Itai Kloog, Joel D. Schwartz, Carmen J. Marsit, Jia Chen, PM2.5 exposure during pregnancy is associated with altered placental expression of lipid metabolic genes in a US birth cohort, Environmental Research, Volume 211, 2022, 113066, ISSN 0013-9351, https://doi.org/10.1016/j.envres.2022.113066.(https://www.sciencedirect.com/science/article/pii/S0013935122003930)

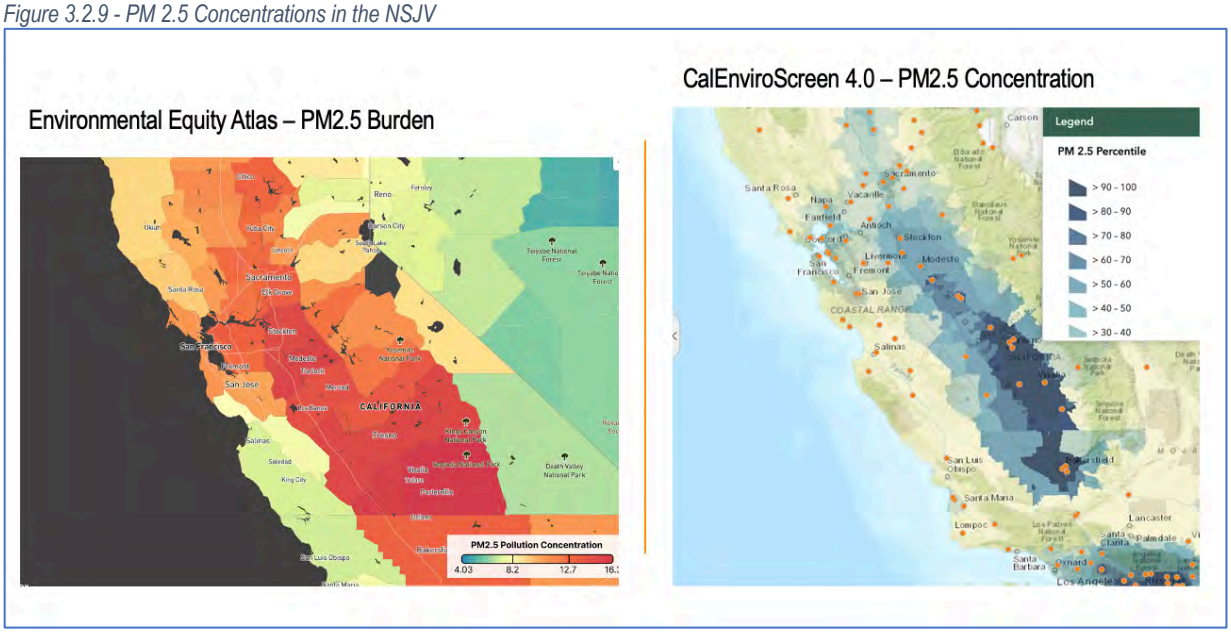
[63] Union of Concerned Scientists. Climate Change Threatens Already Poor Air Quality in California's Central Valley. https://blog.ucsusa.org/carly-phillips/climate-change-threatens-already-poor-air-quality-in-californias-central-valley/

[64] CalEnviroscreen4.0 Indicator Maps. Pollution Burden. Accessed 2023. https://experience.arcgis.com/experience/ed5953d89038431dbf4f22ab9abfe40d/page/Indicators/?views=PM2.5

[65] Environmental Equity Atlas Tool. Central Valley PM2.5 Pollution Burden. https://environmentaleq.com/

south than Modesto. Effectively, this creates two NSJV regions: the Northern segment which experiences comparatively improved air quality due to the delta breeze, and the Southern section which does not receive the benefits of the delta breeze.

Figure 3.2.9 - PM 2.5 Concentrations in the NSJV



Ground Ozone in the NSJV

According to the Environmental Protection Agency, ozone is a gas composed of three oxygen atoms and exists both in the Earth's upper atmosphere and at ground level. In the upper atmosphere, known as stratospheric ozone, ozone forms a protective layer against harmful ultraviolet rays. On the ground level, ozone becomes a harmful air pollutant and a key component of smog. Ground-level ozone is formed through chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOC) emitted by various sources like cars, power plants, and industrial facilities in the presence of sunlight. Effectively, when there is particulate matter and high temperatures, the ground level ozone is higher and more dangerous. In the NSJV, this means increasing levels of ground ozone along with increasing regional temperatures.[66]

When pooling Merced, San Joaquin, and Stanislaus counties, CalEnviroscreen (CES) indicates that ozone percentiles in the NSJV are at 60.8%. This means that these counties present better conditions than 39.2% of other California counties. Ozone, in this context, refers to the amount of daily maximum 8-hour ozone concentration.[67] The CES indicator measures the mean of summer months (May-October) of the daily maximum 8-hour ozone concentration, averaged over three years (2017 to 2019).[68]

Even at low levels of exposure, it is important to note that ozone can irritate the lungs, cause inflammation, and make chronic illnesses worse. For more data and interregional comparison of Ozone levels, see Appendix 3.3.A: NSJV Public Health Equity Index.

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[66] Environmental Protection Agency. Ground Level Ozone Basics. https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#wwh

[67] CalEnviroScreen4.0. San Joaquin, Stanislaus and Merced Counties. https://experience.arcgis.com/experience/6b863505f9454cea802f4be0b4b49d62

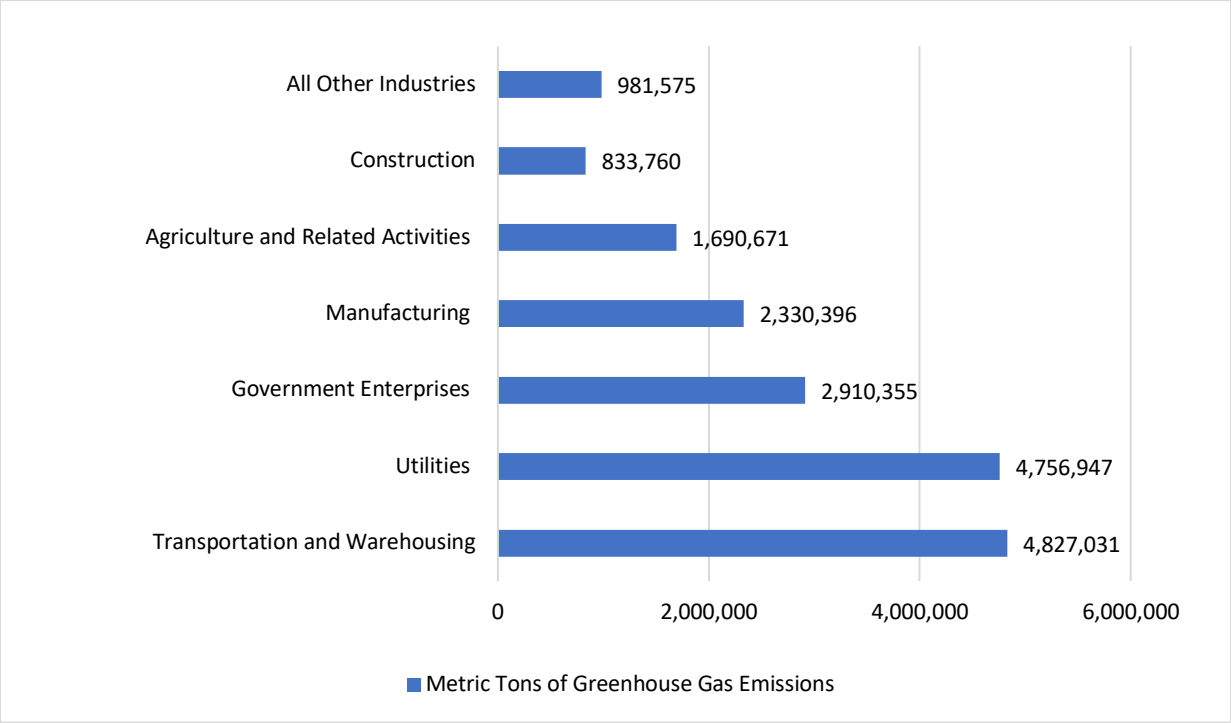
[68] Office of Environmental Health Hazard Assessment. CalEnviroscreen4.0. P31. https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf,

For a list of all actions taken to date by the California Air Resources Board (CARB) and the San Joaquin Valley Air Pollution Control District (SJVAPCD), please reference Appendix 3.2.H.

Major Sources of Greenhouse Gas Emissions

As indicated in Figure 3.2.10, the greatest sources of GHG emissions in the NSJV are transportation and warehousing, utilities, government enterprises, manufacturing, agriculture and construction. It is important to note that these sectors are also some of the NSJV's primary sources of industry and employment.
Early conversations with communities have indicated that this dichotomy is one many localities are already grappling to balance. Navigating the challenge of providing regional jobs that will allow residents of the NSJV to both build industry while also considering environmental impact will be a key challenge moving forward with the CERF process.

Figure 3.2.10 - Metric Tons of Greenhouse Gas Emissions in the NSJV



Source: IMPLAN 2021 Greenhouse Gases Satellite Account

This data suggests that several industry sectors are responsible for most climate and environmental impacts. These industry sectors likely to have a much larger share of environmental impacts than all other industries combined Please reference Section 3.2.4 Figure 3.2.18 and associated discussion for additional details regarding the intersection of climate and industry development in the NSJV.

Community Comments: Air Quality and Pollution

Residents across the three county NSJV region repeatedly highlighted concerns about air quality in their communities. Comments and experiences include the following:

"We are ruining the air because factories are releasing gas in the air and people are smoking and with the fires."

- Girl Scout Troop #3204 – Girls and their families from South and West Modesto

Organizations throughout the NSJV also noted that dust in the air from harvesting crops presented air quality concerns and threats.

During the **Data Walk held on August 24, 2023**, community members also noted in detail the duality of industry operation in the NSJV: There is a need to balance industry interests with environmental justice while at the same time also needing to engage industry and "be friendly" without failing to consider environmental concerns. Participants noted the following specific concerns:

- "Is it better to die of poverty or clean air"
- "Is it climate or jobs we care about more": not enough industries and people starve. However, we need more industry for a livable wage. If we make it too hard for industries to operate, they will go elsewhere for cheaper operation.

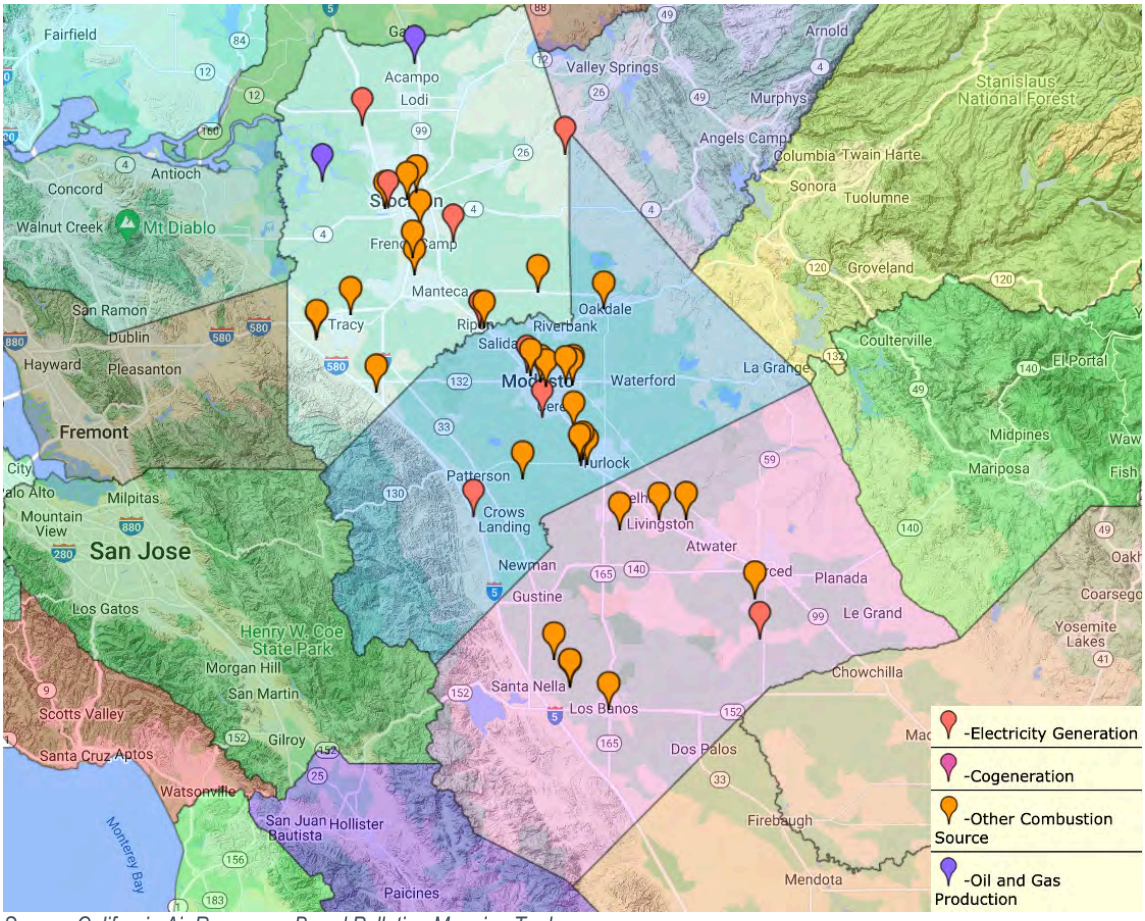
Data Walk participants noted that the topography of the Valley and naturally occurring inversion layer was also noted as a particular challenge when addressing air quality:

- "Not our pollution (coming from elsewhere/other regions), so the problem defines solution (re: what are we supposed to do about it)"

Pollution Source Mapping – Primary Point Source Facilities in the NSJV

As identified via the California Air Resources Board's Pollution Mapping Tool, Figure 3.2.11 depicts all sites in the NSJV that are major sources of criteria pollutants, toxic air contaminant, and greenhouse gas (GHG) emissions. [69]

Figure 3.2.11 - Point Sources for Airborne Pollution in the NSJV



Source: California Air Resources Board Pollution Mapping Tool

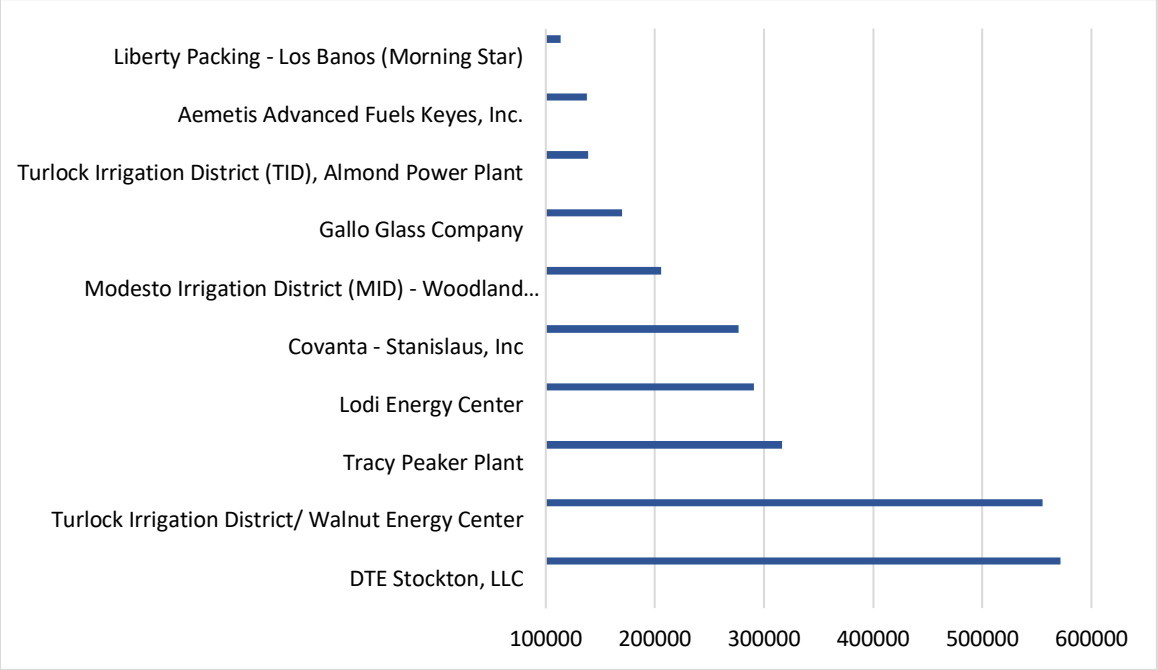
As identified in Figure 3.2.11, there are 45 identified facilities in the NSJV region. It is key to note here that only emissions directly emitted from California point source facilities are represented. Emissions from imported electricity and fuel suppliers are not included in the tool.[70]

The top ten facility sources of GHG Emissions in the NSJV are indicated below in Figure 3.2.12.

[69] California Air Resources Board. Pollution Mapping Tool. https://www.arb.ca.gov/carbapps/pollution-map/doc/caveats%20document12_22_2017.pdf

[70] Air Resources Board. Important Notes about CARB Pollution Mapping Tool. P 6. https://www.arb.ca.gov/carbapps/pollution-map/doc/caveats%20document12_22_2017.pdf

Figure 3.2.12 - Top Ten GHG Emissions by Facility in the NSJV[71]



Source: California Air Resources Board Pollution Mapping Tool

Of these top ten facilities, 70% are in the electricity generation sector, with three locations in San Joaquin County, six in Stanislaus County and one in Merced County. NAICS descriptions for these facilities include four Fossil Fuel Electric Power Generation facilities, one Solid Waste Combustors and Incinerator facility and one Biomass Electric Power Generation facility.[72]

The remaining 30% of the identified top emission source facilities in the NSJV are categorized as "Other Combustion Sources", and NAICS descriptions include Glass Container Manufacturing, Ethyl Alcohol Manufacturing, and Fruit and Vegetable Canning.[73]

It is important to note that high mass emissions do not necessarily represent a high risk for surrounding communities. Ranked-order listings of the substances with California Office of Environmental Health Hazard Assessment (OEHHA) approved risk assessment health values for cancer and noncancer chronic and acute effects should be considered in any interpretation. As discussed in CARB's own methodology, further analysis and dispersion modeling would be required to develop a more nuanced understanding of community impacts from any facility. [74] Also of importance, communities also experience pollution impacts from multiple non-point sources, such as mobile sources (such as from the transportation industry) or from more dispersed region wide sources and causes (such as the San Joaquin Valley's naturally occurring immersion layer). Nevertheless, understanding the location of facilities that are often the largest stationary sources for air pollution and contaminants for NSJV remains a critical initial step to addressing air quality concerns for many highly vulnerable populations throughout the three-county region.

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[71] California Air Resources Board. Pollution Mapping Tool. https://www.arb.ca.gov/carbapps/pollution-map/doc/caveats%20document12_22_2017.pdf
[72] California Air Resources Board. Pollution Mapping Tool. https://www.arb.ca.gov/carbapps/pollution-map/doc/caveats%20document12_22_2017.pdf
[73] California Air Resources Board. Pollution Mapping Tool. https://www.arb.ca.gov/carbapps/pollution-map/doc/caveats%20document12_22_2017.pdf
[74] CARB. Important Notes About the Pollution Mapping Tool. P 5. https://www.arb.ca.gov/carbapps/pollution-map/doc/caveats%20document12_22_2017.pdf

Rising Temperatures and Extreme Heat in the NSJV

According to Cal-Adapt, temperatures will continue to increase across the NSJV through the end of the century under both medium and high emissions modeling. This means that the three county NSJV region will have an increasing number of annual extreme heat days, higher average annual temperatures, and warmer nights.[75] This will have multiple negative impacts on communities, agriculture and infrastructure in the NSJV. For a visualization of the number of days when the temperature rises enough to require space cooling efforts, please reference Appendix C. The following details the expected temperature increases in the three county NSJV region under both medium and high emissions modeling.

San Joaquin County[76]

Annual Average Maximum Temperature: Looks at the average of all the hottest daily temperatures in a year. As indicated below in Table 3.2.7, San Joaquin County can expect to see temperature increases of 3.8 degrees by mid-century under a medium emissions model, and 4.9 degrees by end of century. Under a high emissions model, the County can expect 4.7 degrees of temperature increase by mid-century, and 8.1 degrees by end of century.
Annual Average Minimum Temperatures: Average of all coldest daily temperatures in a year. As shown in Table 3.2.7, minimum temperatures are expected to rise for the county as well, with a 3.3-degree change by mid-century and 4.4 degree change by end of century under a medium emissions model. Under a high emissions model, the County could see a 4.3 increase by mid-century and a 7.6 degree increase by end of century.
Extreme Heat Days: Number of days in a year when daily maximum temperature is above a threshold temperature of 101.6 degrees. For the extreme heat indicator, the threshold temperature used in this tool is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location. As indicated in Table 3.2.7, the County could see the number of extreme heat days increase from a historical 4 days annually to 18 days by mid-century under a medium emissions standard, and 24 days annually by end of century. Under a high emissions model, the region could see as many as 23 days of annual extreme heat by mid-century, and 45 days by end of century.
Warm Nights: Number of days in a year when daily minimum temperature is above a threshold temperature of 65.4 degrees. As shown in Table 3.2.7, historical data (1961 -1990) indicates a 30-year average of 4 nights a year. Under a medium emissions projection, this changes to 19 nights per year by mid-century (2025-2064) and 27 nights by end of century (2070-2099). Under a high emissions projection, this changes to 26 nights by mid-century and 60 nights by end of century.

[75] Cal-Adapt. Local Climate Change Snapshot for Merced, San Joaquin and Stanislaus Counties. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot

[76] Cal-Adapt. Local Climate Change Snapshot for San Joaquin County. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot

Table 3.2.7 - Temperature Changes for San Joaquin County

Baseline (1961-1990)	Mid-Century (2035-2064)			End-Century (2070-2099)		
Indicators	Medium Emissions	High Emissions	Change	Medium Emissions	High Emissions	Change
Annual Average Maximum (73.9 °F)	77.7 °	78.6 °F	+3.8 °F/+4.7 °F	78.8 °F	82.0 °F	+4.9 °F/+8.1 °F
Annual Average Minimum (47.4 °F)	50.7 °F	51.7 °F	+3.3°F/+4.3 °F	51.8 °F	55.0 °F	+4.4 °F/+7.6 °F
Extreme Heat Days (4 days)	18 days	23 days	+14 days/+19 days	24 days	45 days	+20 days/+41 days
Warm Nights (4 nights)	19 nights	26 nights	+15 nights/+22 nights	+23 nights	+56 nights	27 nights/60 nights

Stanislaus County[77]

Annual Average Maximum Temperature: Average of all the hottest daily temperatures in a year. Similar to Merced and San Joaquin Counties, Stanislaus can also expect to see increases to average maximum temperatures. As shown in Table 3.2.8, under a mid-century medium emissions model, up to a 3.8-degree increase, and 4.9 degrees of increase by end of century. Under a high emissions model, the County could see a 4.7-degree temperature increase by mid-century and up to 8.2 degrees by end of century.

Annual Average Minimum Temperature: Average of all coldest daily temperatures in a year. By mid-century, the County could see a 3.3 degree increase and up to 4.3 degrees by end of century under medium emissions models. Under a high emissions model, minimum temperatures could rise by 4.2 degrees by mid-century and 7.5 degrees by end of century.

Extreme Heat Days: Number of days in a year when daily maximum temperature is above a threshold temperature of 101.2 °F Note: Threshold temperature used in this tool is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location. Under a medium emissions model, the number of annual extreme heat days could increase from a historical average of 4 days to 14 days by mid-century and 21 days by end of century. Under a high emissions model, this increases to 20 days by mid-century and up to 43 days by end of century.

Warm Nights: Number of days in a year when daily minimum temperature is above a threshold temperature of 66.2 °F. Mid-century modeling predicts an increase from a historical average of five nights annually to 20 nights under a medium emissions model and 27 nights under a high emissions model. End of century models indicate an increase to 28 nights under medium emissions modeling and up to 58 nights annually given a high emissions model.

[77] Cal-Adapt. Local Climate Change Snapshot for Stanislaus County. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot

Table 3.2.8 - Temperature Changes for Stanislaus County

Baseline (1961-1990)	Mid-Century (2035-2064)			End-Century (2070-2099)		
Indicator	Medium Emissions	High Emissions	Change	Medium Emissions	High Emissions	Change
Annual Average Maximum Temperature (73.6 °F)	77.4 °F	78.3 °F	+3.8 °F/+4.7 °F	78.5 °F	81.8 °F	+4.9 °F/+8.2 °F
Annual Average Minimum Temperature (47.3 °F)	50.6 °F	51.5 °F	+3.3 °F/+4.2 °F	51.6 °F	54.8 °F	+4.3 °F/+7.5 °F
Extreme Heat Days (4 days)	18 days	24 days	+14 days/+20 days	25 days	47 days	+21 days/+43 days
Warm Nights (5 nights)	20 nights	27 nights	+15 nights/ +22 nights	28 nights	58 nights	+23 nights/+53 nights

Merced County[78]

Annual Average Maximum Temperature: Average of all the hottest daily temperatures in a year. As shown in Table 3.2.9, under both medium and high emissions models, annual maximum temperatures are expected to increase by a minimum of 4 degrees by mid-century to a maximum of 8.5 degrees by end of century.

Annual Average Minimum Temperature: Average of all coldest daily temperatures in a year. Minimum annual temperatures for Merced County are also projected to increase. Medium emissions models suggest an increase of 3.4 degrees by mid-century and 4.4 degrees by end of century. High emissions models increase this to a 4.3 degree increase by mid-century and a 7.7 degree increase by end of century.

Extreme Heat Days: Number of days in a year when daily maximum temperature is above a threshold temperature of 101.8 °F. Note: Threshold temperature used in this tool is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location. As indicated in Table Four, extreme heat days are projected to increase dramatically from a historical average of 4 days annually to 18 days under a mid-century medium emissions model and up to 52 days annually by end of century under a high emissions model.

Warm Nights: Number of days in a year when daily minimum temperature is above a threshold temperature of 67.2 °F. As depicted below in Table 3.2.9 the number of warm nights in Merced County will continue to increase from a historical average of 4 annually to 14 nights by mid-century under a medium emissions model and up to 51 nights annually under an end of century high emissions model.

Table 3.2.9 - Temperature Changes for Merced County

[78] Cal-Adapt. Local Climate Change Snapshot for Merced County. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot

Baseline (1961-1990)	Mid-Century (2035-2064)			End-Century (2070-2099)		
Climate Indicator	Medium Emissions	High Emissions	Change	Medium Emissions	High Emissions	Change
Annual Average Maximum Temperature (74.7 °F)	78.7 °F	79.6 °F	+4.0 °F/+4.9 °F	79.8 °F	83.2 °F	+5.1 °F/+8.5 °F
Annual Average Minimum Temperature (47.3 °F)	50.7 °F	51.6 °F	+3.4 °F/+4.3 °F	51.7 °F	55.0 °F	+4.4 °F/+7.7 °F
Extreme Heat Days (4 days)	22 days	29 days	+18 days/+25 days	30 days	56 days	+26 days/+52 days
Warm Nights (4 days)	18 nights	25 nights	+14 nights/+21 nights	25 nights	55 nights	+21 nights/+51 nights

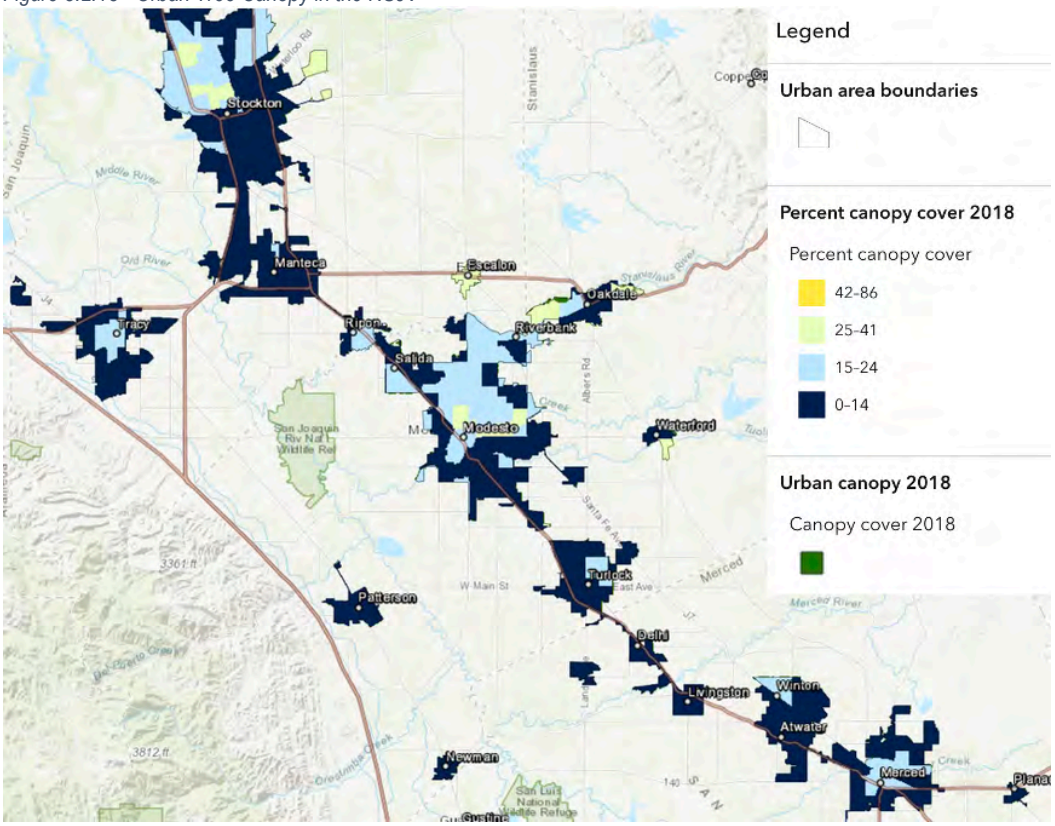
Urban Heat Islands and Tree Cover

As identified by the California EPA, urban areas often experience greater pollution, higher temperatures and more negative health impacts during hot summer months. This effect has been termed the "urban heat island". Per EPA research, heat islands are created by a combination of heat-absorptive surfaces (such as dark pavement and roofing), heat-generating activities (such as engines and generators), and the absence of vegetation (which provides evaporative cooling). The EPA's Urban Heat Island Index provides a tool to calculate a positive temperature differential over time (at the individual city level) between an urban census tract and nearby upwind rural reference points at a height of two meters above ground level, where people experience heat. Review of this Index indicates that urban areas in the NSJV fair worse than rural surrounding areas. The Index also indicates the presence of higher scores during heat waves [79] Given that the NSJV region could see an average of up to 49 annual extreme heat days by end of century, this presents a pressing concern for cities and urban centers in the region.[80]

This heat island effect is exacerbated by factors such as a lack of urban tree cover. According to the U.S. Forest Service's Urban Tree Canopy Mapping Tool, major cities in the NSJV including Stockton, Modesto and Merced have a severe lack of tree cover in their urban centers. As depicted in Figure 3.2.13, many cities in the NSJV have less than 24% tree cover.[81] This further illustrates that these urban centers are more vulnerable to the heat island effect as they have with less vegetation and trees available to absorb heat. (See also Figure 3.3.17: HPI Neighborhood Indicators in the Public Health Section).

[79] California EPA. Urban Heat Island Index for California. https://calepa.ca.gov/climate/urban-heat-island-index-for-california/
[80] For a detailed examination of Ca-Adapt predicted temperature changes under medium and high emissions modeling through the end of the century for the NSJV, see Tables One through Three in Appendix A.
[81] U.S. Forest Service. Urban Tree Canopy in California – North San Joaquin Valley. Accessed 2023. https://hub.arcgis.com/maps/usfs::urban-tree-canopy-in-california/explore?location=37.648769%2C-120.983514%2C10.00

Figure 3.2.13 - Urban Tree Canopy in the NSJV[82]



Heat Impact on Disinvested Communities

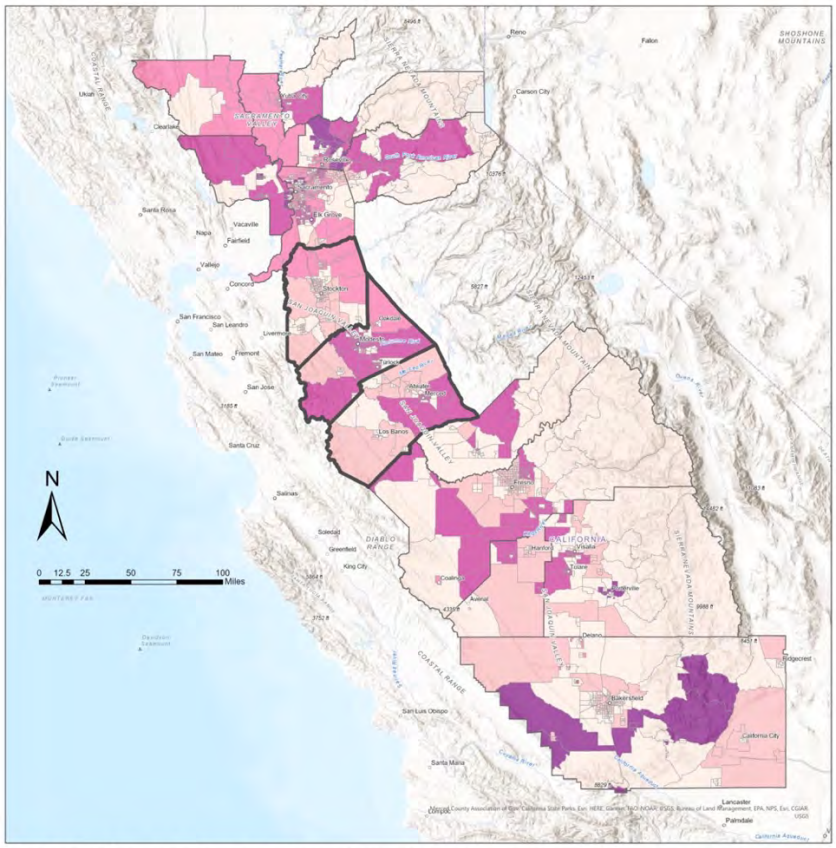
The effect of increasing temperatures and extreme heat days is felt most severely by already vulnerable communities. For example, as daily temperatures rise along with nightly temperatures (e.g. the number of annual warm nights), residents throughout the NSJV can't rely on the ability to open windows at night to cool down interior temperatures. This means that those without air conditioning many have fewer other resources available to stay cool. DICs are often located in regions with less urban tree cover density, which increases the surface temperature of roads and streets. Research indicates that the majority of major urban areas in the NSJV have less than 24% tree cover (see Table 3.2.13 above).[83] Further, NSJV communities with lower incomes are more likely to experience the daily impact of extreme temperatures as they are more often employed outside in industries such as agriculture and construction. [84]

Rising temperatures and extreme heat events across the NSJV will have numerous effects on public health. As indicated above, already vulnerable communities are likely to be even more sensitive to extreme heat days compared to the rest of the population. The California Heat Assessment Tool (CHAT) allows regions to track heat related health events in order to better understand local and regional vulnerability. Shown in Figure 3.2.14, many regions of the NSJV are expected to experience long duration heat health events. This is especially true for southern regions of both Stanislaus and Merced counties. According to CHAT, a Heat Health Event (HHE) is any event that results in

[82] U.S. Forest Service. Urban Tree Canopy in California – North San Joaquin Valley. Accessed 2023. https://hub.arcgis.com/maps/usfs::urban-tree-canopy-in-california/explore?location=37.648769%2C-120.983514%2C10.00
[83] U.S. Forest Service. Urban Tree Canopy in California – North San Joaquin Valley. Accessed 2023. https://hub.arcgis.com/maps/usfs::urban-tree-canopy-in-california/explore?location=37.648769%2C-120.983514%2C10.00
[84] EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. Appendix E – Temperature Mortality. P 5-6. U.S. Environmental Protection Agency, EPA 430-R-21-003. www.epa.gov/cira/social-vulnerability-report;

negative public health impacts, regardless of the absolute temperature. Each local area has a unique HHE specific to its climate and the historical sensitivity of people in that area to past heat events.[85]

Figure 3.2.14 – Heat Health Event Projections[86]



[85] California Heat Assessment Tool. https://www.cal-heat.org/about

[86] Heat Health Event Projection map created by Dongni Ma, University of California, Berkeley MLA Candidate, with supervision from Professor Zoé Hamstead, Department of City & Regional Planning.

Heat and Evapotranspiration — Potential Impact on Agriculture in the NSJV

Increasing temperatures can also increase the evapotranspiration of plants and crops throughout the NSJV region. Evapotranspiration (ET) is the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants. Effectively, as the atmosphere becomes warmer, it also becomes the thirstier, sucking water out of vegetation. As vegetation becomes drier and thirstier, it is not only becomes more prone to wildfires but can also cause increased levels of drought for regional cropland and agriculture. [87]

As atmospheric evaporative demand has increased, particularly in the western United States, crops now require more water than they did in the past. This heightened demand for water is a consequence of regional warming trends, which have led to higher evaporative demands. For every drop of precipitation that falls, less water is available to drain into streams, wetlands, and aquifers, which are critical sources for agricultural irrigation. The increased evaporative demand means that soils and vegetation experience drier conditions more frequently, which can lead to increased potential for forest fires, tree mortality, and failure in tree regeneration. These conditions are particularly concerning for NSJV agriculture, which relies heavily on consistent water supply for the irrigation of crops. With less water available due to higher evaporative demands, there is a risk of reduced agricultural productivity and increased water stress on farming operations. [88]

Rising Temperatures — Impact on Transportation and Infrastructure

Annual increasing temperatures and increasing extreme heat days also pose threats to transportation in the region. For example, as identified by the San Joaquin Council of Governments' 2020 Climate Adaptation and Resilience study, extreme temperatures can cause damage to roads through asphalt and concrete cracking, and damage to rail systems by causing tracks to buckle. Heat can also hinder air travel as planes may not be able to take off in extremely high temperatures. Even passenger and bus transit can be disrupted due to vehicle overheating. Given the region's reliance on agriculture and distribution, threats to transportation pose serious problems for long term economic sustainability.[89]

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[87] Albano, C. M., Abatzoglou, J. T., McEvoy, D. J., Huntington, J. L., Morton, C. G., Dettinger, M. D., & Ott, T. J. (2022, April 1). A multidataset assessment of climatic drivers and uncertainties of recent trends in evaporative demand across the continental United States. AMETSOC. https://journals.ametsoc.org/view/journals/hydr/23/4/JHM-D-21-0163.1.xml?tab_body=abstract-display

[88] McEvoy, D. J., Pierce, D. W., Kalansky, J. F., Cayan, D. R., & Abatzoglou, J. T. (2020). Projected changes in reference evapotranspiration in California and Nevada: Implications for drought and wildland fire danger. Earth's Future, 8, e2020EF001736. https://doi.org/10.1029/2020EF001736

[89] San Joaquin Council of Governments Climate Adaptation and Resiliency Study. April 2020. P6; P 53. https://www.sjcog.org/DocumentCenter/View/5355/SJCOGAdaptationReport_4220?bidId=

Community Comment and Experience: Heat and Green Space Access
Community members also stressed the need for increased access to green space and recreation areas:

"Community Gardens" and "Better Parks"

- Invest In Me - Youth from Patterson

Community members also stressed that they were concerned about the need to leverage existing natural resources and create more green space rather than building over them. In response to being asked "How might we build on what we already have?" communities highlighted the following:

"Keep our farmlands instead of building over them"

- **LGBTQ+ Collaborative**

"Use public land and turn it into farming for communities (community gardens)"

- ***MLK JR Committee*** (Org that serves West Modesto communities)

"Disappearance of nature" was also noted as a key concern.

- **Valley Improvement Projects - Families in Riverbank/Empire/Waterford**

Identified Research Gaps and Call for Future Analysis

The draft baseline assessment identified the need to analyze the impact extreme temperatures will have on the NSJV electrical grid and the ability of infrastructure to adapt to rising regional temperatures.

Prior research on regional grid vulnerability has focused on the broader San Joaquin Valley region, and has noted significant gaps in accessing data and information relevant to grid age and condition. There is great need to further analyze these issues in the context of the NSJV, and identify key regional vulnerabilities and weaknesses.

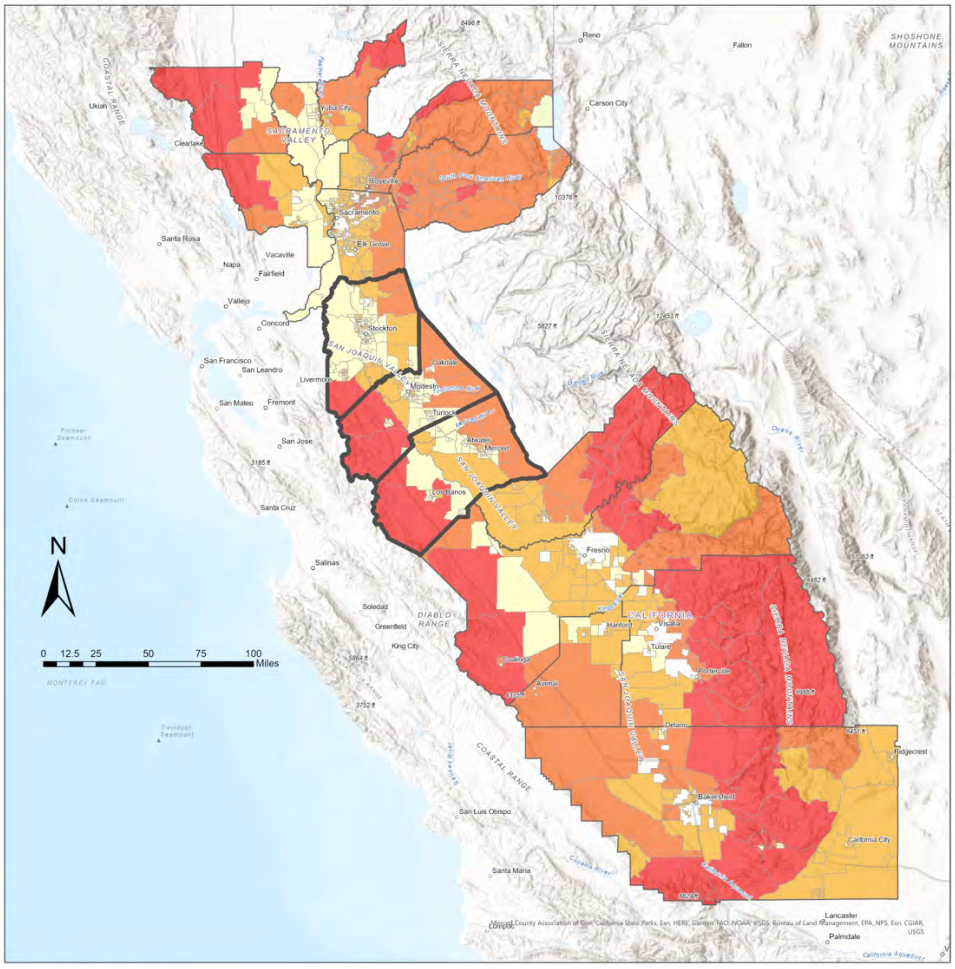
While beyond the scope of this report, the data and research team have noted the components required by such future analysis and have flagged this issue as a priority for future research development and capacity building.

For a complete overview of all identified data and research gaps related to this issue, please Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

Wildfire Risk in the NSJV

As indicated by the fire hazard severity zone maps developed by the Office of the State Fire Marshall and depicted in Figure 3.2.15, the eastern and western edges of the NSJV remain highly vulnerable to wildfires where the terrain backs into the coastal ranges to the west and the Sierra Nevada Ranges to the East.

Figure 3.2.15 Fire Hazard Zones in the NSJV[90]



[90] Fire Hazard map created by Dongni Ma, University of California, Berkeley MLA Candidate, with supervision from Professor Zoé Hamstead, Department of City & Regional Planning. For the created map, zip code-level climate indicators are based on the value of the nearest 6-km pixel.

County Hazard Mitigation Plans in the NSJV note that all three counties (San Joaquin[91], Stanislaus[92] and Merced[93]) are exposed to a variety of wildfire hazard conditions that vary based on fuels, topography, weather, and human behavior (including existing housing and development patterns). It is likely that increased drought and changes to precipitation will continue to increase fire risk for the region going forward. As indicated below in Table 3.2.10, Risk Factor's fire risk analysis identifies Merced County as having the highest wildfire risk of the three-county region. Risk Factor calculates this percentage based on the level of risk the properties within a county face over the next 30 years, rather than the proportion of properties with risk. Factors considered in the evaluation include risk from wildfires from fire fuels, weather, humans, and fire movement.[94]

Table 3.2.10 - NSJV Wildfire Property Risk[95]

County	Percent of Properties at Risk from Wildfire
San Joaquin	52%
Stanislaus	65%
Merced	89%

Earthquake Risk in the NSJV

While the NSJV is not known for seismic activity, most of California is at risk for earthquakes due to major active fault lines such as the San Andreas, Hayward, and Calaveras faults. Risks include damage to buildings, infrastructure and roads, as well as cracking and damage to dams and levees. As such, Local Hazard Mitigation Plans across the NSJV region consider the threat of seismic activity in both emergency planning as well as infrastructure development. Specific risk assessments vary based on the hypothetical epicenter of an earthquake as well as the degree of shaking. While both Merced and Stanislaus counties include some assessment of the estimated cost of damages due to ground shaking, [96] [97] the 2023 San Joaquin County update to the local hazard plan omits earthquakes from consideration, noting that while the County has a history of seismic activity, the likelihood and magnitude of a significant incident are minimal. [98]

Climate Change and Occupational Hazards for Workers and DICs

Research and early community conversations have indicated that many workers in the NSJV are already experiencing adverse working conditions due to rising temperatures. Rising daily temperatures are altering shifts and changing worker's schedules, pushing start times earlier and earlier. This often has ripple effects for everything from childcare access to transportation availability. The risk extreme temperatures pose are felt most severely by those working jobs outdoors, such as agriculture, farm laborers, or construction, as well as those employed in factories and manufacturing centers without adequate air cooling. Other examples of high heat risk occupations in the NSJV include delivery drivers and even restaurant workers.

Throughout the NSJV, the number of annual extreme heat days (temperatures greater than 101.6 degrees) is predicted to increase dramatically from a historical average of 4 days annually to 18 days annually under medium

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[91] San Joaquin County. Local Hazard Mitigation Plan. 2023. P 37. https://www.sjgov.org/docs/default-source/covid-19/2023-lhmp-final-.pdf?Status=Master&sfvrsn=62a3c44d_3

[92] Stanislaus County. Local Hazard Mitigation Plan. 2016. P 95. https://stanoes.com/pdf/lhmp/2017-lhmp.pdf

[93] Merced County. Local Hazard Mitigation Plan. 2016. P 170. https://web2.co.merced.ca.us/pdfs/oes/MercedCounty-MJHMP-2021-2016.pdf

[94] First Street Foundation. Risk Factor. Wildfire Modeling. Accessed 2023. https://firststreet.org/risk-factor/fire-factor//

[95] Risk Factor. Flood Risk Overview. San Joaquin, Stanislaus and Merced Counties. Accessed 2023. https://riskfactor.com/

[96] Stanislaus County. Local Hazard Mitigation Plan. 2016. P 64. https://stanoes.com/pdf/lhmp/2017-lhmp.pdf

[97] Merced County. Local Hazard Mitigation Plan. 2016. P 90. https://web2.co.merced.ca.us/pdfs/oes/MercedCounty-MJHMP-2021-2016.pdf

[98] San Joaquin County. Local Hazard Mitigation Plan. 2023. P 40. https://www.sjgov.org/docs/default-source/covid-19/2023-lhmp-final-approved.pdf?Status=Master&sfvrsn=f64fc505_3

emissions modeling, and as many as 52 days annually under high emissions modeling.[99] A recent workplace heat study from the Washington Center for Equitable Growth found that any day above 100 degrees can lead to a 10-15% increase in same-day injuries on the job, with low income workers experiencing the worst effects. The study also found that the cost of recovering from a heat related illness costs the average worker $35,000, including both health care and long-term wage impact.[100]

Ultimately, climate change models indicate that temperatures will continue to increase throughout the NSJV. This will make conditions both hotter and harder for workers, and will likely continue to impact key regional industry and workforce needs.

Identified Research Gaps and Call for Future Analysis

The draft baseline assessment identified the need for future analysis examining all plans and strategies focused on hazard mitigation in the NSJV.

While beyond the scope of this report, the data and research team have outlined the components required by such future analysis, and have flagged this issue as a priority for future research development and capacity building.

Following community comments received during the August 24th, 2023 Data Walk, such analysis should also examine currently used methods of communication around future and emergent hazards, and explore possible alternatives.

For a complete overview of all identified data and research gaps related to this issue, please reference Appendix 3.2.F - Need for Additional Analysis and Future Research Capacity.

3.2.4 — Regional Pollution Burden and Significant Sources of Toxic and Hazardous Waste

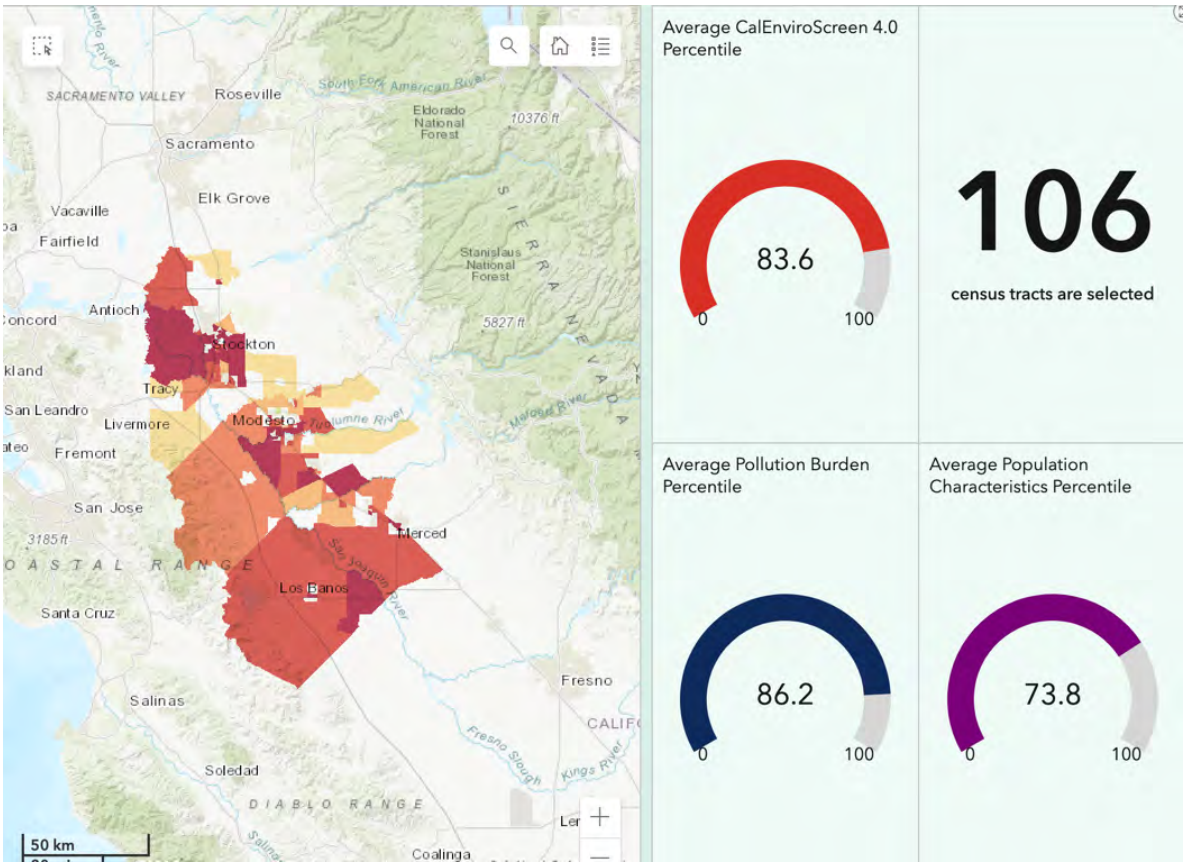
Overall Pollution Burden in the NSJV Region

According to the CalEnviroScreen4.0 (CES), residents of the North San Joaquin Valley continue to experience a disproportionately high pollution burden compared to other counties in the San Joaquin Valley. CES is a mapping tool that helps identify California communities that are most affected by many sources of pollution, and where people are often especially vulnerable to pollution's effects. CES uses environmental, health, socioeconomic information and population characteristics to produce scores for every census tract in the state. The CalEnviroScreen formula considers the presence of various types of pollution, the prevalence of health problems that can be worsened by pollution, and population data including race, educational attainment and poverty levels.[101]

As shown in Figure 3.2.16, the CalEnviroScreen tool was filtered for San Joaquin, Stanislaus and Merced Counties, then by selecting then by selecting the filter\indicator for census tracts experiencing the highest 25th percentile of overall pollution burden.

[99] Cal-Adapt. Local Climate Change Snapshot for Stanislaus County. 2023. https://cal-adapt.org/tools/local-climate-change-snapshot
[100] Cal Matters. Workplace Injuries and Rising Temperatures. 2023. https://calmatters.org/california-divide/2023/07/workplace-injuries-rising-temperatures/
[101] CalEnviroscreen4.0 Data Dashboard. https://experience.arcgis.com/experience/6b863505f9454cea802f4be0b4b49d62/

Figure 3.2.16 – Census Tracts in The NSJV With Highest Pollution Burden[102]



As indicated, there are 106 census tracts identified in the NSJV that are currently in the highest 25th percentile of overall pollution burden. Further, the NSVJ region receives an overall CalEnviroScreen Percentile score of 83.6 %, and an average pollution burden of 86.2 %.

Excluding the NSJV, the remaining 10-county San Joaquin Valley region has 160 census tracts identified as experiencing the top 25th percentile of pollution burden, with an overall CalEnviroScreen Percentile of 87.6% and an average pollution burden of 86.4%. Ultimately, the entire San Joaquin region experiences a high pollution burden as well as a high percentage of sensitive populations with compounding socioeconomic factors (given its' high Population Characteristic Percentile scores).[103] Critically, of the 266 total census tracts in the San Joaquin Valley identified as experiencing the highest 25% pollution burden**, 66.25%** of these tracts are located within the three county NSJV region.[104] [105]

This data is also supported by the Environmental Equity Atlas. The Atlas provides an overall Environmental Health Index score for each selected county or census tract. This score is an aggregate environmental health statistic

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[102] CalEnviroscreen4.0 Data Dashboard. https://experience.arcgis.com/experience/6b863505f9454cea802f4be0b4b49d62/

[103] Population Characteristics score for a census tract is the average Sensitive Populations and Socioeconomic Factors component for that census tract. For further explanation of how each percentile is calculated see CalEnviroScreen's Scoring and Model Page: https://oehha.ca.gov/calenviroscreen/scoring-model

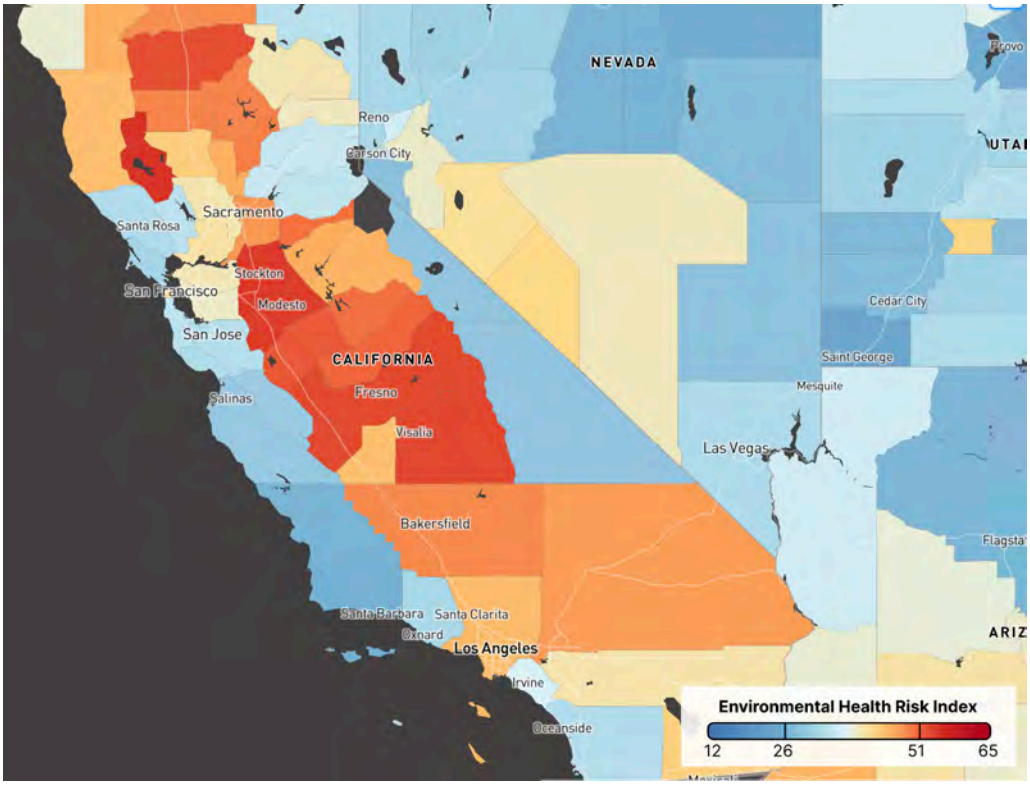
[104] CalEnviroscreen4.0 Data Dashboard. https://experience.arcgis.com/experience/6b863505f9454cea802f4be0b4b49d62/

[105] It is also important to note that even within each county, climate equity is not distributed evenly. At the individual census tract level, environmental inequality can vary widely depending on factors such as economic disinvestment and exposure to environmental hazards.

calculated as the average of a tract or county's percentile values for energy burden, low life expectancy, adult asthma rate, PM2.5 pollution, diesel particulate pollution, DOT travel barriers, lead paint risk, proximity to NPL superfund sites, CEJST (Climate Economic and Justice Screening Tool) threshold criteria exceeded, and adult coronary heart disease rate.[106]

According to the Atlas – and as indicated in Figure 3.2.17 – counties in the North San Joaquin Valley receive some of the highest Environmental Risk Scores in California.[107] San Joaquin and Stanislaus County each received an index score of 54; Merced County fares only marginally better with a score of 52.[108]

Figure 3.2.17 – Environmental Equity Atlas Environmental Heath Index[109]



Identified DICs and vulnerable populations experiencing high environmental health risk are indicated by the darker red tones. As visible in Figure 3.2.16 and 3.2.17, the three county NSJV region has a significant population living within some of the highest pollution burdened area in the state of California. Overall, the NSJV ranks 11th of the 13 California Jobs Regions in terms of pollution burden experienced by residents.

For a comparison of the pollution burden rank of all 13 California Jobs First regions, please reference Table 3.3.3 - NSJV Cal Enviro Screen Indicators in the Public Health Section, as well as Appendix 3.3.B for the NSJV's relative performance on each CalEnviroScreen indicator.

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[106] Environmental Equity Atlas. About. Accessed 2023. https://environmentaleq.com/site-template/index.html#one
[107] Lake County is the only California County to receive a higher Environmental Equity Atlas Risk score than Merced and Stanislaus County.
[108] Environmental Equity Atlas. About. Accessed 2023. https://environmentaleq.com/site-template/index.html#one
[109] Environmental Equity Atlas. About. Accessed 2023. https://environmentaleq.com/site-template/index.html#one

It is also important to note that the census level risk index within each county provides a better indication of regional pockets with greater exposure levels.[110] Please reference Appendix 3.2 A for this visualization.

Key Pollution Source: Superfund Sites in the NSJV Region

The EPA's Superfund Locator tool identifies sites that have been identified as contaminated due to hazardous waste that has been spilled, dumped or otherwise improperly managed. This can include sites such as landfills and mining sites, processing plants, and manufacturing facilities.[111] In the NSJV, the EPA Superfund locator identifies eight such locations as regional superfund facilities. As identified in Table 3.2.11, of the three-county region San Joaquin County has the greatest number of these sites, with four identified within the County borders.[112]

Table 3.2.11 - Identified Superfund Sites in the NSJV[113]

County	City	Site Location	Site Name
San Joaquin	Tracy	Corral Hollow Road Tracy, CA 95376	Lawrence Livermore National Laboratory (Site 300)
San Joaquin	Tracy	Chrisman Road Tracy CA 95376	Tracy Defense Depot
San Joaquin	Stockton	1214 W. Washington St. Stockton CA 95203	McCormick & Baxter Creosoting Co.
San Joaquin	Lathrop	700 East Roth Road Lathrop CA 95330	Sharpe Army Depot
Stanislaus	Modesto	Near Modesto, CA 95351	Modesto Ground Water Contamination Site
Stanislaus	Riverbank	5300 Claus Road Riverbank CA 95367	Riverbank Army Ammunition Plant
Stanislaus	Turlock	2237 S Golden State Blvd Turlock CA 95380	Valley Wood Preserving, Inc
Merced	Merced	Castle AFB Merced, CA 95342	Castle Air Force Base (CAFB) – 6 sites

Key Pollution Source: Underground Storage Tanks

Underground storage tanks the steel storage tanks such as those used to hold petroleum at gas stations. Many of these underground tanks are ageing, prone to leaks, and pose significant threats to the groundwater and surrounding environment. Following a leak, hazardous chemicals can seep into lakes and rivers as well as groundwater, and cause soil contamination at the surface level.[114] According to the EPA's Underground Storage Tank Locator, there are 120 Leaking Underground Storage Tanks (LUSTs) that have not been remediated yet in the NSJV. According to the EPA, an "open release" or site where remediation is not yet completed generally means the LUST site is

[110] Environmental Equity Atlas. About. Accessed 2023. https://environmentaleq.com/site-template/index.html#one

[111] In response to the environmental movements of the late 1970s, Congress established the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in 1980. CERCLA allows the EPA to cover the cost of cleanup at identified sites. Specifically, it also forces the parties responsible for the contamination to either perform cleanups or reimburse the government for EPA-led cleanup work. See: EPA Superfund Locator. Accessed 2023. https://www.epa.gov/superfund/what-superfund

[112] EPA Superfund Locator. Accessed 2023. https://www.epa.gov/superfund/what-superfund

[113] EPA Superfund Locator. Accessed 2023. https://www.epa.gov/superfund/what-superfund

[114] Yoder, Kate. Grist Online. The Hidden Cost of Gasoline. 2023. https://grist.org/accountability/gas-stations-underground-storage-tank-leaks-environmental-disaster/

undergoing assessment, treatment and/or monitoring.[115] As indicated below in Table 3.2.12, the majority of the leaking tanks in the NSJV are found in San Joaquin County, with 73 open releases identified.

Table 3.2.12 - Leaking Underground Storage Tanks in the NSJV[116]

County	Tanks with Identified Leaks	Remediation not Complete	Remediated Tanks
San Joaquin	913	73	840
Stanislaus	465	12	453
Merced	349	35	313
Total	1727	120	1606

Pollution Burden and Community Identified Sources

Many community members also noted that many existing industries are the source of pollution and air quality issues in the NSJV, noting:

"Bad smell around residual water plants…and because of animal industries"
"Waste of water from agriculture"

- ***Valley Improvement Projects - Families in Riverbank/Empire/Waterford***

As discussed, during **the Data Walk held on August 24, 2023**, the duality of industry operation in the NSJV was a key concern for community members. In many cases, some of the biggest offenders in terms of pollution are industries that the region relies on for jobs and commerce. Participants noted the following specific concerns and sources of pollution and contamination in their communities:

- "Warehousing and transportation creating air + material pollution and paving of roads and lots."
- "Livestock emission of greenhouse gasses."
- "Agriculture is a big source of pollution yes, but warehousing is just as significant a source."
- "Contamination of water wells and source - increasing #wildfires can play a role here."
- "Warehouses a major point source of NSJV pollution."

Participants also noted that noise pollution from those warehouses for residential neighborhoods that are located close to them, and noted excessive noise has connection to Alzheimer's and other illnesses.

Wastewater Treatment Sites in the NSJV

While research to date has not indicated wastewater treatment sites in the NSJV to be significant source of pollution burden or public health risk, it is important to note that factors such as drought and decreased water availability in the region may affect the amount of water treatment sites receive or have access to. This could impact wastewater site functions in several ways. Lower water flow can reduce the dilution of contaminants in sewage, potentially impacting the efficiency of treatment processes. With less water available, wastewater can become more concentrated with pollutants, including chemicals, pathogens, and organic matter. Treating highly concentrated wastewater can strain

[115] EPA Underground Storage Tank Locator. https://www.epa.gov/ust/ust-finder
[116] EPA Underground Storage Tank Locator. https://www.epa.gov/ust/ust-finder. Note: The EPA UST locator can also identify the following: map/identify proximity information about UST facilities and LUST sites—re: people living nearby, land-use type, number of private wells nearby, location within source water protection areas and floodplains, nearby water treatment facilities, and location in 100-year floodplains.

treatment plants and may require adjustments or additional treatment steps. [117] Drought conditions can increase the demand for water-saving measures like reclaimed water and recycled wastewater. Wastewater treatment plants might experience higher demand for treated effluent for irrigation or industrial purposes, putting pressure on these facilities to meet the increased need without compromising water quality standards.

Such factors are significant because increased strain on such facility operations increase the risk of Inadequate treatment or accidental spills that might lead to water contamination, impacting local water sources and potentially affecting public health.

Please see Appendix 3.2.D for a map of all 16 identified wastewater treatment sites in the NSJV.

Industry and the Environment – Community Concerns and Impact

The Northern San Joaquin Valley (NSJV) face a conflict between industry growth and environmental concerns. Many of the region's key industries, including transportation and warehousing, utilities, government enterprises, manufacturing, agriculture, and construction, are also the primary sources of greenhouse gas emissions and employment (See Figure 3.2.10 and Figure 3.2.18 below). Community members throughout the NSJV expressed concerns about balancing industrial development with environmental justice, emphasizing the need to consider environmental impact in discussions of industry growth and job development. Participants noted the tension between industry growth and environmental conservation but also highlighted opportunities to address environmental vulnerabilities while developing jobs in the green industry, such as levee improvement and floodplain restoration, which can create local and regional job opportunities. Additionally, community members emphasized the need for industry growth and development to prioritize reducing pollution and environmental sustainability, including investments in renewable energy and bio-industry for fuel production. This highlights the complex relationship between economic growth and environmental concerns in the NSJV, and emphasizes the need for sustainable and environmentally conscious industrial development.

IMPLAN, the economic impact software, incorporates the Environmental Protection Agency's model for climate and environmental impacts in 8 categories (accounts). The estimates make assumptions based on industry business activity and national models for pollution, emissions, land use, and water use. These include data on hazardous air emissions, commercial waste (construction and non-construction), hazardous waste, greenhouse gases, land use, mineral extraction, Nitrogen and Phosphorus releases, pesticide releases, and water pollution.[118] Pollution and emissions factors are in units of millions of kilograms. Water use is in millions of cubic meters. Land use is in millions of square meters. Since the accounts use a national model overlayed on local industry activity, the actual impacts in the NSJV may differ.

> *The data suggest that the agriculture, utilities, transportation and warehousing, and manufacturing sectors are responsible for more emissions, pollution, and land and water use in the NSJV than all other sectors combined.*

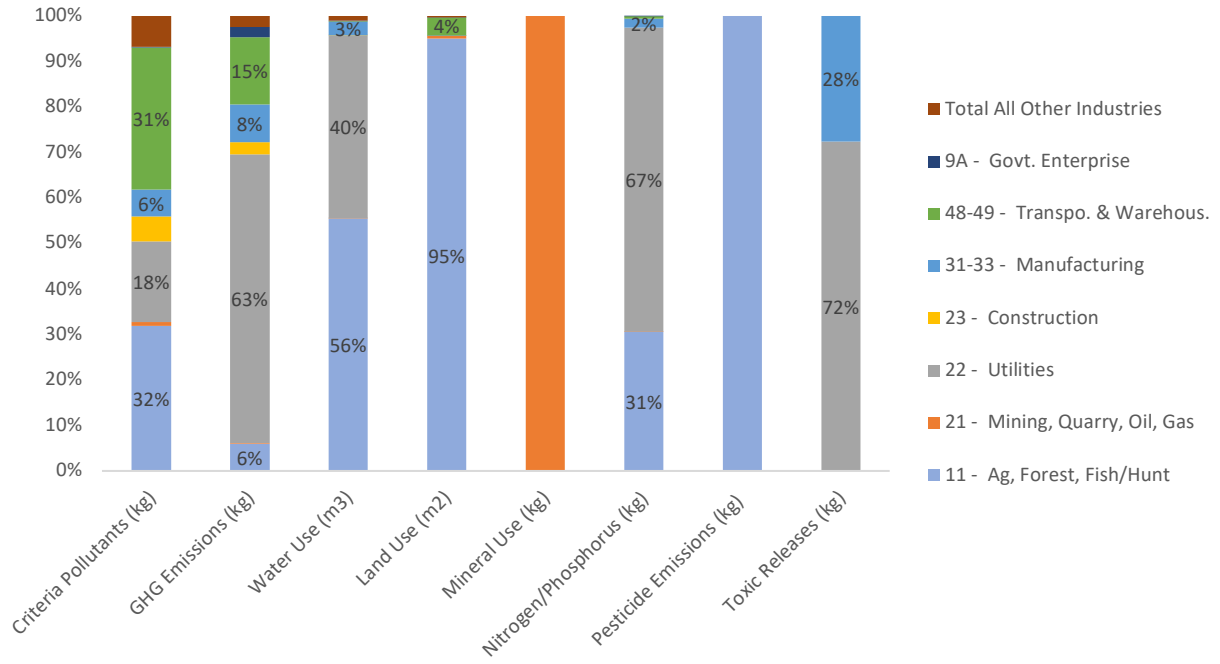
The data suggests that several industry sectors are responsible for most climate and environmental impacts. These industry sectors have a much larger share of environmental impacts than all other industries combined (Figure

[117] Erik Porse, Caitlyn Leo, Erick Eschker, Harold Leverenz, Jonathan Kaplan, John Johnston, Dakota Keene & David Babchanik (2023) Adapting wastewater management systems in California for water conservation and climate change, Sustainable and Resilient Infrastructure, 8:4, 437-450, DOI: 10.1080/23789689.2023.2180251

[118] See IMPLAN's discussion of the modeling of EPA's accounting. https://support.implan.com/hc/en-us/articles/4402880039579-Environmental-Data

3.2.18). Agriculture, Forestry, Fishing, and Hunting account for the vast majority of land use impacts, pesticide emissions, more than half of water use, and a third of Criteria Pollutants and Nitrogen and Phosphorus impacts. Utilities are the other primary source, accounting for nearly a fifth of Criteria Pollutants, 63% of greenhouse gas emissions, three-quarters of Toxic Releases, and Nitrogen and Phosphorus releases. Transportation and Warehousing accounts for nearly a third of Criteria Pollutants; 15% of greenhouse gas emissions, and a smaller share of land use. Manufacturing's most significant impact is in Toxic Emissions, though it also contributes to impacts in greenhouse gas emissions, Criteria Pollutants, and water use. Construction has some effects on Criteria Pollutants and greenhouse gas emissions. The appendices detail the 8 accounts' estimated annual impacts between 2017 and 2021 combined and broken out by industry sector.

Figure 3.2.18 — Percent of total environmental impact (millions of kg, m3, m2), 8 Accounts by Industry Sector NSJV, Annual Average, 2017-2021



Source: IMPLAN, based on EPA Environmentally-Extended Input-Output

Broadly, NSJV stakeholders are very aware of the duality that often exists between industrial operation and the need to reduce environmental pollutants, but see strong opportunity for future industry growth to both protect the environment while creating new career opportunities. Examples of community comment related to the intersection of industry and climate are included below.

Community Comment: Industry Development and the Environment

Participants at the Data Walk held August 24, 2023 noted that while there is often tension between industry growth and environmental conservation, **numerous opportunities exist to both address key environmental vulnerabilities while developing jobs in the green industry**. For example, participants noted that both levee improvement and floodplain restoration are also opportunities for local and regional job creation:

- "Improve our dams and levees using local labor - creating jobs"
- "Investment in multi benefit floodplain restoration + river restoration + greenbelt. This will make places safer to live, and create regional jobs."
- "Invest in growing eco/enviro tourism"
- "More pro-agritourism policies"
- "Make it too hard for industries to operate and they will go elsewhere for cheaper operation."

At the same time, participants also noted that this does not need to be mutually exclusive: economic opportunity exists to create eco-friendly jobs – e.g. jobs in floodplain restoration, or other "Allocating industry"

Community Comments: Environmental Considerations and Industrial Development

Community members noted multiple concerns about **the need to balance industrial development with environmental concerns:**

During the Data Walk held on August 24, 2023, community members also noted in detail that they see the **need to balance industry interests with environmental justice while at the same time also needing to engage industry** that remains important to the regional economy**.** Participants noted the following specific concerns:

- "Is it better to die of poverty or clean air"
- "Is it climate or jobs we care about more": not enough industries and people starve. However, we need more industry for a livable wage. If we make it too hard for industries to operate, they will go elsewhere for cheaper operation.

Community members repeatedly highlighted the need to consider environmental impact in discussion of industry growth and job development, and contextually wanted more information and communication on the following:

- "More information about contamination from industries and how we can prepare."
- "How do we know more about the environmental impacts"
- "Are people taking the correct measures to not contaminate communities?"
    - ***Valley Improvement Projects - Families in Riverbank/Empire/Waterford***

Communities also recognized that climate adaptations and environmental cleanup can also come with a cost, stating the need to prevent:

- "Gentrification and destroying established black and brown spaces"
    - **MoPride - BIPOC LGBTQ+ Serving Org.**

Community Comment: Industrial Development that NSJV Residents Want to See

Community members noted that any industry in the region needed to better prioritize reducing pollution and prioritizing environmental sustainability:

- "They should invest in healthier things."
- Industry "should improve community safety and environment."
    - ***Valley Improvement Projects - Families in Riverbank/Empire/Waterford***
    - ***Parent Resource Center - Families in Airport Neighborhoods and West Modesto***
- Consider "How what is being built will affect the environment."
    - ***Legacy Alliance Outreach***

While not exhaustive, community members noted the need for the following types of industry development in order to better invest in regional sustainability:

- "Invest in bio industry making fuel."
- "Invest in renewable energy."
    - ***Vine House - Shelter services for unhoused adults***
- "Create a recycle business."
- "We need a green solar economy"
    - ***United Community Foundation - Families in Grayson and Westley***

Multiple community members noted that there is also a strong need to repair and improve existing infrastructure and development, including repair to streets, community centers, bathhouses, restrooms, and shelters.

During multiple events and meetings held throughout the NV THRIVE region, participants stressed that it was key that new or priority industries focus on the needs and interests of residents and ensure that they operate in ways that protect environmental assets, rather than contributing to pollution burdens.

3.3 Public Health Analysis

Public Health Analysis Overview

This document provides a summary of baseline research regarding public health conditions, including regional inequities, experienced in the Northern San Joaquin Valley (NSJV) region. This summary includes presentation and analysis of data and resources, as well as calls for additional data and analysis, that address the following requirements of California Jobs First (formerly Community Economic Resilience Fund (CERF)):

- Provide a snapshot of the impacts of the current economic trends and climate change effects on public health, especially the impacts on disinvested communities.
- Explore the region's leading causes of chronic illnesses and diseases and whether and how they relate to economic inequalities, climate impacts, environmental factors, etc.
- Analyze regional health disparities disaggregated by race, gender, and other demographics.

After this section's initial overview that presents the overall findings and approach of the baseline public health research, the next section, Section 3.3.2, describes the governance of the public health system in the NSJV. Section 3.3.3 outlines some of the findings with regard to impacts of economic trends and climate change effects on public health, and Section 3.3.4 presents some of the findings with regard to chronic illnesses and diseases, as well as some of their potential causes related to economic inequalities, climate impacts, environmental factors, and other social determinants of health. Section 3.3.5 presents an analysis of regional health disparities, which is further supplemented in more detail by Appendix 3.3.C, Appendix 3.3.D, and Appendix 3.3.E. Section 3.3.6 analyzes the results of the NSJV Public Health Equity Index in more detail, and Section 3.3.7 compares indicators from the Health Status Profile for each NSJV county with objectives from the federal Healthy People 2020 and Healthy People 2030.

To prepare this baseline public health analysis, researchers reviewed the existing public health system and the Bay Area Regional Health Inequities Initiative (BARHII) for a framework to reduce inequities,[1] as well as existing research related to NSJV public health priorities. Further, to gain additional information and reality check data findings, including regarding public health inequities, researchers reviewed comments from multiple community events and online surveys. Further, researchers conducted a Health Disparities in the NSJV Pilot Survey in English and in Spanish, which included door-to-door survey collection, as well as data collection at local flea markets, shopping centers, and homeless shelters in the NSJV, particularly focused on Merced and Stanislaus counties (the two counties with the greatest proportion of disinvested communities, as seen in the map below). The results of this pilot survey are discussed in more detail in Section 3.3.5.

Regarding the public health care system, as an existing strength, local health departments and organizations recently completed Community Health Needs Assessments (CHNAs) to understand each NSJV county's health status and issues, which helped justify how and where resources should be allocated with Community Health Improvement Plans (CHIPs) in each county. Researchers reviewed the recent CHNA and CHIP documents for each of the three counties within the NSJV and identified five broad themes of overlapping public health challenges to structure consideration of regional health priorities and challenges experienced and identified by the NSJV region. Throughout multiple community workshops and gatherings, comments coalesced around each of these five themes, as well as in survey responses, which further supported their validity and provided additional insights related to them.

[1] https://barhii.org/framework

The five public health themes identified from the baseline analysis of research to date include the following:

1. Behavioral/Mental Health, Including Substance Abuse
2. Environmental
3. Health and Safety
4. Healthcare Access and Transportation
5. Income, Education, and Employment

To develop more context and to gain additional understanding of regional health inequities related to the five identified themes, researchers adapted a list of 98 indicators generated by the San Joaquin Valley Public Health Consortium in 2022, *An Analysis of Health Equity in the San Joaquin Valley Region,* which was "meant to lay the groundwork for future analyses, and to act as a foundational data set that can inform work in the Valley."[2] Researchers updated much of the data and added additional indicators, such as for food safety and vector control, to facilitate interregional comparison and a more comprehensive overview. Further, to assess actual indicator rates compared to federal Healthy People objectives, researchers produced Appendix 3.3.C and Appendix 3.3.D. See indicator rates compared to California and U.S. rates in Table 3.3.5 below.

Additionally, researchers utilized existing data analysis tools related to public health, including the Healthy Places Index, CalEnviroScreen 4.0, and County Health Rankings, to further develop understanding of the public health conditions in the NSJV region, including interregional inequities between the NSJV and other CERF regions, as well as intraregional inequities between counties within the NSJV region (see Appendix 3.3.B). To demonstrate how the variety of data sources contribute to the overall analysis in a cohesive way, this report integrated key indicators from each data source into the five aforementioned public health themes (see Appendix 3.3.A and Table 3.3.1.A, B, C, D, and E below). Appendix 3.3.A helps visualize how the NSJV's rates compare to other CERF regions in terms of rankings and actual indicator data. Ultimately, this integrated, high-level analysis resulted in the identification of the following particularly significant regional inequities in each of the five public health themes (for actual indicator rates, see Appendix 3.3.A).

Table 3.3.1.A: Integrated Thematic Indicator Table with Interregional Ranking

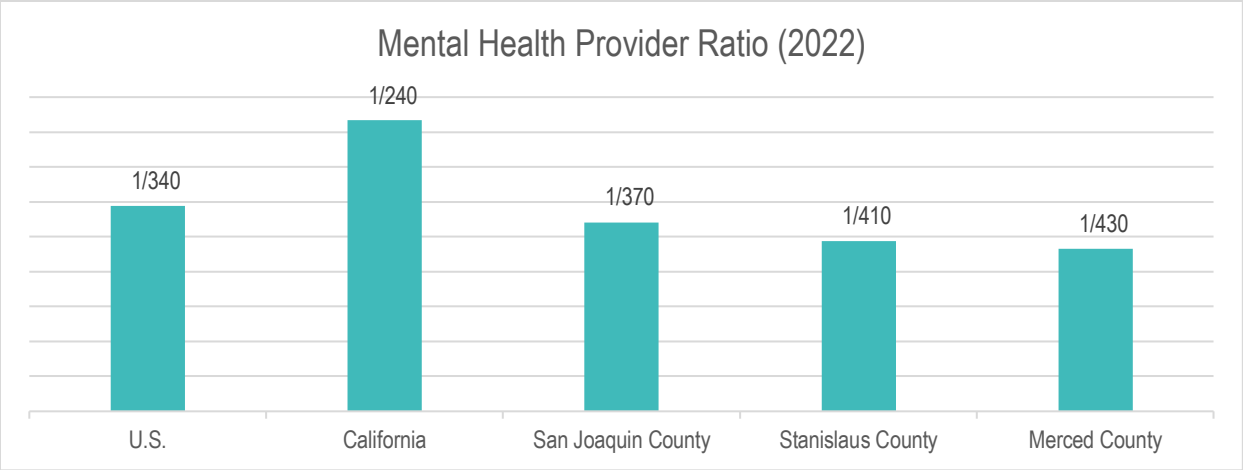
Issue and Indicators	Rank Among 13 CERF Regions (see Appendix 3.3.A for actual rate comparisons)
1) Behavioral/Mental Health, Including Substance Abuse	
Mental Health Provider Shortages	12
Drug Overdose Deaths	11
Suicides (3-year data)	10
Frequent Mental Distress (Self-Report)	9

With regard to the first identified public health theme, Behavioral/Mental Health, Including Substance Abuse, a few representative indicators include the NSJV's relatively poor performance compared to other regions with regard mental health provider shortages, drug overdose deaths, and frequent mental distress. Overall, the NSJV is ranked next to last among CERF regions for the capacity of mental health services as measured by the ratio of mental health providers to population in 2022. Indeed, whereas California includes one mental health provider per 240 people and the United States as a whole includes one mental health provider per 340 people, Merced County includes one mental health provider per 430 people, San Joaquin County

[2] https://chhs.fresnostate.edu/ccphc/index.html

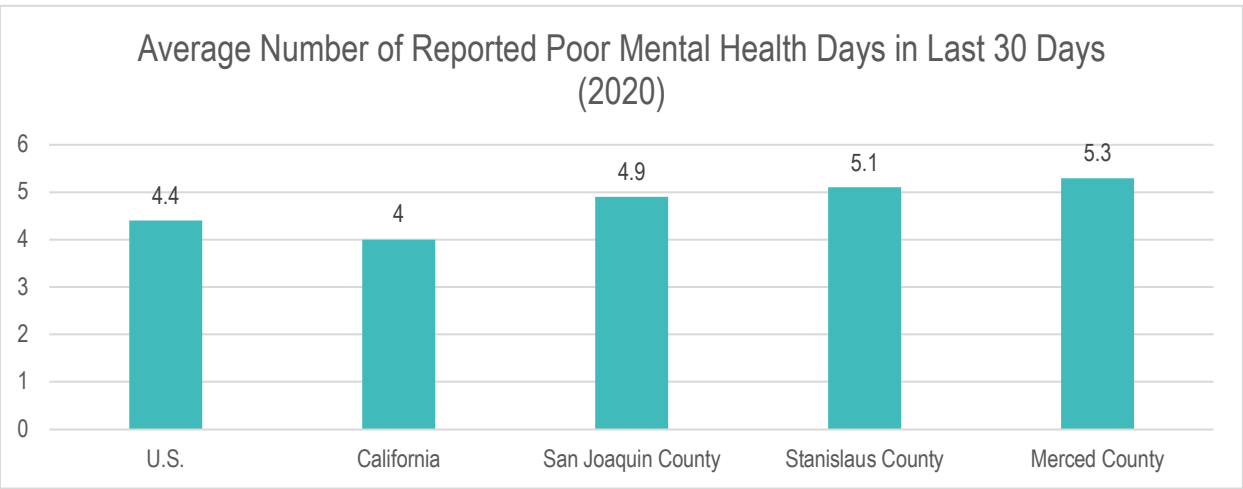
includes one mental health provider per 370 people, and Stanislaus County includes one mental health provider per 410 people, as shown in Figure 3.3.2 below.[3]

Figure 3.3.2: Mental Health Provider Ratios (2022)



The significant shortage in mental health providers presents a regional inequity that exacerbates related regional inequities with regard to substance abuse, suicides, and mental illness. Indeed, with regard to the average number of mentally unhealthy days reported in past 30 days (age-adjusted) in 2020, Figure 3.3.3 shows that whereas California posted an average of 4 and the United States posted an average of 4.4, Merced County posted an average of 5.3, San Joaquin County posted an average of 4.9, and Stanislaus County posted an average of 5.1.[4]

Figure 3.3.3: Average Number of Reported Poor Mental Health Days in Last 30 Days (2020)



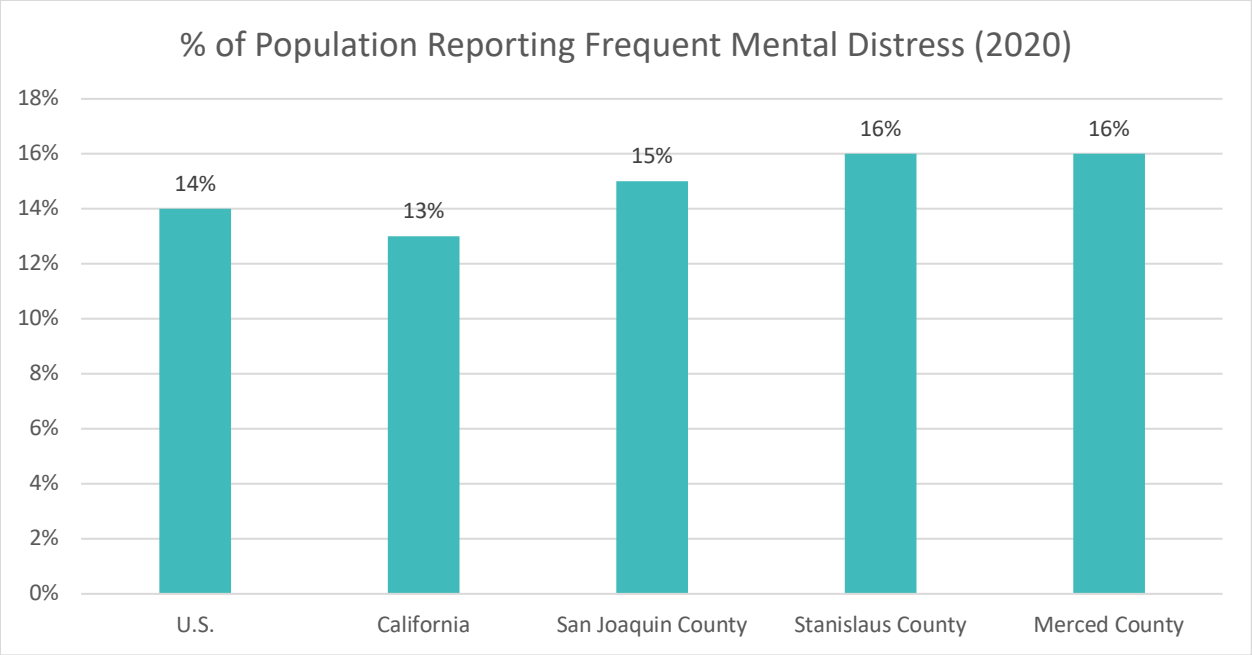
Further demonstrative of the relatively high levels of mental illness in the NSJV region, with regard to the percentage of adults reporting 14 or more days of poor mental health per month (age-adjusted frequent

[3] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-factors/clinical-care/access-to-care/mental-health-providers?year=2023

[4] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-outcomes/quality-of-life/poor-mental-health-days?year=2023

mental distress) in 2020, Figure 3.3.4 below shows that whereas California posted 13% and the United States posted 14%, Merced County and Stanislaus County posted 16% and San Joaquin County posted 15%.[5]

Figure3.3.4: % of Population Reporting Frequent Mental Distress (2020)



Possibly related to mental distress, the NSJV experiences elevated levels of suicide, ranking as number 10 of 13 CERF regions, with 10 deaths due to suicide per 100,000 population (age-adjusted) in Merced County and 11 in San Joquin and Stanislaus counties from 2016-2020, compared with 10 in California and 14 in the United States overall. Further, possibly related to coping with mental distress, the NSJV experiences relatively high levels of drug overdose deaths, ranking 11 out of 13 CERF regions, with Merced County experiencing 16 drug poisoning deaths per 100,000 people and San Joaquin County and Stanislaus County experiencing 18 drug poisoning deaths per 100,000 people.[6]

Further, with regard to alcohol-related substance abuse specifically, 19% of adults in Merced County reported binge or heavy drinking (age-adjusted), as well as 21% of adults in San Joaquin County and Stanislaus County, compared with 18% of adults in California and 19% in the United States overall.[7] The higher levels of substance abuse in the NSJV contributes to related diseases and likely reflects the higher levels of mental distress and lower levels of mental health providers in the region. Indeed, the NSJV experiences higher levels of mental health and substance abuse challenges with lower capacity to deal with them. Thus, the first theme manifesting from the baseline analysis of public health in the NSJV consists of Behavioral/Mental Health, Including Substance Abuse and suggests the need to consider the development of greater mental health and substance abuse counseling and care capacity in the region while improving access to care and to related employment opportunities in line with California Jobs First goals.

[5] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-outcomes/quality-of-life/frequent-mental-distress?year=2023
[6] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-factors/health-behaviors/alcohol-and-drug-use/drug-overdose-deaths?year=2023
[7] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-factors/health-behaviors/alcohol-and-drug-use/excessive-drinking?year=2023

Table 3.3.1.B: Integrated Thematic Indicator Table with Interregional Ranking

Issue and Indicators	Rank Among 13 CERF Regions (see Appendix 3.3.A for actual rate comparisons)
2) Environmental	
Drinking Water Contaminant	13
Drinking Water (CalEnviroScreen)	13
Asthma ER Visits	13
Asthma (CalEnviroScreen)	13
Pesticides (CalEnviroScreen)	13
Pesticides	12
CalEnviroScreen	12
Average Pollution Burden (CalEnviroScreen)	11
Groundwater Threats (CalEnviroScreen)	11
Impaired Water Bodies (CalEnviroScreen)	11
Extreme Heat (# of Daily Maximum Temps Above 100 F)	11
Healthy Places Index- Extreme Heat Edition	10
Air- Diesel Particulate Matter	10
Valley Fever (Coccidioidomycosis)	10
Clean Environment (Healthy Places Index)	10
Children's Lead Risk from Housing (CalEnviroScreen)	10

With regard to the second theme from the baseline analysis of public health in the NSJV, several indicators outlined in Table 3.3.1B demonstrate the significant environmental inequities experienced in the region. Many of these indicators also demonstrate intraregional inequities as elucidated in Appendix 3.3.E. Whereas mental health and substance abuse challenges likely reflect the lack of sufficient mental health providers in the region, environmental challenges likely reflect some of the economic trends and climate change effects in the region. Section 3.3.6 and Appendix 3.3.B of this report provide more detail regarding each indicator. As an overview, data from the indicators demonstrate significant cases of asthma, Valley Fever, and pollution burdens with regard to air, land, and water, which may at least partially emanate from economic trends related to the region's strong and growing agricultural and manufacturing/transportation/warehousing sectors. Further, significant water and heat issues also likely reflect the regional effects of climate change, and the high level of lead risk in housing reflects disinvestment in older communities within the region. This suggests a need to invest in mitigation and environmental justice, including cleanups and adaptation strategies (e.g., water capture and filtration, air filtration), as well as to invest in more sustainable and equitable industries and employment opportunities within the competitive agricultural and manufacturing/transportation/warehousing sectors of the region.

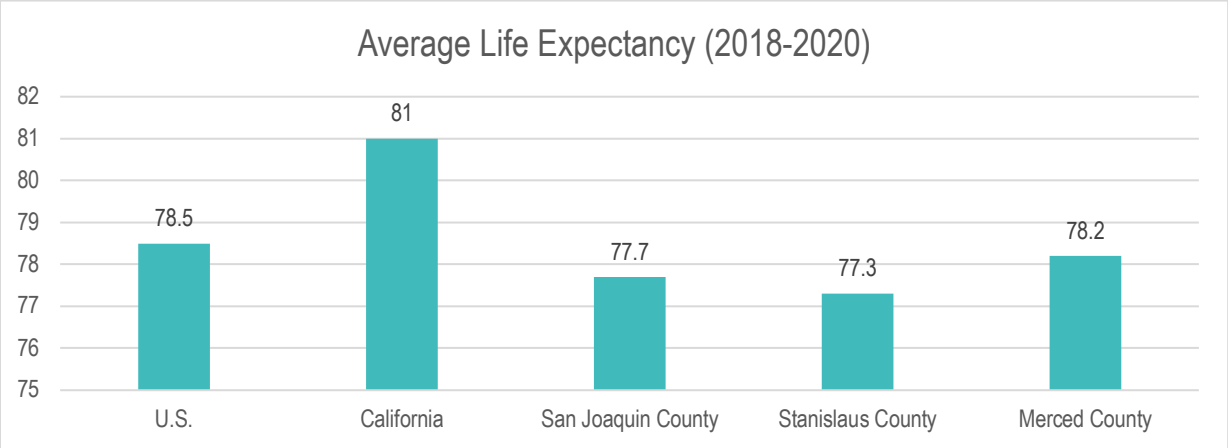
Table 3.3.1.C: Integrated Thematic Indicator Table with Interregional Ranking

Issue and Indicators	Rank Among 13 CERF Regions (see Appendix 3.3.A for actual rate comparisons)
3) Health and Safety	
Breast Cancer Deaths	13
Violent Crime	13
Stroke Deaths	12
Healthy Places Index	12
Congenital Syphilis Incidence	12
Cardiovascular Disease (CalEnviroScreen)	12
Cardiovascular Disease ER Visits	11
Chronic Kidney Disease Diagnosis	11
Colorectal Cancer Deaths	11
Diabetes Deaths	11
Low Birth Weight Infants (3 Years)	11
Coronary Heart Disease Deaths	10
Stroke Diagnosis	10
Lung Cancer Deaths	10
Prostate Cancer Deaths	10
Obesity	10
Diabetes Diagnosis	10
Lack of Physical Activity	10
Total Tooth Loss	10
Social Associations	10
Years of Potential Life Lost	10
Social Vulnerability Index	10

With regard to the third theme from the baseline analysis of public health in the NSJV, Health and Safety, Table 3.3.1.C above displays several of the leading regional inequities experienced within the NSJV. As a whole, the Healthy Place Index ranks the NSJV as next to last among CERF regions. Further, related to social determinants of health and the region's capacity to respond to disease outbreaks as well as natural and man-made disasters (e.g., indicators related to the economy, education, household characteristics, housing, language ability, ethnicity, and vehicle access), the Social Vulnerability Index ranks the NSJV as number 10 of 13 CERF regions. Demonstrating the result of regional health disparities such as those tracked by the Healthy Places Index and Social Vulnerability Index, as shown in Figure 3.3.5 below, whereas the average life expectancy in California is 81, the average life expectancy is 78.2 in Merced County, 77.7 in San Joaquin County, and 77.3 in Stanislaus County.[8]

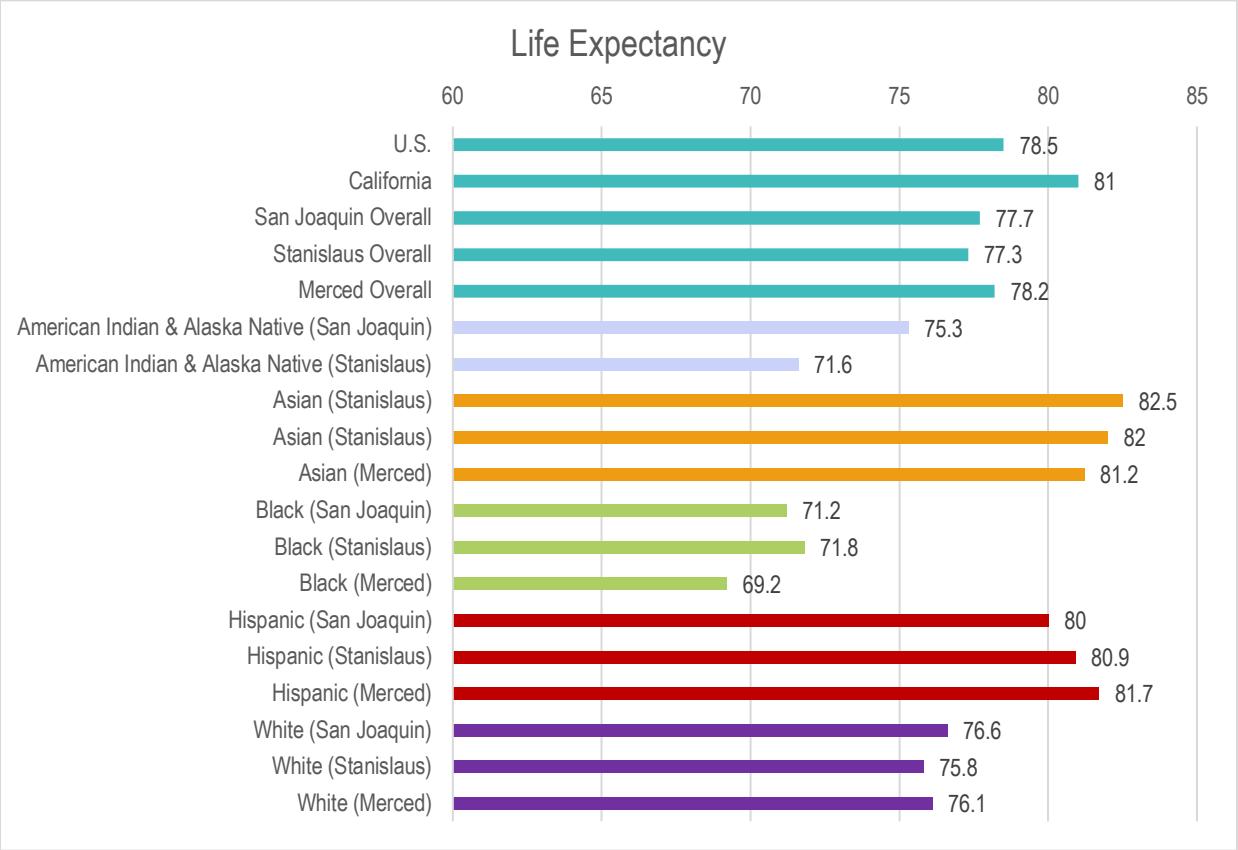
[8] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-outcomes/length-of-life/life-expectancy?year=2023

Figure 3.3.5: Average Life Expectancy (2018-2020)



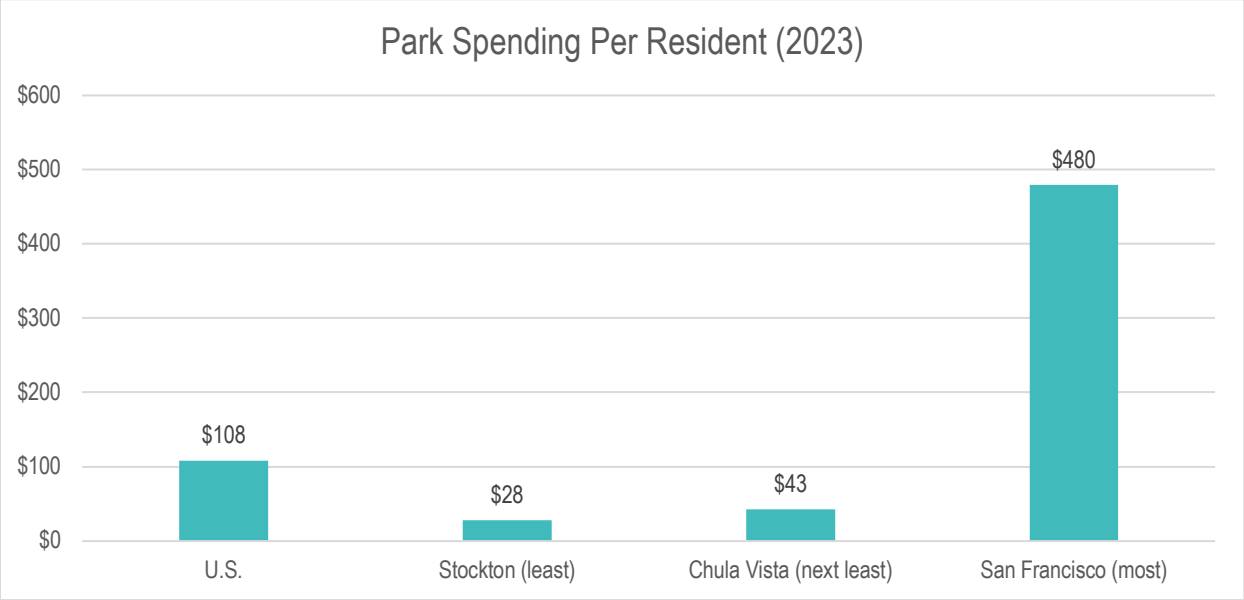
Demonstrating the outcome of regional health inequities, such as those displayed in Table 3.3.1.C above, Figure 3.3.6 disaggregates life expectancy data by race and ethnicity. Overall, life expectancy appears the inequitably low for Black people in the NSJV, with the lowest life expectancy of 69.2 experienced by Black people in the disinvested community of Merced County overall. The next lowest regional life expectancies are experienced by Black people in San Joaquin County (71.2), Black people in Stanislaus County (71.8), and American Indian & Alaska Native people in Stanislaus County (71.6).

Figure 3.3.6: Life Expectancy by Race/Ethnicity and Location



Reflecting on the BARHII framework to reduce inequities, including the concept of social determinants of health, several of these inequitable health and safety issues, including multiple chronic illnesses and diseases leading to life expectancy disparities, are likely caused by a combination of climate impacts, environmental factors, including environmental injustices, disinvestment in the region and related economic inequalities. For example, data shows that the City of Stockton within the NSJV invests $28 per capita on parks, which ranks in last place among 100 other cities included in the Trust for Public Land's Park Score Investment rankings (see Figure 3.3.6).[9] Whereas the national median among of land dedicated to park and recreation space at 15%, Stockton dedicates just 3% of land for such purposes.

Figure 3.3.6: Park Spending Per Resident (2023)



With less investment in green spaces like parks, as well as extreme heat due to climate change, people likely go outdoors and engage in less physical activity and social associations, which contributes to poor public health outcomes. The indicators in Table 3.3.1.C further support this explanation. Add in the high levels of violent crime and air pollution in the NSJV, and environmental and social determinants of health likely further limit physical activity and time spent in green spaces within the region, which contributes to related negative public health outcomes.

Additionally, demonstrating significant regional health disparities disaggregated by race, data for Stockton suggests that white neighborhoods benefit from 43% more park space than the city median, with highly concentrated BIPOC neighborhoods realizing 14% less park space than highly concentrated white neighborhoods.[10] Indeed, highly concentrated Asian neighborhoods experience 7% less park space than the city median, highly concentrated Black neighborhoods experiencing 10% less, and Hispanic and Latinx neighborhoods experiencing 9% less. This suggests the need for greater investment in parks, recreation, and green spaces within disinvested BIPOC neighborhoods, as well as the need to explore opportunities for eco-tourism and other strategies to increase physical activity while also enhancing sustainable and equitable

[9] https://parkserve.tpl.org/customranking/?0675000
[10] https://www.tpl.org/city/stockton-california

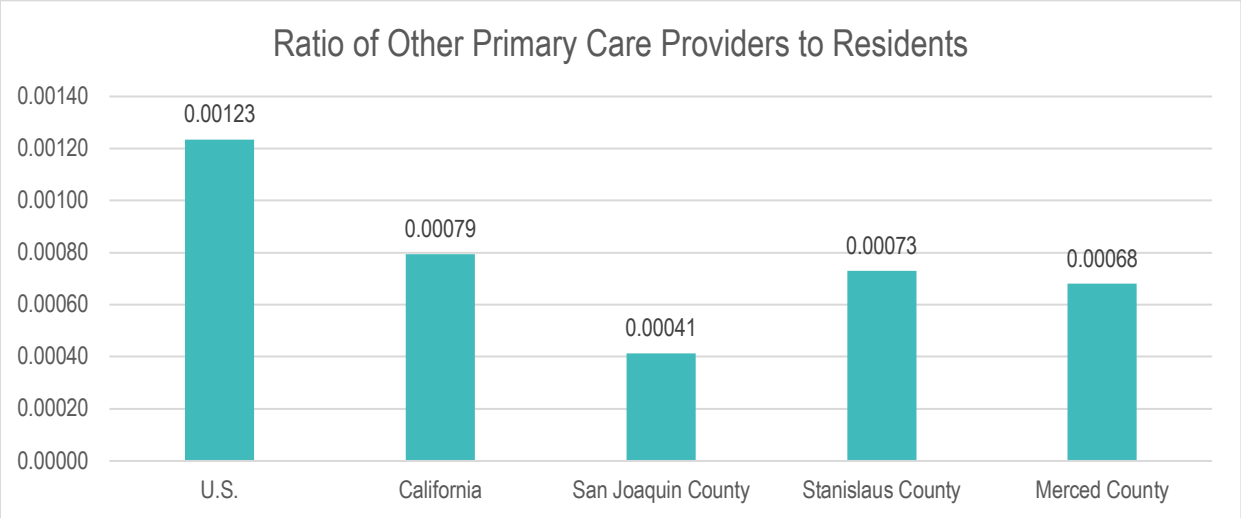
economic development in line with the goals of the California Jobs First program.

Table 3.3.1.D: Integrated Thematic Indicator Table with Interregional Ranking

Issue and Indicators	Rank Among 13 CERF Regions (see Appendix 3.3.A for actual rate comparisons)
4) Healthcare Access and Transportation	
Other Primary Care Providers Shortages	13
Mental Health Providers Shortages	12
Dental Visit (Self-Report)	11
Transportation (Healthy Places Index)	11
Linguistic Isolation (CalEnviroScreen)	11
Dentists	10
Not Proficient in English	10

While the issue of mental health provider shortages came up previously with regard to the first theme, the issue comes up again with regard to the fourth theme, Healthcare Access and Transportation. As demonstrated in Table 3.3.1.D above, the NSJV not only ranks next to last place among CERF regions for shortages in mental health providers and number 10 of the 13 regions for the ratio of dentists to population (likely contributing to the relatively low number of dental visits), the region also ranks last place among the CERF regions in terms of shortages of other primary care providers, including nurse practitioners, physician assistants, and clinical nurse specialists. Indeed, Figure 3.3.7 below shows that whereas Merced County includes 1 of these other primary care providers per 1,470 residents, San Joaquin County includes 1 per 2,420 residents, and Stanislaus County includes 1 per 1,370 residents, California as a whole includes 1 per 1,260 residents and the U.S. includes 1 per 810 residents.[11]

Figure 3.3.7: Ratio of Other Primary Care Providers to Residents by Location



[11] https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-factors/clinical-care/access-to-care/other-primary-care-providers?year=2023

Further exacerbating the capacity shortages of mental health, healthcare, and dental care providers, residents face barriers to access services due to transportation and linguistic challenges. Indeed, the NSJV ranks 11 of 13 regions for Transportation according to the Healthy Places Index, which measures automobile access, as well as 10 of 13 with regard to English proficiency. The lack of transportation and the dominance of English in services provided likely contribute to regional health inequities and suggest the need to not only increase the training and employment of people for careers in mental health, other primary care, and dentistry in line with California Jobs First goals, it also suggests the need to improve transportation and to enhance linguistic justice by offering services, education, and resources in more than the English language, such as in the prevalent Spanish, Tagalog, and Punjabi languages of the region.

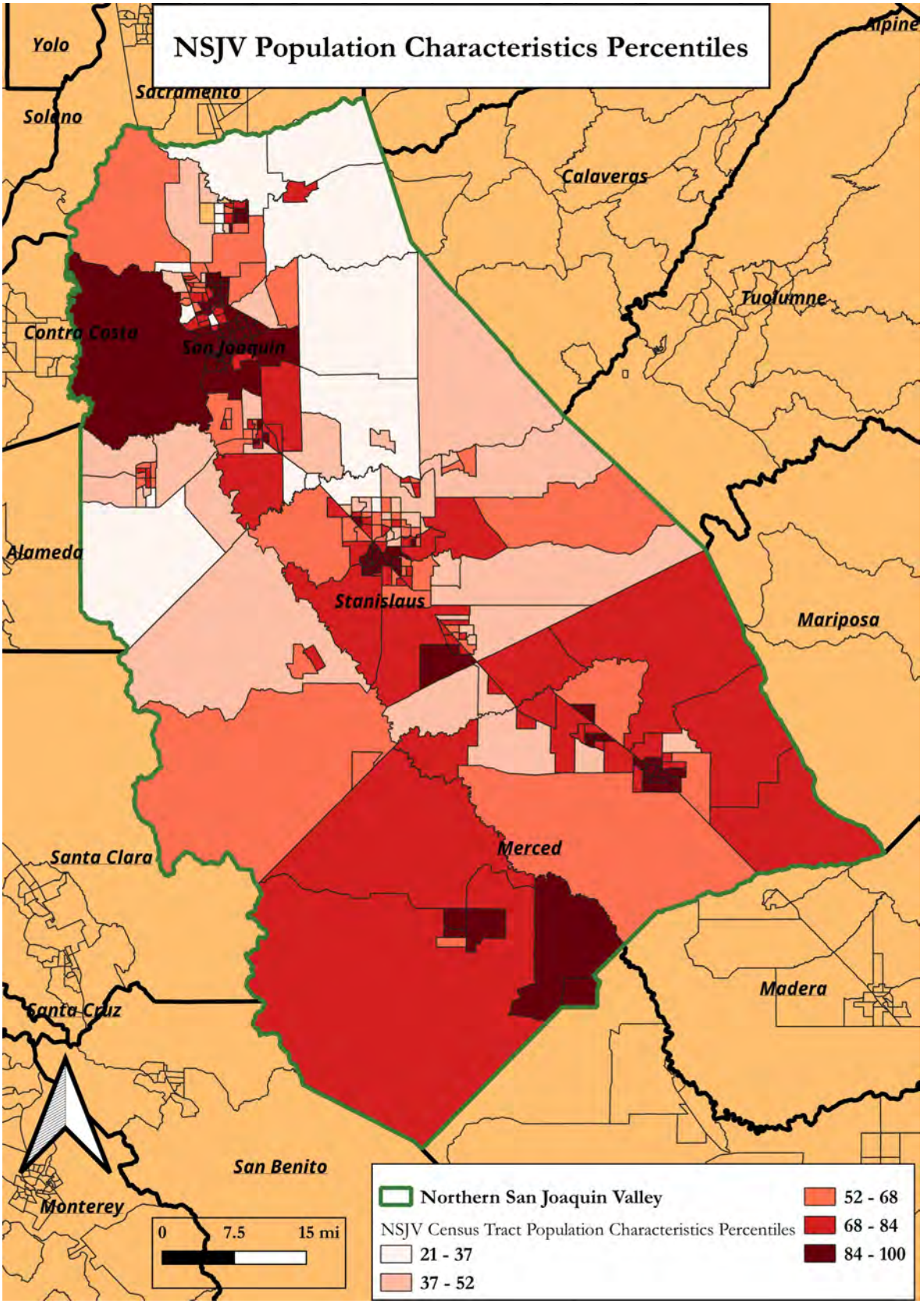
Table 3.3.1.E: Integrated Thematic Indicator Table with Interregional Ranking

Issue and Indicators	Rank Among 13 CERF Regions (see Appendix 3.3.A for actual rate comparisons)
5) Income, Education, & Employment	
Real Cost Measure (amount required to meet basic needs)	(Merced 41st (last), San Joaquin 27th, and Stanislaus 26th of 41 ranked county regions for % of households below real cost measure)
Average Population Characteristics (CalEnviroScreen)	13
Education (CalEnviroScreen)	13
Unemployment (CalEnviroScreen)	12
Some College	12
High School Completion	11
Education (Healthy Places Index)	11
Homeownership	11
Linguistic Isolation (CalEnviroScreen)	11
Not Proficient in English	10
Unemployment	10
Not Proficient in English	10
Children Living in Poverty	10
Poverty (CalEnviroScreen)	10

Further contributing to poor public health outcomes through known social determinants of health, the indicators in Table 3.3.1.E above highlight many of the challenges faced by the NSJV, and the maps in Appendix 3.3.E demonstrate the inequitable distribution of several of these challenges throughout the NSJV. Indeed, not only does the NSJV as a whole post the lowest average population characteristics score among all CERF regions according to CalEnviroScreen data (in terms of asthma, cardiovascular disease, low birth weight infants, educational attainment, housing burdened low-income households, linguistic isolation,

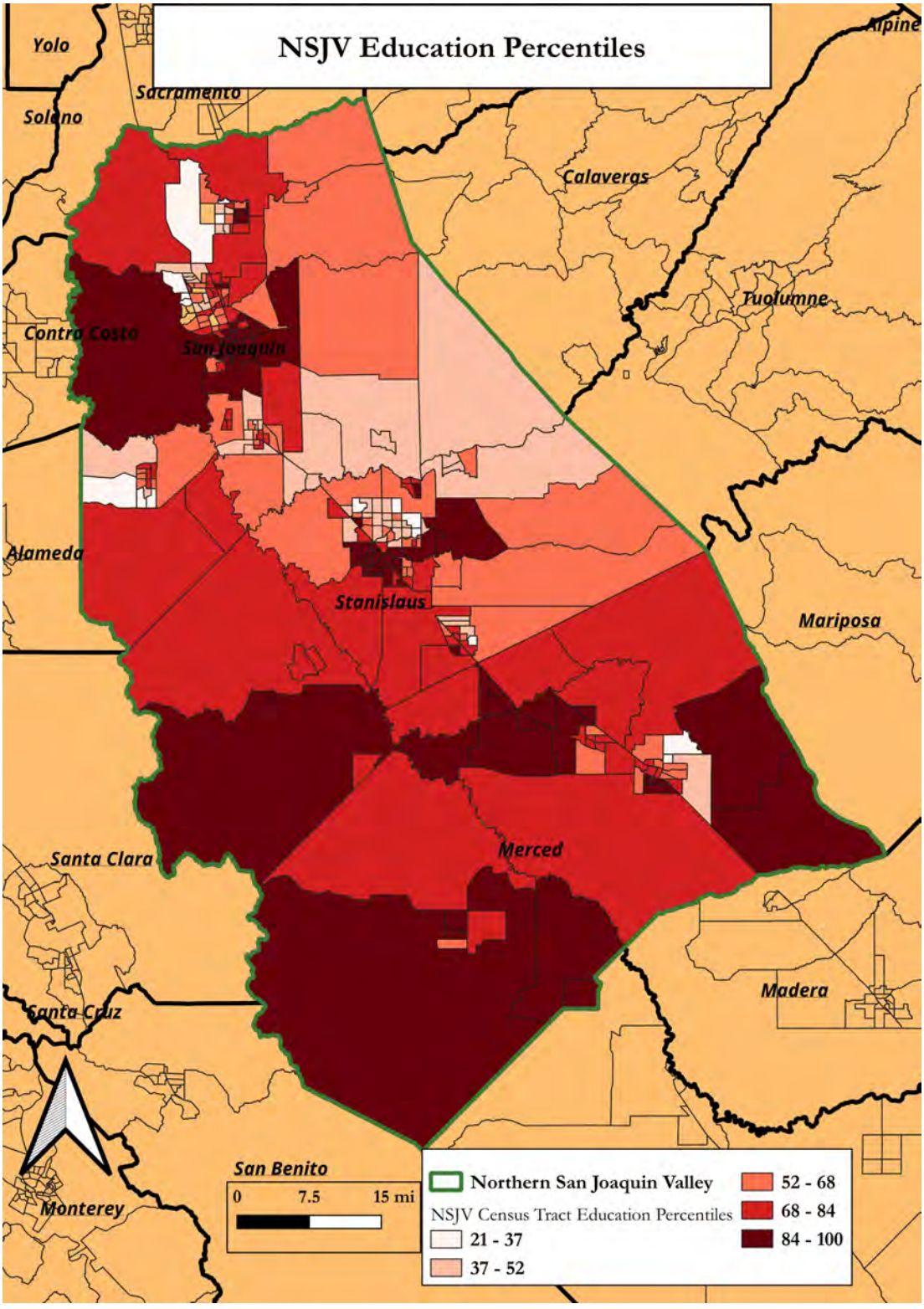
poverty, and unemployment), the maps in Appendix 3.3.E, including the one in Figure 3.3.8 below, demonstrate some of the intraregional geospatial disparities of such interregional inequities that appear more concentrated in central San Joaquin County, central Stanislaus County, and most of Merced County.

Figure 3.3.8: NSJV Population Characteristics CalEnviroScreen Percentile Map



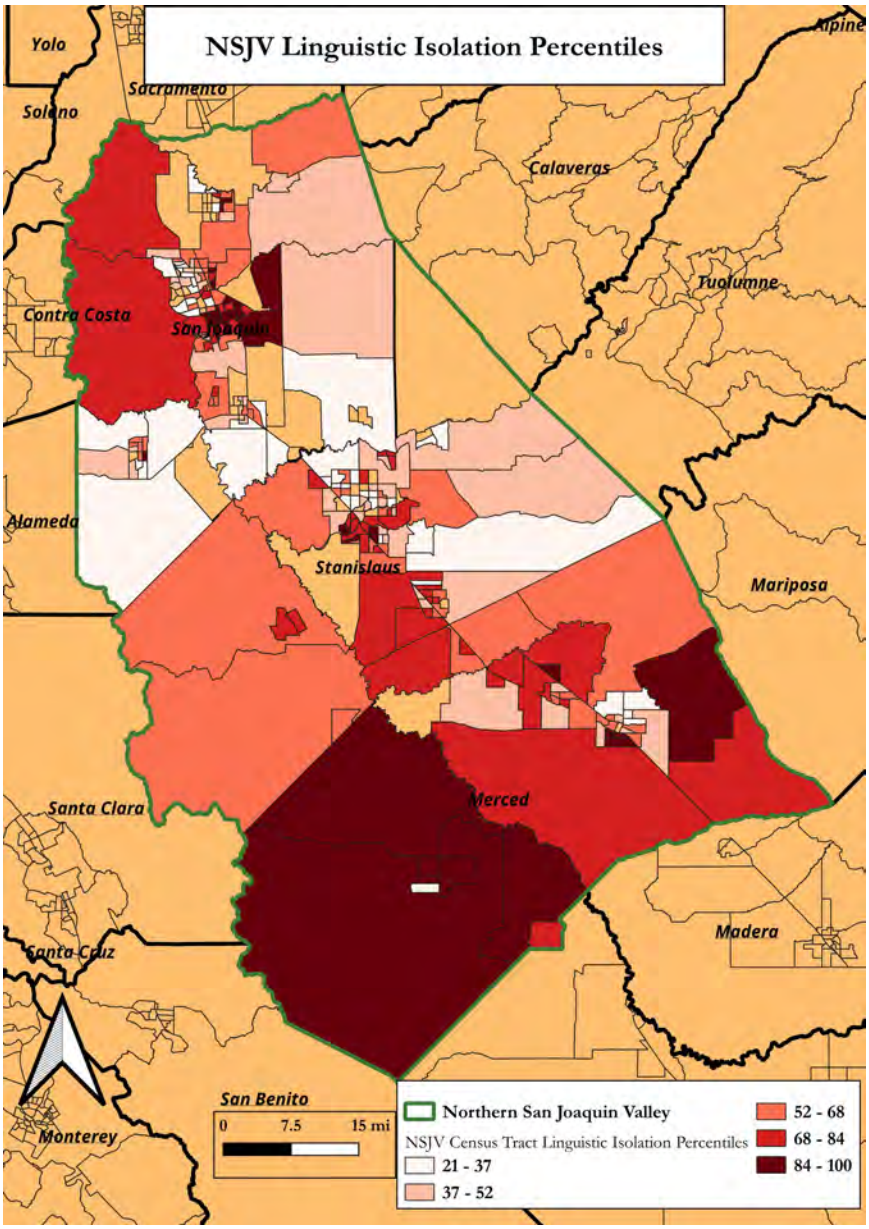
Overall, the indicators in Table 3.3.1.E demonstrate a need to raise educational attainment, particularly within disinvested communities experiencing the lowest levels, as shown geospatially in Figure 3.3.9 below.

Figure 3.3.9: NSJV Educational Attainment Levels CalEnviroScreen Percentile Map



Lower levels of educational attainment negatively and inequitably impact the region and its residents in numerous ways. Indeed, lower levels of educational attainment impact regional economic development and likely contribute to the region's challenges with unemployment, home ownership, poverty, and low levels of self-sufficiency to meet basic needs as shown in Table 3.3.1.E above. Further contributing to these challenges, the region experiencing relatively high levels of linguistic isolation, with many households speaking languages other than English and not speaking English proficiently. Figure 3.3.10 below demonstrates the geographic disparities in this regard, which likely impact educational attainment, unemployment, home ownership, poverty, and self-sufficiency as well as related public health outcomes through these social determinants of health. This suggests the need to provide education and training for employment and entrepreneurship in multiple languages and fields that will enhance regional economic development, equity, sustainability, resiliency, and capacity.

Figure 3.3.10:: NSJV Linguistic Isolation Levels CalEnviroScreen Percentile Map



With strong NSJV industries in agriculture, healthcare, and manufacturing/transportation/warehousing sectors, as well as a realization of the opportunity to address the weaknesses and negative externalities involved with these sectors (e.g., healthcare shortages, as well as high pollution burden (air, land, water) and traditionally low-paying jobs in agriculture and manufacturing/shipping/warehousing), including with regard to many of the indicators in the five themes above, researchers propose the following three tentative sectoral-themed working groups to potentially assist with the forthcoming process of developing strategies and initiatives to holistically address the identified public health themes and indicators with attention to California Jobs First goals:

1. Make-It/Ship-It:
    a. This working group is concerned with building on the region's historic manufacturing and shipping strengths to develop highroad economic opportunities. Leveraging existing highroad manufacturing activities, efforts seek to develop sustainable production that integrates modern technology with traditional manufacturing processes while incorporating efficient shipping strategies. Through this focus, our region will develop an augmented advanced manufacturing strategy. While a guiding principle will be to create higher value products by reconceiving their design and production to enhance productivity and reduce environmental impacts, this work will also recognize and actively respond to the need to equitably build residents' skills in this transition.

2. Building Health and Well-Being:
    a. This working group encompasses a wide range of activities centered around providing care and support services to individuals of all ages, with a particular focus on health, behavioral health, and child/elder care. It not only addresses the physical and emotional well-being of NSJV residents but also offers promising career pathways to advance equity.

3. Farming and Fostering the Land:
    a. This working group seeks to build on the concentrated agricultural and farming activities in the NSJV region to create more equitable, higher-value job opportunities and knowledge intensive, sustainable business activities that minimize negative externalities while maximizing benefits to disinvested communities. In building these opportunities, attention will be given to historic and ongoing inequities and barriers created by skill requirements that would traditionally limit much of the established agricultural workforce from accessing these family-supporting jobs.

These proposed sectoral-themed working groups should aim to develop strategies to holistically, equitably, and sustainably address the five aforementioned public health themes while advancing California Jobs First goals of fostering economic resilience by helping regions develop plans and strategies to diversify local economies and develop sustainable industries that create high-quality, broadly accessible jobs (e.g., goals related to industrial planning; economic diversification; job quality and access, equity, economic competitiveness; and sustainability perspectives) and state climate goals, including the following:

1. Supporting the development of low-carbon or regenerative industries, and/or
2. Supporting economic diversification designed to minimize Greenhouse Gas (GHG) emissions and/or water or energy usage

Overall, the NSJV presents many public health issues, including challenges related to the social determinants of health, which must be addressed holistically with attention to regional inequities and health disparities. The remainder of this document provides additional details related to the aforementioned analyses.

3.3.1 Governance of Public Health in the NSJV

The California Department of Public Health (CDPH) is the state department responsible for public health throughout California. CDPH functions include the following aspects of public health:

1. Infectious disease control and prevention,
2. Food safety,
3. Environmental health,
4. Laboratory services,
5. Patient safety,
6. Emergency preparedness,
7. Chronic disease prevention and health promotion,
8. Family health,
9. Health equity, and
10. Vital records and statistics

CDPH works in partnership with local health departments, as well as other state, federal, and private partners, to protect the public's health and help shape positive health outcomes for individuals, families and communities.

Further, NSJV counties of Merced, San Joaquin, and Stanislaus house the following county public health departments, which work with regional, state, federal, private, and community partners.

1. Merced County Depart. of Public Health
2. San Joaquin County Public Health Services
3. Stanislaus County Health Services Agency

Indeed, California possesses a decentralized public health services system, with counties leading local public health as called for in California Welfare and Institutions Code Section 17000:

> "Every county and every city and county shall relieve and support all incompetent, poor, indigent persons, and those incapacitated by age, disease, or accident, lawfully resident therein, when such persons are not supported and relieved by their relatives or friends, by their own means, or by state hospitals or other state or private institutions."[12]

County health services often include the following services:

1. County Hospitals and Health Services in Detention Facilities,
2. Emergency Medical Services,
3. Environmental Health,
4. Indigent Medical Care and Services for Medically Indigent Adults,
5. Mental Health Services and Substance Abuse Services, and
6. Public Health Services (prevention, early intervention, education, and treatment)[13]

As an existing regional strength, local health departments and organizations in each NSJV county completed CHNAs to understand a community's health status, needs, and issues, as well as the CHIPs to guide how and where resources should be allocated to address the identified needs and community

[12] https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WIC&sectionNum=17000.
[13] https://www.ca-ilg.org/sites/main/files/file-attachments/resources__Helping_Families_Find_Health_Insurance_in_CA_shortversion_1-21-11_0.pdf

priorities. See the list of NSJV CHNAs and CHIPs consulted for this document in Table 3.3.2 below.

Table 3.3.2: NSJV CHNAs and CHIPs

Community Health Needs Assessment (CHNA)	Community Health Improvement Plan (CHIP)
• Merced County 2016 Community Health Assessment (CHA) • 2022 Community Health Needs Assessment (sponsored by Dignity Health Mercy Medical Center Merced)	• Merced County Community Health Improvement Plan (2017-2022) • Merced Medical Center 2022 Community Health Implementation Strategy
• San Joaquin County 2022 Community Health Needs Assessment	• Community Health Improvement Plan for San Joaquin County (2023-2025)
• Stanislaus County Community Health Assessment 2020	• Stanislaus County Community Health Improvement Plan (2020-2025)

While the county-level CHNAs and CHIPs do not engage in regional analysis of the NSJV as a whole, they provide a basis for identifying regional needs and priorities from areas of overlap between the three counties that constitute the NSJV region. Indeed, an analysis of the existing CHNAs and CHIPs listed in *Table 3.3.2* resulted in the identification of the five overlapping public health challenges for the NSJV region:

1. Behavioral/Mental Health, Including Substance Abuse
2. Environmental
3. Health and Safety
4. Healthcare Access and Transportation
5. Income, Education, and Employment

These public health challenges reflect the emerging public health practice to include focus on the social determinants of health, which "are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks."[14]

3.3.2 Economic Trends and Climate Change Impacts on Public Health

While the Climate and Environment section of this report analyzes CalEnviroScreen data in more detail, looking at the NSJV as a whole compared to other counties in California, CalEnviroScreen 4.0 provides a percentile score that is a measure of the relative environmental health risk of an area.[15] The percentile score ranges from 0 to 100, with higher scores indicating higher environmental health risks. Overall, when compared to the 55 other counties in California, CalEnviroScreen 4.0 ranks the three-county NSJV region in the 71 percentile, which means that it presents a greater environmental health risk than 71% of other California counties. Looking at the NSJV's Pollution Burden, CalEnviroScreen 4.0 ranks the NSJV in the 63 percentile. With regard to Population Characteristics, including SDOH and public health outcomes therein, CalEnviroScreen 4.0 ranks the NSJV in the 70.6 percentile. Thus, CalEnviroScreen confirms the findings of

[14] https://www.kff.org/racial-equity-and-health-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/, https://health.gov/healthypeople/priority-areas/social- determinants-health, and https://www.center4healthandsdc.org/the-social-determinants-of-health.html.

[15] https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40

the NSJV Public Health Equity Index and the HPI with regard to the relatively high environmental health risk in the NSJV, as well as the key influence of social determinants of health, such as low educational attainment, on negative public health outcomes in the region.

Indeed, CalEnviroScreen 4.0 ranks fifty NSJV census tracts (nearly 18 percent of the regions 282 census tracts) within the top 10 percent of census tracts in California in terms of the greatest environmental health risk. Over fifty-five percent of the 282 census tracts in the NSJV (156 census tracts) are within the top 30 percent of census tracts in California in terms of the greatest environmental health risk. Table 3.3.3 below provides an overview of the NSJV with regard to a variety of indicators included in the CalEnviroScreen 4.0 analysis, ranked against other CERF regions.

Table 3.3.3: NSJV Cal Enviro Screen Indicators

Economic Regions	Overall Rank	Pollution Burden Rank	Population Characteristics Rank
Bay Area	2	6	3
Central Coast	3	7	2
Central San Joaquin Valley	13	12	12
Eastern Sierra	1	2	5
Inland Empire	10	9	11
Kern County	6	5	6
Los Angeles County	11	13	10
North State	4	3	8
Northern San Joaquin Valley	**12**	**11**	**13**
Orange County	9	10	1
Redwood Coast	5	1	9
Sacramento	8	4	7
Southern Border	7	8	4

Largely confirming the findings of the NSJV Public Health Equity Index and the HPI that the NSJV's two worst public health indicators relate to clean water and clean air, likely as a result of climate change, existing environmental conditions, and economic trends related to a dominant agricultural industry and growing transportation and warehousing industry, CalEnviroScreen 4.0 data show that, of the 23 indicators in *Appendix 3.3.B*, the NSJV performs relatively worse with regard to the following ten indicators in particular relative to the other 12 CERF regions:

1. Asthma (13th)
2. Drinking Water (13th)
3. Education (13th)
4. Pesticides (13th)
5. Overall CalEnviroScreen Score (12th)
6. Cardiovascular Disease (12th)
7. Unemployment (12th)
8. Groundwater Threats (11th)
9. Impaired Water Bodies (11th)

10. Linguistic Isolation (11th)[16]

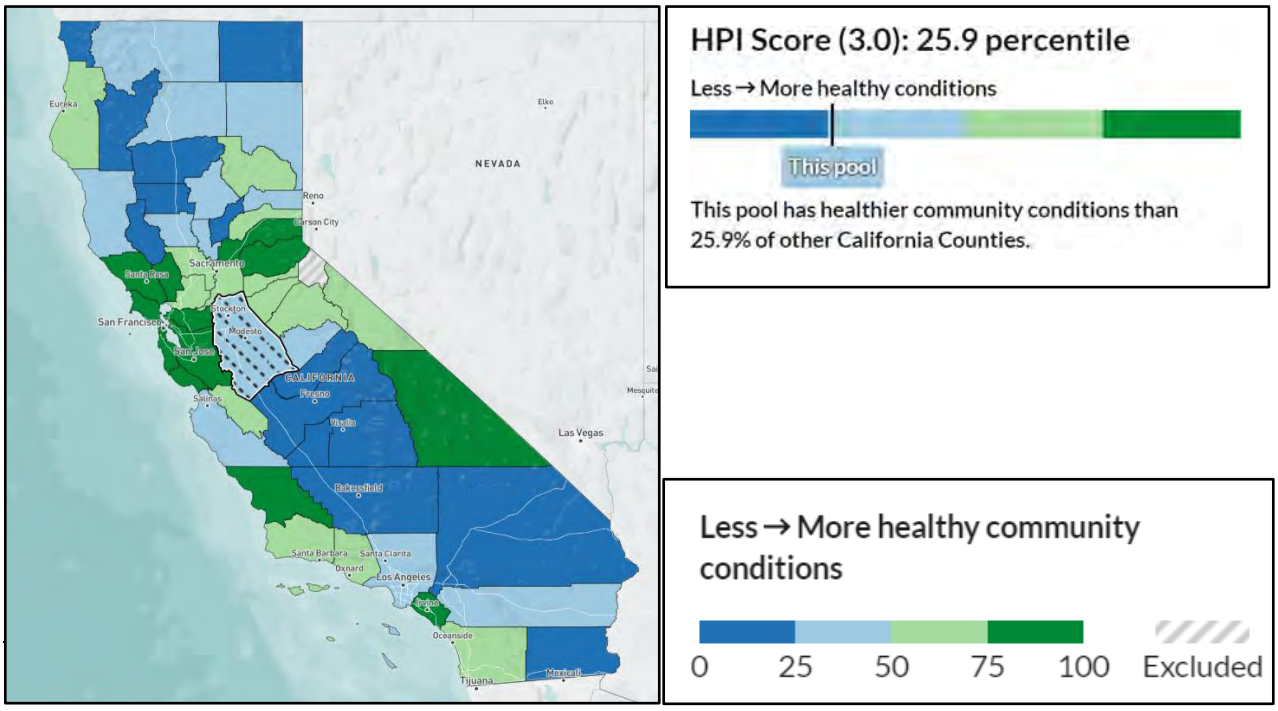
Appendix 3.3.B of this document provides more detail regarding the NSJV's relative performance on each CalEnviroScreen indicator. Not only does the NSJV rank 12th worst of 13 CERF regions with regard to its overall CalEnviroScreen score, CalEnviroScreen suggests that the region performs the worst with regard to drinking water contaminants and pesticides environmental conditions, educational attainment as a SDOH, and asthma public health outcomes. Additionally, with regard to SDOH overall, CalEnviroScreen ranks the NSJV last with regard to population characteristics, including housing burden (7th), unemployment (12th), poverty (10th), linguistic isolation (11th), education (13th), cardiovascular disease (12th), low birth weight (10th), and asthma (13th). To provide more nuance with regard to these rankings and the underlying data in Appendix 3.3.B, the maps in Appendix 3.3.E provide additional data visualizations to compare geographies on key indicators, as well as to illustrate key regional disparities with regard to significant regional inequities identified in this analysis.

3.3.3 Causes of Chronic Illness and Diseases

Supplementing the analysis of the new NSJV Public Health Equity Index, researchers also analyzed existing research and resources for NSJV public health information in this section and in the section on Climate and Environment. The Public Health Institute's Public Health Alliance of Southern California developed the Healthy Places Index (HPI) to provide a data visualization and policy platform that helps identify the most impactful opportunities to improve public health in an area. As described on the website hosting the HPI, the tool "maps data on social conditions that drive health — like education, job opportunities, clean air and water, and other indicators that are positively associated with life expectancy at birth. Community leaders, policymakers, academics, and other stakeholders use the HPI to compare the health and well-being of communities, identify health inequities and quantify the factors that shape health."[17]

[16] The percent of limited English-speaking households (households where no one over age 14 speaks English well)
[17] See https://www.healthyplacesindex.org/.

Figure 3.3.11: NSJV Healthy Places Index Score



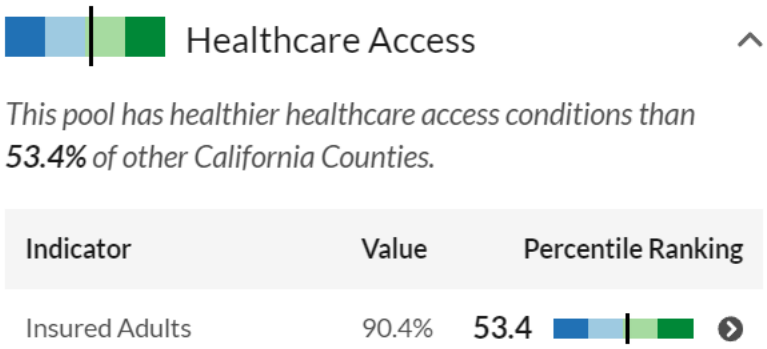
As shown in Figure 3.3.2 above, if the three-county NSJV region was ranked against the 55 other counties in California with regard to health and well-being, including health inequities, factors, and outcomes that shape public health, the NSJV would rank in the 25.9 percentile (ranked about 41st of 55 measured counties), which means that it presents healthier conditions than 25.9 percent of other counties. In other words, if the NSJV region was its own county, it would rank lower than 74.1 percent of counties in California in terms of health conditions. The following table presents the rankings of the NSJV in the HPI according to a variety of conditions, which shows that the NSJV falls within the bottom 50 percent of California counties with regard to every HPI condition other than "Healthcare Access".

Table 3 .3.4: NSJV's HPI Percentiles

NSJV Condition	Percent of California Counties with Less Healthy Conditions
Clean Environment	16%
Transportation	24%
Education	26%
Economic	36%
Neighborhood	36%
Housing	36%
Social	45%
Healthcare Access	53%

Table 3.3.4 above presents the 8 main conditions tracked by the HPI in order of the NSJV's performance on each of them, from worst performance to best performance. The 8 conditions tracked by the HPI reflect data from 23 indicators.

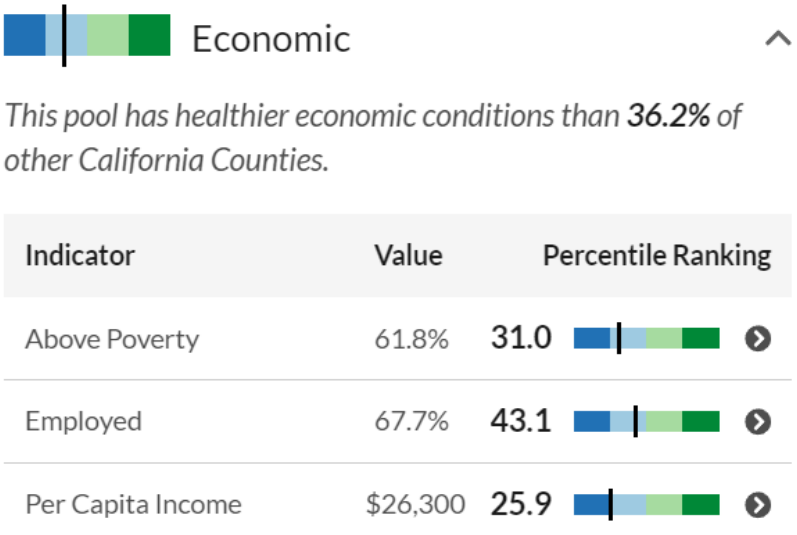
Figure 3.3.12: HPI Healthcare Access Indicators



With regard to relative strengths, overall, the HPI ranks the NSJV in the 53.4 percentile for Healthcare Access, which means that the region has healthier healthcare access conditions than 53.4 percent of other California counties. 90.4 percent of adults aged 18 to 64 years have health insurance in the NSJV, which places the region in the 53.4 percentile for the "Insured Adults" indicator. While "Insured Adults" provides helpful information regarding the "Percent of adults aged 18 to 64 years with health insurance," it may not present the full picture of healthcare access, such as health professional availability, which the aforementioned NSJV Public Health Equity Index tracks.

With regard to relative weaknesses, the HPI suggests that the greatest relative challenges of the NSJV consist of environmental, transportation, and education conditions, followed by economic, housing, neighborhood conditions, then, finally, social and healthcare access conditions. The NSJV performs relatively worst with regard to Drinking Water Contaminants (3.4 percentile), Homeownership (17.2 percentile), PM 2.5 (19th percentile), Diesel PM (22.4 percentile), Active Commuting (24.1 percentile), and Voting (24.1 percentile).

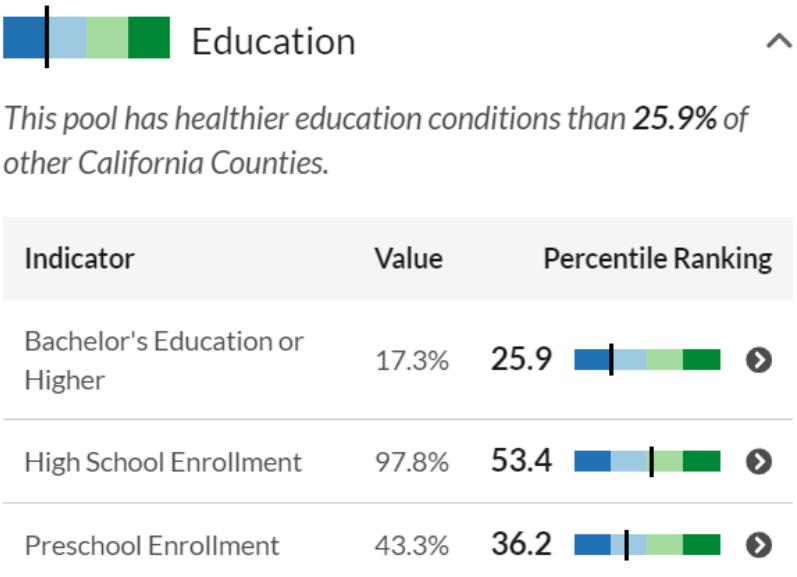
Figure 3.3.13: HPI Economic Indicators



With regard to Economic conditions, the HPI ranks the NSJV in the 36.2 percentile overall. More specifically, the HPI ranks the NSJV in the 31st percentile for the "Above Poverty" indicator, with 61.8 percent of people

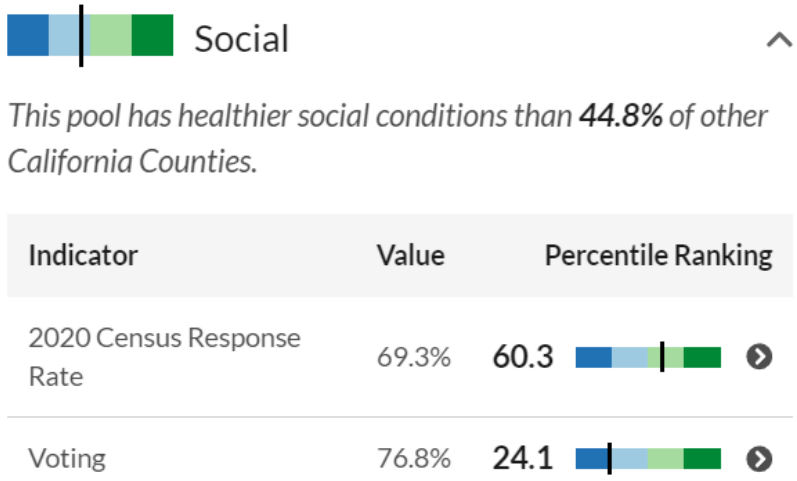
earning more than 200 percent of the federal poverty level. The NSJV ranks in the 43.1 percentile for the "Employed" indicator, with 67.7 percent of people aged 20-64 with a job. And, with a per capita income of $26,300, the HPI ranks the NSJV in the 25.9 percentile for the "Per Capita Income" indicator.

Figure 3.3.14: HPI Education Indicators



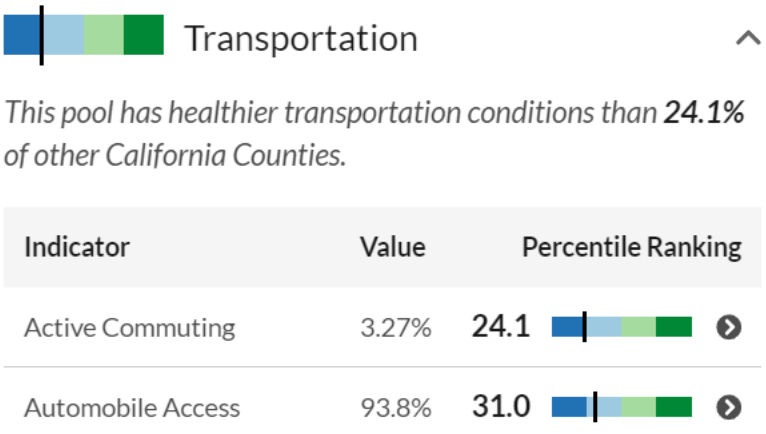
With regard to Education conditions, the HPI ranks the NSJV in the 25.9 percentile overall. Regarding the three indicators that make up the Education policy action area, with 17.3 percent of people over age 25 with a bachelor's education or higher education, the HPI ranks the NSJV in the 25.9 percentile for the "Bachelor's Education or Higher" indicator. With 97.8 percent of 15-17 year olds in school, the HPI ranks the NSJV in the 53.4 percentile for the "High School Enrollment" indicator. Finally, with regard to the "Preschool Enrollment" indicator, 43.3 percent of 3- and 4-year-olds in the NSJV are in school, which places the NSJV in the 36.2 percentile.

Figure 3.3.15: HPI Social Indicators



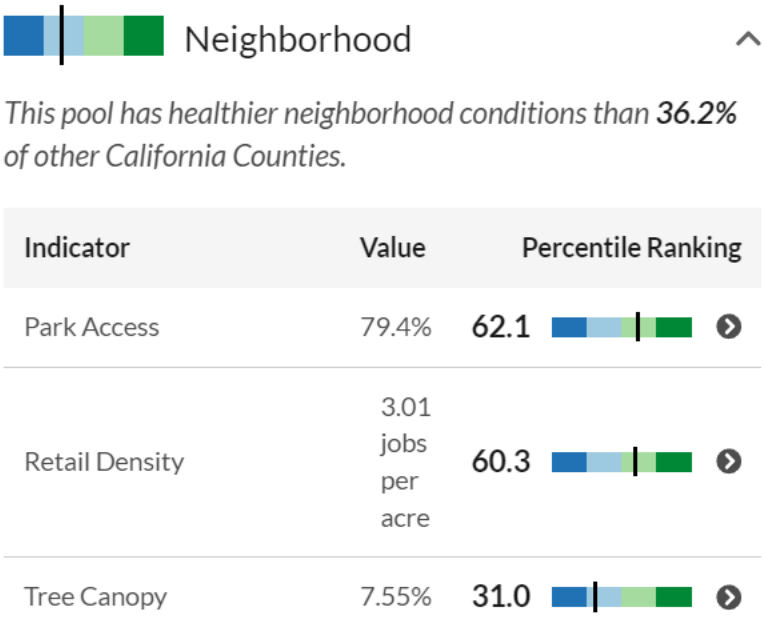
With regard to Social conditions, the HPI ranks the NSJV in the 44.8 percentile overall. With 69.3 percent of NSJV households completing the 2020 decennial census, the HPI ranks the NSJV in the 60.3 percentile for the "2020 Census Response Rate" indicator. With 76.8.7 percent of registered voters voting in the 2020 general election, the HPI ranked the NSJV in the 24.1 percentile for the "Voting" indicator—the NSJV's fifth lowest performing indicator, tied with Active Commuting, and after Drinking Water Contaminants, PM 2.5, Homeownership, and Diesel PM.

Figure 3.3.16: HPI Transportation Indicators



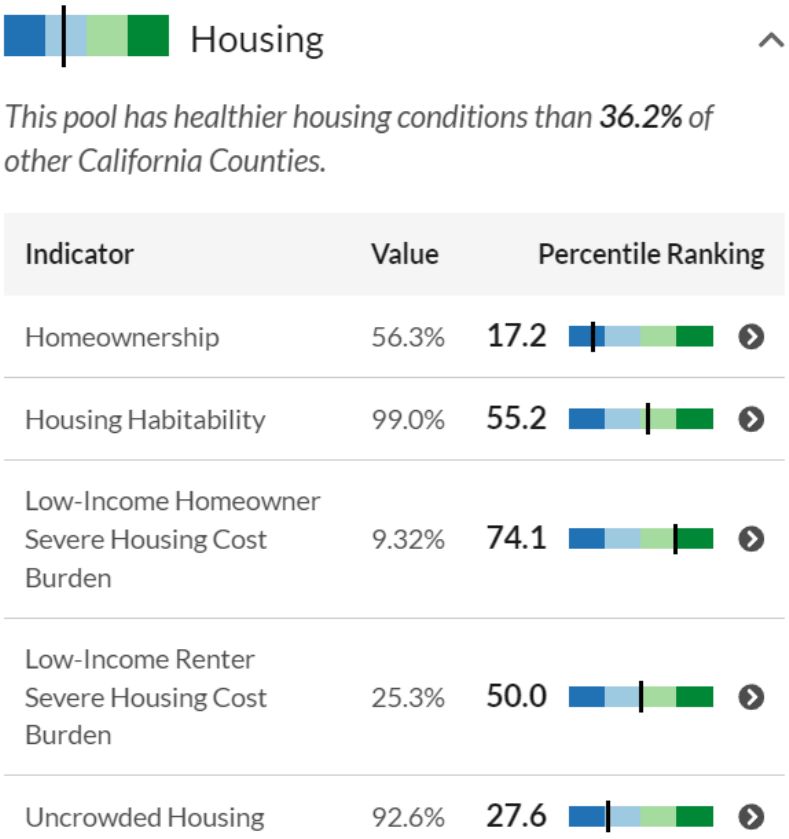
With regard to Transportation conditions, the HPI ranks the NSJV in the 24.1 percentile overall. With 3.27 percent of workers (16 years and older) commuting to work by transit, walking, or cycling, the HPI ranks the NSJV in the 24.1 percentile for the "Active Commuting" indicator. With 93.8 percent of households with access to an automobile, the HPI ranks the NSJV in the 31st percentile for the "Automobile Access" indicator.

Figure 3.3.17: HPI Neighborhood Indicators



With regard to Neighborhood conditions, the HPI ranks the NSJV in the 36.2 percentile overall. With 79.4 percent of people in the NSJV living within walkable distance (half-mile) of a park, beach, or open space, the HPI ranks the NSJV in the 62.1 percentile for the "Park Access" indicator; however, this indicator does not reflect park amenities, safety, usage, and investments. With 3.01 retail, entertainment, services, and education jobs per acre in the NSJV, the HPI ranks the NSJV in the 60.3 percentile for the "Retail Density" indicator. With 7.55 percent of land with tree canopy (weighted by number of people per acre), the HPI ranks the NSJV in the 31 percentile for the "Tree Canopy" indicator. Performance on these indicators further support the need to provide greater access to parks and tree canopy to address health inequities and extreme heat.

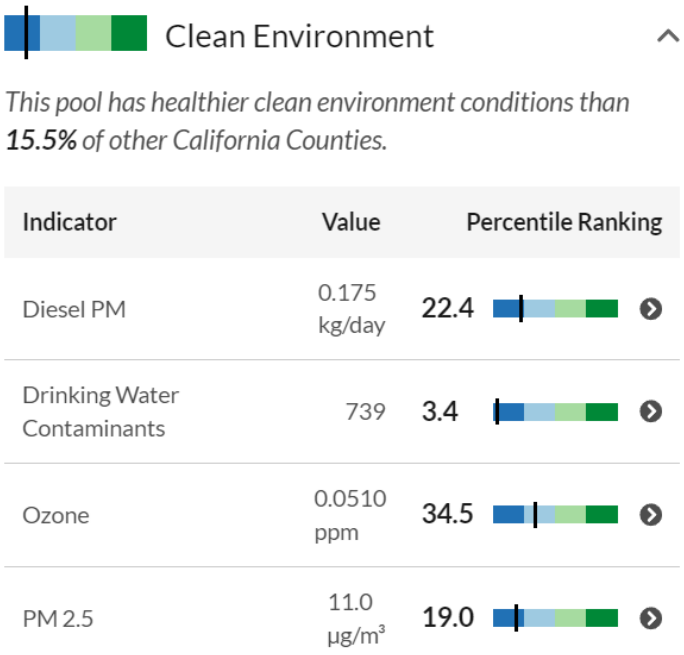
Figure 3.3.18: HPI Housing Indicators



With regard to Housing conditions, the HPI ranks the NSJV in the 36.2 percentile overall. With 56.3 percent of people in the NSJV owning their own home, the HPI ranks the NSJV in the 17.2 percentile for the "Homeownership" indicator. With 99 percent of NSJV households with basic kitchen facilities and plumbing, the HPI ranks the NSJV in the 55.2 percentile for the "Housing Habitability" indicator. With 9.32 percent of low-income homeowners in the NSJV paying more than 50% of their income on housing costs, the HPI ranks the NSJV in the 74.1 percentile for the "Low-Income Homeowner Severe Housing Cost Burden" indicator.

Further, with 25.3 percent of low-income renters in the NSJV paying more than 50% of their income on housing costs, the HPI ranks the NSJV in the 50th percentile for the "Low-Income Renter Severe Housing Cost Burden" indicator. Finally, with 92.6 percent of households not being overcrowded (more than 1 person per room) in the NSJV, the HPI ranks the NSJV in the 27.6 percentile for the "Uncrowded Housing" indicator.

Figure 3.3.19: HPI Clean Environment Indicators



Based on the HPI as of August 2023, the NSJV' greatest relative weakness consists of its environment, which may represent a significant contributor to chronic illnesses and diseases. Overall, the HPI ranks the NSJV in the 15.5 percentile for Clean Environment conditions. With an average of 0.175 kilograms of diesel particulate matter pollution released per day, the HPI ranks the NSJV in the 22.4 percentile for the "Diesel PM" indicator. With an average amount of ozone in the air during the most polluted 8 hours of summer days at 0.051 parts per million (ppm), the HPI ranks the NSJV in the 34.5 percentile for the "Ozone" indicator, which represents the highest performing Clean Environment indicator in the NSJV when compared to the rest of California's counties.

With an index score of 739, which reflects combined information about 13 contaminants and 2 types of water quality violations that are sometimes found when drinking water samples are tested, the HPI ranks the NSJV in the 3.4 percentile for the "Drinking Water Contaminants" indicator—the NSJV's second lowest performing indicator when compared to the rest of California's counties.

With an annual average of fine particulate matter concentration (very small particles from vehicle tailpipes, tires and brakes, power plants, factories, burning wood, construction dust, and many other sources) of 11 micrograms per cubic meter (µg/m³), the NSJV's third worst performing indicator, particulate matter 2.5 micrometers and smaller ("PM 2.5"), also occurs within the HPI's Clean Environment conditions. Overall, the HPI ranks the NSJV in the 19th percentile for the "PM 2.5" indicator. Thus, relatively, three of four of the NSJV's worst indicators relate to clean water and clean air, with the NSJV in the bottom 3.4 percentile of California counties for "Drinking Water Contaminants," the bottom 19 percentile for "PM 2.5" air pollution, and the bottom 22.4 percentile for Diesel PM air pollution. While water quality and air quality are significant public health weaknesses in the NSJV, climate change and economic trends threaten to worsen this further still through growing agricultural and manufacturing/transportation/ warehousing sectors. These findings support the findings of regional health inequities with regard to the NSJV Public Health Equity Index, as well as the five aforementioned public health themes.

3.3.4 Regional Health Disparities

This section engages in intraregional analysis that highlights the relative performance of each NSJV county regarding a variety of health factors compared to rates of California and the United States as a whole. Additionally, this section presents some of the preliminary findings of the Health Disparities in the NSJV Pilot Survey. For further intraregional analysis and data visualizations, see Appendix 3.3.C, Appendix 3.3.D, and Appendix 3.3.E.

As of 2023, Merced County ranks 39th out of 58 counties, San Joaquin ranks 41st of 58 counties, and Stanislaus ranks 36th out of 58 counties in California according to County Health Rankings,[18] which is prepared by the University of Wisconsin's Population Health Institute to provide "data, evidence, guidance, and examples to build awareness of the multiple factors that influence health and support leaders in growing community power to improve health equity." Merced County ranks among the bottom 25% of counties in terms of health factors, which "represent those things we can modify to improve the length and quality of life for residents." Further, Merced County ranks in the lower middle 25-50 percentile for health outcomes, which "represent how healthy a county is right now, in terms of length of life but quality of life as well." San Joaquin County and Stanislaus County both rank among the lower middle 25%-50% of counties in terms of health factors and health outcomes.

The County Health Rankings provide a useful indication of each NSJV county's strengths and weaknesses in terms of public health factors and outcomes. For example, *Table 3.3.5* presents each NSJV county's score on a variety of indicators, compared against the performance of California and the United States as a whole (whereas green highlighting indicates NSJV county data was better than comparison California and U.S. data, salmon highlighting indicates at least one county's data was worse). *Table 3.3.5* demonstrates that each NSJV county performs much worse than California and the United States with regard to a variety of indicators, including with regard to many of the same indicators identified through the NSJV Public Health Equity Index, the HPI, and CalEnviroScreen. Thus, collectively, this data supports the focus on the five public health themes identified in this baseline assessment. Additionally, the County Health Rankings data show that the NSJV lacks child care centers compared to California and the United States, and that Merced County experiences a much larger percentage of children in poverty than the rest of the NSJV, California, and the United States. The data also demonstrates the extreme shortage of mental health providers, primary care physicians, other primary care providers, and dentists in NSJV counties, as well as a high level of disconnected youth, frequent mental and physical distress, homicides, premature death, premature age-adjusted death, preventable hospital stays, and unemployment. As a result, the data also shows lower life expectancies in NSJV counties compared with California and the United States, as well as lower performance on reading and math assessments. Further, the data shows significant school funding inadequacy in NSJV counties, as well as comparatively low voter turnout.

In addition to the interregional and intraregional inequities observed in existing data, the Health Disparities in the NSJV Pilot Survey found several demographic inequities. For example, preliminary results of the pilot survey found that there appeared to be an association between being obese and having diabetes, particularly among the BIPOC population. Further, on the question, "Do you feel depressed?", 46.15 percent of the respondents who felt depressed very often, a few times a week, and every day were white or Caucasian, while 7.69 percent were Hawaiian or Other Pacific Islander, 15.38 percent were Black or African American, and 30.76 percent were the "other" category. Of those respondents who indicated being Chicana/o/x, Hispanic, Latina/e/o/x or of Spanish Origin, 11.6 percent indicated that they either felt depressed very often,

[18] See https://www.countyhealthrankings.org/.

a few times a week, and every day. Noteworthy is that the two races identified here as suffering most for depression are the two races who appear to make most use of drugs such as marijuana, cocaine, crack, heroin, methamphetamine, hallucinogens, and ecstasy/MDMA, which suggest elevated and inequitable substance abuse rates in the NSJV may reflect coping mechanisms to deal with depression. Still, a breakdown of the "other" category is important to undertake in a full-scale study to see how this segment of the population can be identified in more detail, including how the group's covariates come into play with other racial categories.

Table 3.3.5: Select Indicators from 2023 County Health Rankings

Health Factor	Merced	San Joaquin	Stanislaus	California	United States
Adult Obesity	38%	30%	33%	30%	32%
Adult Smoking	15%	14%	14%	9%	16%
Air Pollution – Particulate Matter	9.6	9.8	10.6	7.1	7.4
Alcohol-Impaired Deaths	28%	30%	31%	28%	27%
Broadband Access	89%	88%	89%	90%	87%
Child Care Centers (number of child care centers per 1,000 population under 5 years old)	5	6	4	8	7
Children in Poverty	29%	16%	19%	16%	17%
Dentists	2,200:1	1,700:1	1,440:1	1,100:1	1,380:1
Diabetes Prevalence	13%	11%	11%	9%	9%
Disconnected Youth	10%	10%	8%	7%	7%
Drinking Water Violations	Yes	Yes	Yes	N/A	N/A
Excessive Drinking	19%	21%	21%	18%	19%
Food Environment Index (Index of factors that contribute to a healthy food environment, from 0 (worst) to 10 (best).)	7.2	7.9	8.1	8.8	7
Frequent Mental Distress	16%	15%	16%	13%	14%
Frequent Physical Distress	13%	11%	11%	10%	9%
Gender Pay Gap	0.85	0.84	0.83	0.86	0.81
High School Completion	70%	80%	80%	84%	89%
Homicides[19]	8	10	4	5	6
Life Expectancy	78.2	77.7	77.3	81	78.5
Mammography Screening	30%	29%	30%	30%	37%
Math Scores	2.5	2.5	2.5	2.7	3
Mental Health Providers	430:1	370:1	410:1	240:1	340:1
Motor Vehicle Crash Deaths	18	16	15	10	12
Other Primary Care Providers	1,470:1	2,420:1	1,370:1	1,260:1	810:1
Physical Inactivity	29%	24%	26%	21%	22%
Poor or Fair Health	22%	17%	18%	14%	12%
Premature Age-Adjusted Mortality	380	390	400	290	360
Premature Death	7,400	7,800	7,800	5,700	7,300
Preventable Hospital Stays	3,323	2,427	3,229	2,256	2,809
Primary Care Physicians	2,270:1	1,680:1	1,530:1	1,230:1	1,310:1
Reading Scores	2.7	2.6	2.7	2.9	3.1
School Funding Adequacy[20]	($6,428)	($3,882)	($4,136)	($1,882)	$1,062
Severe Housing Problems	23%	24%	23%	26%	17%
Social Associations[21]	4	4.7	5.6	6	9.1
Some College	49%	52%	53%	67%	67%
Unemployment	10.40%	8.70%	8.40%	7.30%	5.40%
Uninsured	11%	8%	7%	8%	10%
Voter Turnout	59.50%	61.70%	62.50%	67.90%	67.90%

[19] Number of deaths due to homicide per 100,000 population.

To the question “In the past 12 months, have used any drugs including marijuana, cocaine or crack, heroine, methamphetamine (crystal meth), hallucinogens, ecstasy, or MDMA?”, 29 percent of the white or Caucasian respondents answered as yes, along with 41 percent of the “other” raced category. Black or African American, Asian, American Indian/Native American or Alaska Native, and Native Hawaiian or Pacific Islander respondents each constituted about 6 percent of the total answering yes to the same question. As such, the disparity between white or Caucasian, other and the remaining races were at least five times as much. From an ethnic standpoint, however, those respondents who answered yes were about 65 percent of Chicana/o/x, Hispanic, Latina/e/o/x or Spanish origin.

Certainly, in a full-scale study it is important to break up the “other” category to obtain more information, if possible, to further identify this group. It might be good perhaps to support this question with a follow-up question on ancestry or county of origin as well. Interestingly, white or Caucasian respondents rated themselves with the most life satisfaction in general while also reporting the most drug use and the highest levels of depression. This association is worth further investigation in a full-scale study. Similarly, in the question of self-rating of life satisfaction in general with regard to ethnicity, those who reported being Chicana/o/x, Hispanic, Latina/e/o/x or of Spanish origin constituted about 55 percent in the “very satisfied” category while those who were not constituted about 45 percent in the same “very satisfied” category. For other responses to this question, the results were qualitatively the same.

From the list of problems respondents identified, “not enough money to live on” received the most response in terms of being perceived as a “very serious problem,” second in this category was “poor housing,” and third was a tie between “difficulty paying for medical care,” and “not enough job opportunities.” These findings largely reflect the need to address California Jobs First goals. Those that tied for fourth place were “transportation,” “loneliness,” and “not seeing relatives enough.” American Indian/Native American or Alaska Native respondents, Black or African American respondents, and Native Hawaiian or Other Pacific Islander respondents had the highest percentage numbers in classifying “not enough money to live on” as a “very serious problem,” which reflects another demographic inequity in the region. A strong covariate among survey respondents is not having skills for higher paying jobs, which suggests a need to prioritize these racial groups in skill training education and employment access and opportunities.

With regard to preventative care, respondents who were born outside the United States were a lot less likely to get a mammogram than those who were born in the United States. White or Caucasian respondents reported getting a mammogram at a much higher rate of 48 percent. The group with the “other” option had the second highest rate at 41 percent. No American Indian/Native American or Alaska Native respondents reported having a mammogram done, which suggests the need for further analysis in a full-scale study. The results were qualitatively the same for prostate examinations and pap smears. Clearly, in those categories of preventive care American Indian/Native American or Alaska Native category appear to be experiencing the greatest inequities.

There are several direct and indirect implications of the pilot survey. Findings show that there is a negative association between the image of local health care providers and government institutions among the general perceptions of BIPOC populations and people without housing. Indeed, the survey found that social trust and

[20] The average gap in dollars between actual and required spending per pupil among public school districts. Required spending is an estimate of dollars needed to achieve U.S. average test scores in each district.
Required spending is an estimate of dollars needed to achieve U.S. average test scores in each district.
[21] Number of membership associations per 10,000 population. These include civic, political, religious, sports and professional organizations.

trust in governments and hospitals appears to be much lower among BIPOC groups and people without housing in the NSJV. Significant efforts must be made to earn the trust of these communities to effectively address the underlying health disparities in the NSJV. One implication of the findings is that to gain trust of the public, it may be important to have a university hospital in the NSJV region training local doctors and nurses who are from this area and who will work in this region upon obtaining their degrees, as well as for this hospital to implement research and training oriented on health conditions and disparities specific to the NSJV, such as breast cancer, asthma and other environment-related conditions and diseases. That said, UC Merced recently launched medical education accredited by the Licensing Committee on Medical Education to deliver medical education as a branch campus of the UCSF School of Medicine, which is shared with another underserved region through Fresno State University.[22] This new development presents an opportunity to further the development of healthcare career pathways and healthcare equity, sustainability, services, capacity, and resiliency throughout the NSJV.

It is essential that education attainment levels increase quickly in the NSJV. Almost every survey response was related proportionally to education. The higher the educational attainment levels, the healthier were the responses to survey questions and therefore, the respondents had lower odds of struggling with an onset of a disease or health condition. For example, the educated cohort suffered less from undiagnosed depression and those diagnosed were taking medication for depression. Less educated respondents went less often to doctors for checkups. There was divide between white or Caucasian and Black or African Americans respondents and respondents from ethnic groups such as Chicana/o/x, Hispanic, Latina/e/o/x or Spanish in the way they get regular checkups by visiting doctors, dentists, and optometrists. The latter cohort went less often to doctor visits than the former.

To complete this study in the very short time given, some survey questions, regional coverage such as remote locations of the NSJV region were naturally left to a full-scale study. It became clear that some questions needed revision in a full-scale study as well. In all, this pilot survey helps further inform the existing data to establish the baseline assessment of health disparities in the NSJV region for other studies to follow and be able to measure progress in terms of eliminating existing disparities to attain healthy aging and quality of life for all of residents living in NSJV. Further, the findings of this survey support and inform the findings from data reported by the health care system.

3.3.5 Social Determinants of Health

As described by Healthy People 2030, which is a U.S. Department of Health and Human Services project and recurring 10-year plan for addressing the nation's public health priorities, "Social determinants of health (SDOH) have a major impact on people's health, well-being, and quality of life. Examples of SDOH include:

- Safe housing, transportation, and neighborhoods
- Racism, discrimination, and violence
- Education, job opportunities, and income
- Access to nutritious foods and physical activity opportunities
- Polluted air and water
- Language and literacy skills"

The understanding of the significance of SDOH helps guide a more holistic approach to addressing the inequitable public health outcomes experienced in the NSJV. An understanding of the importance of SDOH may help better address upstream determinants of health outcomes before they lead to the observed

[22] https://meded.ucmerced.edu/

disparities in health and health care in the NSJV.

While the five health priorities identified in baseline research to date largely overlap with priorities identified by the public health system in each NSJV county's Community Health Needs Assessments (CHNAs) and Community Health Improvement Plans (CHIPs), researchers supplemented this high-level understanding of the NSJV's public health challenge themes with a more detailed analysis of a variety of SDOH and health outcome indicators.

Indeed, as a foundation for this, researchers utilized the San Joaquin Valley Public Health Consortium's list of 98 indicators from their 2022 report, *An Analysis of Health Equity in the San Joaquin Valley* Region.[23] Working with graduate students at the University of the Pacific, researchers updated the 98 indicators, where possible, added a few more (e.g., food safety), and analyzed the resulting CERF Public Health Equity Index by CERF region in order to facilitate an analysis of interregional inequities. Similar to the overview in Table 3.3.1.A, B, C, D, and E above, Table 3.3.6 below highlights a sample of indicators from each of the five identified public health challenge themes in the NSJV, which support the prioritization of these themes due to the NSJV experiencing significant interregional inequities.

Table 3.3.6: NSJV Public Health Equity Index Indicators

Issue and Indicators	Rank Among 13 CERF Regions
1) Behavioral/Mental Health, Including Substance Abuse	
Drug Overdose Deaths	11
Suicides (3-year data)	10
Frequent Mental Distress (Self-Report)	9
2) Environmental	
Drinking Water Contaminant	13
Asthma ER Visits	13
Pesticides	12
Extreme Heat (# of Daily Maximum Temps Above 100 F)	11
Air- Diesel Particulate Matter	10
Valley Fever (Coccidioidomycosis)	10
3) Health and Safety	
Breast Cancer Deaths	13
Violent Crime	12
Stroke Deaths	12
Congenital Syphilis Incidence	12
Cardiovascular Disease ER Visits	11
Chronic Kidney Disease Diagnosis	11
Colorectal Cancer Deaths	11
Diabetes Deaths	11
Low Birth Weight Infants (3 Years)	11
Coronary Heart Disease Deaths	10
Stroke Diagnosis	10
Lung Cancer Deaths	10
Prostate Cancer Deaths	10
Obesity	10
Diabetes Diagnosis	10
Lack of Physical Activity	10
Total Tooth Loss	10
Social Associations	10

[23] https://chhs.fresnostate.edu/ccphc/index.html

Years of Potential Life Lost	10
Social Vulnerability Index	10
4) Healthcare Access and Transportation	
Other Primary Care Providers	13
Mental Health Providers	12
Dental Visit (Self-Report)	11
5) Income, Education, & Employment	
Real Cost Measure (amount required to meet basic needs)	(San Joaquin 27th, Stanislaus 26th and Merced 41st (last), of 41 ranked county regions)
Some College	12
High School Completion	11
Homeownership	11
Unemployment	10
Not Proficient in English	10
Children Living in Poverty	10

See the full list of indicators in the NSJV Public Health Equity Index included in *Appendix 3.3.B* of this document. These indicators, which include SDOH, explore the region's possible causes of chronic illnesses and diseases and whether and how they relate to economic inequalities, climate impacts, environmental factors. The five public health challenge themes, as supplemented with a sample of related indicators from the NSJV Public Health Equity Index in Table 3.3.6 above, provides a snapshot of some of the impacts of the NSJV's economic trends, climate change, and environmental conditions on public health, especially the impacts on disinvested communities given that the majority of the NSJV consists of designated Senate Bill (SB) "Disadvantaged Communities." With BIPOC populations constituting nearly 70 percent of the overall NSJV population, the regional health disparities observed through the NSJV Public Health Equity Index also highlight possible regional health disparities by race and ethnicity, and more disparities are seen when disaggregating some of the indicators by gender and family size.

For example, the region's poor performance with regard to the public health outcome of Asthma ER visits (ranked 13 of 13 CERF regions), may reflect the region's relatively poor air quality,[24] including with regard to Air- Diesel Particulate Matter, which may reflect the region's economic conditions that continue to realize a growth in transportation and warehousing that might exacerbate the region's poor air quality with additional particulate matter from truck transportation. Further, climate change is likely responsible for the region's poor performance with regard to Extreme Heat, which also likely directly contributes to a host of health challenges, including heat cramps, heat exhaustion, heatstroke, and hyperthermia.

Additionally, Extreme Heat also indirectly leads to a variety of health challenges because it "can alter human behavior, the transmission of diseases, health service delivery, air quality, and critical social infrastructure such as energy, transport, and water."[25] Indeed, the U.S. Department of Health & Human Services (DHHS) claims that "Heat waves are also associated with increased hospital admissions for cardiovascular, kidney, and respiratory disorders."[26] Thus, NSJV climate change, environmental conditions, and economic trends likely exacerbate many of the public health inequities identified in the NSJV Public Health Equity Index included in *Appendix 3.3.B* of this document.

Similarly, the NSJV's poor performance with regard to Drinking Water Contaminants and Pesticides likely reflects climate change's impact on environmental conditions and resulting drinking water quality. Indeed, the United Nations (UN) highlights that climate change affects water quality, especially "as higher water

[24] https://www.cdc.gov/climateandhealth/effects/air_pollution.htm
[25] https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health
[26] https://www.cdc.gov/climateandhealth/effects/temperature_extremes.htm

temperatures and more frequent floods and droughts are projected to exacerbate many forms of water pollution – from sediments to pathogens and pesticides."[27] The NSJV's poor performance with regard to the Pesticides indicator, which may reflect the region's comparatively strong agricultural industry,[28] likely impacts its poor performance with regard to Drinking Water Contaminants as well. According to the U.S. Environmental Protection Agency (EPA), "If drinking water contains unsafe levels of contaminants, it can cause health effects, such as gastrointestinal illnesses, nervous system or reproductive effects, and chronic diseases such as cancer."[29] Thus, again, NSJV climate change, environmental conditions, and economic trends likely exacerbate many of the public health inequities identified in the NSJV Public Health Equity Index included in *Appendix B* of this document and sampled from in Table 3.3.6 above.

Researchers added the United Way's Real Cost Measure to the NSJV Public Health Equity Index, and it assesses how well a diversity of household compositions in a variety of locations meet basic needs.[30] The 2023 Real Cost Measure shows that 36.4% of households in the NSJV, 47.6% of households in Merced County, 34.4% of households in San Joaquin County, and 34.2% of households in Stanislaus County fell short of meeting basic needs in 2021.[31] While the precise percentages vary depending on the measure used, the data consistently shows that about a third of households fail to meet basic needs in the NSJV, with San Joaquin County households struggling at a slightly higher rate than households in Stanislaus County and at a lower rate than households in Merced County.

Altogether, 30,577 households in Merced County, 66,494 in San Joaquin County, and 48,135 in Stanislaus County fail to meet the Real Cost Measure, with the average household needing an additional $34,104 in Merced County, $33,210 in San Joaquin County, and $36,926 in Stanislaus County per year to fill the gap.[32] Disaggregating data by race, gender, and other demographics points to additional regional health disparities in that one's citizenship status, educational achievement, gender, marital status, parental status, race/ethnicity, and neighborhood all appear correlated with the likelihood of a household meeting basic needs in the NSJV. Indeed, BIPOC single mothers with multiple children struggle to meet basic needs at the highest levels in the NSJV, followed by people with less than a high school education and non- citizens.

Looking forward, after additional reflection and consideration of community feedback from the discussion of the aforementioned findings on August 24, 2023, researchers propose adding additional indicators to the NSJV Public Health Equity Index, including those related to existing public health assets, such as hospital beds, as well as composite scores that facilitate overall analysis of regional public health inequities.

Additionally, to better understand regional health disparities disaggregated by race, gender, and other demographics, researchers propose additional analysis of the NSJV Public Health Equity Index's indicators and their performance in census tracts with designation as a Disinvested Community (DAC) (just over 63% of NSJV census tracts) and/or with higher concentrations of BIPOC populations. DAC "refers to the areas throughout California which most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous wastes as well as high incidence of asthma and heart disease." These census tracts are discussed in more detail in

[27] https://www.un.org/en/climatechange/science/climate-issues/water (also see https://www.apha.org/topics- and-issues/climate-change/water-quality)
[28] https://www.epa.gov/report-environment/drinking-water
[29] https://www.epa.gov/report-environment/drinking-water
[30] https://unitedwaysca.org/realcost/
[31] See https://www.unitedwaysca.org/realcost
[32] https://public.tableau.com/app/profile/hgascon/viz/TheRealCostMeasureinCalifornia2023/RealCostDashboard?publish=yes

the Climate and Environment section of this report.

Research shows that BIPOC populations live "disproportionately in communities with EJ concerns, experiencing more risk and exposure to environmental pollution and toxic substances than other communities." Indeed, "Low-income neighborhoods primarily made up of BIPOC tend to face more detrimental social determinants of health, including poverty, racism, discrimination, neglect, and higher pollution burdens. There is a connection between place-based social inequalities and health. Where someone lives can shape their capacity to live their healthiest life, including how long they live." Reflective of the regional inequities experienced within the diverse NSJV, the region ranks 10th of 13 CERF regions with regard to the Years of Potential Life Lost indicator of the NSJV Public Health Equity Index.

Still, this report shares the San Joaquin Valley Public Health Consortium's recognition that "Data on race/ethnicity was available for only a handful of indicators and the data for different racial and ethnic groups that was collected did not include all the racial and ethnic groups that exist in the state and the Valley. In addition, many of the numbers for several racial/ethnic groups were missing for smaller" geographies. Indeed, "While this report easily demonstrates the disparities experienced by the region as a whole, a lack of region-specific data (especially demographic data) contributes to a lack of understanding of the unique experiences of San Joaquin Valley residents and glosses over disparities that exist among different demographic groups within the region itself that may or may not be reflected at the state and national level" more generally. Thus, researchers call for more qualitative research with communities to gain a better understanding of the diversity of experiences in the NSJV by race, gender, and other distinctions. Still, this report shares the San Joaquin Valley Public Health Consortium's recognition that "Data on race/ethnicity was available for only a handful of indicators and the data for different racial and ethnic groups that was collected did not include all the racial and ethnic groups that exist in the state and the Valley. In addition, many of the numbers for several racial/ethnic groups were missing for smaller" geographies.[33] Indeed, "While this report easily demonstrates the disparities experienced by the region as a whole, a lack of region-specific data (especially demographic data) contributes to a lack of understanding of the unique experiences of San Joaquin Valley residents and glosses over disparities that exist among different demographic groups within the region itself that may or may not be reflected at the state and national level" more generally.[34] Thus, researchers call for more qualitative research with communities to gain a better understanding of the diversity of experiences in the NSJV by race, gender, and other distinctions.

As the San Joaquin Valley Public Health Consortium stated, adding to limitations of the available data with regard to the relationship of various health determinants and outcomes with various demographic factors (race, ethnicity, gender, age), there is a challenge "to identify effective solutions to inequitable health and social outcomes, it is critical to understand the unique causal and systemic pathways that exist in the region between a variety of social and health outcomes, and for this, accurate and aggregated regional data is necessary."[35] In this regard further region specific evidence is limited and evidence suggesting causal linkages between some of the identified health determinants and health outcomes more generally is primarily not NSJV-specific. In this the North Valley THRIVE data and analytics efforts also support the San Joaquin Valley Public Health Consortium's call to:

- **Expand research capacity and funding for research within the region:** research efforts should be led by those living and working in the region, informed by community members,

[33] https://chhs.fresnostate.edu/ccphc/documents/SJVPHC%20RHEA%20Report%20Final%203.22.2022%20.pdf
[34] https://chhs.fresnostate.edu/ccphc/documents/SJVPHC%20RHEA%20Report%20Final%203.22.2022%20.pdf
[35] https://chhs.fresnostate.edu/ccphc/documents/SJVPHC%20RHEA%20Report%20Final%203.22.2022%20.pdf

particularly from disinvested communities.

- **Pursue additional research analyzing the impact of social determinants on health outcomes in the San Joaquin Valley:** Research efforts should include investigation of specific causal pathways that lead to inequitable outcomes both within the region and in comparison to other regions (i.e., how poverty and health insurance access in the Valley impact health).
- **Expand limited race/ethnicity categories included in surveys, records, and other data collection instruments** to reflect the diversity of the region more effectively.[36]

3.3.6 CDPH County Health Status Profile and Healthy People 2020 and 2030

Rather than solely engage in comparative interregional and intraregional analyses, this research also compared the NSJV's performance on a variety of health indicators with the corresponding health objectives, when available, from Healthy People 2020 and Healthy People 2030. The California Department of Public Health (CDPH) produced a Health Status Profile for each NSJV county, which facilitated rankings and comparisons related to a variety of health determinants and health outcomes. In addition to facilitating the ranking of counties, the tables in *Appendix 3.3.C* and *Appendix 3.3.D* add information for comparison with California and the United States as a whole, as well as comparison with Healthy People 2020 and 2030 objectives. For all tables, green highlighting indicates NSJV county data was better than comparison data and salmon highlighting indicates at least one NSJV county's data was worse. For the most recent data presented in *Appendix D*, Healthy People 2030 provides 70 objectives that correspond to indicators in NSJV counties, with NSJV counties failing to meet the standard over 64 percent of the time. About 87 NSJV county indicators correspond to Healthy People 2023 objectives in *Appendix 3.3.D*, with NSJV counties failing to meet the standard about 61% percent of the time, which suggests that the NSJV's public health may be growing further from federal health objectives over time. While the HPI, NSJV Public Health Equity Index, County Health Rankings, Health Status Profiles, and baseline research identify potential regional inequities to prioritize, the goal is to address these in a holistic way as called for with the state's vision for a High Road Economy, which is an approach to economic and workforce development that prioritizes equity, sustainability, and job quality while advancing a shared prosperity wherein workers and communities share equally in the benefits of a carbon-neutral future.[37] Combining the analysis in this section with the other sections' analyses can assist with identification of holistic interventions.

[36] https://chhs.fresnostate.edu/ccphc/documents/SJVPHC%20RHEA%20Report%20Final%203.22.2022%20.pdf

[37] https://laborcenter.berkeley.edu/labor-management-partnerships/high-road-training-partnerships/

4 Industry and Occupational Cluster Analysis

Introduction

The California Jobs First initiative specifies the development of a Baseline Report of the North San Joaquin Valley's (NSJV) regional economy, including a Labor Market Analysis and an Industry Cluster Analysis. The initiative calls for regional researchers to identify the trends and indicators that highlight the best opportunities for workers to access jobs that pay wages that enable self-sufficiency for themselves and their families.

The study thoroughly analyzed the region's industrial activity, looking at trends in export-oriented and locally-serving industries in the private sector to identify staple and emerging activities that hold the most promise. It also comprehensively assessed the region's workforce and labor market. It looked at groups of jobs with similar skills to understand the types of workers contributing to the region's staple and emerging industries. Finally, the last part of the report sought to understand the training and education system's contributions to the regional workforce and industrial activity.

The initiative also asks to identify challenges and barriers to accessing education and economic opportunity. Data on demographics, comparative wages and earnings, industrial automation, educational attainment, awards, and environmental impacts present several indicators to illustrate challenges and successes. What results is a comprehensive assessment that uses multiple indicators to understand the opportunities and challenges in the NSJV region's industries, workforce, and education system.

Section Overview

The assessment's methodology focuses on the regional economy, using the U.S. Cluster Mapping Project's clusters to analyze the highest-performing industries that point to regional specializations. Analyzing the regional labor market is directly tied to those highest-performing industry clusters in the NSJV. The research assesses the extent to which industries and occupational employment pay self-sufficiency wages. The third part of the Career Cluster Assessment (Subsection 4.2.3) assesses how well the region's portfolio of education and training programs aligns with the labor market. The industry and occupation analysis includes data on automation risk for industries and occupations. The industry cluster section also briefly discusses environmental impacts as well as referring to previous discussion of industrial environmental indictors (Section 3.2.4). To support report readability and audience understanding, the assessment covers the industry clusters first (Section 4.1) and then turns to consider occupation clusters (Section 4.2).

Industry Clusters (Section 4.1): This section assesses traded and locally-serving clusters, with an overview and detailed analysis of critical indicators, demographics, earnings and self-sufficiency, and automation risk. These components cover the content examples from the state guidance under the sections Impacts on the Labor Market; Projected Labor Trends; Snapshot of Major Industries and Industry Trends; Analysis of Potential Growth Clusters; Identification of Displacement Risks and At-Risk Workers.

Career Clusters (Section 4.2): This section uses O*NET's career clusters to analyze the region's occupational employment. It assesses similar indicators to the industry clusters: demographics, wages and self-sufficiency, education requirements, and automation. These sections cover several parts of the state guidance examples: Overview of Labor and Workforce Dynamics; Impacts on the Labor Market; Projected Labor Trends; Industry-Specific Labor Standards; Barriers to Accessing High-Quality Jobs; Training Programs and Partnerships; Analysis of Potential Growth Clusters; and Identification of Displacement Risks and At-Risk Workers.

Appendices and supplemental materials: In addition to the key findings below, the assessment has created a summary appendix (Appendix 4A) that reviews strategic findings to inform subsequent strategy, policy, and planning efforts. The summary appendix is followed by a technical appendix (Appendix 4B). The assessment of industry clusters and career clusters yielded vital information on industry and business drivers and the workforce and education components that support them. Detailed supplemental analysis of industry and career clusters form two additional appendices (Appendix 4C and 4D. These are intended to provide additional data for program leaders and the community to understand further opportunities to engage with education and business stakeholders.

Methodology

This section outlines the methods and data used to conduct the analysis. Unless otherwise described, the research employed Lightcast's Q3 2023 dataset.

Study geography

The primary study geography is the combined 3-county NSJV region: San Joaquin, Stanislaus, and Merced counties. In the industry and occupation section, data on employment, location quotient, wages, and earnings compare the region and the state. The appendices describe each of the three counties' industry cluster employment, location quotients, and trends.

Industry clusters

The analysis uses the U.S. Economic Development Administration's U.S. Cluster Mapping Project's definitions to count industry employment, location quotients, earnings, and historical and projected trends. The clusters are divided into 51 "traded" clusters, industry groups with similar supply chains and occupation employment that generally sell products and services outside the region. These export-oriented industries (often manufacturing) generate higher earnings and multiplier effects. The EDA definitions also include 16 locally-serving industry clusters, like health care, construction, and retail, industries that primarily involve business activities with local customers.

Career clusters

The analysis uses staffing patterns to describe the type and share of workers in a selection of industry clusters. Staffing patterns provide estimates of occupational employment in groups of industries that make up the industry clusters. The analysis used the O*NET Career Clusters, a national model that groups hundreds of occupations into 16 clusters of occupations with similar skills and other characteristics. The study details major trends for key indicators—employment, median wages, and projected annual openings.

Scoring and priority clusters

The research uses a scoring system to prioritize industry and occupation clusters. Three metrics are considered—employment size, location quotient, average annual earnings (average median hourly wages for occupation clusters), and 5-year historical trends for all three metrics (% change 2017-2022). The occupation clusters also compared the number of average projected annual openings. The process resulted in selecting 26 traded clusters, 10 local industry clusters, and 9 career clusters for additional profiling. The appendices detail the exact criteria and scoring system.

Government and Crop and Animal Production

The EDA cluster definitions do not include the large public sector employment categories (government or public administration). In addition, Lightcast's coding system groups all government-related employment into a separate category. As such, the report does not detail public healthcare, utilities, schools, and local, state, and federal government offices. The EDA cluster definitions also do not include the on-farm activities of Crop and Animal Production, though several support activities related to agriculture are included.

Comparisons of annual earnings, hourly wages, and self-sufficiency standards

The analysis of industry and occupation clusters compares average annual earnings and hourly wages between the NSJV and California. The study offers several interpretations: (a) an indicator of the NSJV's industry competitiveness; (b) an indicator of competition for workers from employers outside the region; (c) an intraregional comparison of workforce opportunities. The analyses also show earnings and wage thresholds based on self-sufficiency standards using the University of Washington's Center for Women's Welfare Self-Sufficiency wage and earnings standards. The standards present cost-of-living indices according to research on basic necessities (housing, utilities, transportation, food, etc.) in local areas according to family sizes. An analysis of household self-sufficiency in the NSJV indicates that 50% of families with children who earn less than $32.80 per hour or $66,708 struggle to

make ends meet. The research compares the shares of jobs in the traded and local clusters and career clusters to these thresholds and quantifies the number of jobs meeting or exceeding the threshold. The analysis is intended to demonstrate the extent to which specific industries and occupations provide wages to provide families with basic necessities.

Demographics
The research presents a demographic profile of industry and career clusters by race and ethnicity, age, and gender. The report highlights fundamental share differences within the region to highlight disparities among certain race and ethnic groups in industry and career clusters requiring higher education levels and higher wages.

Education and training alignment
Building on the Human Capital Assessment in Section 3.1.3, we include an analysis of the NSJV's postsecondary education and training awards addresses talent availability. The research employs a crosswalk from the National Center for Employment Statistics that compares award output on an annual basis from the NSJV's education programs to the projected yearly openings in 16 related occupation career clusters. The accounting method has well-known issues in regional economic analysis, but the results provide helpful context for program planning.

Automation risk
The report uses the automation risk scores that Lightcast embeds into occupation data based on the work of Frey and Osborne, who studied the probability that occupations would be "computerized." Each occupation is conveniently assigned an index-style score above or below an average of 100.0. Surpassing 100.0 signals above-average automation risk, indicating the potential need for retraining or support to transition. The analysis shows average scores for the occupation and industry clusters.

Appendices with supplemental data
The assessment resulted in a considerable amount of detailed data on the more than 600,000 jobs in the NSJV, a valuable trove of information for the next strategic planning phase. Supplemental data on industry and occupation clusters ("career clusters") offer additional data to support the North Valley THRIVE collaborative's strategic planning phase in 2024. These data include at-a-glance tables of the indicators for each of the selected priority industry clusters and career clusters. The analysis used EconoVue (Dun & Bradstreet) and lists significant employers in each priority industry cluster. The career cluster playbook specifies critical detailed occupations by education requirement.

Job quality
The assessment considers job quality across the topics covered in the report: (1) whether average earnings in related industries and occupations surpass self-sufficiency thresholds based on family sizes; (2) the number of jobs in industry and career clusters that surpass self-sufficiency thresholds; (3) the indicators (employment, location quotient, earnings, and openings, etc.) that suggest employment prospects based on business competitiveness and talent needs; (4) the outlook for education and training programs that align with the most promising industries and occupations; (5) occupation groups that have diverse education requirement profiles, and that have widespread industry concentrations, which suggest opportunities to advance with additional education and in careers in other industries; and (6) other supporting or mitigating factors that may affect industry performance resulting in employment impacts, such as automation risk; and environmental impacts.

There is an emerging literature and set of practices alongside the subject of "quality jobs" and "promising jobs." The research team weighed additional analysis alongside the report's extensive scope, and the need to further engage the community to determine criteria and priorities for future research. Much of the data on the subject is not readily available without primary research or novel data approaches. Future research could build on the analysis of quality jobs in Section 3.1.4 and perform additional analyses on part-time employment and health benefits, conduct business and worker surveys, or invest in defining new data analysis.

Key Findings

The summary below reviews the findings from the analysis of the NSJV's industry, career clusters, and demographics, highlighting areas for critical strategic focus. A more comprehensive summary of findings can be found in Appendix 4A: Summary of Some Strategic Considerations.

The research considered critical indicators of performance and specialization in the NSJV's industry clusters, using definitions from the U.S. Cluster Mapping Project, and identified 24 traded clusters and 10 local clusters for detailed profiles of job trends, earnings, and demographics. Using these industry clusters, the analysis used O*NET's career clusters, groups of occupations with similar skills, and also focused on a subset. The assessment profiles 9 career clusters for projected annual openings and growth, education requirements, and alignment with regional education and training programs. The assessment's last section details regional programs in the 9 categories that produce the most awards.

Key findings on the industry clusters include the following:

- Several small traded clusters have experienced rapid growth and merit strategic focus. These are often connected to large, staple industries in the NSJV—agriculture, food processing, health care, and logistics. The emerging industries include materials and product manufacturing in metals, chemicals, and plastics. IT and Analytical Instruments (equipment for testing and controls), and Production Technology and Heavy Machinery are also among these emerging industries. Others are associated with construction activities: Structural Metal Manufacturing, Vulcanized and Fired Materials, Wood Products, Furniture, and Construction Products and Services.

- The region's agricultural legacy is apparent in the industrial data on Agricultural Inputs, Food Processing, and Livestock Processing, which have substantial location quotients. However, these clusters consistently display weakening labor market potential. Some activities in Food Processing may yield opportunities.

- Distribution and Electronic Commerce is a behemoth that has rapidly emerged. Other related cluster activities in logistics and wholesaling have also grown. These clusters offer a mixed picture of opportunity and challenges considering their earnings and education requirements, as well as automation risks and environmental considerations.

- The assessment highlights Aerospace and Defense and Environmental Services and consulting as having displayed strong indicators, but further research and engagement are needed to explore the potential opportunity.

- The assessment emphasizes two main locally-serving industry clusters for strategic planning: Health Services, owing to the region's numerous healthcare facilities with hiring challenges, and Real Estate, Construction, and Development, which has outpaced the state's growth rate and presents a vast workforce development potential.

- The region has had numerous tourism and hospitality initiatives, but the locally-serving hospitality cluster shows weak employment numbers and earnings.

- Utilities have above-average earnings, but the cluster's growth is owed to natural gas increases.

- The Education and Training cluster (only including private sector activity) will figure into various regional strategies, but it is notable for low wages and weak employment trends.

- Comparing estimates of wages in the industry clusters (and career clusters) suggests that most workers in

the NSJV do not earn enough to support families with children ($32.80 per hour or $66,708 annually).[1] The research finds that only about 13% of the employment in the traded clusters and 18% in the local clusters surpass that rate. (The figure is 16% in the career cluster.)

Key findings on the career clusters include the following:

- The manufacturing career cluster is a leading strategic opportunity for its significant shares of jobs across a range of traded and locally-serving clusters and its substantial postsecondary education requirements below the bachelor's level.
- Like related industry activity, the Agriculture, Food, and Natural Resources career cluster is a fundamental workforce category. Still, it is dominated by low-wage, low-skilled jobs that have experienced historical reductions.
- The Health Science career cluster has vast numbers of jobs and annual openings. Its jobs have educational requirements at every level, signaling opportunities to advance with more education and training.
- The Architecture and Construction career cluster has many jobs overall and a wage level that is encouraging in many cases. Most jobs require postsecondary education and experience.
- Business Services and Administration and Transportation and Distribution have significant shares of jobs that require postsecondary education and experience. Both have average hourly wages of less than $30 per hour.
- The STEM career cluster is tiny in the NSJV, with about 2,000 jobs, nearly all requiring at least a bachelor's degree.
- Like its related industry clusters, the Hospitality and Tourism career cluster is also dominated by low-wage, low-skilled jobs; 9 out of 10 jobs require a high school diploma or less.
- The research finds that only about 16% of the total employment in the selected career clusters meets or exceeds the targeted self-sufficiency rate of $32.80 or $66,708 for families with children.[2]

The main findings related to demographics, automation, and the environment include the following:

- The method for scoring automation risk is based on occupations, so the industry and career clusters present similar findings. Automation risk is highest in manufacturing, construction, hospitality, and logistics activities. The traded clusters generally display higher-than-average automation risk scores owed to the predominance of manufacturing.
- Findings on demographics are also similar between the industry and career clusters. A quarter and a third of the workforce are 55 or older, indicating current and future retirement threats.
- With few exceptions, there are higher shares of Latinx workers in industry and occupation clusters that have lower education requirements and wage levels. There are virtually no African Americans in STEM occupations; a few career clusters (public safety, transportation, and logistics) have higher shares of African Americans.

[1] For further discussion of this threshold see Section 3.1.4.
[2] Again for further discussion of the self-sufficiency target, see Section 3.1.4.

- In all but 3 traded clusters, where manufacturing industries are common, women make up a minority share. In the locally-serving Health Services cluster, women make up a majority. Just 8% of the Architecture and Construction career cluster and 24% of the STEM career cluster are women.

- The data, which was previously discussed in Section 3.2.3, suggests that several industry sectors are responsible for more emissions, pollution, and land and water use in the NSJV than all other sectors combined. These include agriculture, utilities, transportation and warehousing, and manufacturing sectors.

4.1 Industry Clusters

This section offers an analysis of the industry activity in the NSJV, highlighting the industry groups with the most promising trends. The study used the U.S. Cluster Mapping definitions to quantify employment in the NSJV.[3] The section begins with an overview of the region's business clusters' aggregated trends (combined traded and local). The first subsection focuses on the "traded" industry clusters, the export-oriented business activity that brings wealth into the local economy from outside the region. The second subsection examines locally-serving clusters, which are just that—they primarily involve the business activity serving local customers.

The research used the U.S. Cluster Mapping Project definitions of export-oriented and locally-serving industries. Industry clusters share suppliers and workers. High-performing clusters indicate regions with competitive industry specializations relative to other regions. The research scored the NSJV clusters according to several key indicators and prioritized a subset for further analysis.

The analysis used a scoring system to identify high-performing clusters and industries, which are noted as priority clusters and emphasized throughout the assessment in further detail. From 51 traded industry clusters, the research identified 26 for further analysis. Of the 16 locally-serving clusters, the study highlights 10 for additional findings.

The selection of clusters for inclusion in the subset of priorities was based on the number of jobs in the cluster, growth rates, location quotients, earnings, and the 5-year historical trends for these measures (2017-2022). The selection also includes clusters aligned with existing regional plans and initiatives. The methodology for the scoring is detailed in this section's appendices.

Most jobs in the traded and local clusters make the priority cut in the NSJV. These jobs have faster growth rates, higher location quotients, and higher earnings (Table 4.1 and Figure 4.1). The priority traded clusters have an average location quotient that is 30% greater than the national average. Many of these clusters have important specializations, often in one or more detailed industries.

In 2022, the traded clusters accounted for 26% of the jobs in the NSJV. Locally-serving clusters comprised 54% of employment, while Government accounted for 15% and Crop and Animal Production comprised 4%. The latter two sectors are not included in the U.S. Cluster Mapping definitions and are not covered in the report beyond the summary section below. On average, the traded clusters had higher earnings and growth rates than the local clusters in the more recent 5-year period, 2017-2022, owing to resiliency during the pandemic.

Crop and Animal Production activities grew slower than most cluster activities between 2012 and 2017 and reduced employment by 11.5% between 2017 and 2022. Government experienced some growth between 2012 and 2017, but stagnated in the recent 5-year period. (Government jobs' earnings are, on average, nearly $25,000 higher than traded clusters' earnings.)

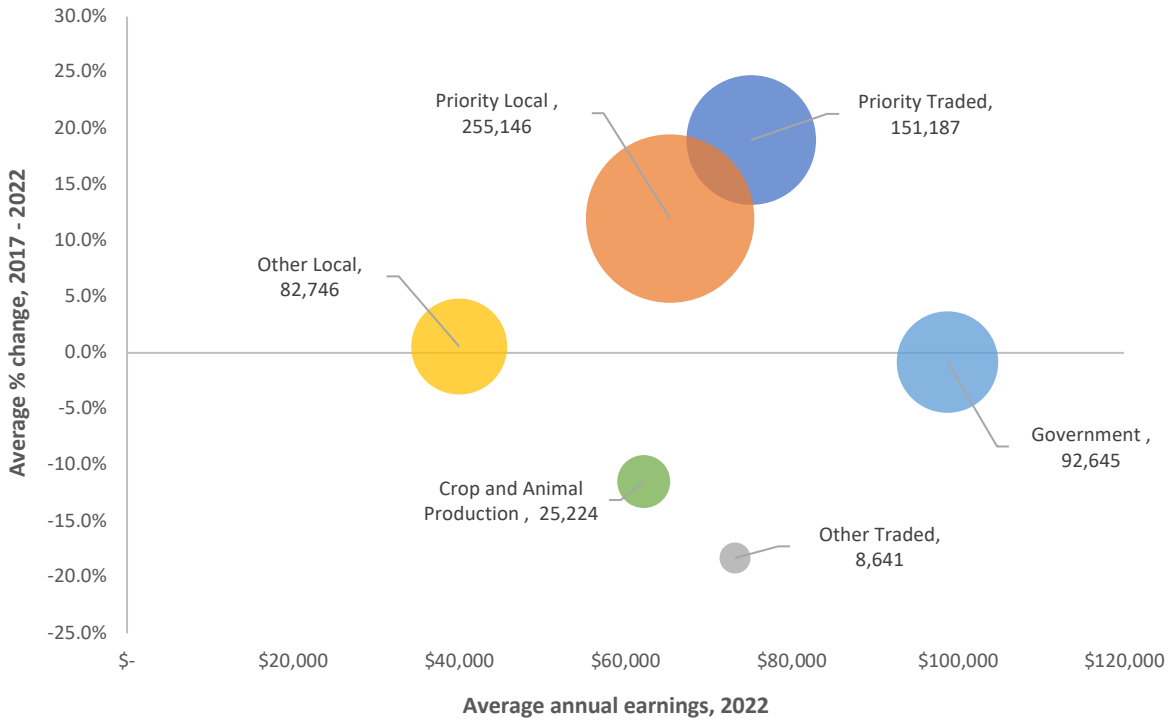
[3] U.S. Economic Development Administration, U.S. Cluster Mapping Project https://www.clustermapping.us/content/cluster-mapping-methodology

Table 4.1 Historical and projected employment, traded and local clusters, Government, and Crop and Animal Production, NSJV, 2012-2027

Industry cluster/sector	2012 Emp	2017 Emp	2022 Emp	2027 Emp	% Change 12-17	% Change 17-22	% Change 22-27	Avg. Ann. Earnings 22	Avg. LQ 22
Traded (all)	119,919	137,649	159,828	174,980	14.8%	16.1%	9.5%	$74,980	0.9
Priority Traded	108,396	127,075	151,187	166,236	17.2%	19.0%	10.0%	$75,085	1.3
Non-Priority Traded	11,523	10,574	8,641	8,745	-8.2%	-18.3%	1.2%	$73,137	0.3
Local (all)	265,500	310,153	337,892	374,255	16.8%	8.9%	10.8%	$59,118	1.0
Priority Local	196,206	227,870	255,146	282,477	16.1%	12.0%	10.7%	$65,331	1.0
Non-Priority Local	69,294	82,283	82,746	91,778	18.7%	0.6%	10.9%	$39,961	0.8
Government	80,565	93,414	92,645	99,251	15.9%	-0.8%	7.1%	$98,693	1.0
Crop, Animal Production	26,478	28,492	25,224	24,863	7.6%	-11.5%	-1.4%	$62,155	5.1
Total*	507,155	576,534	620,095	677,279	13.7%	7.6%	9.2%	$69,108	1.0

Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/
**Note:* Unclassified employment is not displayed. The rows in the table do not add to the total.

Figure 4.1 Historical trends (2017-2022) and baseline employment (2022), and average annual earnings of NSJV clusters



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.1 displays the distinguishing features of the priority and other clusters regarding employment growth and earnings. The priority traded, and local clusters had higher growth rates and earnings than other economic sectors between 2017 and 2022. The size of the bubbles shows the large share of jobs that comprise the selected traded

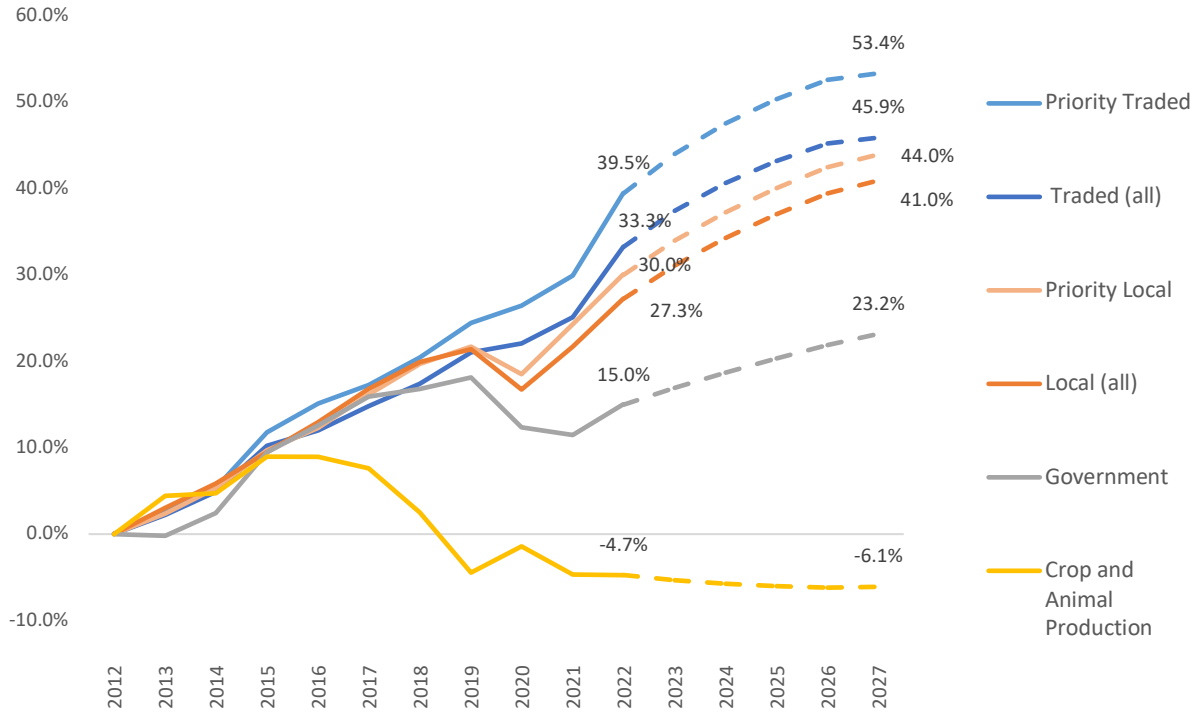
and local sectors.

Figure 4.1 further illustrates the differences in growth among the clusters, the public sector (Government), and Crop and Animal Production in the NSJV. The traded clusters experienced the highest growth rates. The selected priority traded clusters increased employment by 39.5% in the 10 years 2012-2022. Local clusters also substantially increased employment by nearly a third (27.3%), with the priority local clusters having a slightly higher increase (30.0%). The 5-year projections show the clusters continuing on a similar growth trajectory.

The selected traded and local clusters generally have higher growth rates and earnings than other parts of the economy. The traded clusters proved more resilient to the shock of the pandemic, and continued to grow.

The traded clusters experienced only minor impacts from the pandemic overall and accelerated growth in 2022. Local clusters resumed growth trends following the pandemic, while Government remained slightly below pre-pandemic levels. Crop and Animal Production saw sharp reductions following drought years and continued a steady decline during and following the pandemic.

Figure 4.2 Historical and projected employment change by major industry category, NSJV, 2012-2027 (indexed to 2012)



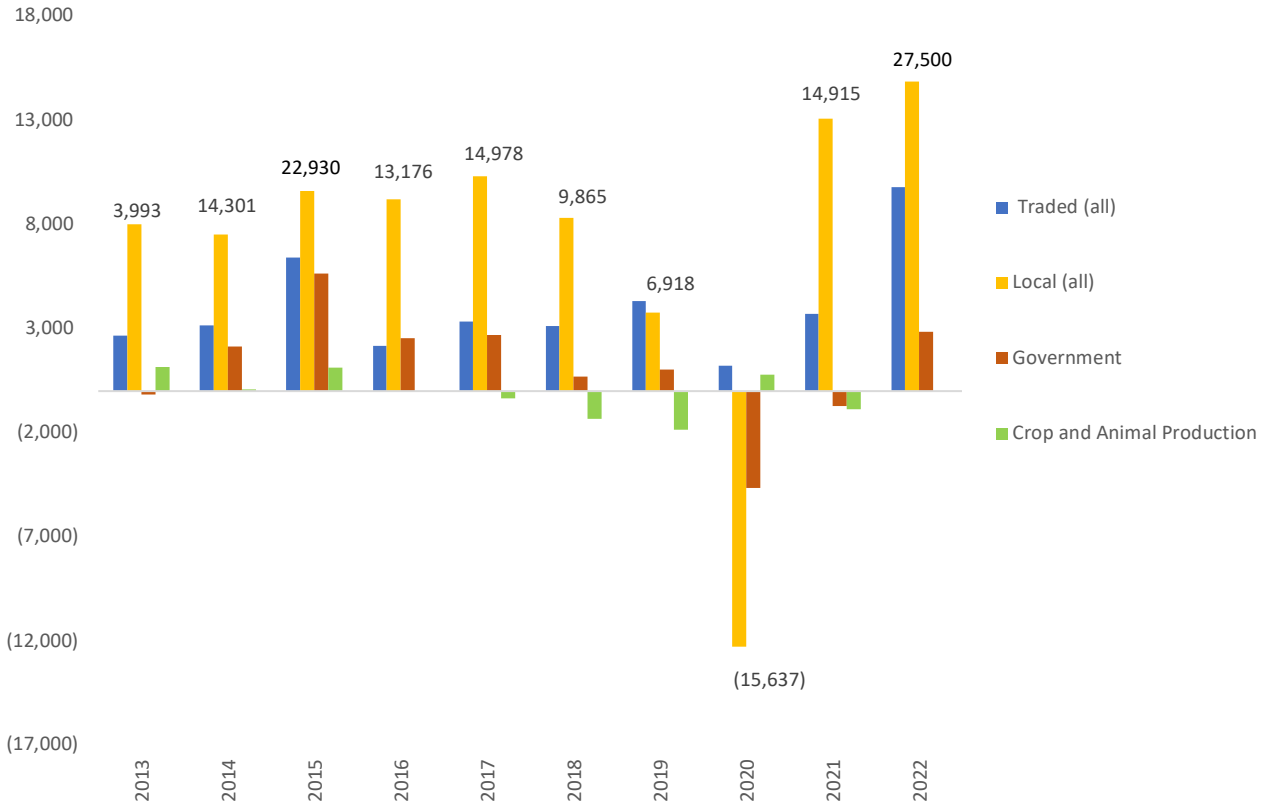
Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.3 displays the yearly job changes (year over year) in the traded and locally-serving clusters, in Government and Crop and Animal Production, and for the overall economy. (The clusters in the graphic include all traded and local clusters, not only the priorities.) The data show that in most years, local clusters added double or more jobs created by traded clusters in the NSJV. In the 2 years leading into the pandemic, regional employment growth had weakened primarily in the local clusters, Government, and Crop and Animal Production.

Traded clusters maintained substantial growth numbers and were resilient through the pandemic—they increased

employment for the 2020 totals. By 2022, the traded and local clusters had resumed pre-pandemic growth trends. In 2022, traded clusters accounted for a little more than a third (35.4%) of the region's annual job growth. Government had only reached just below pre-pandemic levels. Crop and Animal Production continued on a trajectory of job losses.

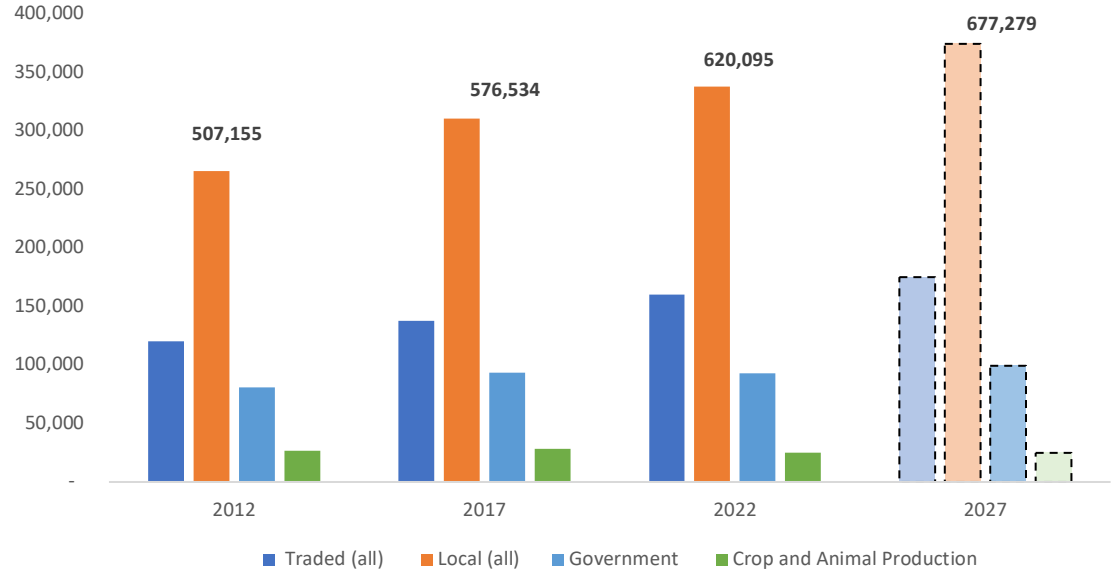
Figure 4.3 Year-over-year employment change by industry cluster/sector (and total change) NSJV, 2012-2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/
**Note:* Unclassified employment is not displayed. The columns do not add to the total.

Figure 4.4 displays job totals for the traded and local industry clusters, Government, and Crop and Animal Production, further illustrating the historical and projected trends described above. By 2022, the regional clusters had substantially recovered from the pandemic, but their growth trajectory had slowed and impacted overall employment growth. Employment grew by 13.7% between 2012 and 2017 and 7.6% between 2017 and 2022. The traded clusters were generally not affected by the pandemic and continued on a steady growth trajectory. The 5-year projections indicate the region will grow slightly faster (9.2%) than the previous 5-year period between 2017 and 2022 (7.6%).

Figure 4.4 Historical and projected employment by industry cluster/sector (and total employment), NSJV, 2012-2027



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/
**Note:* Unclassified employment is not displayed. The columns do not add to the total.

4.1.1 Traded Clusters Overview of Industry Groups and Clusters in the NSJV

Of the 51 traded clusters, the scoring analysis identified 24 priority clusters based on employment, location quotients, earnings, and recent historical trends. The section below illustrates these key indicators, comparing the NSJV's figures to the state. The additional analysis reviewed detailed industries and business records within the NSJV's priority clusters, which revealed the activities most responsible for the performance. Supplemental data in the appendices on the industry clusters details specific activities and lists notable businesses in the NSJV. The list below is an abbreviated version of the top-level summary and highlights the key takeaways for strategy from the data illustrations in the section.

Several small traded clusters have experienced rapid growth. These are often connected to large, staple industries in the NSJV—agriculture and food processing, health care, and logistics. Many of the emerging clusters are associated with construction activities.

- Upstream and downstream materials and product manufacturing, including Upstream Chemicals and Metals, Downstream Chemicals and Metals, and Plastics, are small clusters with rapid growth and increased location quotients. Downstream Metals, also noted below for its relationship to construction, has surpassed the national location quotient.

- IT and Analytical Instruments, including equipment for testing and controls, and Production Technology and Heavy Machinery have rapidly grown and have significant location quotients.

- Several traded clusters related to construction have experienced employment growth and increases in location quotient. These include Structural Metal Manufacturing, Vulcanized and Fired Materials, Wood Products, Furniture, and Construction Products and Services. Downstream Metals also has a relationship

with construction activities.

- Environmental services has strong indicators on all measures. The cluster includes recycling, waste treatment, and hazardous materials.

- Agricultural Inputs, Food Processing, and Livestock Processing are regional staples with huge employment totals and location quotients. These clusters have bright spots but consistently display weakening labor market potential over 10 years.

- Some activities in Food Processing may yield opportunities. Biopharmaceuticals may belong in the category since its main activities involve food-related supplements.

- Distribution and Electronic Commerce is an unmistakable behemoth of growth and employment in the region. The local cluster Logistical Services and traded Transportation and Logistics have also skyrocketed.

- Aerospace and Defense has also experienced remarkable growth.

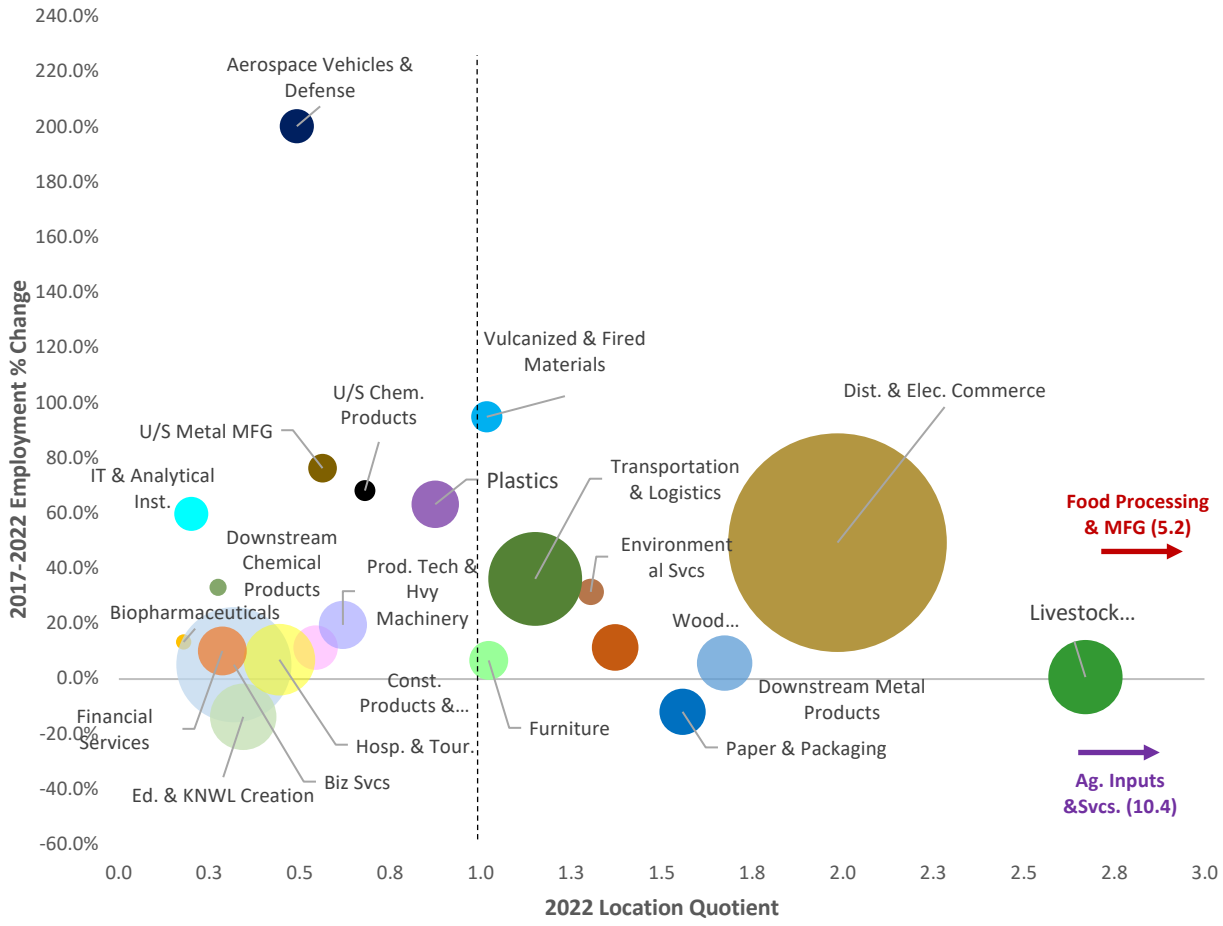
- The research finds that only about 13% of the employment in the traded clusters surpasses a self-sufficiency threshold to support families with children ($32.80 per hour or $66,708 annually).

- The traded clusters face higher than average automation risk scores owed to the predominance of manufacturing industries in the clusters. However, clusters related to agriculture, construction, hospitality, and transportation and logistics face the highest automation risk.

- Most traded clusters have large shares of workers aged 55 or older. In all but 3 traded clusters, women make up a minority share, which is typical in manufacturing industries. Most traded clusters have average or higher shares of Latinx workers, except those with large shares of jobs requiring bachelor's degrees.

Figure 4.5 displays the priority traded clusters in a standard quadrant bubble chart showing 5-year growth rates (2017-2022, vertical axis), location quotient (on the horizontal axis), and the amount of employment for each cluster (size of the bubble). Distribution and Electronic Commerce is the giant bubble on the upper right, indicating a considerable location quotient, rapid growth, and a huge number of jobs. (It is the largest traded cluster by employment.) The related cluster Transportation and Logistics is also in the upper right quadrant of sizeable growth and location quotient. Aerospace and Defense on the upper left shows significant recent growth, small numbers of jobs, and emerging, but low, location quotient. The range of promising clusters in the upper left of the quadrant are those small emerging industries mentioned above—Upstream Chemical Products and Metal Manufacturing, IT and Analytical Instruments, Plastics, and Vulcanized and Fired Materials. Furniture and Wood Products are also noted for employment growth and higher-than-average location quotients.

Figure 4.5 Location quotient and employment % change, 24 selected priority traded clusters, NSJV, 2017-2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Table 4.2 compares the priority traded cluster employment and location quotient) in the NSJV and California. The analysis also calculated the share of the total employment in the economy for each traded cluster. The table shows where the NSJV has more significant employment and location quotient shares than the state. These include logistics, food and agriculture, various industries related to construction and materials manufacturing (upstream and downstream chemicals and metals), and plastics. The region has small location quotients in business services, education, financial services, hospitality, and information.

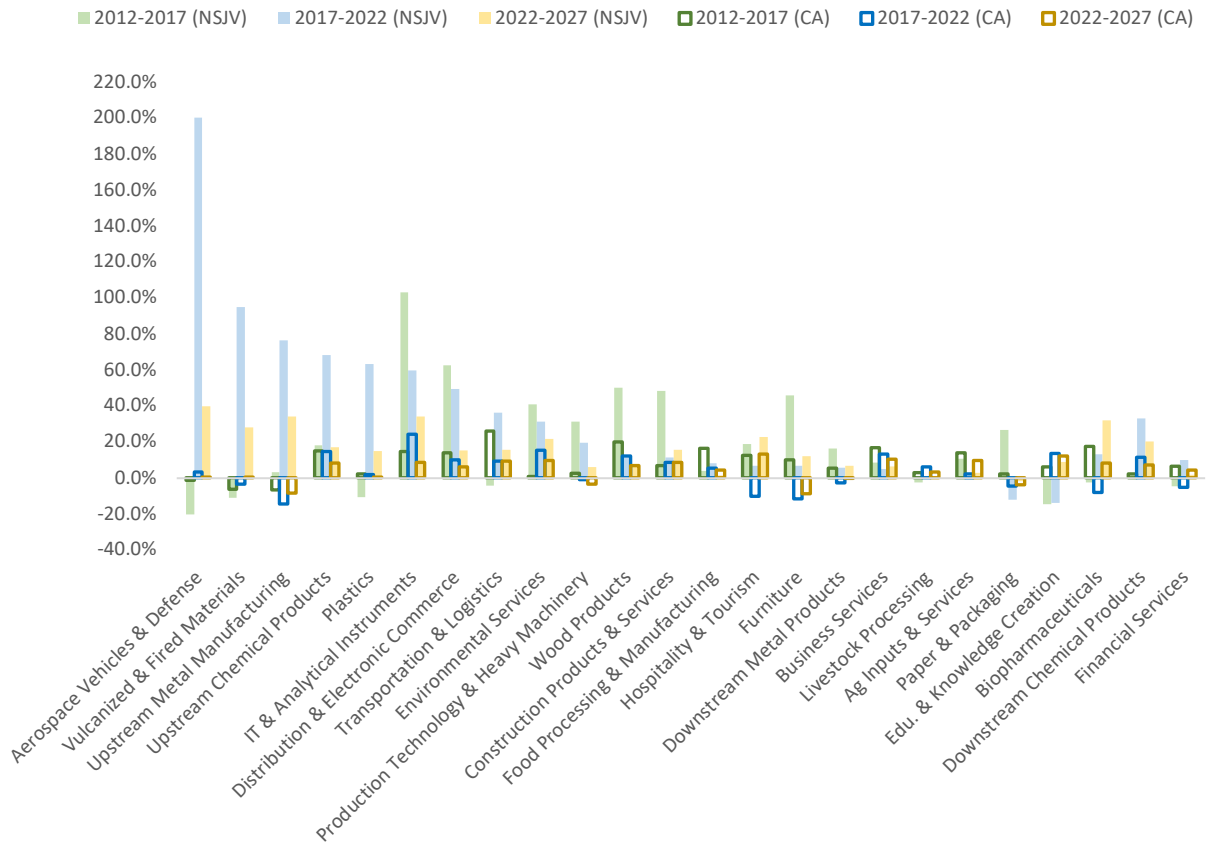
Table 4.2 Priority traded cluster employment, % of total economy, and location quotient, NSJV and California, 2022

Cluster	2022 Employment		%of Economy		2022 LQ	
	NSJV	CA	NSJV	CA	NSJV	CA
Distribution and Electronic Commerce	46,844	782,349	7.5%	3.8%	2.0	1.0
Food Processing and Manufacturing	24,273	184,466	3.9%	0.9%	5.2	1.2
Agricultural Inputs and Services	20,575	235,876	3.3%	1.2%	10.4	3.6
Business Services	12,985	1,395,941	2.1%	6.8%	0.3	1.0
Transportation and Logistics	8,624	204,489	1.4%	1.0%	1.1	0.8
Livestock Processing	5,402	23,845	0.9%	0.1%	2.7	0.4
Hospitality and Tourism	5,025	370,318	0.8%	1.8%	0.4	1.0
Education and Knowledge Creation	4,323	460,124	0.7%	2.3%	0.3	1.1
Downstream Metal Products	3,008	30,437	0.5%	0.1%	1.7	0.5
Financial Services	2,337	226,027	0.4%	1.1%	0.3	0.8
Production Technology and Heavy Machinery	2,274	61,623	0.4%	0.3%	0.6	0.5
Plastics	2,206	43,661	0.4%	0.2%	0.9	0.5
Wood Products	2,129	27,616	0.3%	0.1%	1.4	0.5
Paper and Packaging	2,097	21,018	0.3%	0.1%	1.6	0.5
Construction Products and Services	1,937	70,689	0.3%	0.3%	0.5	0.6
Furniture	1,484	31,374	0.2%	0.2%	1.0	0.7
Aerospace Vehicles and Defense	1,144	106,250	0.2%	0.5%	0.5	1.4
Information Technology and Analytical Instruments	1,136	385,845	0.2%	1.9%	0.2	2.1
Vulcanized and Fired Materials	953	13,064	0.2%	0.1%	1.0	0.4
Upstream Metal Manufacturing	805	19,592	0.1%	0.1%	0.6	0.4
Environmental Services	680	16,529	0.1%	0.1%	1.3	1.0
Upstream Chemical Products	428	7,304	0.1%	0.0%	0.7	0.4
Downstream Chemical Products	287	26,486	0.0%	0.1%	0.3	0.8
Biopharmaceuticals	229	48,503	0.0%	0.2%	0.2	1.2

Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.6 displays 5-year historical and projected employment trends for the selected priority traded clusters, comparing the NSJV to California. The recent 5-year period (2017-2022) shows significant growth in the NSJV in several areas. The industry clusters with the most significant growth rates in the last 5 years include Aerospace Vehicles and Defense, Vulcanized and Fired Materials, Upstream Metals Manufacturing, Upstream Chemicals Manufacturing, Plastics, IT and Analytical Instruments, and Distribution and Electronic Commerce.

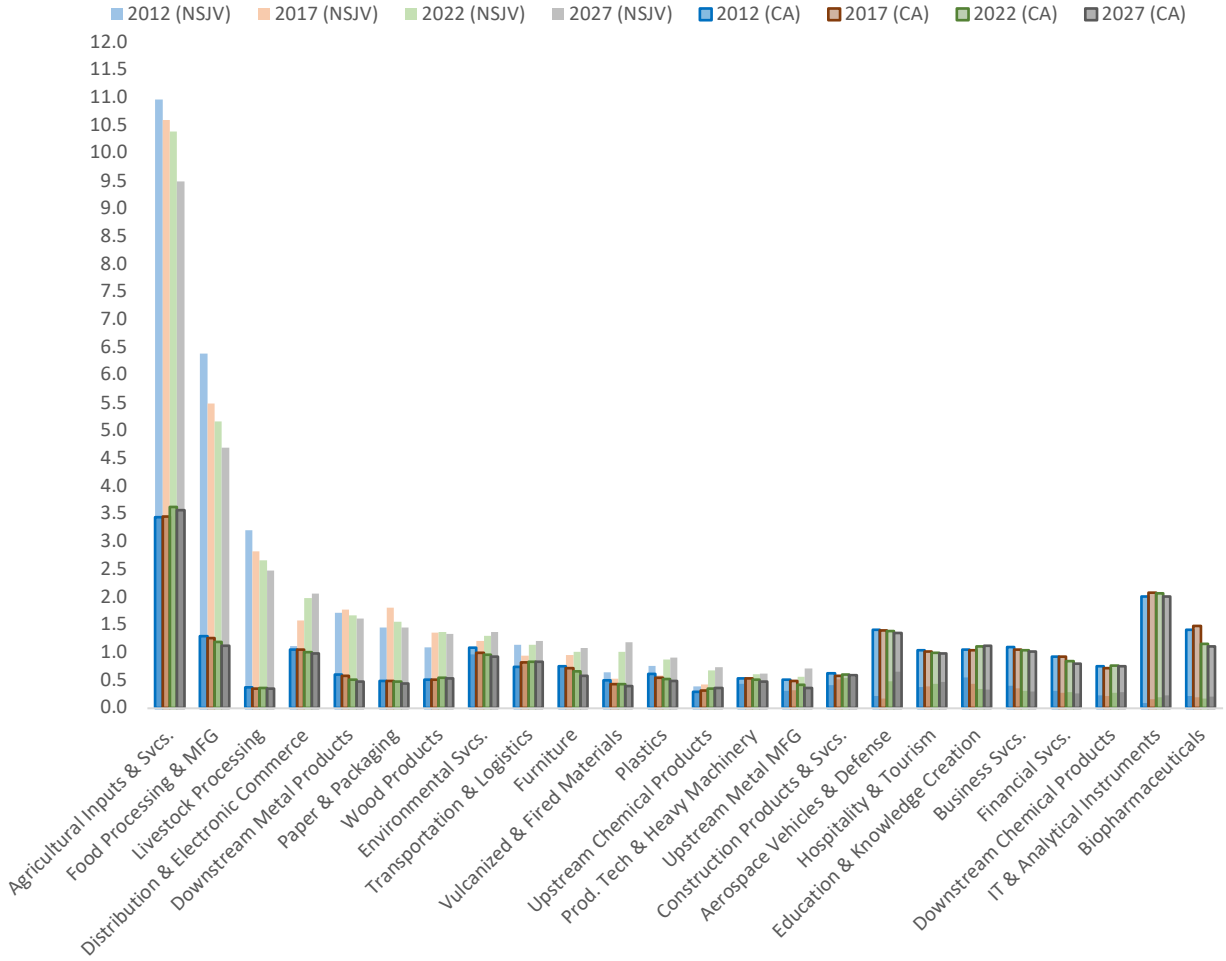
Figure 4.6 Historical and projected employment % change, selected priority traded clusters, NSJV and California, 2012-2027



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Error! Reference source not found. displays 5-year historical and projected location quotients for the selected priority traded clusters, comparing the NSJV to California. The graphic clearly illustrates the weakening strength of the labor market in agriculture-related clusters: Agriculture Inputs and Services, Food Processing and Manufacturing, and Livestock Processing. Other clusters consistently have larger location quotients than the state, including Distribution and Electronic Commerce, Downstream Metal Products, Paper and Packaging, and Wood Products. The other trends illustrate the emerging competitiveness of several clusters: Environmental Services, Furniture, Vulcanized and Fired Materials, Plastics, and Upstream Chemical Products.

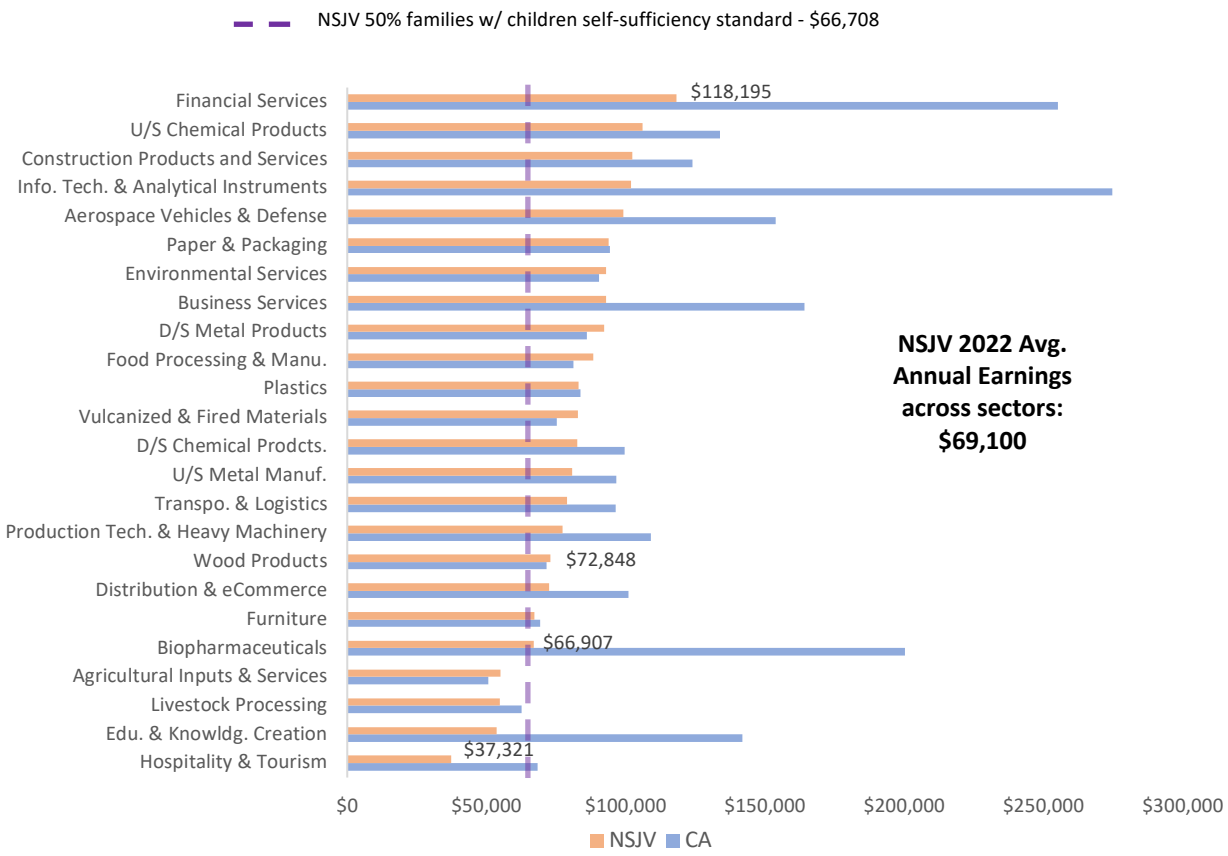
Figure 4.7 Historical and projected location quotients 2012-2027, selected priority traded clusters, NSJV and California, 2012-2027



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.8 compares the selected traded clusters' average annual earnings in the NSJV and California. The analysis also compares the earnings to self-sufficiency wage levels in the NSJV. California has significantly higher earnings in more than half of the 24 priority traded clusters, outpacing the NSJV's earnings in Financial Services; Upstream (and Downstream) Chemical Products; Construction Products and Services; Aerospace Vehicles and Defense; Business Services; Upstream Metal Manufacturing; Transportation and Logistics; Distribution and eCommerce; Biopharmaceuticals; Education and Knowledge Creation; and Hospitality and Tourism.

Figure 4.8 Average annual earnings compared to self-sufficiency, selected priority traded clusters, NSJV and California, 2022



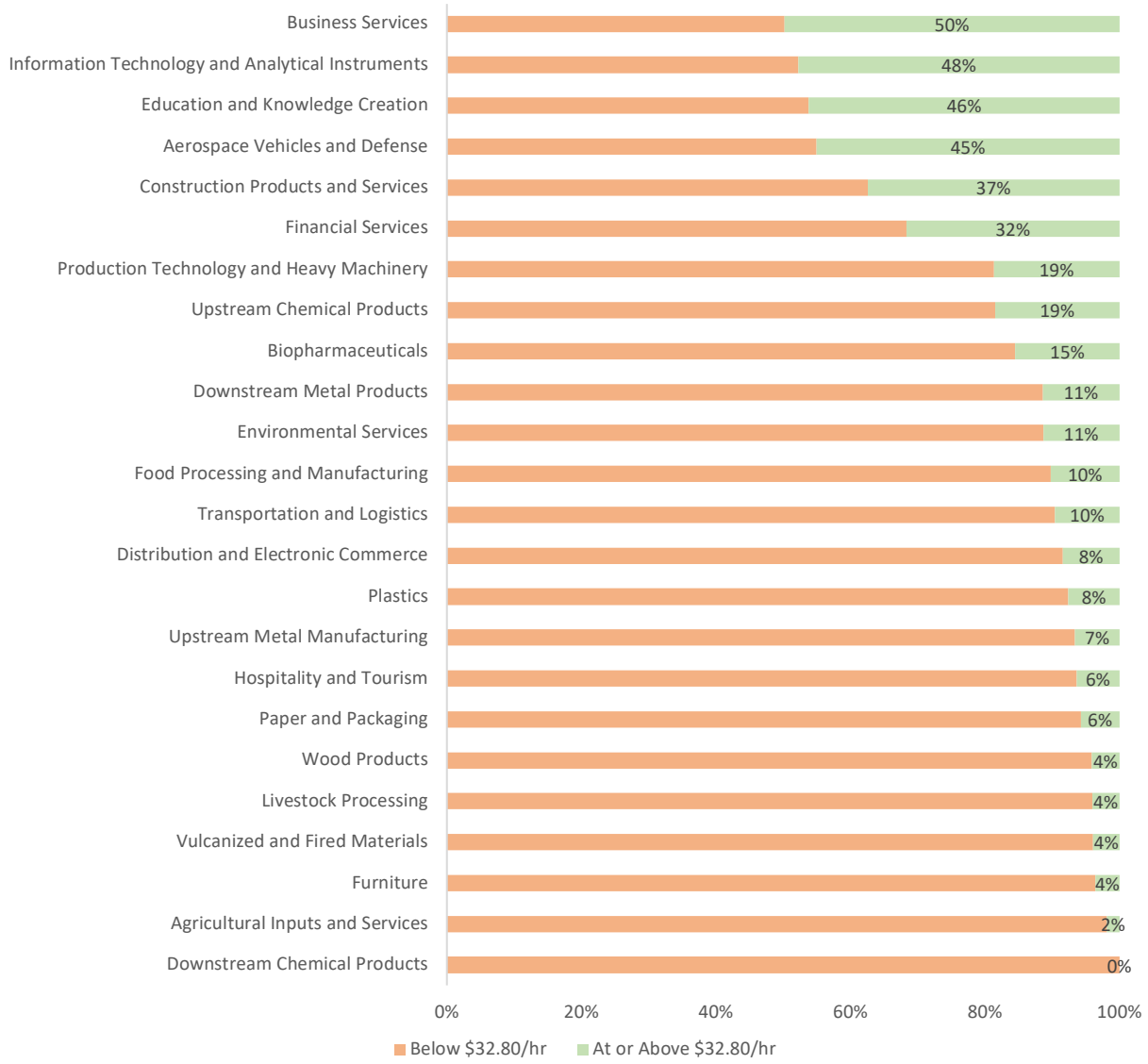
Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/; University of Washington Center for Women's Welfare Self-Sufficiency Standard https://selfsufficiencystandard.org/California

The analysis of "quality jobs" in the NSJV, Section 3.1.4, identified a wage of $32.80 per hour or $66,708 as being necessary to reduce by 50% the number of children in a household that struggles to make ends meet. The average annual earnings of 20 of the 24 selected traded clusters surpass that rate.

The research quantified the specific share of employment meeting or exceeding this "quality job" threshold. The analysis uses occupation staffing patterns and the hourly wage rate of $32.80 per hour. The measure is one touchstone for assessing the likelihood that specific industries offer wages that support families in the NSJV.

Only 13% of the total employment in the selected traded clusters meets or exceeds the rate of $32.80. None of these clusters has a majority share of its workforce earning more than the threshold. More workers are meeting the wage threshold in Business Services, IT and Analytical Instruments, Education and Knowledge Creation, and several other clusters. But for the majority, only a small share of workers earn above the "quality job" threshold that would have the population of children living in households that are struggling to make ends meet without state assistance.

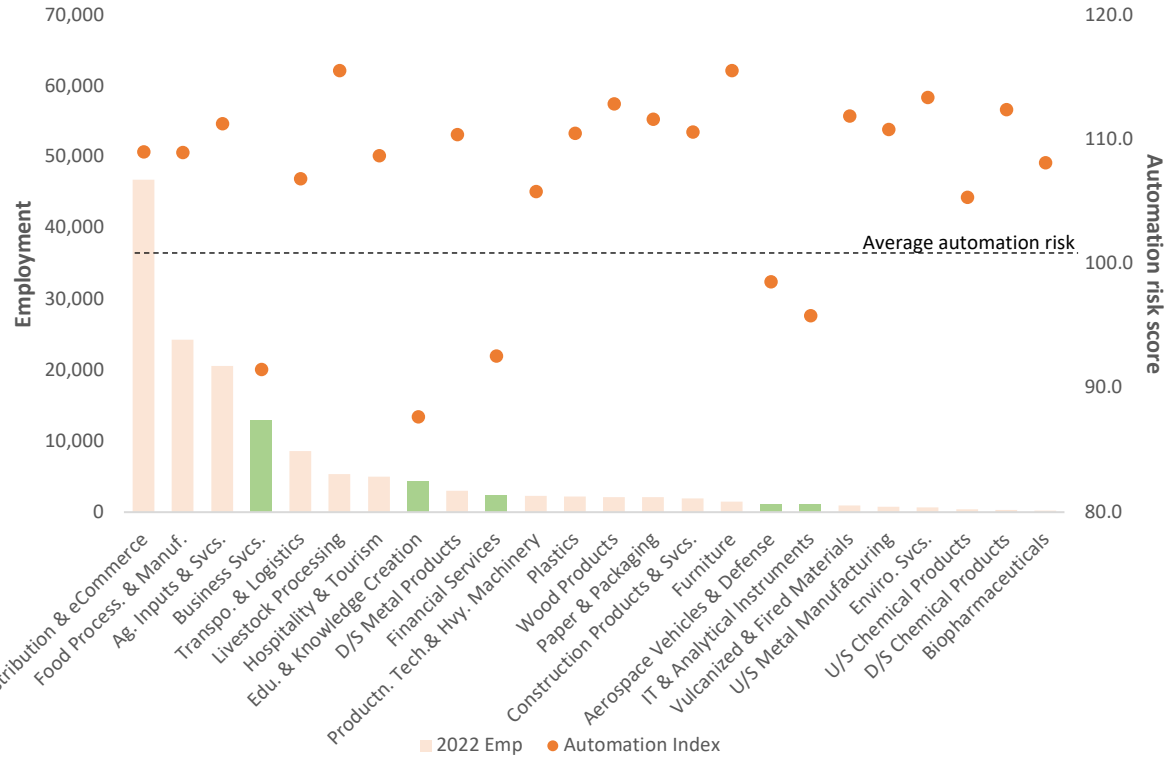
Figure 4.9 Share of employment meeting or exceeding "quality job" threshold ($32.80), selected priority traded clusters, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping; University of Washington Center for Women's Welfare Self-Sufficiency Standard https://selfsufficiencystandard.org/California/

Most of the NSJV's clusters have a higher than average automation risk score, based on the work of Frey and Osborne, who measured the probability that occupations could be "computerized." The analysis sums occupational employment in each industry cluster and uses a weighted average to determine the average automation score (100.0). Business Services, Education and Knowledge Creation, Financial Services, Aerospace Vehicles and Defense, and IT and Analytical Instruments have below-average automation scores. But clusters with large numbers of jobs, such as Distribution and Electronic Commerce, Food Processing and Manufacturing Agricultural Inputs and Services, and Transportation and Logistics have high automation risk scores. These critical areas of the economy and workforce may require more focus on worker transitions and reskilling as industries adopt new technology that automates some work processes and functions.

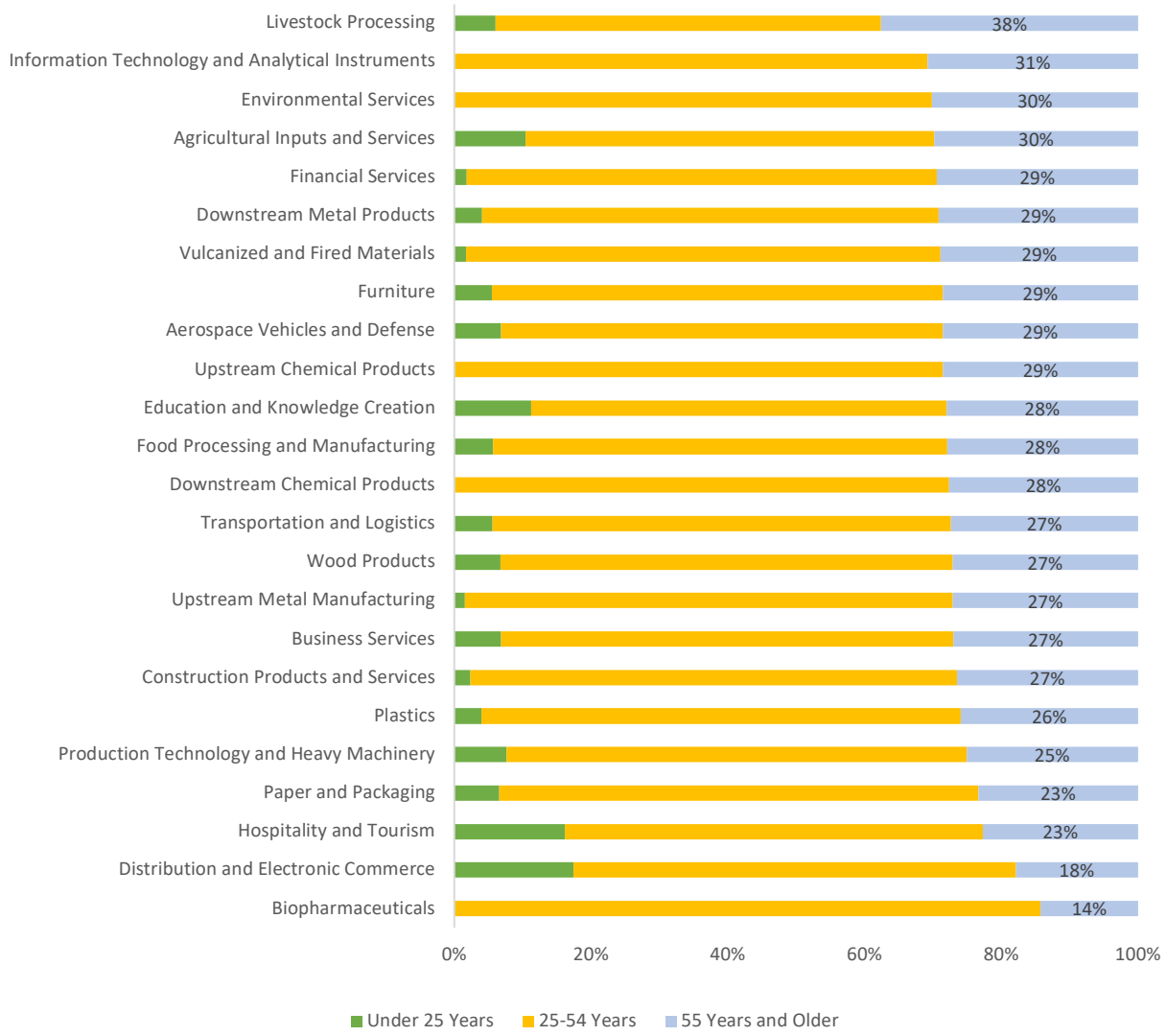
Figure 4.10 Automation risk score and employment for NSJV traded clusters, 2022



Source: Lightcast, 2023.3 based on Frey and Osborne, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.11 profiles the share of workers in the priority traded clusters by age. Every industry cluster faces a coming wave of retirements. A quarter of the cluster's workforce is age 55 or above. A third of the Livestock Processing cluster is in the older age segment. Hospitality and Tourism and Distribution and Electronic Commerce have significant shares of workers under 25.

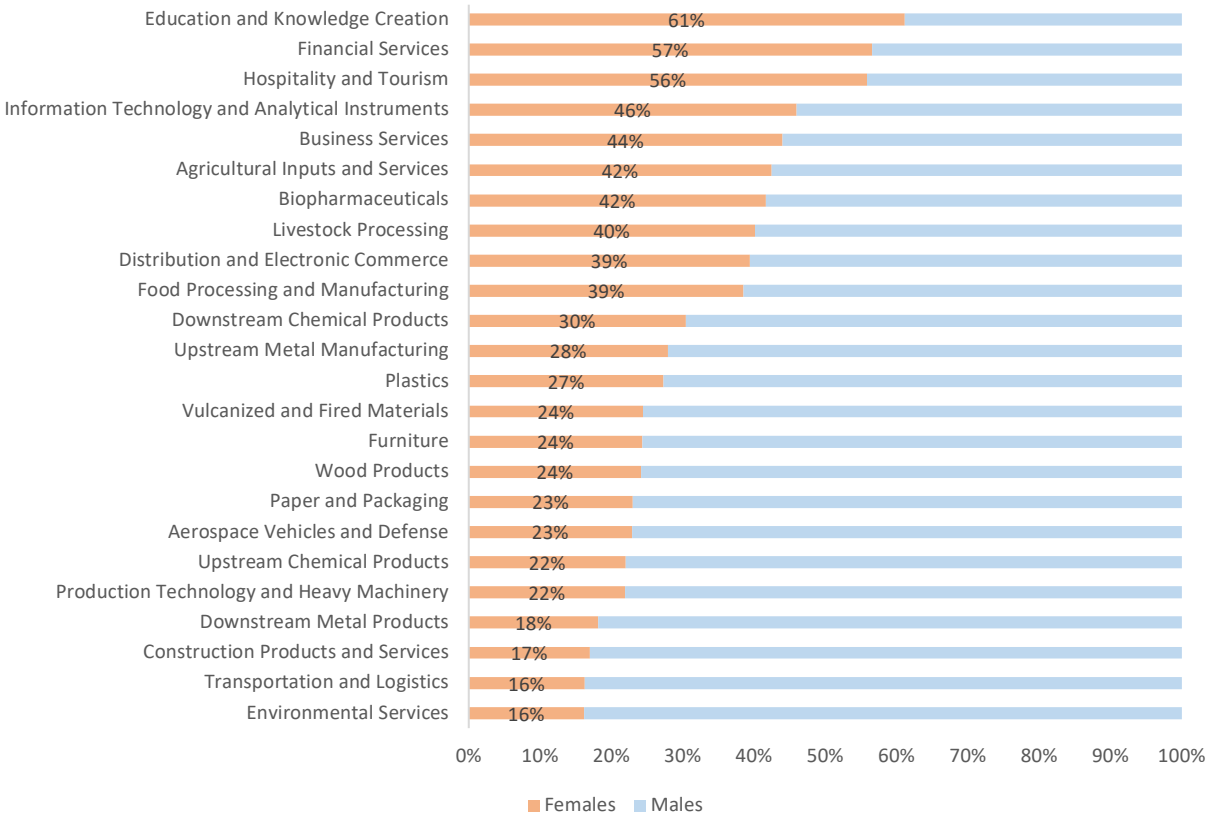
Figure 4.11 Employment share of priority traded clusters by age, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Most clusters are skewed toward one gender. Since the traded clusters are mostly related to manufacturing, there are large shares of male workers. The employment in 22 of the 24 selected traded clusters is greater than 50% male (Figure 4.12). Of the workers in Construction Products and Services, 82% are male. There are larger shares of women in just 3 of the 24 selected traded clusters--Education and Knowledge Creation, Financial Services, and Hospitality and Tourism.

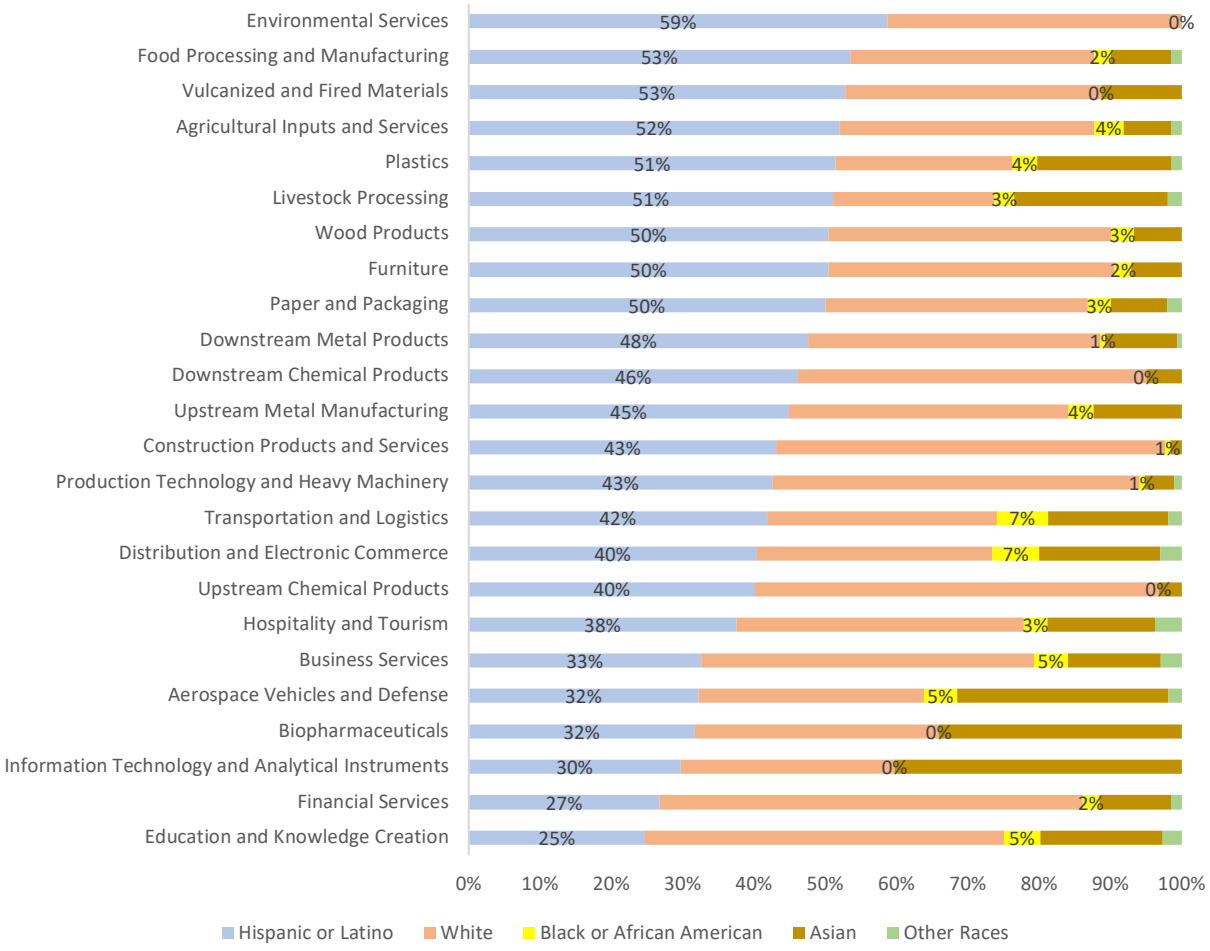
Figure 4.12 Employment share of priority traded clusters by gender, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

The concentrations of Latinx workers in the traded sectors are revealing: many of these are clusters with lower levels of education requirements and lower wages and have higher shares of Latinx workers. (The average share of Latinx workers in the traded clusters is 42.1%.) Several traded clusters have larger shares of African Americans—Transportation and Logistics and Distribution and Electronic Commerce. Several that have small shares or none listed—Construction Products and Services and Information Technology and Analytical Instruments.

Figure 4.13 Employment share of priority traded clusters by race and ethnicity, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

4.1.2 Local Clusters

Of the 16 locally-serving clusters, the research focuses on 10 based on a review and scoring of the same indicators mentioned above. The section below details baselines and trends for these critical indicators—employment and trends, location quotient, and earnings. A more detailed report includes business record data and a key indicators summary. The report summary of the 10 highlighted local clusters emphasizes two main areas for strategy potential: Health Services and Real Estate, Construction, and Development, with additional findings on logistics, environmental services, and hospitality.

- The locally-serving Health Services cluster is the largest in the region, representing over 9% of employment. The data on jobs and earnings suggest the pandemic took a toll on healthcare industries, and regional employers continue to struggle with hiring and retention.

- Real Estate, Construction, and Development is among the region's largest, accounting for nearly 8% of employment. The cluster grew twice as fast as the state between 2017 and 2022 and had solid baselines and performance in trade-specific industries and industries that deal with large-scale infrastructure and utilities. The cluster shares many workforce linkages with several construction-related traded clusters.

> *Health Services and Real Estate, Construction, and Development make up about 17% of the employment in NSJV. These career clusters have higher-than-average earnings and diverse education requirements that present workforce development and training opportunities.*

- Locally serving logistics activities mirrored the massive growth trends of Distribution and Electronic Commerce but at a smaller scale. On a related note, wholesale activities are notable for slightly above-average earnings in the otherwise lackluster Food and Beverage cluster.

- Environmental Consulting Services is the lone bright spot in the local Commercial Services cluster. Recycling wholesaling is an industry defined under local Industrial Products and Services that also merits investigation for connections to the promising traded recycling and materials management industries.

- The review of regional plans highlighted the importance of tourism and hospitality in the region, but the locally-serving hospitality cluster shows weak employment numbers and earnings.

- Other notes: the growth in utilities is owed to the increase in Natural Gas employment. The Education and Training cluster includes private sector employment and is notable for low wages and poor performance. Commercial Services include professional and business services and have weak indicators.

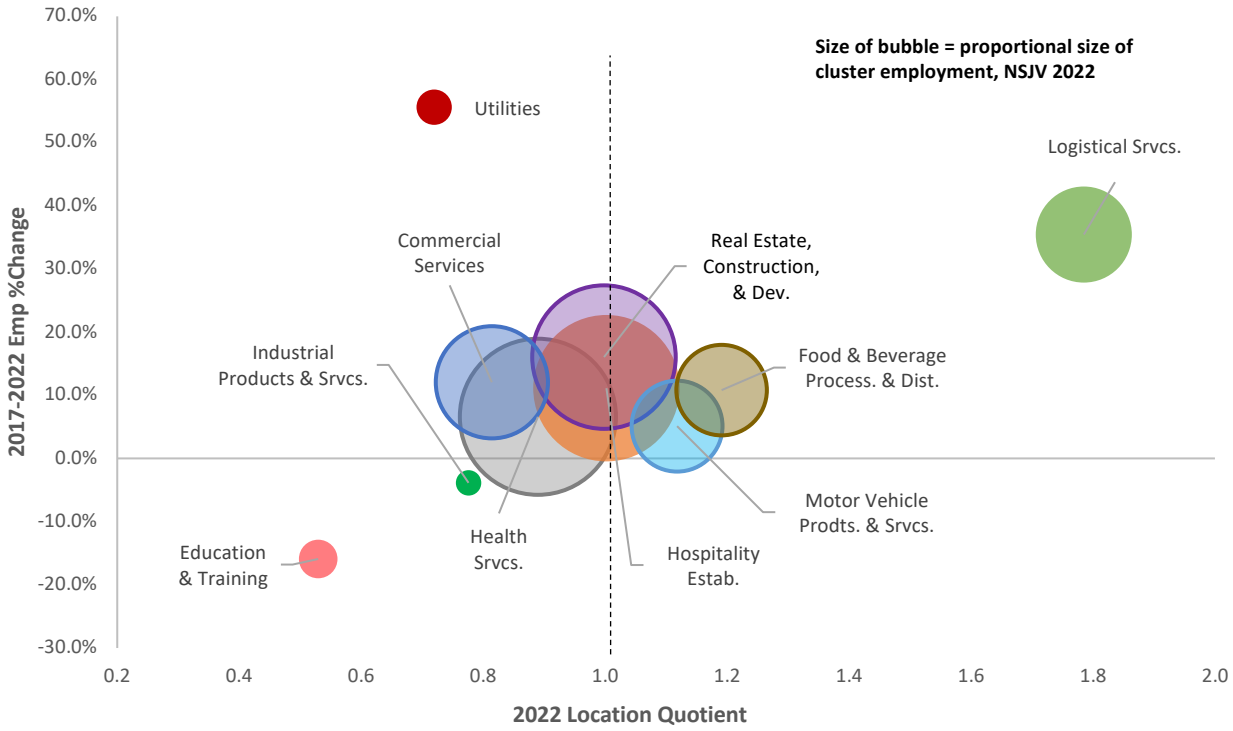
- The local construction, hospitality, and transportation clusters face the highest automation risk.

- Demographic trends indicate that every cluster faces a significant share of workers at or near retirement and typical gender concentrations. There are higher shares of Latinx workers in industries with lower education requirements and wage levels; construction is a notable exception.

Figure 4.14 displays the priority local clusters in the same quadrant bubble chart as above. Logistical Services mirrors the exceptional growth of the Distribution and Electronic Commerce cluster in the 5 years between 2017 and 2022. The growth of the Utilities cluster is also notable; the cluster has a modest number of jobs. The remaining clusters are grouped in the center. They have approximately average, or slightly better than average, location quotients. Real Estate, Construction, and Development Hospitality Establishments, Health Services, and Commercial

Services had encouraging, but not massive, growth rates. Food and Beverage Processing and Distribution grew similarly and had a slightly better location quotient.

Figure 4.14 Location quotient and employment % change, 10 selected priority local clusters, NSJV, 2017-2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

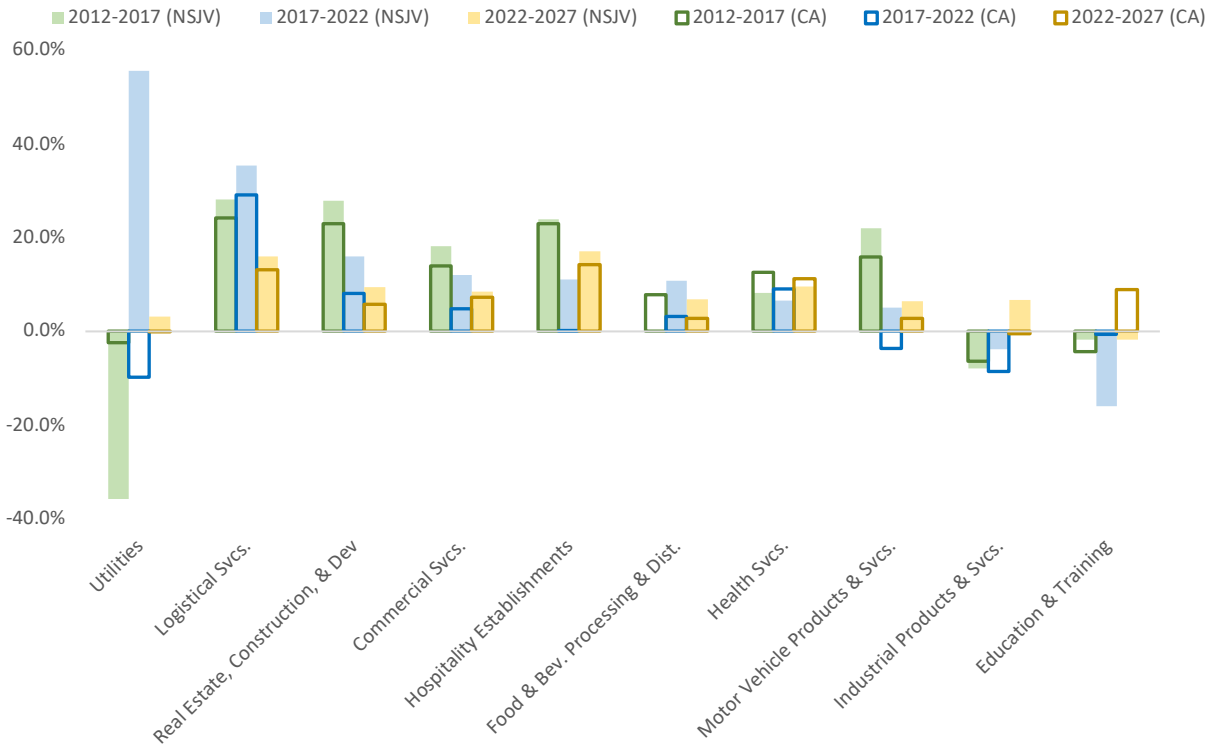
Table 4.3 Priority local cluster employment, % of total economy, and location quotient, NSJV and California, 2022

Cluster	2022 Employment		% of Economy		2022 LQ	
	NSJV	CA	NSJV	CA	NSJV	CA
Health Services	57,836	1,806,576	9.3%	8.9%	0.9	0.8
Hospitality Establishments	49,116	1,628,687	7.9%	8.0%	1.0	1.0
Real Estate, Construction, and Development	49,019	1,612,820	7.9%	7.9%	1.0	1.0
Commercial Services	30,275	1,317,025	4.9%	6.5%	0.8	1.1
Logistical Services	21,146	396,871	3.4%	1.9%	1.8	1.0
Motor Vehicle Products and Services	20,085	498,442	3.2%	2.4%	1.1	0.8
Food and Beverage Processing and Distribution	19,928	540,353	3.2%	2.7%	1.2	1.0
Education and Training	3,409	211,666	0.5%	1.0%	0.5	1.0
Utilities	2,856	102,704	0.5%	0.5%	0.7	0.8
Industrial Products and Services	1,478	57,818	0.2%	0.3%	0.8	0.9

Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Table 4.3 compares the priority local cluster employment and location quotient in the NSJV and California. The analysis also calculated the share of the total employment in the economy for each local cluster. The NSJV has higher shares of employment and location quotients in Health Services, Logistics Services, Motor Vehicle Products and Services, and Food and Beverage Processing Distribution.

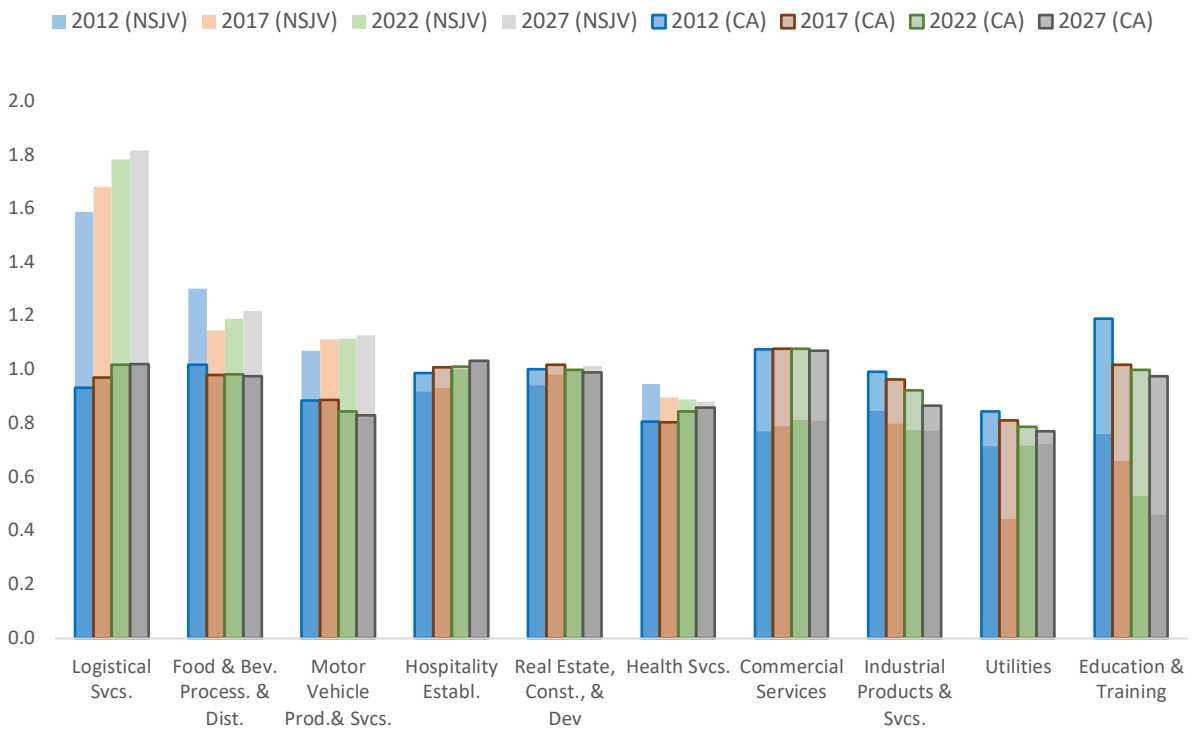
Figure 4.15 Historical and projected employment % change, selected priority local clusters, NSJV and California, 2012-2027



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.15 displays 5-year historical and projected employment trends for the selected local traded clusters, comparing the NSJV to California. The NSJV shows faster growth trends in Utilities, Logistical Services, Real Estate, Construction and Development, Commercial Services, and Food and Beverage Processing and Distribution. Industrial Products and Services and Education and Training clusters consistently reduced employment in the last 10 years.

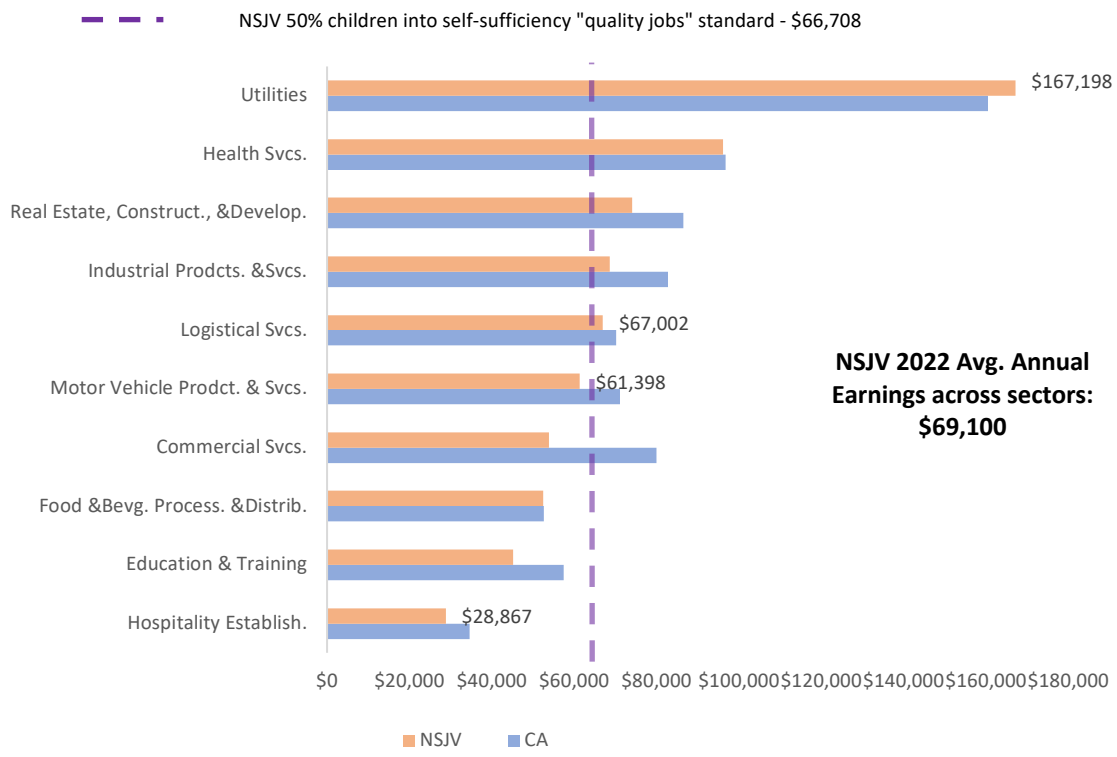
Figure 4.16 Historical and projected location quotients 2012-2027, selected priority local clusters, NSJV and California, 2012-2027



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.16 displays 5-year historical and projected location quotients for the selected priority traded clusters, comparing the NSJV to California. The graphic shows the increasing location quotients in Logistical Services and Motor Vehicle Products and Services. The analysis shows that Real Estate, Construction, and Development has increased employment and achieved a similar location quotient as the state. The Education and Training cluster has consistently reduced its location quotient.

Figure 4.17 Average annual earnings compared to "quality jobs" levels, selected priority local clusters, NSJV and California, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/; University of Washington Center for Women's Welfare Self-Sufficiency Standard https://selfsufficiencystandard.org/California/

Figure 4.17 compares the selected local clusters' average annual earnings in the NSJV and California. The analysis also compares the earnings to self-sufficiency wage levels in the NSJV. California has significantly higher earnings in 6 of the 10 priority local clusters. The four clusters with similar earnings are Utilities, Health Services, Logistical Services, and Food and Beverage Processing and Distribution.

Using the "quality jobs" wage threshold of $32.80 per hour or $66,708 per year, to reduce the number of children in households that depend on state assistance to make ends meet,[4] the research finds that of the 10 selected local clusters, five do not have average earnings that surpass the "quality job" threshold.

The local clusters have a similar profile to the traded clusters (Section 4.1.1) regarding employment that meets or exceeds self-sufficient wage levels. Only 18% of the total employment in the selected local clusters meets or exceeds the rate of $32.80. There are higher shares of workers meeting the wage threshold in Utilities, Education and Training, and Health Services. However, the analysis suggests that most workers in the local clusters do not earn above the "quality jobs" wage threshold that halves the number of children living in households struggling to get by.

[4] See Section 3.1.4 for details on the quality jobs analysis.

Figure 4.18 Share of employment meeting or exceeding "quality jobs" threshold ($32.80), selected priority local clusters, NSJV, 2022

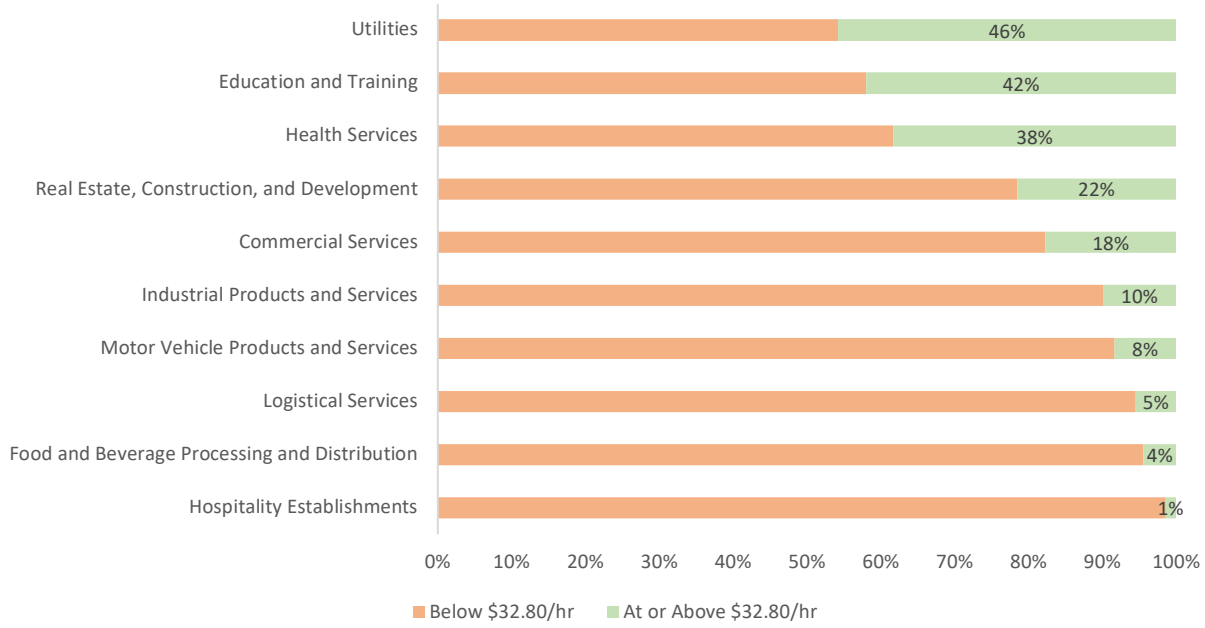
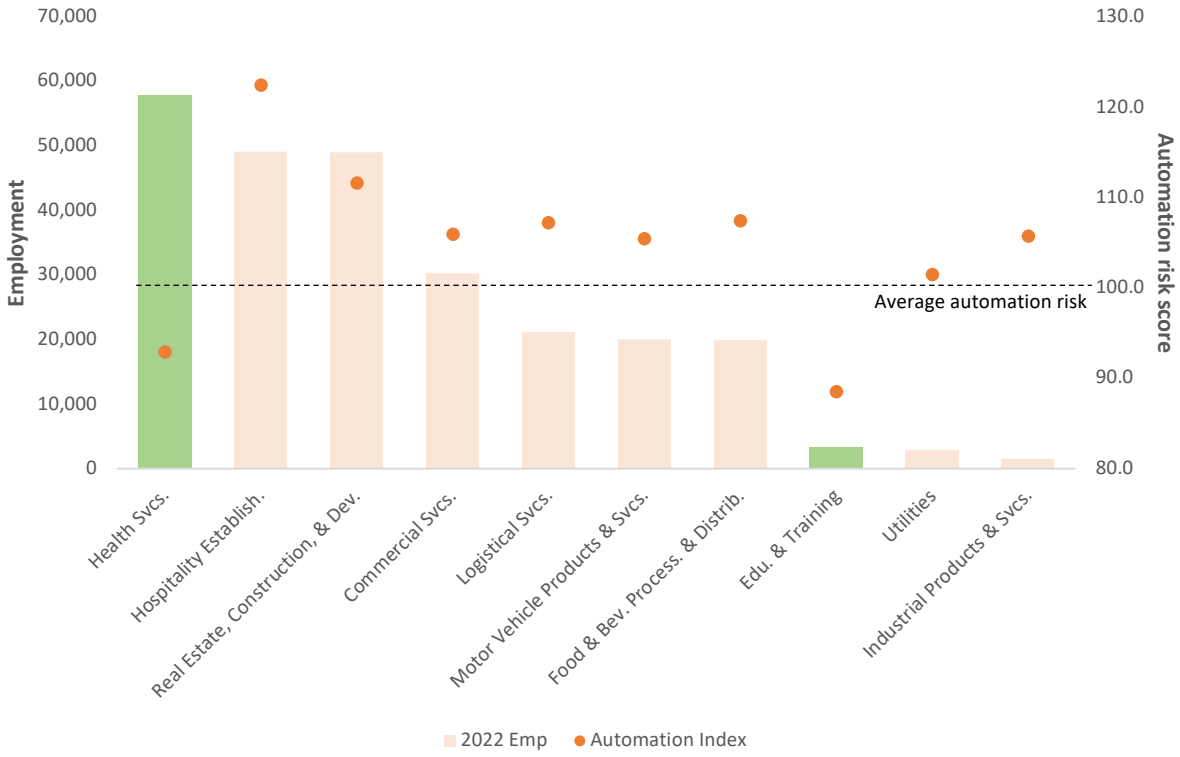


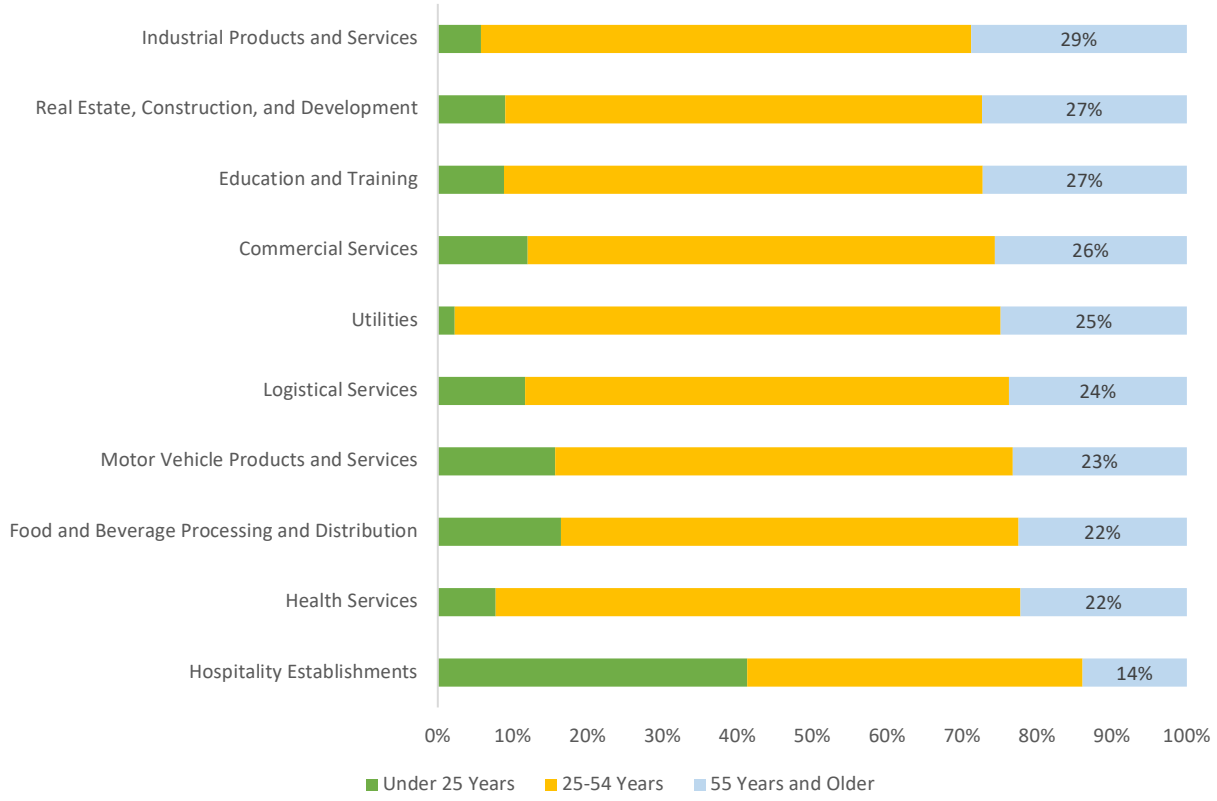
Figure 4.19 Automation risk score and employment for NSJV local clusters, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Figure 4.19 also quantified the average automation score for the local clusters, with a similar result to the traded clusters. Of the 10 selected locally-serving industry clusters, two including Health Services and Education and Training, have below-average automation risk scores. The other clusters, Hospitality Establishments, Real Estate, Construction, and Development Commercial Services, and others, could have more significant needs for retraining to retain employment and transitioning to new employment.

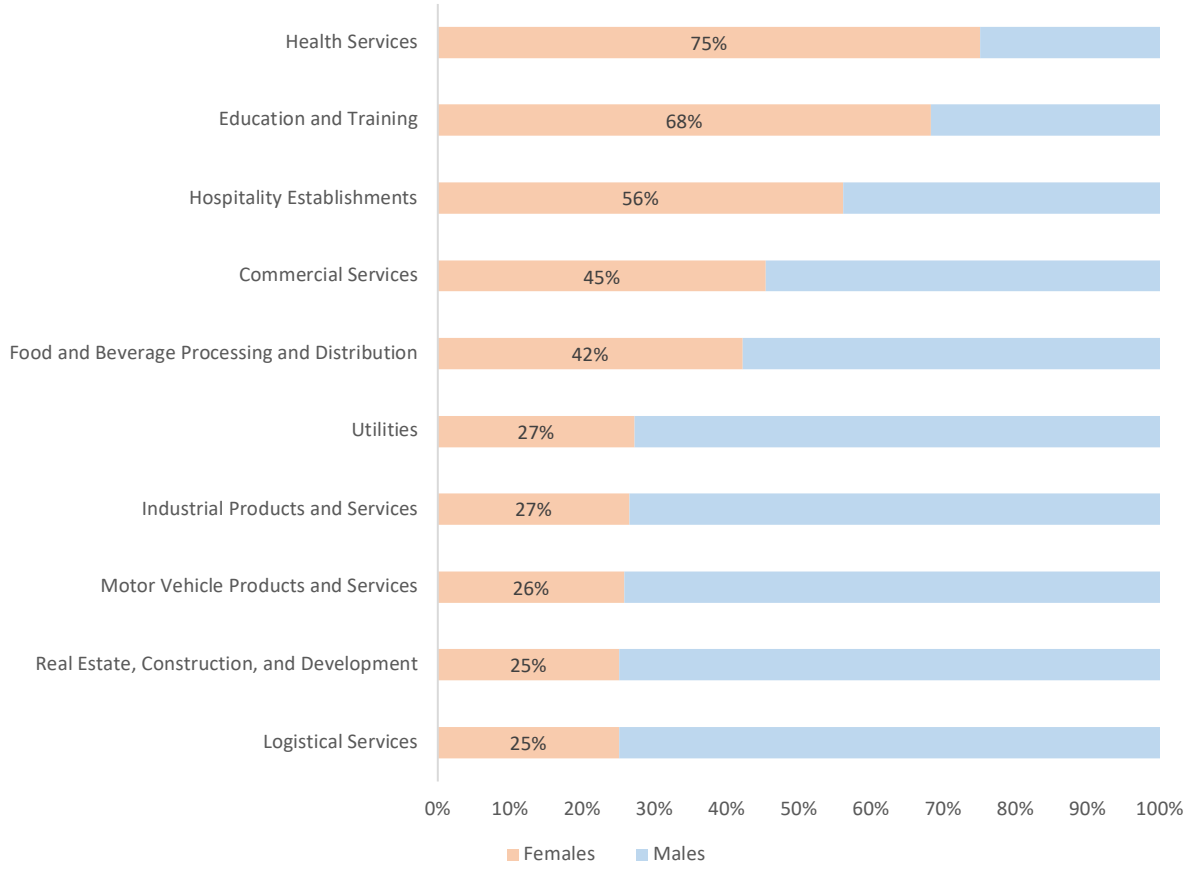
Figure 4.20 Employment share of priority local clusters by age, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

The age demographic profile in the local clusters is similar to the traded clusters (Figure 4.20). A quarter to a third of the local clusters' workforce is nearing retirement. About 40% of Hospitality Establishments' workforce is in the under-25 age category.

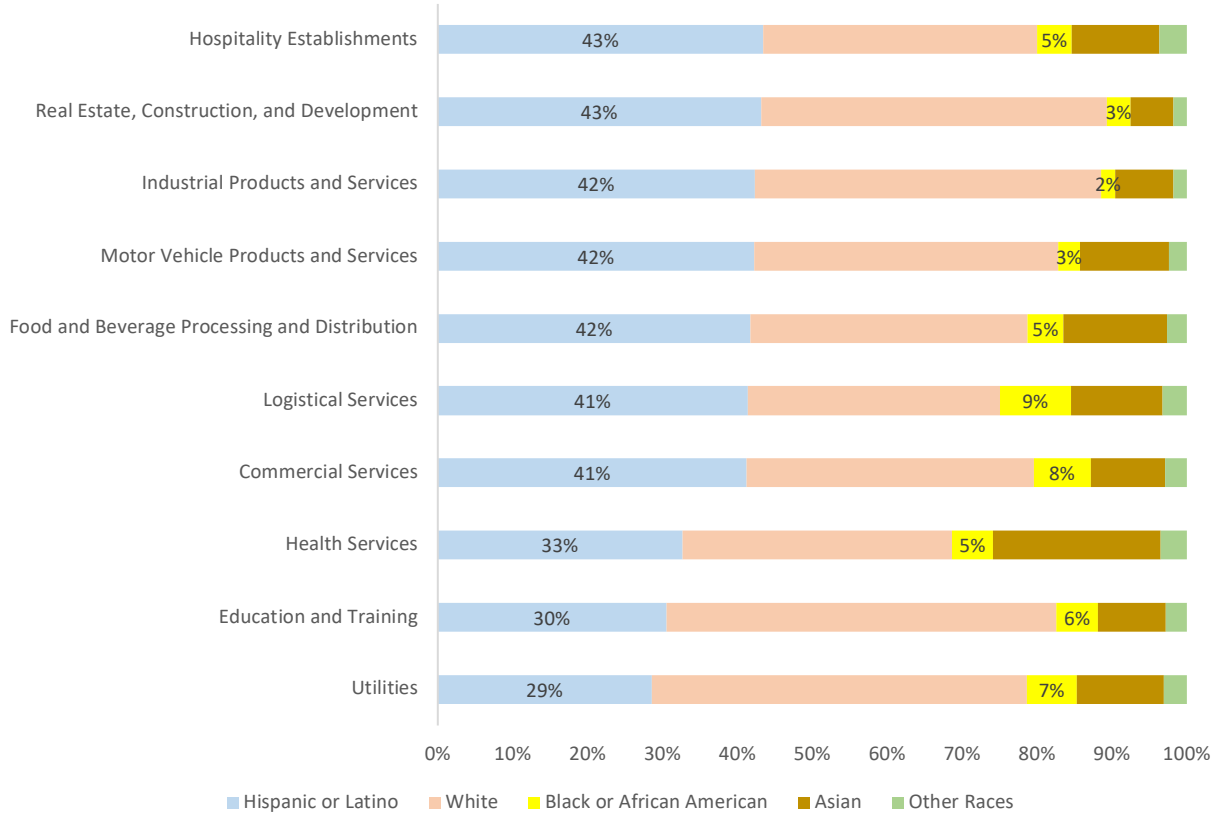
Figure 4.21 Employment share of priority local clusters by gender, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

In the local clusters, 7 of the 10 selected regional industry clusters are majority male. Roughly three-quarters of the workers in Motor Vehicle Products and Services, Real Estate, Construction and Development, Logistical Services, Utilities, and Industrial Products and Services are male. The profile is flipped in Education and Training and Health Services, where 7 out of 10 workers are women.

Figure 4.22 Employment share of priority local clusters by race and ethnicity, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

More than half of the local clusters have above-average shares of Latinx workers. (The average rate for local clusters is 39%.) There are larger shares of African Americans in Logistical Services, Commercial Services, and Utilities. The largest share of Asians is in Health Services.

4.1.3 Industry Environmental Impacts

The region's sources of greenhouse gas emissions, air and water pollution, and toxic/hazardous waste were discussed in Section 3.2.4 and Appendix 3.2.I. That analysis suggested that agriculture, utilities, transportation and warehousing, and manufacturing were responsible for the vast majority of environmental impacts in the region. Given the overlap and linkages that the priority traded, and local clusters have to these industries their development will need to consider environmental remediation efforts. In this regard existing green and bio industry initiatives such a BEAM Circular, the CBIO collaborative, and Pelican Renewables may represent important opportunities to build and leverage the priority clusters while addressing their environmental impacts.

4.2 Career Clusters

This section of the analysis describes the occupation and workforce characteristics and trends within the priority industry clusters using staffing patterns to quantify occupational employment in the industry clusters. Understanding the occupation composition within the most promising industry sheds light on workforce supports that will benefit key industry clusters. The report uses the Department of Labor's Occupational Information Network (O*NET) Career Clusters to profile the industry clusters according to 16 categories of occupations that are grouped by similar knowledge, skills, and abilities.[5]

The research selected 9 career clusters for additional analysis based on performance in several key criteria and alignment with regional plans and initiatives.

Staffing patterns show how pervasive several career clusters are (manufacturing, logistics and transportation, business administration) across the priority industry clusters.

Similar to the process for prioritizing industry clusters, the analysis scored the career clusters according to criteria on employment, location quotients, earnings, and growth rates of all three factors. The research used this and other qualitative knowledge of the region (alignment with plans and initiatives) to select 9 of the 16 career clusters for profiling in the report.

Supplemental data in the appendices on the career clusters details critical data on notable, specific occupations and provides an at-a-glance overview of key indicators on employment, location quotient, average wages, annual openings, industry cluster concentrations, and significant education program sources, and intra-career cluster occupation linkages called career pathways for each of the 9 career clusters.

4.2.1 Staffing Patterns

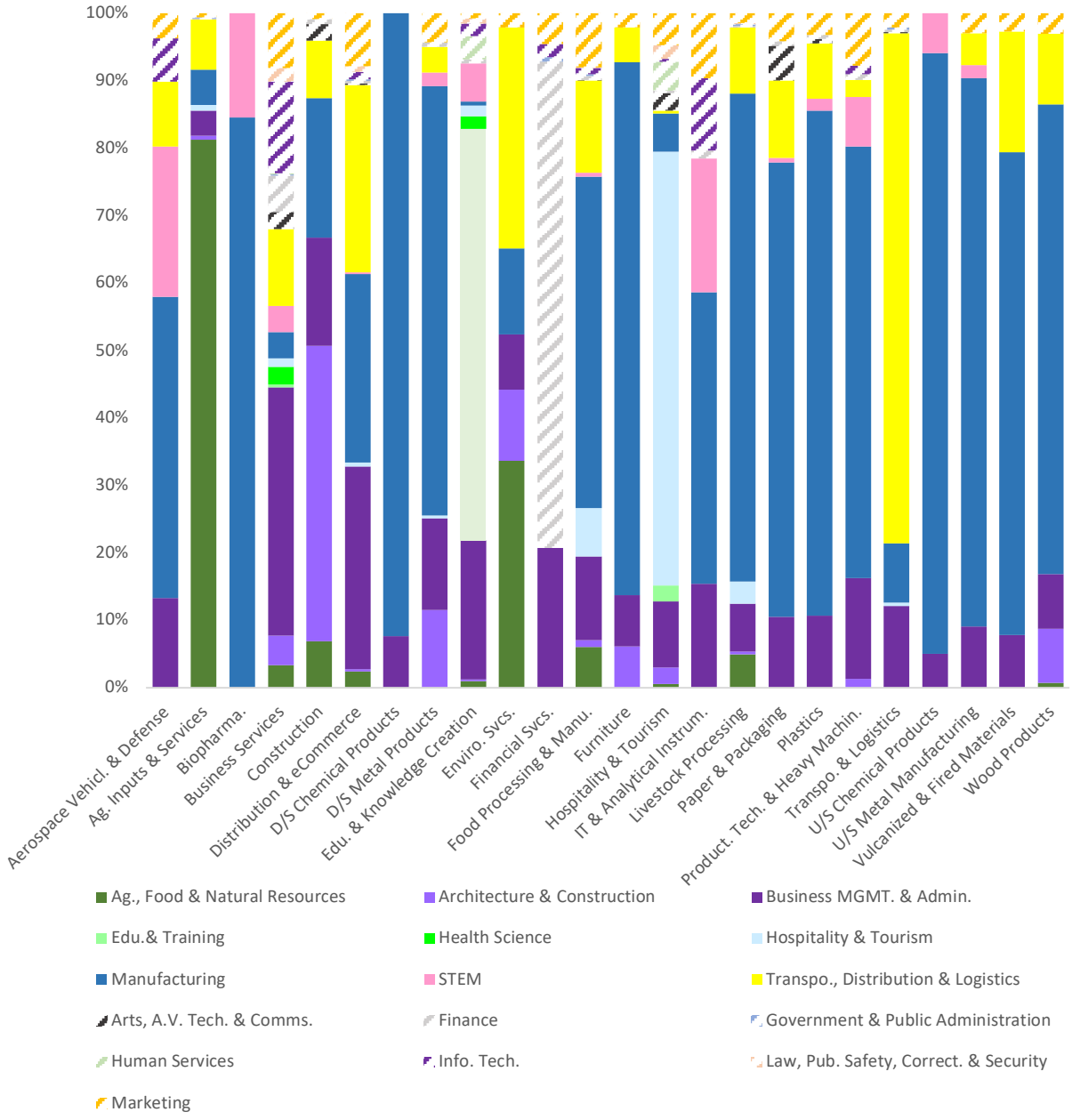
For the traded industry clusters, it is unmistakable that the Manufacturing career cluster has a majority share of employment in nearly every tradeable industry cluster (

[5] U.S. Department of Labor ETA, O*NET Career Clusters https://www.onetonline.org/find/career

Figure 4.23). Business Management and Administration, STEM, and Transportation, Distribution, and Logistics career cluster occupations will play a key role across multiple industry clusters. Other career clusters have most employment in one or two main industry clusters. Hospitality and Tourism occupational employment is primarily found in the Hospitality and Tourism cluster. Similarly, Agriculture, Food, and Natural Resources occupational employment is located in the Agricultural Inputs and Services and the Environmental Services industry clusters.

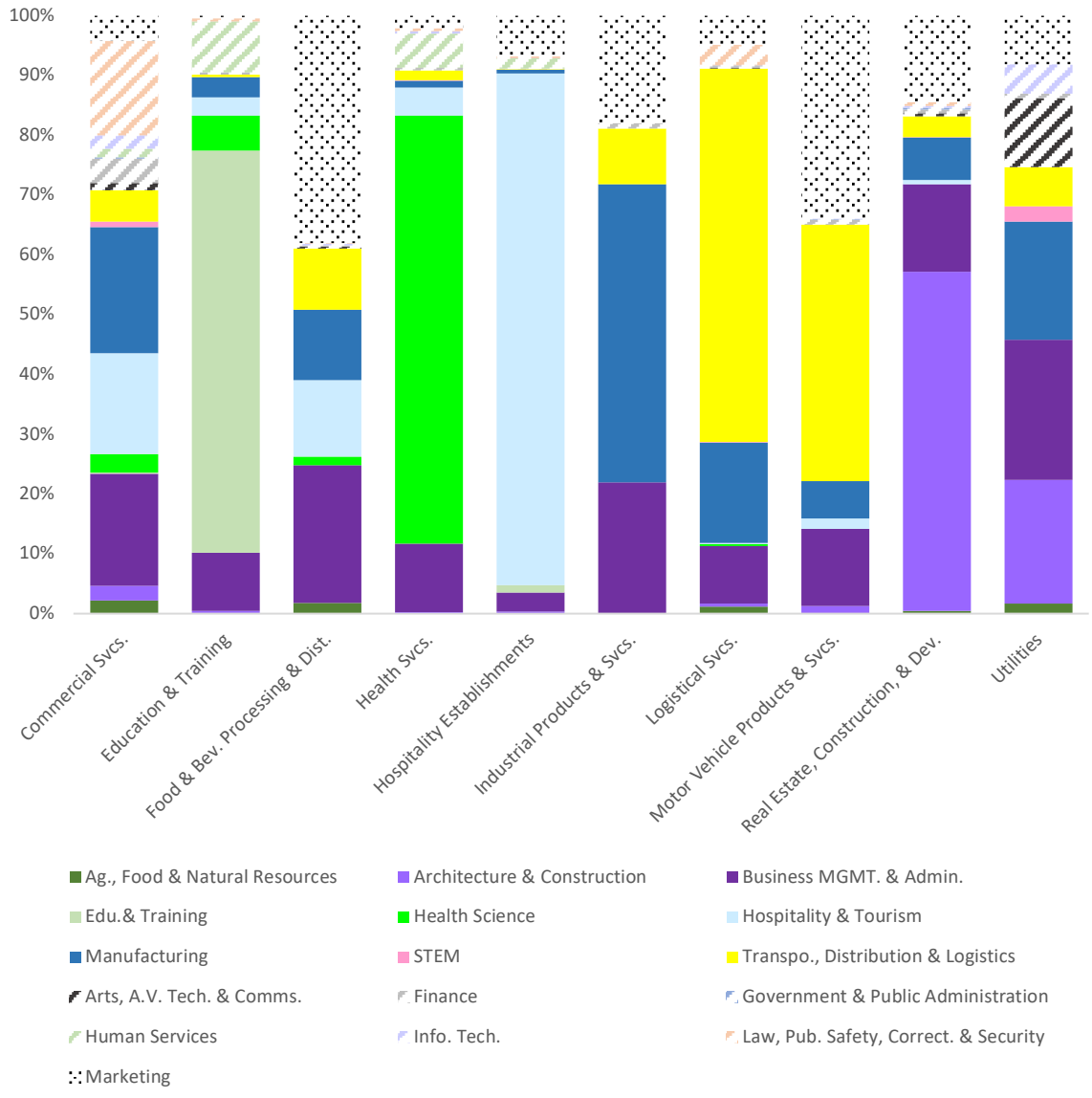
The analysis emphasizes the 9 priority career clusters but includes all 16 in the graphics below.

Figure 4.23 Share of career cluster employment (emphasis on 9) across 24 priority traded industry clusters, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career

Figure 4.24 Share of career cluster employment (emphasis on 9) across 10 priority local industry clusters, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career

For these local industry clusters, the Manufacturing career cluster still plays a crucial role in multiple industry clusters. Business management and Administration represents a significant segment in multiple industry clusters. So does Transportation, Distribution, & Logistics. (Marketing, mostly retail and sales jobs, are prominent but deemphasized). Like the traded industry clusters, Construction and Architecture require occupations dedicated to the construction industry, but Utilities also have a significant share of these jobs.

4.2.2 Overview of Career Clusters

This section summarizes the leading indicators analyzed in the career clusters and the key characteristics and trends of the 9 priority clusters. (Except for the annual openings data, the data below refers to the occupational employment only in the 26 selected priority traded industry clusters and the 10 selected priority local clusters.) The analysis consists of a demographic profile and summary of automation scores for the 9 career clusters. The research also quantifies the share of jobs in each career cluster that require a high school diploma or less, postsecondary education (some college and associate's degrees), and bachelor's degrees and above. The education data sets up the final section in the report on education and training programs that support the career clusters (and priority industry clusters, by extension).

Supplemental data in the appendices details specific occupations within the 9 career clusters representing potential foci for workforce developers and education and training organizations. The appendices include at-a-glance tables and a discussion highlighting each career cluster's main features and trends.

The list below is a shortened version of the top-level summary of the findings from the research on career clusters. These are the main takeaways from the data analysis included in the section.

- The manufacturing career cluster is notable for its large numbers of jobs, above-average location quotient, and impact across a range of traded and locally-serving clusters.
- The Health Science career cluster mirrors its industry cluster counterpart. It has huge numbers of jobs and annual openings. It has the largest share of jobs that require postsecondary education.
- The Architecture and Construction career cluster resembles Health Science. It has many jobs overall and a wage level that is encouraging in many cases. Most jobs (nearly 8 out of 10) require postsecondary education and experience.
- The STEM career cluster is tiny in the NSJV, with about 2,000 jobs, nearly all requiring at least a bachelor's degree.
- Business Services and Administration and Transportation and Distribution have significant shares of jobs (a little more than 4 out of 10 jobs in each cluster) that require postsecondary education and experience. The Business Services and Administration pays more than Transportation and Logistics; both have average hourly wages of less than $30 per hour.
- Agriculture, Food, and Natural Resources is a fundamental, staple workforce category dominated by low-wage, low-skilled jobs. The career cluster experienced job reductions between 2017 and 2022.
- Hospitality and Tourism is also dominated by low-wage, low-skilled jobs; 9 out of 10 jobs require a high school diploma or less and no experience.
- The automation risk profile resembles the industry clusters' profiles. The highest automation risks are in those clusters related to manufacturing, construction, hospitality, and logistics.
- There is a lower share of Latinx workers in those career clusters with higher education requirements and wages. Construction is a notable exception. Just 8% of the Architecture and Construction career cluster and 24% of the STEM career cluster are women. The data indicates there are virtually no African Americans in STEM occupations; they have concentrations in a few career clusters, including public safety and transportation and logistics.

- There are opportunities for consideration and further research in the other 7 career clusters that were not selected for profiling. There were compelling reasons to deemphasize them. The Marketing cluster comprises front-line retail and clerk jobs that require little education and experience (though some sales jobs require middle and high education levels). Technology and design jobs face a monumental wage gap with nearby geographies and low regional demand. These and other clusters had at least one poor performance indicator.

Table 4.4 provides an overview of all 16 O*NET career clusters in the NSJV, including baseline employment (2022), 5-year historical employment (2017-2022), 5-year projected employment, and the average hourly wage across all occupational employment in each cluster. The table also shows the percentage of jobs with education and experience requirements beyond high school. (The data refers to occupational employment of middle or high education requirements. The methodology for the calculation is summarized below and detailed in the methodology section.)

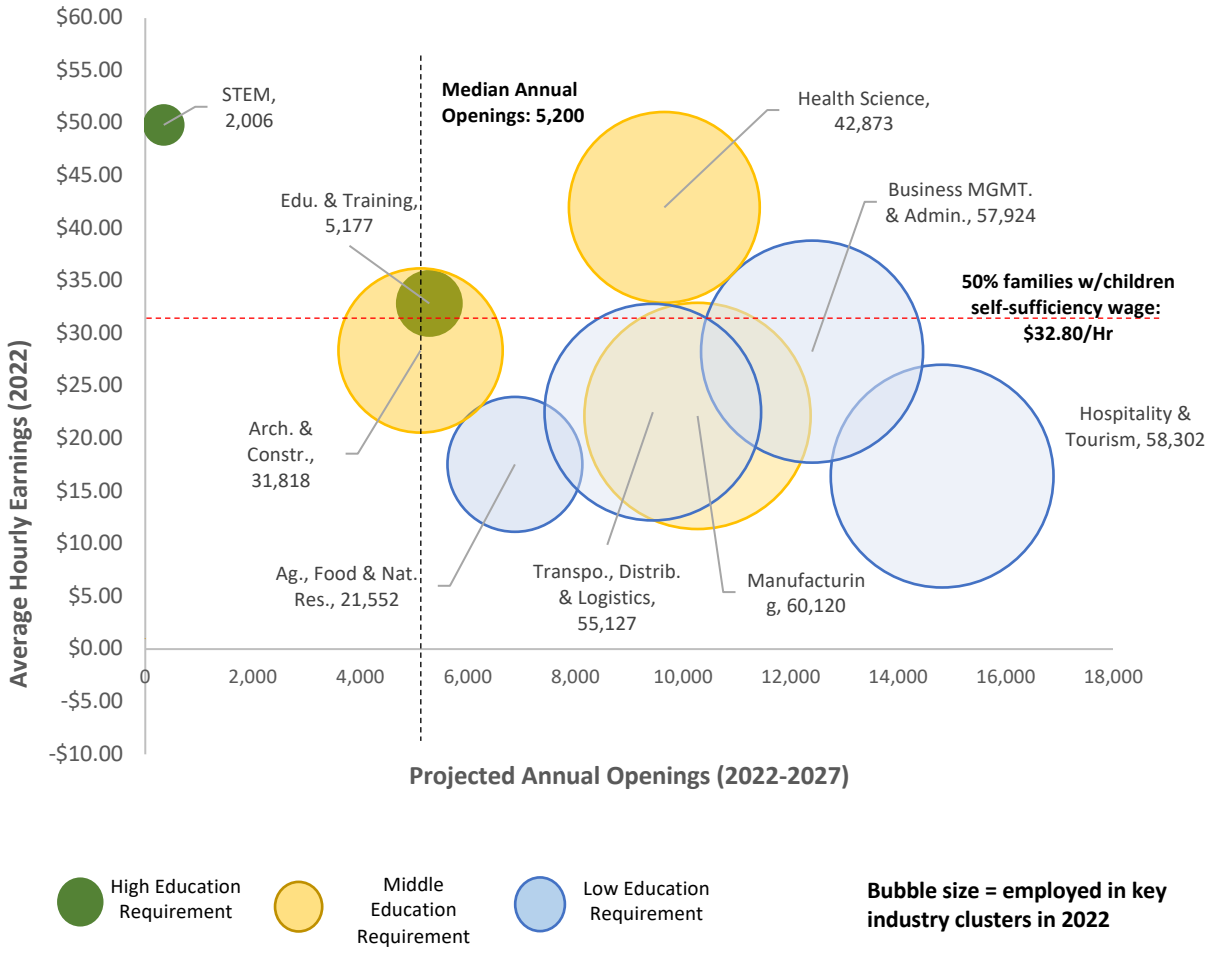
The table splits out the 9 priority career clusters selected for higher wages, more significant numbers of annual openings, larger location quotients, higher growth rates, and alignment with regional initiatives. The top-level summary and supplemental data in the appendices on the career clusters offer key, at-a-glance findings and describe the main features of each priority career cluster.

Table 4.4 Baseline and historical employment trends, projected annual openings, weighted average hourly wage, and % employment with postsecondary education and experience requirements, 16 career clusters, NSJV, 2017-2027

Career Clusters	2022 Emp	% Change 17-22	Avg. Annual Openings 22-27	Avg. Hourly Wage	% Emp. Middle or High Edu-Experie.
Ag., Food & Natural Resources	21,552	-3.1%	6,873	$17.55	16%
Architecture & Construction	31,818	20.9%	5,119	$28.37	77%
Business MGMT. & Admin.	57,924	21.6%	12,397	$28.26	43%
Edu.& Training	5,177	-7.4%	5,281	$32.85	84%
Health Science	42,873	18.3%	9,651	$41.97	87%
Hospitality & Tourism	58,302	9.2%	14,816	$16.43	8%
Manufacturing	60,120	27.3%	10,268	$22.15	53%
STEM	2,006	64.2%	343	$49.81	100%
Transpo., Distribut. & Logistics	55,127	20.5%	9,437	$22.51	46%
Priority total	334,900	17.3%	74,183	$25.44	-
Arts, A.V. Tech. & Comms.	1,682	10.0%	553	$30.92	99%
Finance	4,829	8.1%	1,140	$32.88	91%
Govt.& Public Administration	508	104.3%	257	$34.46	98%
Human Services	5,161	-5.2%	3,188	$26.35	55%
Info. Tech.	3,982	45.4%	750	$41.24	100%
Law, Pub. Saft. Correx.& Security	6,823	16.4%	2,140	$25.79	42%
Marketing	36,281	7.8%	8,288	$22.80	32%
Other career clusters total	59,266	9.8%	16,316	$25.85	-

Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career

Figure 4.25 Employment, projected annual openings, and average hourly wage compared to "quality job" wage level, 9 selected priority career clusters, NSJV, 2022-2027



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career; University of Washington Center for Women's Welfare Self-Sufficiency Standard https://selfsufficiencystandard.org/California/

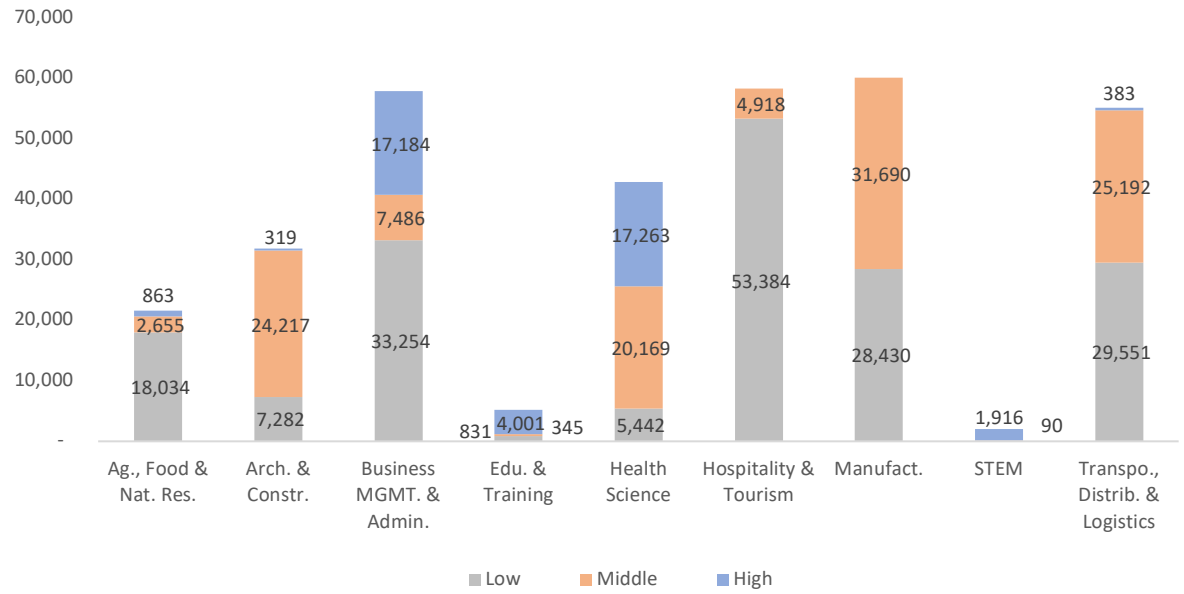
Figure 4.25 describes the general features of the 9 selected priority career clusters. The graphic displays the number of jobs (the size of the bubble) and the number of projected annual openings between 2022 and 2027 (the horizontal axis). The analysis compares the average hourly wage (the vertical axis) to self-sufficiency wages in the NSJV for two family sizes. Of the 9 career clusters, 7 have more than 20,000 jobs each. All but 1 career cluster, the STEM cluster, has more than the median number of annual openings, 5,200. (The median is taken from all 16 career clusters.) Only 3 of the 9 career clusters have average hourly wages that surpass the "quality job" wage threshold ($32.80) (Halving the number of NSJV's children living in households that require public assistance for basic necessities).

The analysis categorizes occupations by education and experience requirements.

- *Occupations that require a high school diploma or below and no experience are "low."*
- *Occupational employment that requires some college or experience or an associate degree are "middle."*
- *Occupations that require a bachelor's degree or advanced degree are "high."*

The bubble shading refers to the predominant education and experience requirements for occupational employment for each career cluster. The analysis indicates that a small minority of occupational growth and demand comes from jobs that require a bachelor's degree or above. (The occupational employment in each career cluster is spread among occupations of varying requirement levels.)

Figure 4.26 Employment totals in nine selected priority career clusters by education and experience requirements, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career; University of Washington Center for Women's Welfare Self-Sufficiency Standard https://selfsufficiencystandard.org/California/

Figure 4.26 shows the distribution of jobs in the 9 career clusters according to each cluster's education and experience requirements for occupational employment. The analysis provides context for the section on education and training below. Career clusters with large shares of jobs that require some college, an associate, or a high school diploma and experience (middle requirement) represent training opportunities for postsecondary education institutions and training organizations like community colleges that offer certificates and associate degrees. Many of these jobs are at the middle requirement level in Architecture and Construction, Health Science, Manufacturing, and Transportation, Distribution, and Logistics. However, there are fewer regional opportunities for the institutions that produce bachelor's and advanced degrees. Career clusters with large shares of jobs that require a bachelor's degree or advanced degree (high requirement) represent large shares of jobs in career clusters that have few jobs. The higher requirements represent 30% of employment in Business, Management, and Administration and 40% in Health Science. In other career clusters representing tens of thousands of jobs, most of these career clusters' employment higher education requirements are few.

> *The analysis suggests that there is much less demand for jobs that require a bachelor's degree or advanced degree than other education requirements in the NSJV.*

The occupational employment at all levels is detailed in the supplemental appendices on career clusters. The analysis provides a starting point for discussions around pathways for advancement with training and education supports, including work-based learning like internships and apprenticeships.

The research assessed the share of jobs in the career clusters meeting self-sufficiency requirements (Figure 4.27), resulting in findings similar to the industry clusters. About 16% of the total employment in the selected career clusters

meets or exceeds the rate of $32.80. Most STEM workers, and about half of workers in Health Science and Education and Training, meet the self-sufficiency threshold. Otherwise, most workers in the career clusters do not earn above the wage threshold that would be considered “quality jobs”.

Figure 4.27 Share of employment meeting or exceeding “quality jobs” threshold ($32.80), selected priority career clusters, NSJV, 2022

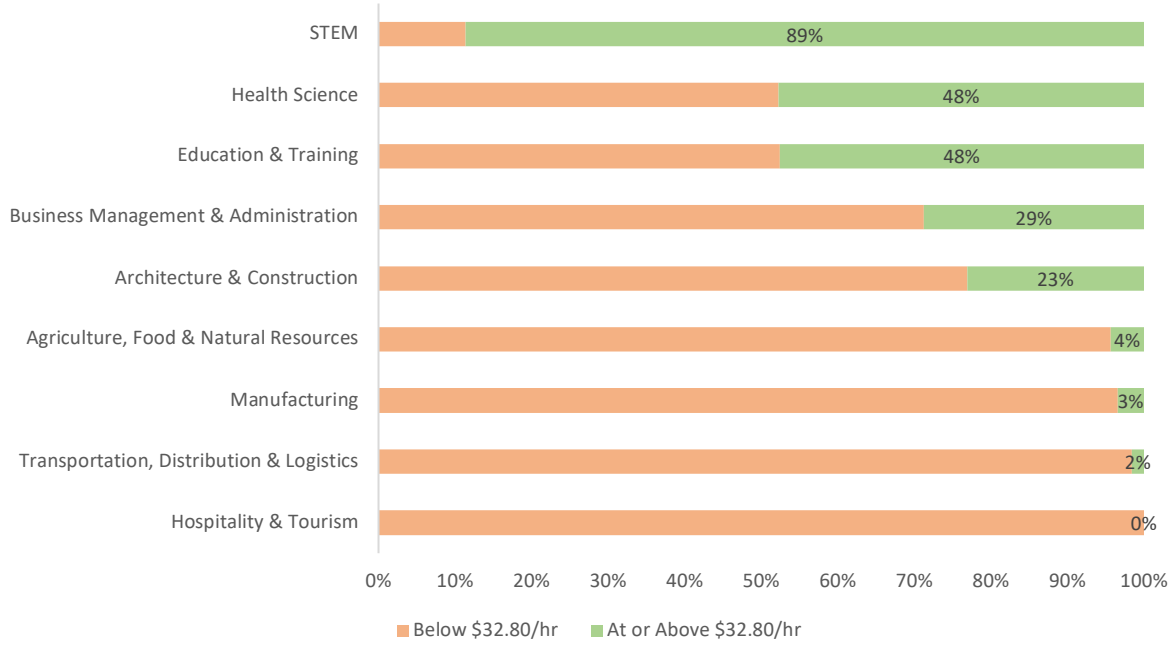
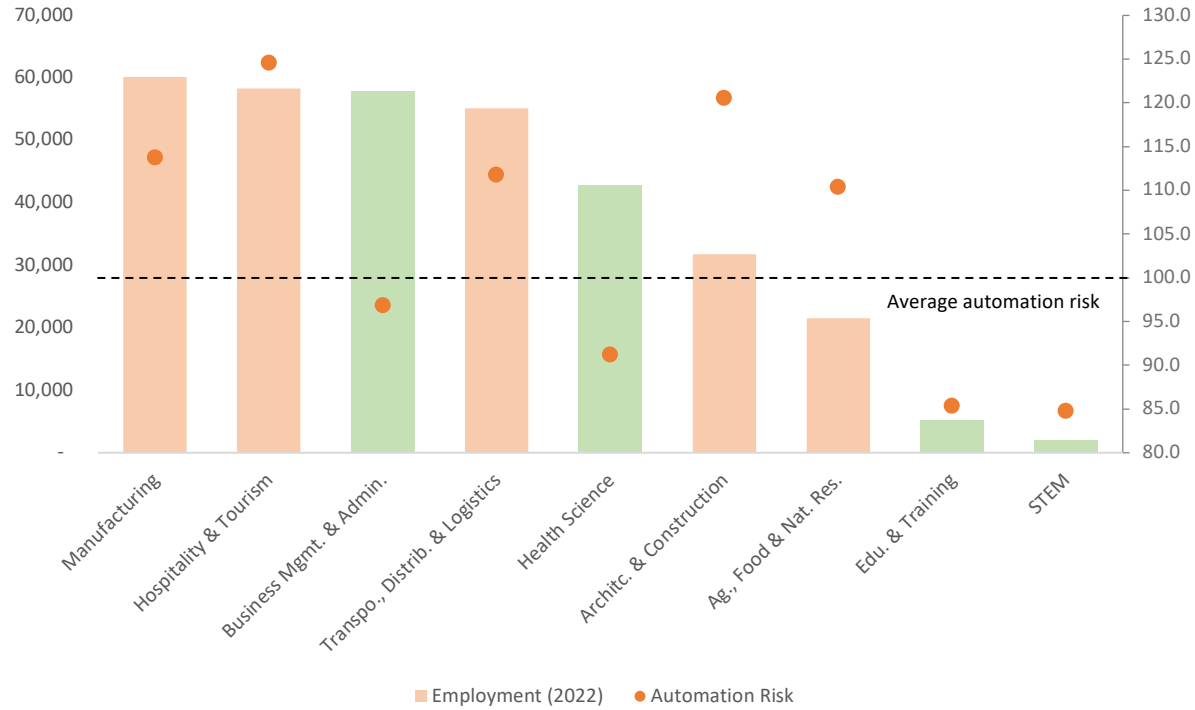


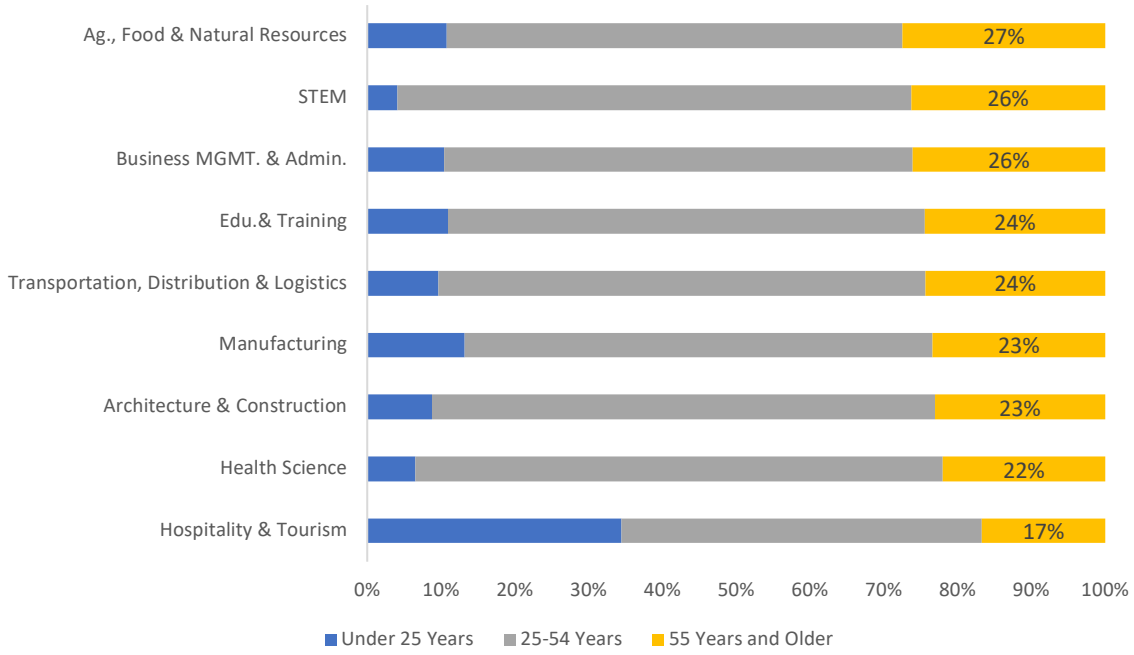
Figure 4.28 Automation risk score and employment for NSJV career clusters, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/

Several of the selected 9 career clusters have large shares of jobs with above-average automation risk scores (greater than 100.0), meaning there could be more significant retraining and upskilling needs in these clusters (Figure 4.28). These include clusters with massive numbers of jobs—Manufacturing, Hospitality, and Tourism; Transportation, Distribution, and Logistics; Architecture and Construction; Agriculture, Food, and Natural Resources. Of the 9 selected career clusters, 4 have lower automation risk—Business Management and Administration, Health Science, Education and Training, and Science, Technology, Engineering, and Mathematics. These clusters have larger shares of jobs that require education and experience beyond high school or a bachelor's degree.

Figure 4.29 Employment share of priority career clusters by age, NSJV, 2022



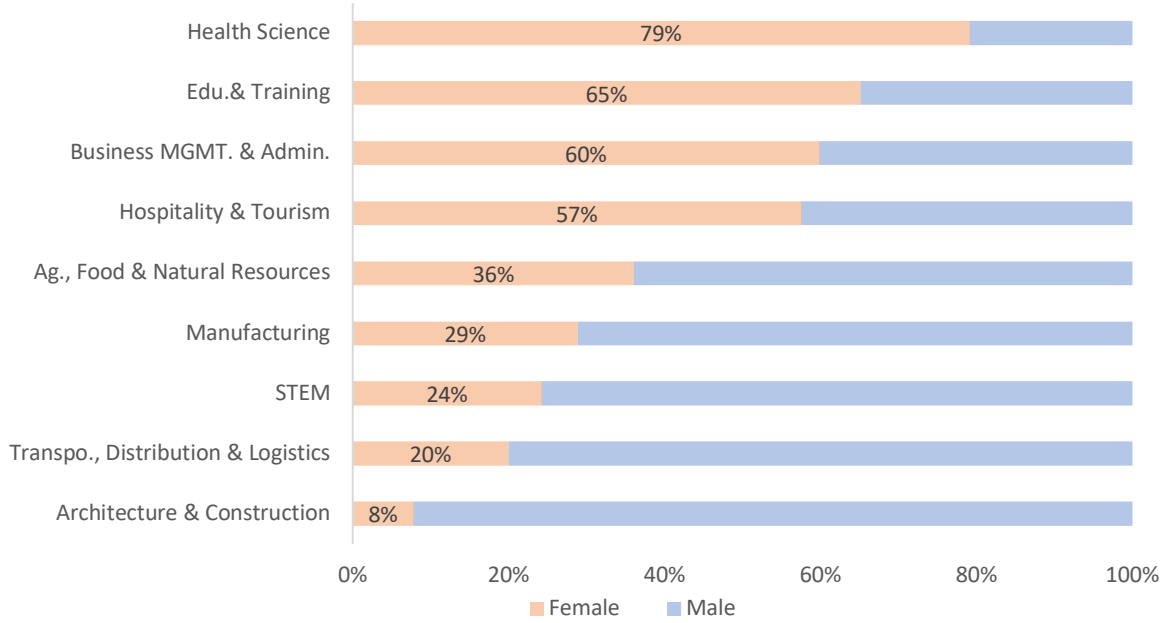
Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career

Like the industry clusters, every career cluster has a significant share of workers nearing retirement (Figure 4.29). Of the 9 selected priority clusters, the Agriculture, Food, and Natural Resources Cluster has the largest share of workers aged 55 years and older (27%). But several other clusters have a similar profile, with about a quarter of the workforce approaching retirement age. Hospitality and Tourism has the youngest worker age profile. More than a third of the career cluster's workforce is under 25.

The career clusters skew male or female like the industry clusters (

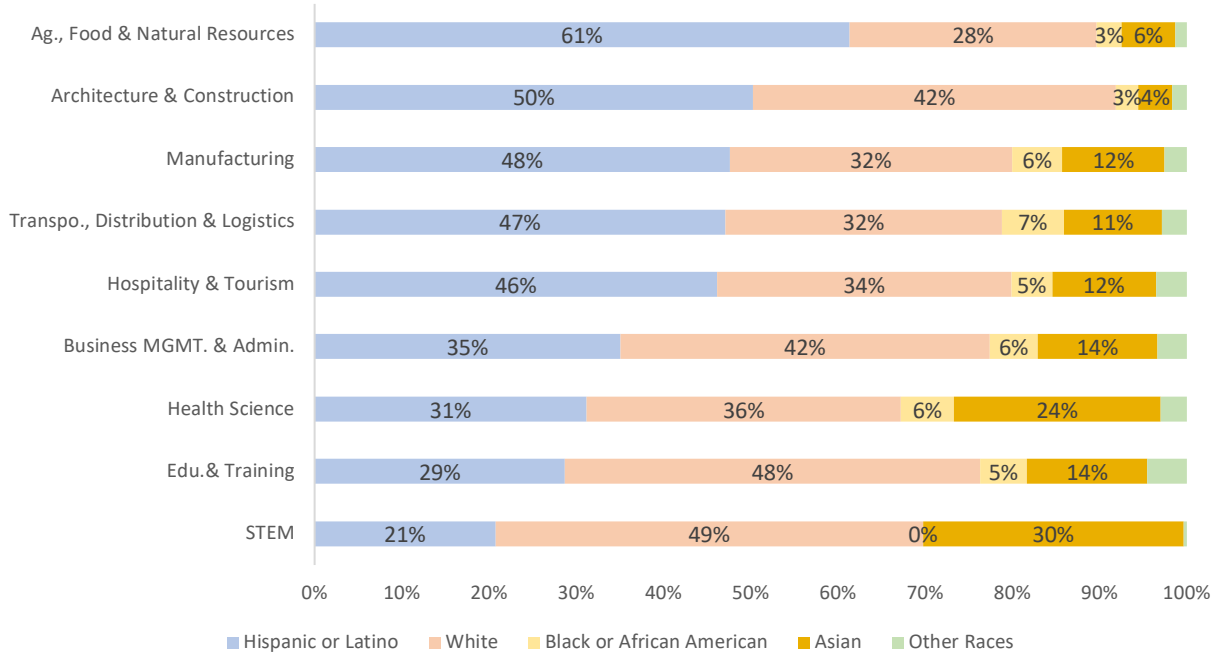
Figure 4.30). About 8 out of 10 workers in the Health Science career cluster are women. Education and Training, Business Management and Administration, and Hospitality and Tourism are majority women. Women occupy a minority position in the other 5 selected career clusters. Only 1 in 10 workers in Architecture and Construction occupations are women in the NSJV. Only a quarter of workers in Science, Technology, Engineering, and Mathematics are women. Only about a third of workers in Manufacturing occupations are women.

Figure 4.30 Employment share of priority career clusters by gender, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career

Figure 4.31 Employment share of priority career clusters by race and ethnicity, NSJV, 2022



Source: Lightcast 2023.3, U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career

The racial and ethnic makeup of the career clusters is just as stark as those of the industry clusters. Latinx workers are distributed along a continuum according to education and experience requirements and wage levels. Latinx workers comprise 6 out of 10 workers in Agriculture, Food, and Natural Resources are Latinx. However, they account for only about a fifth (21%) of STEM occupational employment in the NSJV and less than a third (29%) of the

Education and Training career cluster and the Health Science career cluster (31%). With a couple of exceptions (e.g., Architecture & Construction), the shares of Whites and Asians increase in direct proportion to lower shares of Latinx workers.

With few exceptions, Latinx workers are concentrated in career clusters with lower education and experience requirements and wage levels. 6 out of 10 workers in Agriculture, Food, and Natural Resources are Latinx, whereas just 2 out of 10 STEM workers are.

The largest share of African Americans is in the Law, Public Safety, Corrections, and Security career cluster (11%), which was not selected for the reporting profiles. Of the 9 selected career clusters, Transportation, Distribution, and Logistics have the largest share of African Americans (7%). The group's distribution is pretty consistent, with notable exceptions. The data suggests there are few Blacks in STEM, Architecture and Construction, and Agriculture, Food & Natural Resources occupations in the NSJV. The zero percentage in STEM is striking and deserves further investigation for remedies.

4.2.3 Education and Talent Availability with Respect to Career Clusters

This section reviews the alignment between educational attainment and estimated requirements in major industry sectors. It also compares award production from regional postsecondary institutions, whose award data is accessible from the National Center for Employment Statistics awards, and projected occupation demand. The analysis compares the region's education portfolio of annual award output with related occupational openings using an approximate crosswalk method based on the career cluster definitions discussed above.

The research provides context for workforce developers and education and training providers to address shortfalls in support systems and the education portfolio that might better address community needs and industry demand. At the same time, the section provides additional data to inform development strategies that would foster business growth that requires higher rates of professional and technical workers with matching credentials.

Educational attainment compared to employer requirements

The analysis compares household Census data (place of residence) on educational attainment by industry sector to the estimated educational requirements using national occupation averages overlayed on local job counts. Due to data availability, this analysis used 2-digit NAICS industry sectors, not the clusters described in other parts of the report. By and large, the NSJV's workforce has more education than is required, except at the bachelor's level and above. The data suggest that employers in several sectors may struggle to find workers with needed bachelor's degrees. These include Construction, Information, Finance and Insurance, Professional, Scientific, and Technical Consulting Services, and Educational Services.

The data comparing estimated education requirements with resident workers' actual attainment suggests that there are significant mismatches. Several sectors may struggle to recruit workers with bachelor's degrees. In other cases, workers have more education than their positions require.

The data suggests the opposite phenomenon in the other industry sectors (Agriculture, Forestry, Fishing, and Hunting; Utilities; and Real Estate, Rental, and Leasing, and others); the data shows larger shares of workers with bachelor's degrees and some college or an associate degree than the estimated requirements. The comparison between attainment and requirements may suggest several dynamics:

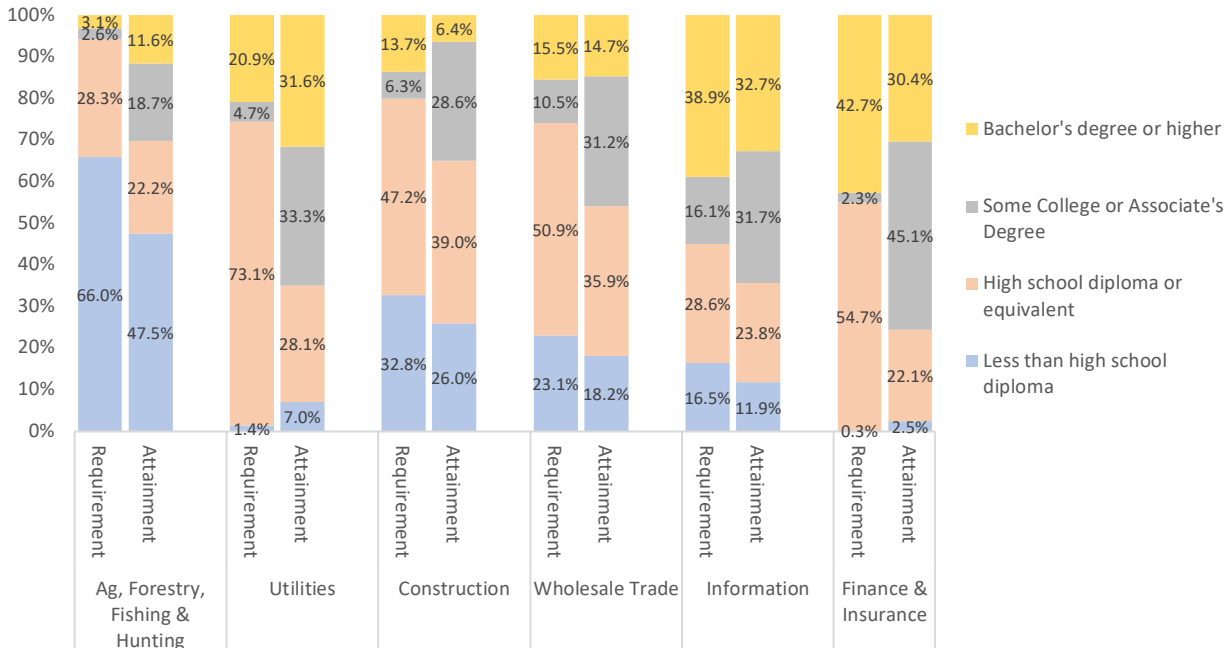
- Where the residential workforce possesses lower shares of educational attainment than the estimated

requirements:

- Employers hire based on other qualifications and training on the job.
- Employers are not finding candidates with the needed credentials.
- Employers value experience over formal credentials.
- The national model may not represent employer needs in the NSJV.
- There may be opportunities to provide education and training support for upskilling and to create hiring pipelines from local schools.

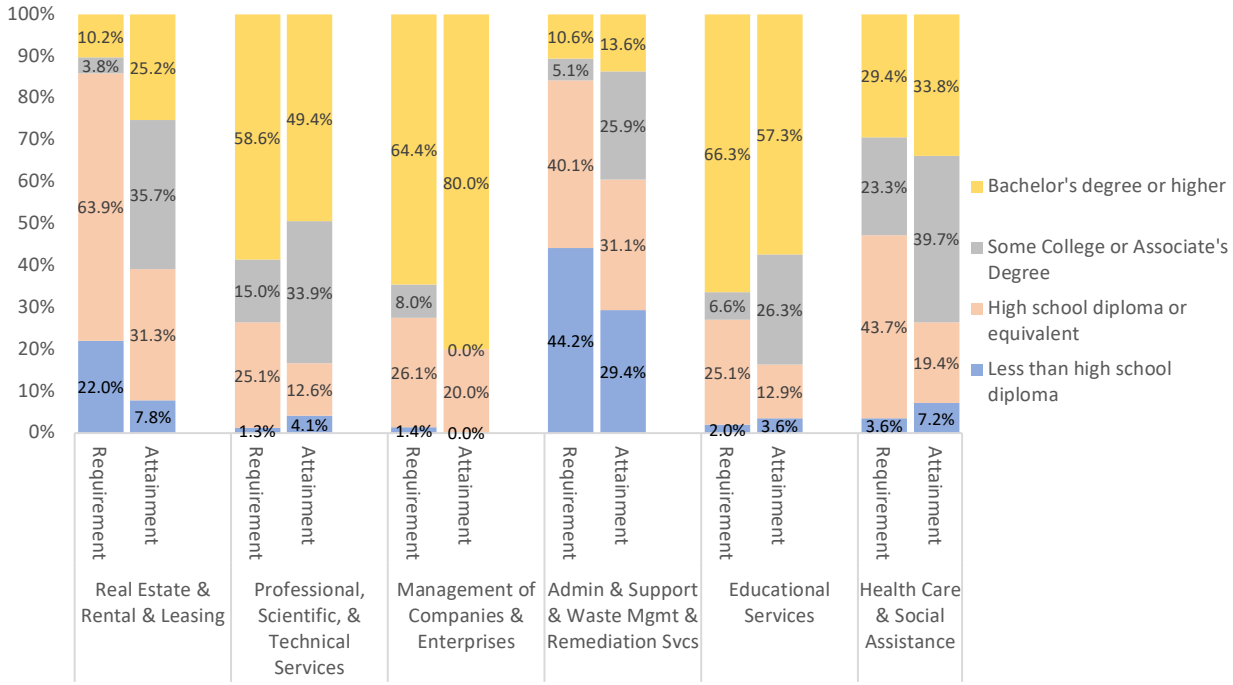
- Where the residential workforce possesses more education than the requirements:
  - Some workers may have credentials that do not match employer requirements.
  - The workforce may be overqualified.
  - Regional employers may have qualifications that surpass the national model's assumptions.
  - Industries with pools of overqualified workers may be sources for employers who need workers with experience and credentials.

Figure 4.32 Comparison of residential educational attainment to estimated education requirements by industry sector, NSJV 2021 (Sector Group 1 of 3)



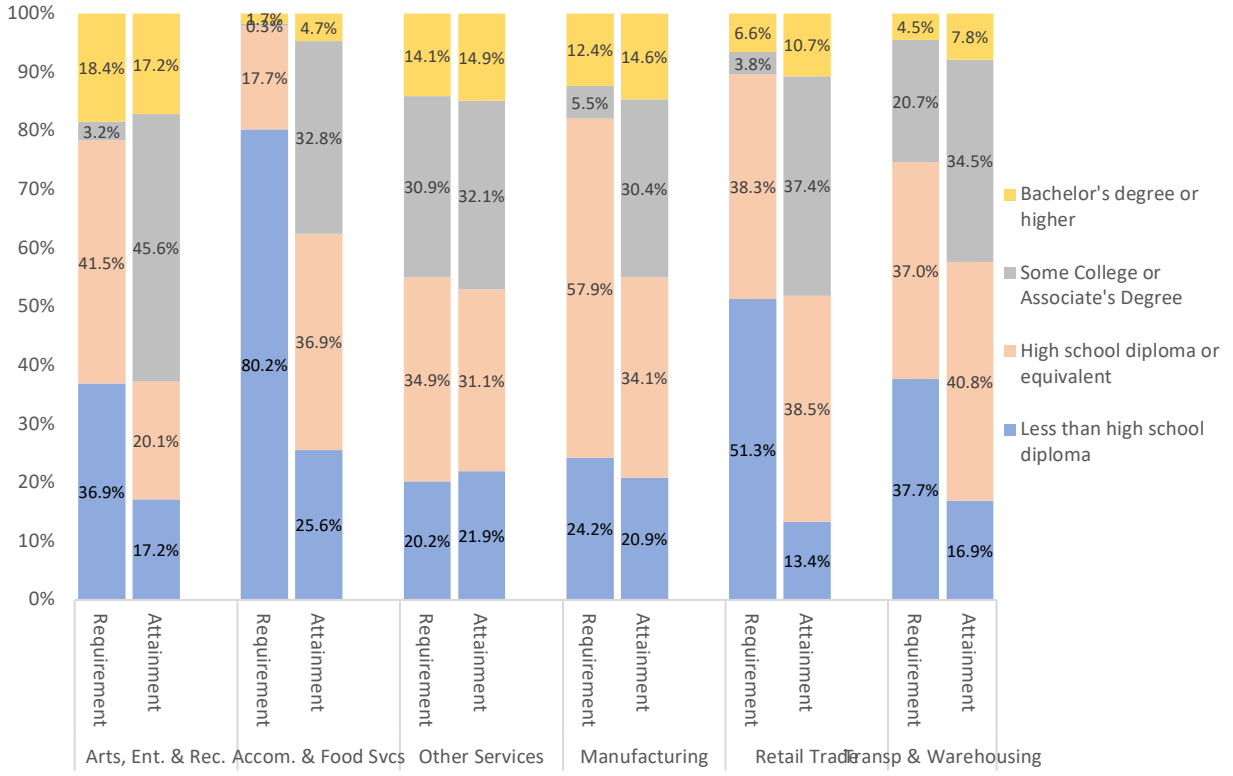
Source: Lightcast, 2023.3; O*NET; U.S. Census Public Use Microdata Sample

Figure 4.33 Comparison of residential educational attainment to estimated education requirements by industry sector, NSJV 2021 (Sector Group 2 of 3)



Source: Lightcast, 2023.3; O*NET; U.S. Census Public Use Microdata Sample

Figure 4.34 Comparison of residential educational attainment to estimated education requirements by industry sector, NSJV 2021 (Sector Group 3 of 3)



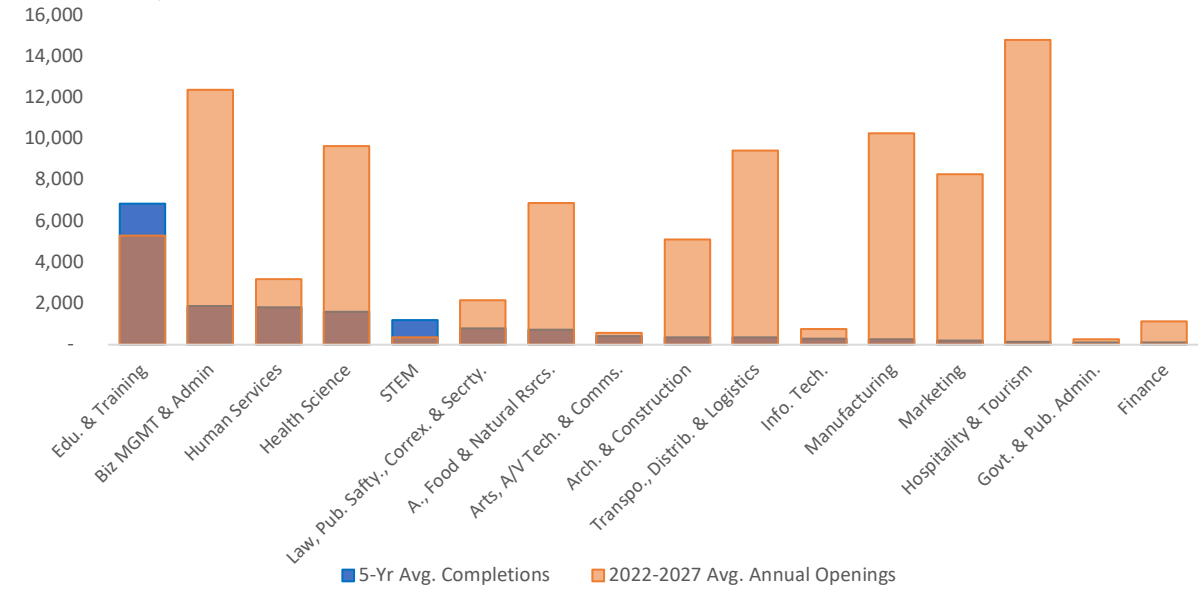
Source: Lightcast, 2023.3; O*NET; U.S. Census Public Use Microdata Sample

Education and training alignment

The analysis compares the occupational demand in the 16 career clusters to related education and training awards using a crosswalk from the National Center for Education Statistics. The methodology has well-known challenges, but it provides a general picture of how the region's education and training institutions supply the workforce.[6]

On average, the NSJV's postsecondary education institutions generate 16,720 certificates and degrees annually, including associate's, bachelor's, and advanced degrees. The average of 5 academic years' awards are displayed in Figure 4.35 as the dark column according to corresponding career clusters. The analysis overlays the related projected annual openings in related occupations.[7]

Figure 4.35 Average annual awards in postsecondary education institutions (2017-2022) compared to projected annual openings (2022-2027), 16 career clusters, NSJV



Source: Lightcast, 2023.3, based on NCES IPEDS; U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career National Center for Employment Statistics CIP-SOC crosswalk https://nces.ed.gov/ipeds/cipcode/post3.aspx?y=56

In all but 3 cases, there is a wide gap between the number of awards and annual openings. The graphic indicates an "oversupply" of awards in the Education and Training category. The crosswalk in the category includes awards from the Humanities and Social Sciences disciplines and are not specific to credentialing programs. The region produces 911 awards annually in the related program category (CIP 13, Education, see Figure 4.37 below), compared to the projected annual openings for occupations in the career cluster (5,281 openings). Thus, the data indicates a shortage of specific education awards, including early childhood education.

The other notable oversupply is in the STEM career cluster. The oversupply is plausible because the category's occupational employment (and demand) is remarkably low in the NSJV, and the region has numerous college and university STEM programs.

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[6] Education programs to occupation crosswalks can only generally describe the programs that would prepare students for certain types of occupational employment. The supply and demand measures do not account for interregional migration or commuting that may be sources of leakage or inter-regional hiring pipelines. It also does not account for sources of hiring beyond education and training organizations.

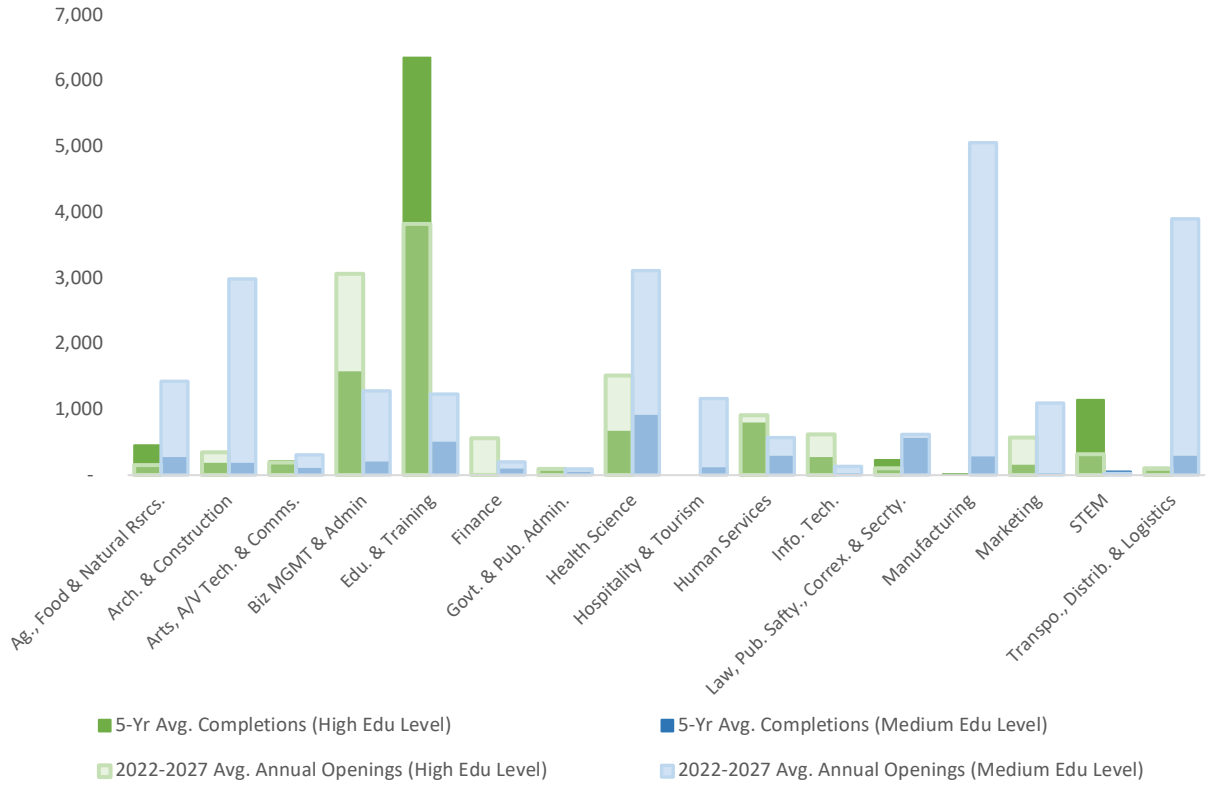
[7] Note the analysis apportions awards that match occupations in more than one career cluster according to the share of occupational employment. The methodology accounts for the many programs that apply to many career clusters.

The analysis suggests that two counterposing phenomena are common: (a) gaps between awards and demand, and workers whose educational attainment falls short of employer requirements; (b) workers educational attainment levels are higher than their job requirements. Each of these issues present compelling cases for workforce developers to provide training and career supports to better align hiring needs and workers with appropriate qualifications.

Figure 4.36 performs the same analysis but separates the awards and occupational openings by education requirements. It includes those occupations that require some postsecondary education or experience (middle-level requirements) and those that require a bachelor's degree or an advanced degree (high education requirement).

Other oversupplies result from the detailed analysis. In Agriculture, Food, and Natural Resources, the award oversupply is owed to the Biology degrees apportioned to the category. In Law and Public Safety, bachelor's degrees in Administration of Justice result in oversupply. In Education and Training, the graphic reveals that bachelor's degrees in related Humanities and Social Sciences produce an oversupply. The oversupply in STEM results from award production across a range of engineering, science, and mathematics disciplines.

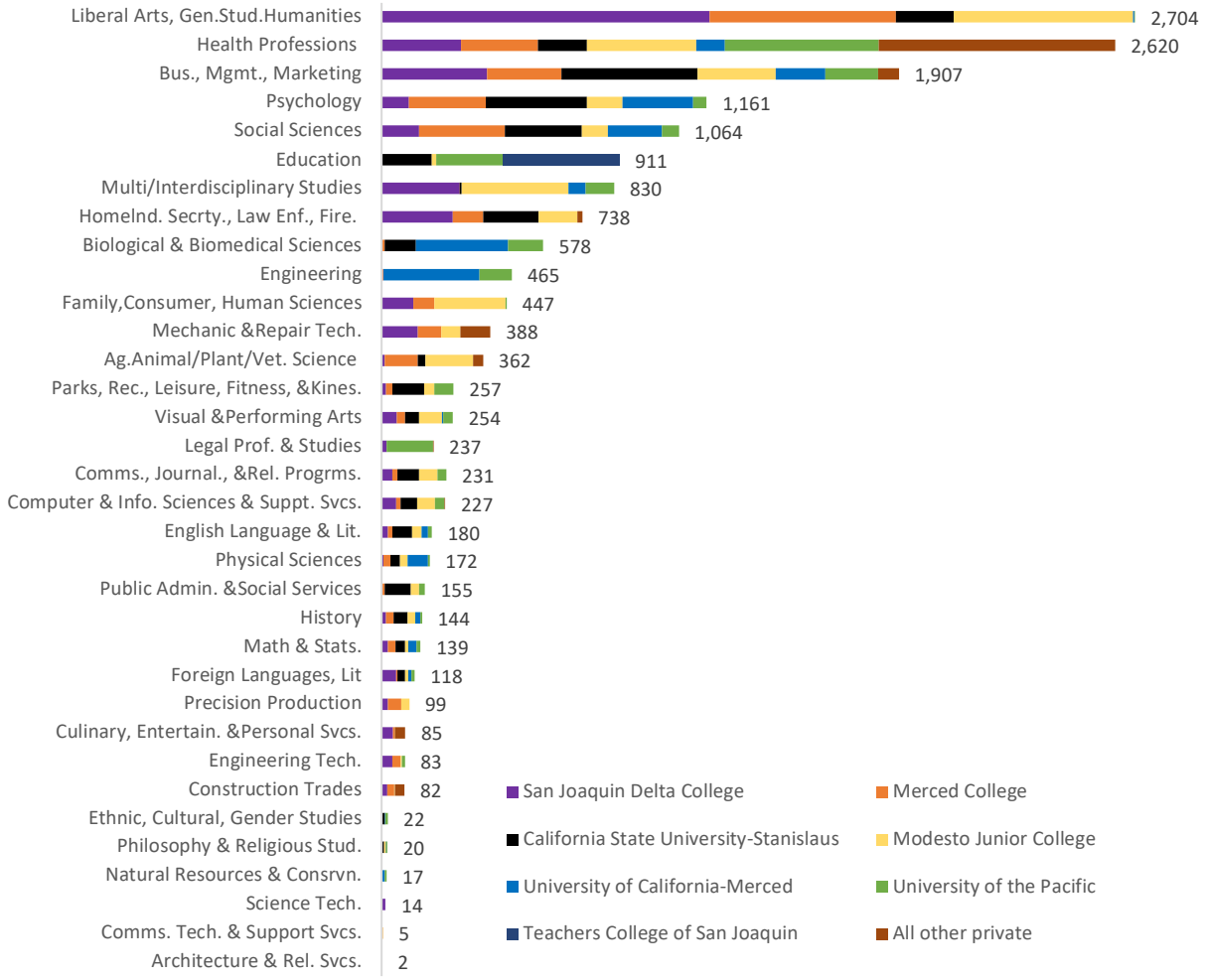
Figure 4.36 Average annual awards in postsecondary education institutions (2017-2022) compared to projected annual openings (2022-2027) for 16 career clusters by education and experience requirement level, NSJV



Source: Lightcast, 2023.3, based on NCES IPEDS; U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career National Center for Employment Statistics CIP-SOC crosswalk https://nces.ed.gov/ipeds/cipcode/post3.aspx?y=56

The analysis of awards and openings data reveals an oversupply of STEM awards. The NSJV has just over 2,000 STEM workers and about 340 annual openings. The region's colleges and universities produce hundreds of awards in various engineering disciplines, physical, life, social sciences, and mathematics. The data suggest there are more limited opportunities for local STEM graduates in the NSJV.

Figure 4.37 Average annual awards by major program category, including certificates and degrees (associate, bachelor's, advanced), NSJV, 2017-2022



Source: Lightcast 2023.3, based on NCES IPEDS

Figure 4.37 provides an overview of the average annual award production for all programs in the NSJV registering awards with the National Center for Education Statistics IPEDS program. The research scope did not include a provision to quantify award production from schools and training organizations whose awards are not accounted for in the IPEDS. The research did have a qualitative inventory from several sources that cataloged hundreds of programs in the NSJV from public and private institutions and organizations. The inventory is too extensive to include in the report, but the sections below detail notable program categories that account for much of the award production. The appendices include details on major corresponding programs and institutions.

Annually, the NSJV's public and private colleges and universities produce nearly 17,000 certificates, associate, bachelor's and advanced degrees in a range of liberal arts, STEM, and other technical disciplines.

The analysis above combines certificates, associate's, bachelor's, and advanced degrees to give an overview of the region's award production from its postsecondary education portfolio. The region produces 2,620 awards in Health Professions and 1,907 in Business, Management, and Marketing. The region produces 465 Engineering awards, 388 Mechanic and Repair Technician awards, and 83 Engineering Technology awards. The data suggests regional public and private colleges and universities produce few awards related to Architecture and Construction.

Table 4.5 Average annual awards (bachelor's and advanced degrees) for leading program categories in each of the 9 career clusters, NSJV institutions, 2017-2021

Career Clusters	CIP2020 Code	CIP Title	5-Yr Avg. Complet.
Agriculture, Food & Nat. Res.	30.0101	Biological and Physical Sciences	193
Agriculture, Food & Nat. Res.	26.0101	Biology/Biological Sciences, General	121
Architecture & Construction	52.0201	Business Administration & MGMT, General	104
Architecture & Construction	14.1901	Mechanical Engineering	33
Architecture & Construction	52.0101	Business/Commerce, General	25
Business MGMT & Admin.	52.0201	Business Administration & MGMT, General	832
Business MGMT & Admin.	42.0101	Psychology, General	192
Business MGMT & Admin.	52.0101	Business/Commerce, General	123
Education & Training	24.0101	Liberal Arts and Sciences/Liberal Studies	1,753
Education & Training	24.0103	Humanities/Humanistic Studies	951
Education & Training	30.0101	Biological and Physical Sciences	387
Education & Training	13.0101	Education, General	224
Education & Training	42.0101	Psychology, General	192
Education & Training	45.0101	Social Sciences, General	162
Health Science	51.3801	Registered Nursing/Registered Nurse	201
Health Science	51.2001	Pharmacy	137
Health Science	51.0401	Dentistry	82
Health Science	31.0505	Exercise Science and Kinesiology	67
Manufacturing	52.1801	Sales, Distr., &Marketing Ops., General	2
Science, Tech., Engineering & Math.	42.0101	Psychology, General	192
Science, Tech., Engineering & Math.	45.1101	Sociology, General	190
Science, Tech., Engineering & Math.	45.0101	Social Sciences, General	162
Science, Tech., Engineering & Math.	26.0101	Biology/Biological Sciences, General	121
Science, Tech., Engineering & Math.	14.1901	Mechanical Engineering	99
Science, Tech., Engineering & Math.	14.0901	Computer Engineering, General	37
Science, Tech., Engineering & Math.	45.0601	Economics, General	32
Science, Tech., Engineering & Math.	27.0101	Mathematics, General	28
Science, Tech., Engineering & Math.	14.0101	Engineering, General	23
Transpo., Distribut. & Logistics	52.0201	Business Administration & MGMT, General	52

Source: Lightcast, 2023.3, based on NCES IPEDS; U.S. Cluster Mapping https://clustermapping.us/ O*NET Career Clusters https://www.onetonline.org/find/career National Center for Employment Statistics CIP-SOC crosswalk https://nces.ed.gov/ipeds/cipcode/post3.aspx?y=56

Table 4.5 and Table 4.6 show the average annual award totals between 2017 and 2021 for the leading education program categories for each of the 9 related career clusters in NSJV's education institutions. The tables in the graphics above offer a summary of detailed programs used in analyzing workforce supply. Table 4.5 focuses on bachelor's degrees and advanced degrees. Table 4.6 focuses on certificates and associate degrees. The appendices provide a list of notable programs and institutions in these categories. The research cataloged an inventory of hundreds of programs in the NSJV beyond what can be listed in the report.

Table 4.6 Average annual awards (certificates and associate's degrees) for leading program categories in each of the 9 career clusters, NSJV institutions, 2017-2021

Career Clusters	CIP2020 Code	CIP Title	5-Yr Avg. Complet.
Agriculture, Food & Nat. Res.	26.0101	Biology/Biological Sciences, General	121
Agriculture, Food & Nat. Res.	01.0102	Agribusiness/Agricultural Business Ops.	35
Agriculture, Food & Nat. Res.	01.0205	Ag. Mechanics and Equip./Machine Tech.	32
Architecture & Construction	47.0201	HVAC Maintenance Tech.	84
Architecture & Construction	46.0302	Electrician	41
Business MGMT & Admin.	52.0302	Accounting Tech. & Bookkeeping	60
Business MGMT & Admin.	52.0201	Business Administration & MGMT, General.	52
Business MGMT & Admin.	52.0401	Admin. Assist. & Secret. Science	31
Education & Training	13.0101	Education, General.	448
Education & Training	13.121	Early Childhood Edu. and Teaching	42
Health Science	51.0801	Medical/Clinical Assistant	253
Health Science	51.3902	Nursing Assist. &Patient Care Assist.	155
Health Science	51.0716	Medical Admin./Exec. Assist. &Med.Secrtry.	118
Health Science	51.3901	Licensed Practical/Vocational Nurse Training	109
Hospitality & Tourism	31.0501	Sports, Kinesiology &Physical Edu./Fitness	46
Hospitality & Tourism	12.05	Cooking and Related Culinary Arts, General	29
Manufacturing	48.0508	Welding Technology/Welder	82
Manufacturing	47.0104	Computer Install. &Repair Tech	29
Manufacturing	15.1306	Mechanical Drafting &CAD/CADD	24
Manufacturing	46.0302	Electrician	20
Manufacturing	47.0105	Industrial Electronics Tech.	16
Science, Tech., Engineering & Math.	43.0104	Criminal Justice/Safety Studies	50
Transpo., Distribut. & Logistics	47.0604	Auto. Mechanics Techn.	132
Transpo., Distribut. & Logistics	01.0205	Ag. Mechan. &Equip./Machine Tech.	64

5 Situational Analysis of Strengths-Weaknesses-Opportunities-Threats

The situational or Strength-Weakness-Opportunity-Threats (SWOT) analysis of the NSJV has thus far primarily focused on reviewing and analyzing initial results from the Baseline component assessments:

- Economy & Economic Development
- Climate and Environment
- Public Health
- Labor Market
- Industry Cluster

Following initial input from each of the five Baseline components assessments, the SWOT is refined to reflect the results of the consultative process with community stakeholders, including additional situational reports, strategies, and other information as relevant. This includes working with the DRO's Research Integration Advisor, and the North Valley THRIVE County Coordinators as well as participating in an online Stakeholder review and webinar presentation process.

The SWOT Analysis is conducted as it relates to equitable economic resilience and growth of sustainable industry clusters, particularly as it seeks to identify at-risk locations of dis-invested communities and identify opportunities to increase economic equity and security.

5.1 Regional Strengths

The NSJV tri-county region acts as a critical economy that feeds the entire country and connects the adjacent regions: the San Francisco Bay Area (SFBA), Sacramento, the Southern San Joaquin Valley (SSJV), and foothills of the Sierras such as Tuolumne, Mariposa, and Calaveras counties.

Agriculture
The NSJV region is part of California's agricultural hub, and an important contributor to the nation's food supply. The sunny climate and fertile soil of the Central and San Joaquin Valley have created a rich agricultural cropland. The agricultural economy and acres of farmland in the NSJV provides a major source of revenue and regional strength. As part of the San Joaquin Valley, the NSJV region has historically concentrated on agriculture-related industries – production, processing, equipment manufacturing, and construction components.

Transit and transportation infrastructure
NSJV's critical location connecting North to South makes it a suitable location for stop-overs for both transit and tourist traffic. The two primary freeway corridors that connect North to South, I-5 and CA99, pass through NSJV. The area economy provides many goods and services to transit traffic. These two freeways are used very heavily along with others that connect East to West and North to South for daily commute and for truck traffic. NSJV's central location, therefore, plays a critical role for adjacent economies' vitality. Although in some ways a dual strength and weakness, the NSJV proximity to major urban areas as well as unique environmental destinations such as Yosemite National Park and the Monterey Bay National Marine Sanctuary further contribute to this value.

Climate
The region's Mediterranean climate has low humidity, not as cold as temperate regions in the winter. It also provides an environment for outdoor activities such as hiking, camping and swimming, and canoeing in the lakes and rivers. Relative to more southern parts of the San Joaquin Valley, the three-county region is considered the "wet" region and is more resilient in times of drought than the southern Valley counties. The Sacramento-San Joaquin Delta is home to many marinas and boat yards making the region an attractive location for boaters and alike. The delta with its diverse habitat is home to many birds and stopover location to migrating ones making it an attractive site for bird watchers and nature photographers.

Housing
Due to its geographic proximity to the Bay area, transportation links, and the relatively lower cost of housing, many highly skilled and educated workers have moved to the NSJV area along with retirees. This influx enhances the level of the labor force and may contribute to the expansion of related businesses. However, the general migration from the much more heavily populated SFBA to the NSJV has been driving an increase in demand for housing in the NSJV, particularly during inflationary times. While highly paid residents from the Bay Area can afford more expensive homes in NJSV, by way of gentrification, it also impacts the cost of housing for low-income residents. (See the Weakness discussion.)

Education and Socioeconomic mobility
Many people come to the NSJV for agricultural jobs and other employment opportunities that require less formal education qualifications. While further capacity needs to be fostered, undergraduate and graduate programs of public and private universities and community colleges in NSJV provide important higher education opportunities. Educational institutions' contributions are often recognized in national lists such as those that bring the most bang for buck, and affordability, economic and social mobility. The region's educational institutions help accumulate human capital in a much-needed area comprised mainly of low-skilled workforce.

5.2 Internal Regional Weaknesses

Among weaknesses, the NSJV's significant disparities in health, socio-economic status, and environment relative to the other regions of California have thus far been central in the assessment.

Environmental issues, air and water quality
As mentioned previously, the NSJV has some of the greatest environmental issues. The HPI findings, which rank NSJV in the 15th percentile for Clean Environment compared with the 55 counties in California. The contributing factors include pollution burden, ozone emitted from the agricultural pollutants on the ground, methane from cow emissions, smog from vehicles, large particulate matters from dust pollens, trees, pesticides, and drinking water.

Due to the central location in the state, many manufactured and agricultural goods pass through the NSJV corridor, contributing to heavy traffic, both public and commercial, as well as rail. While industrial traffic passes through NSJV to deliver goods and services and benefit from the infrastructure and goods and services provided along the routes, their carbon footprint stays in our area as a negative externality creating many health and other issues for the regional population. The same is true for railways on which many cargos and passengers are carried daily. The high level of particulate matter (defined as 2.5 micrograms or smaller) often surpass multifold of acceptable healthy levels thus ranking NSJV in the 12.1 percentile. Diesel particulate matter puts the region in the 24.1 percentile. It is also noted that, when measured during the most polluted eight hours on a summer day, the Ozone indicator of 0.052 PPM puts NSJV in the 37.9 percentile. While industrial traffic passes through NSJV to deliver goods and services and benefits from the infrastructure and goods and services provided along the routes, their carbon footprint stays in the area as a pollutant creating many health and other issues for the resident population. The same is true for railways on which many cargos and passengers are carried daily.

In addition to the impacts on air pollution and the related health hazards, heavy truck traffic also contributes to public safety issues. While there is limited public rail and bus service, issues of reliability, affordability, and convenience discourage use. With the increasing level of traffic connecting NSJV to the Bay Area and its related air pollution, it is apparent that improvements in infrastructure are a critical need to increase air quality in the NSJV as well as for economic growth in the region. (See Appendix F for an Analysis of Traffic and Roads). As can be seen from Table 12from Soydemir and Panopoulos (2019), the educational attainment levels of commuters from NSJV to the high paying Bay Area is increasing, presenting itself as a leakage of much needed skilled work from the region.

Table 5.1 Demographics of Commuters

Demographics	2000	2006	2019
Male	64.9%	62.8%	45.51%
Female	35.1%	37.1%	54.49%
45 years old or older	36.5%	53.8%	32.12%
Has bachelor's degree or higher	23.2%	30.8%	38.21%

Source: Soydemir & Panagopoulos (2019)

The NSJV's quality of life is also affected by the lack of clean drinking water. Specifically, NSJV ranks 15.5 percentile for Drinking Water Contaminants. Contributing factors include agricultural drainage and irrigated crops, pesticides, fertilizers, petroleum storage and transfer areas. Other contributing factors include leaking underground storage tanks, railroad maintenance and fueling areas, and storm drain discharge. Cal Matters reports that 95% of California's rivers, lakes, bays, and wetlands are plagued by pesticides, metals, pathogens, trash, and sediment, making it unsafe to swim, fish or drink. They maintain that most pollution in California waters is caused by runoff from farms and cities, causing toxicity, respiratory diseases, and gastrointestinal illness. It specifically cites Stockton suffering from a growing number of harmful algal blooms. In addition, mercury, and polychlorinated-biphenyl (PCB) contamination is especially alarming in the Sacramento- San Joaquin Delta. Furthermore, commenting on the health of the environment and the quality of life in the Central Valley Region, the California State Water Quality Control Board reports that storm water and urban runoff are often polluted with pesticides, fertilizers, animal droppings, trash, food wastes, automotive byproducts, and many other toxic substances.[1] All these factors combine to contribute significantly to various health problems, including asthma, cancer, and cardio- vascular diseases.

Public health

The Community Health Improvement Plans, produced by each of the three counties, indicate their primary challenges and health needs. Specifically, San Joaquin County's most important challenges are mental health, substance abuse, access to healthcare, income, and employment. Stanislaus County's most pressing health needs include access to healthcare, mental health, housing, homelessness, income, and employment. Merced County's main problems were identified as income, employment, lack of education, heart disease, obesity, access to healthcare, drug and alcohol abuse, and unaffordability. The common denominators for all three counties appear to be income and employment, access to health care, housing, and affordability.

Health disparities largely reflect broad socio-economic and environmental inequities. Poverty is significantly higher in the NSJV, contributing to greater health issues, such as cancer, asthma, diabetes, obesity, and cardiovascular disease. These health issues occur in the NSJV to a much greater degree than the nearby coastal regions. And mental health, substance abuse, crime and homelessness are major concerns throughout the region. Lack of trust in government institutions are also cited as weaknesses. Economic and social equity issues are some other important weaknesses.

Overall, NSJV ranks in the 71st percentile of highest health related risk. Specific health-related problems include Asthma (73.1 percentile) and cardio-vascular diseases (75.7 percentile). Factors that have a significant causal effect on public health in the NSJV include air quality, drinking water quality, transportation, education, income, employment, education, crime, housing, homelessness, mental illness, and substance abuse.

Income and poverty

The region has significant disparities in health, socioeconomic status, and environment relative to the coastal regions. Poverty, education, and job opportunities are inextricably linked in the region. According to www.bestplaces.net, the cost- of-living index of Stanislaus County is 116.3, compared to the U.S. at 100. This may appear as a Strength when compared to California's Cost of Living at 149.9, but income offsets this advantage. Overall, NSJV ranks in the 36.2 percentile in Economic conditions, and is ranked in the 24.1 percentile for per capita income above poverty, with a median per capita income of $26,300. Inversely, the percentage of persons with income above poverty in all three

[1] https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/stockton_draft_r5_2002_xxx.pdf

counties of the NSJV is lower than that for the State of California.

As noted in Soydemir's bi-annual Business Forecast Report, real wages continued to fall gradually over the years. The purchasing power of NSJV consumers also fell continuously making them afford less goods and services than before. The spike in wages immediately after the pandemic was not significant enough to correct the worsening picture in income and poverty. Further, the worsening was at a greater scale in NSJV than the coastal regions.

Employment
Unskilled labor constitutes more than seventy-two percent of the workforce. As reported in the Employment Development Department of the State of California, the annual average of the number of farm-related jobs is between 10,000 and 20,000 for all three NSJV counties, second only to the agricultural region to the south. Construction and government employment accounts for more than twenty percent of the region's remaining jobs. The lack of a diversified economy makes the NSJV more vulnerable to national and international economic shocks than the state and the nation.

Housing
Home values are lower in NSJV than the coastal areas, but they are more volatile to economic shocks and rate hikes, therefore do not necessarily maintain their value like the coastal regions. Longer wait times in issues such as getting a house permit slow growth in the region. While industrial traffic passes through NSJV to deliver goods and services and benefit from the infrastructure and goods and services provided along the routes, their carbon footprint stays in our area as a negative externality creating many health and other issues for the regional population.

Excessive Heat
During the summer months, heat in NSJV can often exceed 100 degrees for many days which presents itself as a danger to those NSJV residents. It also poses a danger to livestock and plants in terms of water consumption and heat endurance. Relatively speaking however, dry weather can act partially as a mitigating factor.

5.3 Regional Opportunities

Key among the regional opportunities in the NSJV are greater economic opportunity through industry sector development, and socio-economic benefits of inclusive regionalism.

Economic Development
As highlighted in Section 3.1.6, substantial economic development opportunities exist in the NSJV, namely:

- *Circular Bioeconomy:* This emergent area of the economy leverages the region's agricultural strengths and focuses on renewable biological resources conversion into products like biofuels, bioplastics, and biochemicals, with great promise. Locally headquartered BEAM Circular is working to transform organic waste and byproducts from the food and agriculture system — such as orchard trimmings, nut shells, food scraps, and livestock waste— into everything from building materials to renewable energy to industrial chemicals to consumer goods. This work intends to catalyze the fledgling circular bioeconomy on an unprecedented scale – generating accessible quality jobs, building community wealth, and advancing environmental solutions. Momentum has included the investment of local County funds, investment from federal agencies, and the attraction of new private dollars attracted to the promise of this new opportunity.

- *High-Road Opportunity within Manufacturing and Goods Movement ("Make It! Ship It!"):* The NSJV's concentration of logistics jobs and manufacturing is significant, but greater opportunity lies in the development of high-wage, quality employment in the advanced manufacturing and shipping industries. Greater opportunity is possible through integration of modern technology and efficient shipping strategies for sustainable, equitable production. CalSTA invested nearly $100M in 2023 into infrastructure

development at the Port of Stockton and Castle Commerce Center (Merced County), providing the foundation for exponential growth and with it, higher-wage employment experienced at intermodal facilities. Co-location of advanced manufacturing at these sites and others in the region has the promise to bring higher-wage manufacturing employment while mitigating environmental concerns through net-zero transportation and development.

- *Health Care ("Building Health and Well-being"):* This sectoral strategy area covers healthcare, behavioral health, childcare, elder care, and home health services, highlighting the significance of these professions in the region. Significant opportunity lies in the alignment of career pathways to bring in greater swaths of the region's workers into higher-wage employment, alongside efforts to structurally strengthen the region's health care system.

- *New Entrepreneurship:* The research shows that business starts in the NSJV (133 per 100,000 residents) lags far behind the State (232 per 100,000 residents); this presents the opportunity to develop a new entrepreneurial strategy across the region, one that in particular leverages the entrepreneurial mindset of the region's immigrant and growing Latino population. Building out broader opportunity in government procurement, navigation of business licensing and start-up, access to capital, and connection to emergent and growing areas of the economy are all important factors in realizing the potential of the entrepreneurial space in the NSJV.

Regional Development

The California Jobs First initiative launched a first-of-its-kind inclusive economic development process across its three counties. In truth, it has caused the consideration of these three counties as a true region, activated through the formation of several working groups, research collaboratives, cross-county collaborations, and inter-agency relationships that had not existed previously among the region's community, economic and municipal leadership. The NSJV quickly formalized this effort under the organizational banner North Valley THRIVE (the High Road for an Inclusive, Vibrant Economy) and in doing so, has spurred the development of new relationships and partnerships in important cross-sections of the region's community-based, government, industry, and research sectors.

Significant opportunity lies in the continued nurture of this nascent process. Consider the following:

- Greater coordination among municipalities can go far in aligning economic and infrastructure investments. While other entities do coordinate activity and advocacy among the governments of the San Joaquin Central Valley, none focus exclusively on the three counties on the NSJV, nor do they include community stakeholders as active, equal partners. This new alignment can attract greater federal and private investment by demonstrating coordination and collaboration in meeting economic, health and climate goals. Independent programmatic and infrastructure investments can be better tied to maximize impact and efficiency.

- Continued research into the regional economy can identify new opportunities, solutions and markets. The CFJ has funded the region's first research collaborative of its three universities (University of the Pacific, California State University Stanislaus, UC Merced) and outside researchers, and this report is an early example of the work. Continuous, well-resourced research will deepen our understanding of our economy and inform better decision-making into the future. Data continues to help identify collective 'north-stars', aid in the securing outside investment, and informing the region about shared opportunities and threats. Formalizing this collaborative further through structural investment will extend its impact and codify the union among these research institutions.

- Strengthened coordination among community-based groups and advocates leads to bigger impact. The work has invited new, strategic partnerships among the region's diverse body of community-based, grassroots organizations. New working groups on climate, health equity, the justice-involved, and new American arrivals

have taken shape with the promise of helping these groups align efforts and deepen their impact. This enhanced organization makes these efforts more competitive for funding, builds strength in the non-profit sector, and widens these groups' access and involvement in economic development activity.

As successful as the first several months of this process have been in forming new connective tissue and enabling access to economic analysis and decision-making, it is dependent on the continued resourcing and coordination initiated though CFJ.

5.4 External Regional Threats

Recurring droughts, water shortages, low educational attainment levels, housing displacement, disparities in income adjusted wages (real wages) in the NSJV relative to coastal areas are some other historically existing threats. Gentrification due to influx of population from the coastal regions is another ongoing threat. The resulting displacement of local businesses and residents is a causal effect. Increasing crime rates, substance abuse, mental and behavioral health issues seriously threaten neighborhood peace and act as a serious impediment to the economic and social wellbeing of NSJV residents.

Water Shortage and Groundwater Basins in NSJV

Water constraints may lead to a reduction in irrigated lands, and in over-drafted basins, areas with less access to surface supplies will face a much higher risk of fallowing. In the worst-case scenario, without developing new supplies or engaging in water trading activities, the transition to sustainability under climate change and increased environmental flows will require the fallowing of nearly 900,000 acres with respect to current conditions.

Achieving groundwater sustainability will be the single biggest driver reducing water supply in the valley. But climate change—which will affect precipitation patterns and increase crop water demands—will further constrain water supplies. So will additional water dedicated to the environment, especially in a few specific basins.

Improving trading rules, water infrastructure, and groundwater recharge could lower the cost of adapting to the coming changes. Incentivizing alternative uses for irrigated lands could bring additional income to farmers and local communities, while improving public health and environmental outcomes on fallowed lands.

However, the valley will still need to manage large increases in fallowed land. Trading reduces the socioeconomic costs of having less water but does not change fallowed acreage. Even with an optimistic scenario for new supplies, the valley is looking at close to half a million acres coming out of irrigated production. Large-scale land fallowing would exacerbate dust and air quality problems, increase the spread of weeds and pests, and degrade soils. It will be essential to put these lands to alternative uses that avoid these problems and generate economic and environmental benefits.[2]

According to the Department of Water Resources, approved basins in the NSJV included Eastern San Joaquin Subbasin in San Joaquin County and Merced Subbasin in Merced County. Two NSJV subbasins were deemed inadequate and are transitioning to DWR oversight. This includes the Chowchilla Subbasin in Madera and Merced counties and Delta-Mendota Subbasin in San Joaquin, Stanislaus, Merced, Fresno, Madera, and San Benito counties.[3]

Based on a review of all primary groundwater sustainability plans and key water management plans for the NSJV,

[2] https://www.ppic.org/publication/policy-brief-the-future-of-agriculture-in-the-san-joaquin-valley/
[3] CA Department of Water Resources. California Advances Groundwater Sustainability with Release of Decisions for Management Plans in Critically Over drafted Basins. https://water.ca.gov/News/News-Releases/2023/March- 23/California-Advances-Groundwater-Sustainability-with-Release-of-Decisions-for-Management-Plans

the primary concerns facing the main groundwater subbasins in San Joaquin County, Merced County, and Stanislaus County, California include the following:

- Groundwater overdraft: One of the significant concerns in these areas is the unsustainable extraction of groundwater, leading to a negative groundwater balance. Over pumping can result in long-term declines in groundwater levels and reduction in water availability.
- Water quality*:* Contamination of groundwater with pollutants, such as agricultural chemicals, industrial waste, and urban runoff, is a major concern. Ensuring the quality of groundwater resources is crucial for drinking water supplies, agricultural irrigation, and ecosystem health.
- Land subsidence: Excessive groundwater pumping can cause land subsidence, which is the sinking or settling of the Earth's surface. Subsidence can damage infrastructure, such as levees, canals, roads, bridges, and buildings, and can also impact the capacity of aquifers to store water. Subsidence can also increase a region's vulnerability to flooding in low lying areas.
- Surface water-groundwater interaction: Managing the interaction between surface water and groundwater is important for maintaining a sustainable water supply. Surface water diversions, irrigation practices, and groundwater pumping can affect the availability and flow of both surface water and groundwater.
- Regulatory compliance and groundwater management: Implementing effective groundwater management practices and complying with regulatory frameworks, such as the Sustainable Groundwater Management Act (SGMA) in California, is essential. It involves coordination among stakeholders, setting sustainable groundwater pumping limits, and developing long-term management plans.
- Ecosystem impacts: Groundwater plays a crucial role in supporting natural ecosystems, including wetlands, rivers, and streams. Unregulated groundwater extraction can lead to reduced base flow, habitat degradation, and impacts on native plant and animal species.

These concerns highlight the importance of sustainable groundwater management practices, monitoring programs, and collaborative efforts among stakeholders to protect and ensure the long-term viability of groundwater resources in these subbasins.

Environmental Threats:
Environment threats can be categorized mainly under, drought, floods, wildfires, sea level rise and earthquake risk.

Drought

Recurring drought is one of the most significant threats in the NSJV region. California's climate normally varies between dry and wet years. Changing patterns driven by climate change will intensify both wet and dry years and increase the risk of drought through back-to-back dry seasons.

Longer drought periods will impact the NSJV region in several ways. Increased drying and shrinking of the ground under roads can cause asphalt cracking which can damage transportation infrastructure and cause transit delays. Drought can also increase the vulnerability of soil and ground to erosion during heavy rain or flood events. It is also possible that drought could lead to lower water levels in some parts of the Delta, which could impact ship's ability to use stationary docking. Finally, increased drought also increases regional vulnerability to other climate hazards such as wildfires.[4]

Flooding

Warm heavy to moderate rainfall, known as "pineapple express" or atmospheric rivers may become more frequent with climate change. Additionally, melting from heavy snowfall in the Sierra Mountain Range can cause the river levels to rise significantly. In both instances, this can lead to flooding throughout the complex levee system and river system in

[4] San Joaquin Council of Governments Climate Adaptation and Resiliency Study. April 2020. P 54. https://www.sjcog.org/DocumentCenter/View/5355/SJCOGAdaptationReport_4220?bidId=

the NSJV.

Wildfire Risk

The eastern and western edges of the NSJV remain highly vulnerable to wildfires where the terrain backs into the coastal ranges to the west and the Sierra Nevada Ranges to the East.

Sea level rise (SLR)

Sea level rise (SLR) will continue to impact both coastal communities as well as some inland areas throughout the state of California. In some parts of the Delta, this will be made more complex due to ground subsidence – research conducted by the Delta Stewardship Council found that continued land subsidence may increase the relative rate of locally observed sea level change for the Delta area when comparing water levels to local land elevations.[5] Of the three county NSJV region, negative impacts of SLR will be felt most acutely in San Joaquin County.

Earthquake Threat

While the NSJV is not known for seismic activity, most of California is at risk for earthquakes due to major active fault lines such as the San Andreas, Hayward, and Calaveras faults. Risks include damage to buildings, infrastructure, and roads, as well as cracking and damage to dams and levees. As such, Local Hazard Mitigation Plans across the NSJV region consider the threat of seismic activity in both emergency planning as well as infrastructure development. Specific risk assessments vary based on the hypothetical epicenter of an earthquake as well as the degree of shaking. While both Merced and Stanislaus counties include some assessment of the estimated cost of damages due to ground shaking,[6/7] in the case of San Joaquin County, 2023 updates to the local hazard plan omit earthquakes from consideration, noting that while the County has a history of seismic activity, the likelihood and magnitude of a significant incident are minimal.[8]

Economy and Technological Challenges

The region's industrial historical and present reliance on agriculture and agricultural processing, and a fast-growing, more recent domination of the transportation and warehousing sector are mixed challenges and opportunities. Both these sectors pose job quality challenges, since they are largely made up of low-skilled, low-wage labor. These sectors present opportunities to spawn related tradable industries, but in the meantime, the economy lacks diversity, making it susceptible to economic shocks from various sources. The manufacturing sector is dominated by food processing. And the large employment base in agriculture results in high seasonal unemployment and contributes to overall higher rates of unemployment compared to other regions and the state.

Public Health, Safety and Disparity

Quality of life in the NSJV region is affected by water quality from nitrates in the ground, air pollution from large particulate matters and other agricultural pollutants from orchards and farms, as well as forest fires. These and other factors are among those that decrease the lifespan of residents living in the area.

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[5] Delta Stewardship Council. Delta Adapts: Creating a Climate Resilient Future. 2021. P47-49. https://deltacouncil.ca.gov/pdf/delta-plan/2021-01-15-delta-adapts-public-draft-vulnerability-assessment.pdf

[6] Stanislaus County. Local Hazard Mitigation Plan. 2016. P 64. https://stanoes.com/pdf/lhmp/2017-lhmp.pdf

[7] Merced County. Local Hazard Mitigation Plan. 2016. P 90. https://web2.co.merced.ca.us/pdfs/oes/MercedCounty-MJHMP-2021-2016.pdf

[8] San Joaquin County. Local Hazard Mitigation Plan. 2023. P 40. https://www.sjgov.org/docs/default- source/covid-19/2023-lhmp-final-approved.pdf?Status=Master&sfvrsn=f64fc505_3

Agricultural pollutants act as one of the main threats in the Valley leading to major health problems such as asthma, various forms of cancer and cardiovascular disease. Smog emitted from internal combustion engines (ICE) is a major structural threat. Health disparities on issues like access to health care, chronic disease management that exist among different cultural, ethnic, and racial groups threaten the wellbeing of the resident population and influx from the coastal region.

Trains and trucks that pass through NSJV constitute a potential threat like the explosions that have occurred in the east creating many environmental and health problems for the residents. One of the most dangerous freeways in the nation, CA 99, is a threat to human lives with fatal accidents occurring almost daily.

Low educational attainment levels, housing displacement, disparities in income adjusted wages (real wages) in the NSJV relative to coastal areas are some other historically existing threats. Gentrification due to influx of population from the coastal regions is an ongoing threat. The resulting displacement of local businesses and residents is a causal effect. Increasing crime rates, substance abuse, mental and behavioral health issues seriously threaten neighborhood peace and act as a serious impediment to the economic and social wellbeing of NSJV residents.

Impact of Excessive Heat on Underrepresented Communities

The effect of increasing temperatures is felt most severely by already burdened communities. For example, as daily temperatures rise along with nightly temperatures (e.g. the number of annual warm nights), communities can't rely on the ability to open windows at night to cool down interior temperatures. This means that residents without air conditioning many have few other resources available to stay cool. Disinvested communities are often located in regions with less urban tree cover density, which increases the surface temperature of roads and streets. Further, lower income demographics are more likely to experience the daily impact of extreme temperatures as they are more likely to be employed outside in industries such as agriculture and construction.[9]

Impact of Excessive Heat on Transportation and Infrastructure

Annual increasing temperatures and increasing extreme heat days also pose threats to transportation in the region. For example, as identified by the San Joaquin Council of Governments, extreme temperatures can cause damage to roads through asphalt and concrete cracking, and damage to rail systems by causing tracks to buckle. Heat can also hinder air travel as planes may not be able to take off in extremely high temperatures. Even passenger and bus transit can be disrupted due to vehicle overheating. Given the region's reliance on agriculture and distribution, threats to transportation pose serious problems for long term economic sustainability.[10]

[9] EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. Appendix E – Temperature Mortality. P 5-6. U.S. Environmental Protection Agency, EPA 430-R-21-003. www.epa.gov/cira/social- vulnerability-report; https://www.epa.gov/system/files/documents/2021-09/appendix-e_temp-mortality.pdf

[10] San Joaquin Council of Governments Climate Adaptation and Resiliency Study. April 2020. P6; P 53. https://www.sjcog.org/DocumentCenter/View/5355/SJCOGAdaptationReport_4220?bidId=

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