CALIFORNIA CENTRAL COAST SUSTAINABLE FREIGHT STUDY

Executive Summary

AUGUST 2, 2024

California Central Coast Sustainable Freight Study

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prepared for

Association of Monterey Bay Area Governments

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1.0 PLAN PURPOSE AND OVERVIEW

The Central Coast region is one of the most important agricultural production areas in the country and is known for its production of fresh produce and wine grapes. Beside agriculture, it has significant clusters of freight-dependent industries – including manufacturing and food processing. These industries rely on the multimodal freight network to serve their customers. However, the region's freight network has been faced with a host of challenges related to safety, congestion, reliability, and others that threatens the continued economic prosperity of the Central Coast. These challenges must be addressed to ensure the region's continued economic competitiveness.

1.1 Purpose of the Sustainable Freight Study

The California Central Coast Sustainable Freight Study (Sustainable Freight Study) serves as the long-term blueprint for addressing the region's challenges and for guiding its freight investments. It followed an approach, grounded in data but informed by the firsthand experiences of stakeholders, to assess the region's freight-related needs and challenges. The Sustainable Freight Study defines a comprehensive set of strategies for improving the performance of and reducing the negative impacts of the regional goods movement system while capitalizing on development opportunities. Additionally, it provides an implementation plan that outlines the action steps, potential funding sources, and planning level cost estimates needed to execute the recommendations.

1.2 Vision and Goals

The vision for the Sustainable Freight Study reflects the 2045 Metropolitan Transportation Plan's vision. That vision emphasized the importance of setting the region on a path towards a sustainable and resilient future, enabled by the development of equitable transportation solutions that will improve the lives of all current and future Monterey Bay Area residents.

VISION

As a national source for key agricultural products, manufacturing, retail, and other freight products, the California Central Coast strives to have one of the State's most innovative, economically-competitive multimodal freight network that is efficient, reliable, modern, integrated, resilient, safe, and sustainable, where benefits are realized by all while supporting equity, healthy communities and a thriving environment.

Defining goals was a critical first step for determining the strategic direction of the Sustainable Freight Study. Goals and objectives establish the means to measure and manage performance. The goals of overarching regional and statewide long-range plans serve as the foundation for the Sustainable Freight Study's goals. Specifically, the Sustainable Freight Study's goals and objectives were developed to align with those goals and objectives defined in the 2045 Metropolitan Transportation Plan (MTP), California Freight Mobility Plan, Climate Action Plan for Transportation Infrastructure (CAPTI), and the California Transportation Plan (CTP).

MULTIMODAL MOBILITY
Implement a long-range freight strategy for the Central Coast Region in alignment with State planning priorities that promotes strategic investments to maintain, enhance and modernize the multimodal freight transportation system.

SUSTAINABILITY
Reduce greenhouse gas emissions by optimizing integrated network efficiency to reduce vehicle miles of travel, congestion and idling, and by expanding Zero Emissions Vehicle (ZEV) infrastructure and access to funding for ZEV medium- and heavy-duty trucks.

ECONOMIC PROSPERITY
Maintaining and growing the economic competitiveness of the California Central Coast's freight sector through increases system efficiency, productivity, and workforce preparation while improving livability and the environment.

ENVIRONMENTAL STEWARDSHIP
Advance our understanding of climate risks and areas of vulnerability on the transportation network while supporting strategies that reduce, avoid, and/or mitigate adverse environmental impacts caused by the movement of goods.

HEALTHY COMMUNITIES
Promote healthy communities across California's Central Coast by reducing freight-generated air quality, noise, and safety impacts by working towards implementation of clean transportation technologies, land use policies that support sustainable industrial development, circulation policies that minimize truck operations near sensitive receptors, and electrified truck parking and loading provisions that reduce idling in communities.

EQUITY
Advance equity in California's Central Coast communities by mitigating existing impacts of incompatible industrial uses near historically disadvantaged communities, establishing local land use and mobility "good neighbor" compatibility policies for industrial development in historically disadvantaged neighborhoods, avoiding the development of affordable housing near major freight generators or major freight transportation corridors, and creating opportunities for local hire.

SAFETY AND RESILIENCY
Reduce freight-related deaths/injuries and improve system resilience by addressing infrastructure vulnerabilities associated with security threats, effects of climate change impacts, and natural disasters.

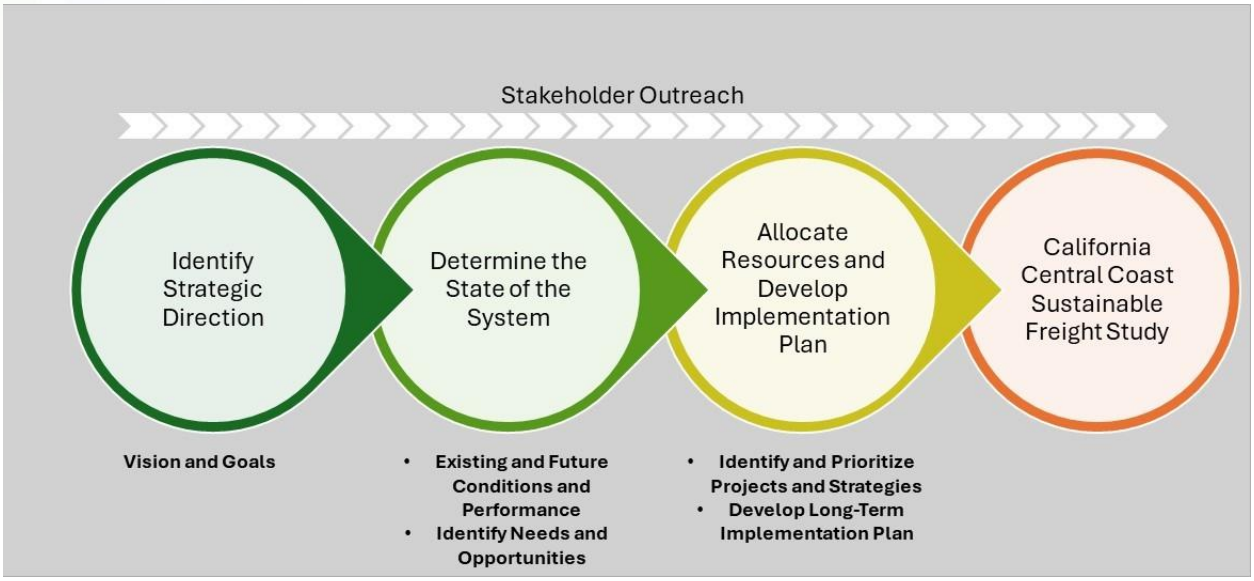
ASSET MANAGEMENT
Maintain and preserve infrastructure assets per the State Highway System Management Plan (SHSMP), the California Asset Management Plan, and other applicable state and federal statutes and regulations.

CONNECTIVITY AND ACCESSIBILITY
Provide Transportation choices and improve system connectivity for all freight modes.

1.3 Approach to Developing the Plan

The Sustainable Freight Study utilized a data-driven, stakeholder-informed approach to identifying priorities, needs, and recommendations for the Central Coast region. Figure 1 shows the approach for developing the Sustainable Freight Study. These tasks resulted in a series of technical memorandums documenting the findings of each analysis phase.

Figure 1 Sustainable Freight Study Approach



Source: Cambridge Systematics.

1.4 Stakeholder Engagement

Stakeholder engagement was critical throughout the development of the Sustainable Freight Study to ensure that freight issues experienced by residents, businesses, community leaders, and other stakeholders were identified and addressed. Stakeholder engagement as part of the Sustainable Freight Study was designed to identify freight mobility concerns through engagement with key partner agencies, local governments and their constituencies, and the California Central Coast business community, most notably the agricultural businesses. Public meetings conducted in each of the five counties coupled with phone interviews provided meaningful input to project processes and outcomes. As a result, there were many stakeholders in both the public and private sectors that contributed valuable knowledge and insight into the update of this plan.

Among stakeholders, the Central Coast Working Group (CCWG) was one of the most important in guiding the Sustainable Freight Study outcomes. The CCWG served as the steering committee for the Sustainable Freight Study provided critical input and feedback throughout the study. The CCWG included representatives from the California Department of Transportation (Caltrans), Association of Monterey Bay Area Governments (AMBAG), Santa Cruz County Regional Transportation Commission (SCCRTC), Council of San Benito County Governments (SBCOG), Transportation Agency for Monterey County (TAMC), San Luis Obispo Council of Governments (SLOCOG), and Santa Barbara County Association of Governments (SBCAG).

2.0 FREIGHT IN THE CENTRAL COAST REGION

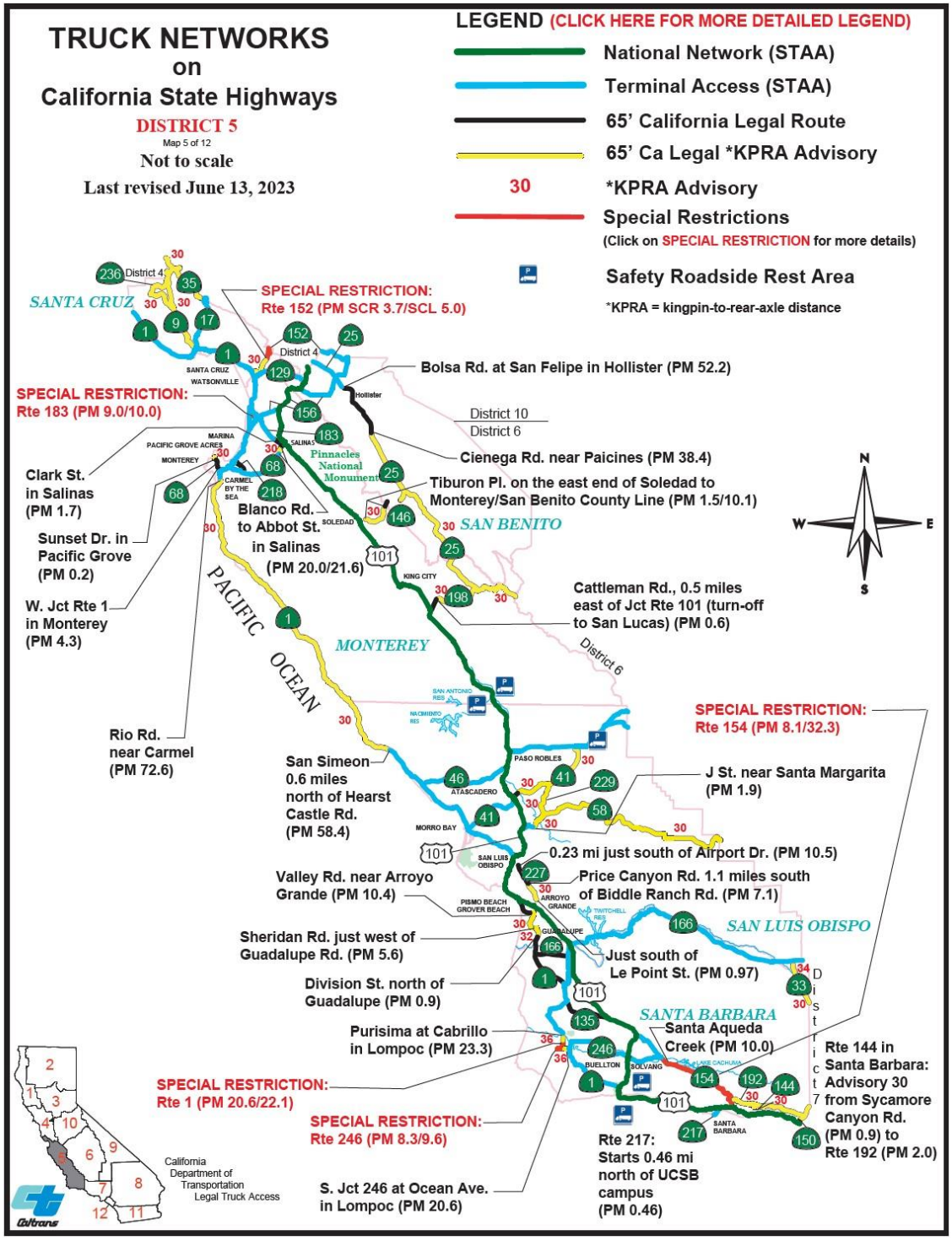
In the Central Coast region, freight moves through a transportation system that includes multiple modes. The region is served by a Class I railroad, multiple shortline railroads, and four commercial service. The region's roadway network connects all these assets to provide access to origins or destinations of goods within and beyond the region.

2.1 Multimodal Freight Network

2.1.1 Highways

The roadway network provides a critical connection between users and producers of goods throughout the region, state, the nation, and the world. The Central Coast region's highways are a vital part of the multimodal freight network as they carry the majority of freight traffic and connect the region to international gateways outside the region such as the Port of Oakland. The region's highway freight network is comprised of approximately 28,000 miles of roadways, 1,226 bridges, 12 truck parking facilities, and several intelligent transportation system (ITS) devices that work to manage traffic and improve safety and mobility.

Figure 2 Caltrans District 5 Truck Routes



Source: Caltrans.

2.1.2 Rail

There is approximately 488 track miles of rail in the Central Coast region. Freight railroads are categorized as Class I, Class II, or Class III based on their annual revenues.[1] Class I railroads are the largest, and generally include those operators that carry freight longer distances across state lines and into other regions of the United States or internationally into Canada and Mexico. Class III railroads are commonly referred to as shortlines and primarily act as last-mile connectors between Class I railroads and the ports, manufacturing facilities, and other industrial properties they serve.

The region is served by one Class I railroad, Union Pacific (UP), and two Class III railroads, the Santa Maria Valley Railroad (SMVRR) and the Santa Cruz, Big Trees & Pacific Railway (SCBG). Union Pacific's tracks run parallel to U.S. 101 through much of the region and is shared with Amtrak for its Coast Starlight service. Of the approximately 488 track miles of rail in the region, Union Pacific owns 85 percent.

The SMVRR is a 14-mile-long shortline operating in the Santa Maria Valley and interchanging with UP in Guadalupe.[2] It primarily transports goods associated with the agricultural, manufacturing, and retail industry sectors. The Betteravia Industrial Park in Santa Barbara County is a major transload location for the line. The SCBG is primarily a tourist railroad, but also hauls some freight – primarily lumber.[3]

2.1.3 Air

Air cargo has a significant role in the multimodal freight network as it provides the fastest service for long-distance shipments of goods. The high service quality provided by air cargo results in higher shipping costs for this mode. As a result, air cargo tends to be limited to high-value and low-weight goods such as medical supplies, flowers, and electronics.

There are four commercial airports in the Central Coast region: Monterey Peninsula Airport, San Luis Obispo Regional Airport, Santa Maria Public Airport, and the Santa Barbara Municipal Airport. Monterey Peninsula Airport provides some minor cargo services, shipping and offloading 625,000 pounds of UPS and FedEx packages between October 2022 and November 2023. The Central Coast is also served by cargo airports in nearby regions such as the Norman Mineta San Jose International Airport and the Fresno Yosemite International Airport.

2.2 Freight Demand

The needs of the Central Coast region's freight system are driven by both the current and future demand for freight transportation. Overall, in 2022 about 117 million tons of commodities worth $146 billion were transported to, from, and within the Central Coast Region. In 2050, the estimated total freight tonnage will

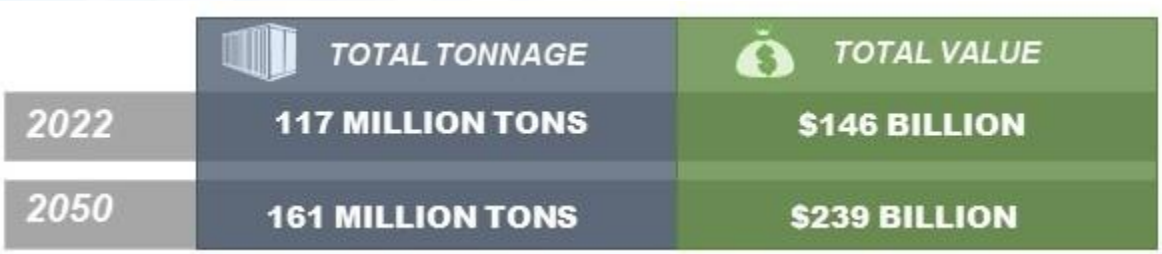
[1] Current Surface Transportation Board thresholds establish Class I carriers as any carrier earning revenue greater than $943.9 million, Class II carriers as those earning revenue between $42.4 million and $943.9 million, and Class III carriers as those earning revenue less than $42.4 million (https://www.stb.gov/reports-data/economic-data/).

[2] https://www.smvrr.com/

[3] https://www.up.com/customers/shortline/profiles_q-s/scbg/index.htm

reach 161 million tons, valued at $239 billion, representing a 38 percent increase in weight and a 64 percent increase in value.[4]

Figure 3 Freight Demand in the Central Coast, 2022 and 2050



Source: FAF5; Cambridge Systematics.

California stands as the foremost state in the U.S. for food manufacturing and agriculture, and within the state, the Central Coast is one of California's most significant agricultural regions. Figure 4 and Figure 5 show that for the base year of 2022 and the forecast year of 2050, respectively, the top commodities transported over the region's multimodal freight network include goods such as other prepared foodstuffs, agricultural products, animal feed and other products of animal origin, non-metallic mineral products, and crude petroleum, among others. That other prepared foodstuffs and agricultural products represent top ten commodities by both tonnage and value, demonstrates how essential the agricultural sector is to the regional economy and is dependent on the freight network.

[4] Note that though the 2016 U.S. 101 Central Coast California Freight Strategy reported a higher total tonnage of freight demand for the region, the results presented here should not be interpreted as a decrease in demand. The 2016 study used a provisional version, as opposed to a final version, of the Freight Analysis Framework (FAF) as that was the most recent data at the time. In addition, the 2016 study used version 3.5 of the FAF while this report uses version 5.1, which incorporates methods and data that were previously unavailable.

Figure 4 Top 10 Commodities by Tonnage and Value, 2022

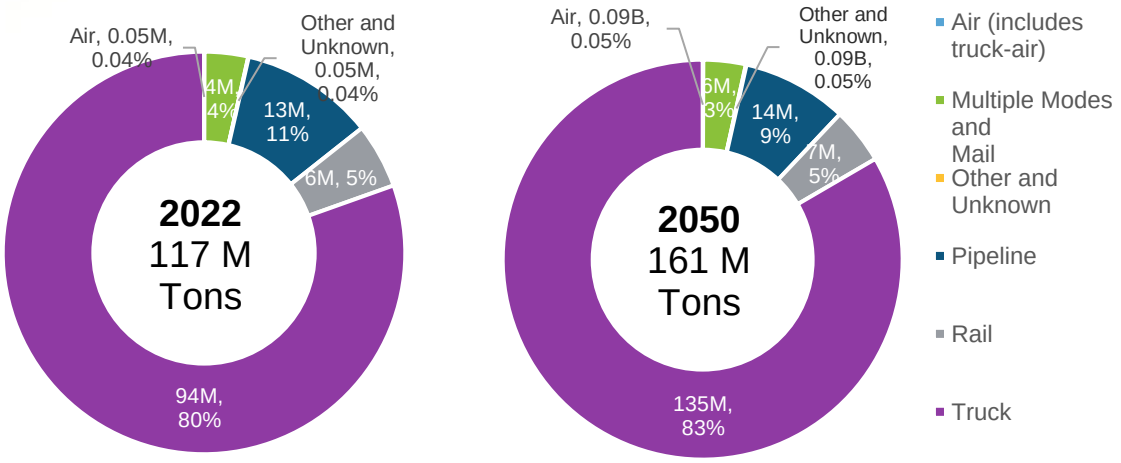
Source: FAF5; Cambridge Systematics.

Figure 5 Top 10 Commodities by Tonnage and Value, 2050

Source: FAF5; Cambridge Systematics.

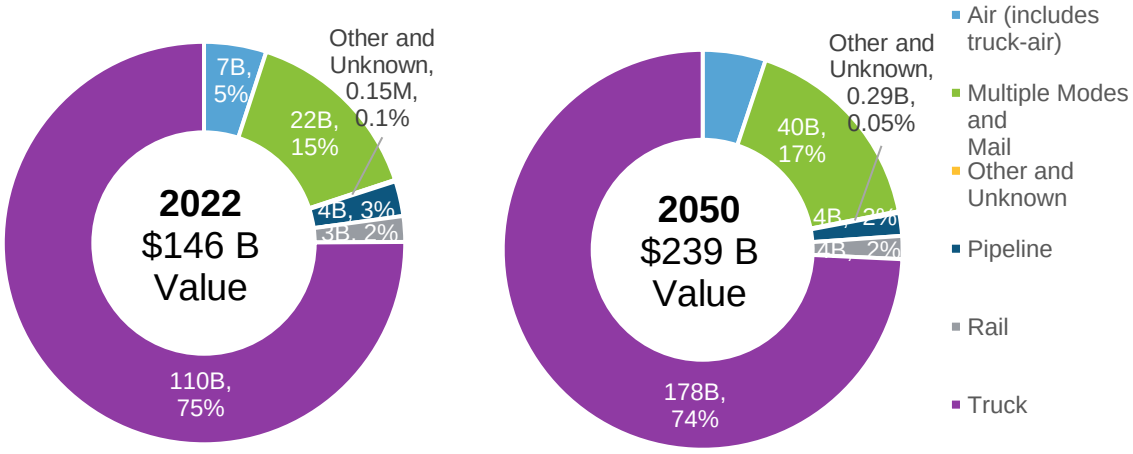
Figure 6 and Figure 7 show freight demand by mode in terms of tonnage and value for 2022 and 2050. Trucks carry the majority of freight both in terms of tonnage and value. In 2022, 94 million tons of goods (valued at $110 billion) were transported via truck. This represents nearly 80 percent of the total tonnage and 75 percent of the total value for that year. The second leading mode by total tonnage was pipeline, carrying 13 million tons of goods in 2022. Despite its substantial share of total tonnage, the value of goods transported via pipeline was relatively low at $4 billion – roughly 3 percent of total value in 2022. Rail ranked third, transporting approximately 6 million tons of goods (5 percent of total tonnage) valued at around $3 billion. Remaining modes comprised less than 5 percent of total freight tonnage. However, in terms of value, the 4 million tons of freight moved by multiple modes corresponded to $22 billion – 15 percent of total value. The 50,000 tons of goods transported by air accounted for $7 billion in value.

Figure 6 Freight Tonnage by Mode, 2022 and 2050



Source: FAF5; Cambridge Systematics.

Figure 7 Freight Value by Mode, 2022 and 2050



Source: FAF5; Cambridge Systematics.

3.0 FREIGHT SYSTEM ASSESSMENT

The Central Coast region's multimodal freight network contributes significantly to its economic prosperity. However, the network faces multiple needs and challenges that limits its ability to further contribute to the region's success. These needs and challenges are summarized in Table 1. These needs and opportunities were determined through data analysis and stakeholder engagement, which was a vital part of understanding needs as it allowed for feedback from users who interact with the freight system regularly. As freight demand is projected to grow substantially over the long-term, the region's freight needs will be exacerbated unless actions are taken now. To this end, these needs and opportunities served as the basis for the recommendations and strategies proposed as part of Sustainable Freight Study.

Table 1 Summary of Needs

Need Area	Description
Congestion and Reliability	» Multiple freight routes exhibit high levels of congestion or unreliable travel times. This hinders the mobility of freight, adds cost to shippers, and negatively impacts the communities reliant on freight-dependent industries.
Infrastructure Conditions	» Poor pavement conditions are dispersed throughout the region's freight corridors. These conditions can result in increased costs for motor carriers and negatively impact the safety of drivers.
Freight Network Connectivity	» At-grade rail crossings contribute to access challenges for farmland and agricultural facilities. In particular, the prevalence of at-grade crossings along certain segments of the U.S. 101 contributes to congestion, reliability, and safety challenges on that corridor. » Limited east-west roadway connectivity hinders freight mobility and accessibility throughout the region. The lack of east-west routes (combined with poor performance on existing routes) impacts the ability of freight shipments to reach critical north-south corridors including U.S. 101, I-5, and the Union Pacific railroad.
Safety	» Multiple corridors that are critical to freight mobility exhibit high crash rates. » Some at-grade rail crossings have experienced multiple crashes over the past ten years. » At-grade rail crossings and at-grade driveways/intersections on U.S. 101 contribute to safety challenges for trucks accessing farmland and agricultural facilities. » The region lacks truck parking capacity, which impacts the safety of truck drivers and the traveling public.
Resiliency	» Several of the region's freight assets are at risk to disruption from sea level rise, flooding, and wildfires.
Equity	» Federal- and state-designated disadvantaged communities are disproportionately impacted by goods movement in the Central Coast, particularly in terms of safety and congestion.

Source: AMBAG; Cambridge Systematics; Fehr and Peers.

3.1 Congestion and Reliability

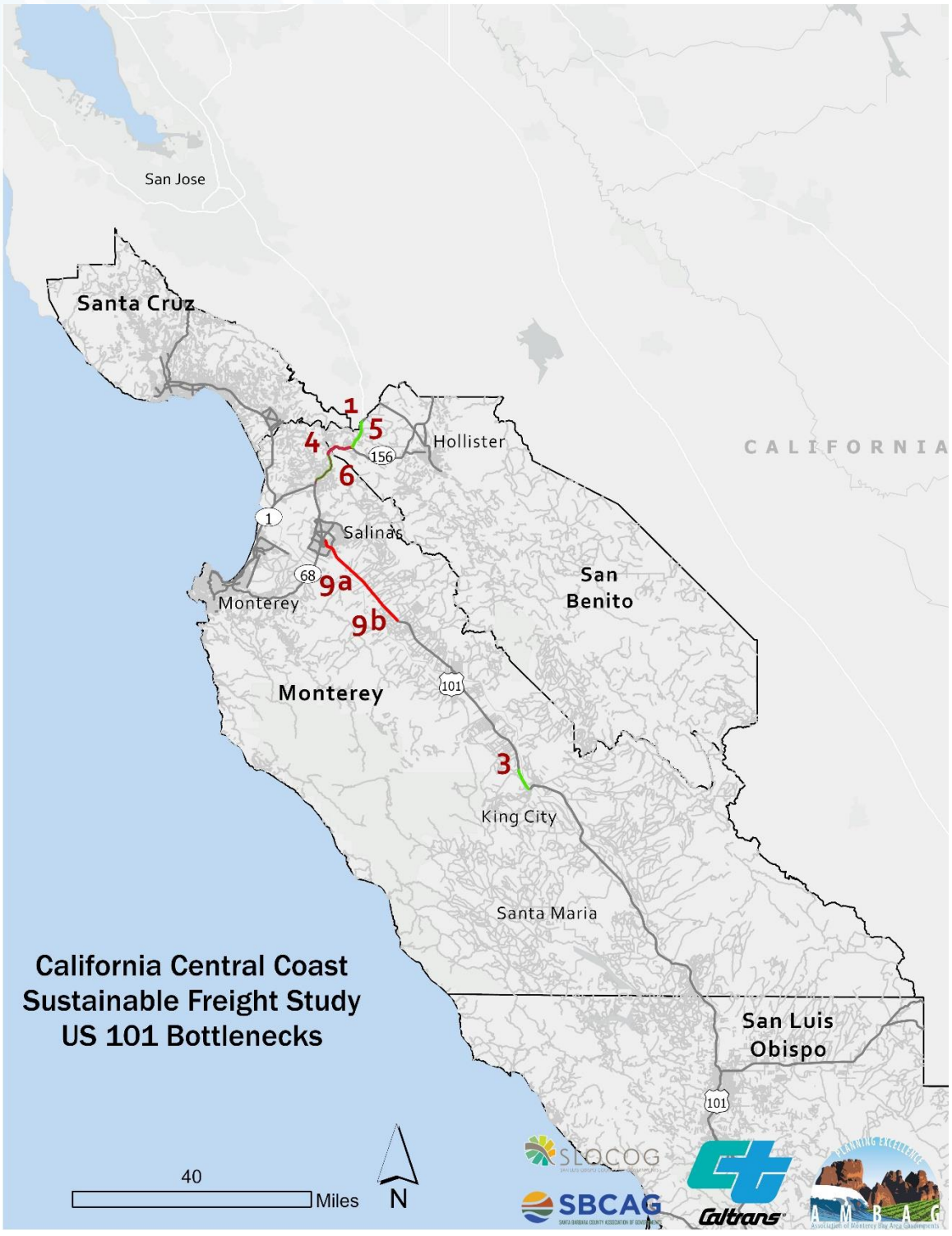
Fast and reliable truck transportation is critical to modern supply chains and the companies that rely on them. The ability of the Central Coast region to support these supply chains impacts economic development opportunities and quality of life across the region. As a result, addressing needs related to congestion and unreliability was a crucial element of the Sustainable Freight Study. Using data of truck volumes and average truck travel times, the top ten bottlenecks on U.S. 101 were identified. They are listed in Table 2 and shown in Figure 8 and Figure 9. The worst ranked freight bottleneck in the Central Coast is U.S. 101 Southbound from SR 129 in San Benito County to Dunbarton Rd. in Monterey County. That portion of U.S. 101 experiences approximately 6,314 truck-hours of delay annually.

Table 2 Top Ten U.S. 101 Freight Bottlenecks

Rank	Location	Length (mi)	Counties
1	U.S. 101 SB from SR 129 to Dunbarton Rd.	6.0	San Benito and Monterey
2	U.S. 101 SB from Tefft St. to SR 166	7.0	San Luis Obispo
3	U.S. 101 SB from Central Ave. to Jolon Rd.	2.8	Monterey
4	U.S. 101 SB from Dunbarton Rd. to San Miguel Canyon Rd.	4.3	Monterey
5	U.S. 101 NB from SR 156 to 0.5 miles north of Betabel Rd. Interchange	3.7	San Benito
6	U.S. 101 NB from Vierra Canyon Rd. to SR 156	8.4	Monterey and San Benito
7	U.S. 101 NB from Donovan Rd. to SR 166	3.8	Santa Barbara and San Luis Obispo
8	U.S. 101 NB from Santa Ynez Ave. to Ortega Hill Rd. On-Ramp	4.7	Santa Barbara
9a	U.S. 101 NB from Spence Rd. to Kern St. On-Ramp	6.5	Monterey
9b	U.S. 101 NB from Alta St. On-Ramp to Spence Rd.	8.1	Monterey
10	U.S. 101 NB from Wineman Rd. (north of SR 166) to Thompson Rd./Los Berros Rd.	6.5	San Luis Obispo

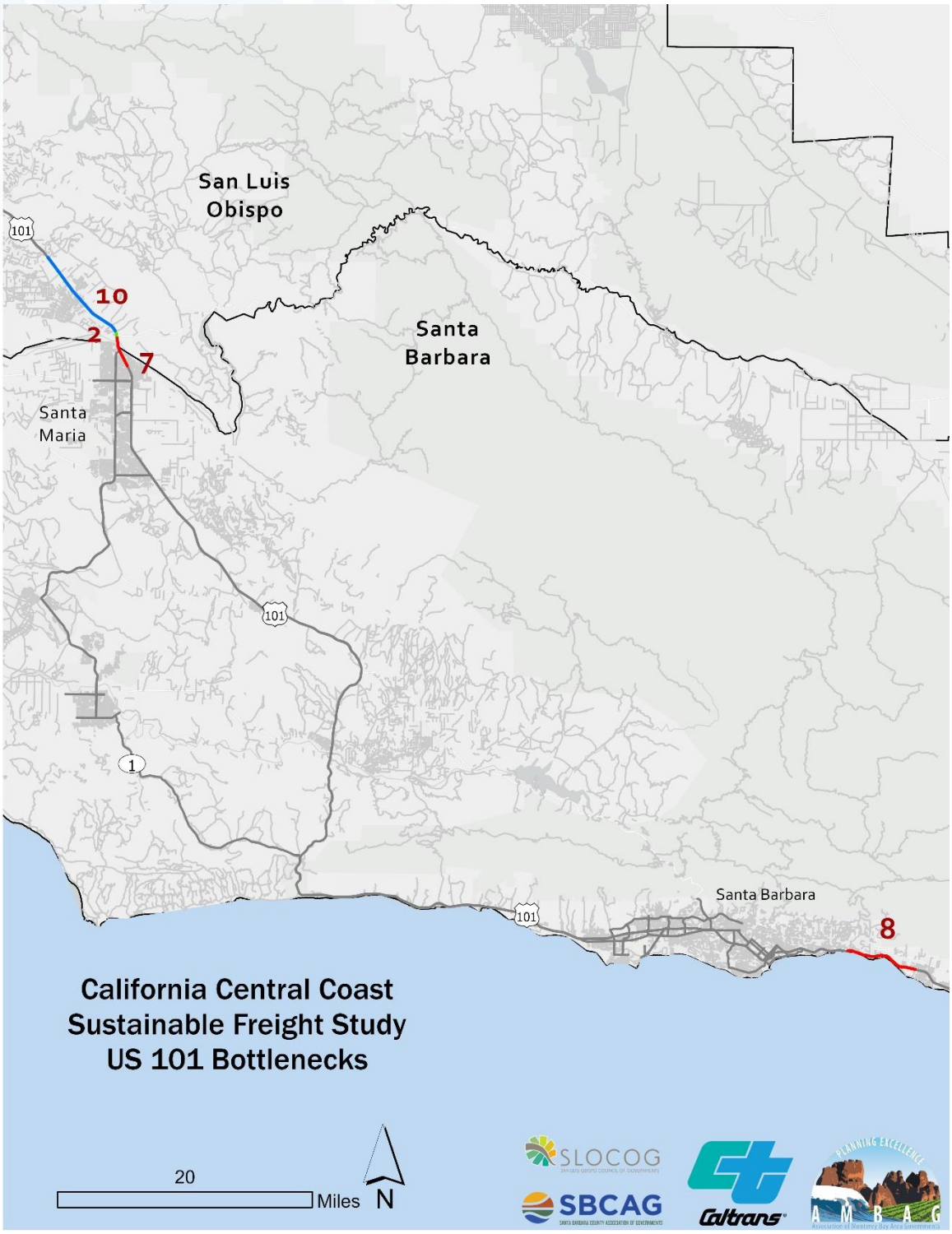
Source: National Performance Management Research Data Set; Cambridge Systematics.

Figure 8 Top Ten U.S. 101 Freight Bottleneck – North Central Coast



Source: National Performance Management Research Data Set; Cambridge Systematics.

Figure 9 Top Ten U.S. 101 Freight Bottleneck – South Central Coast



Source: National Performance Management Research Data Set; Cambridge Systematics.

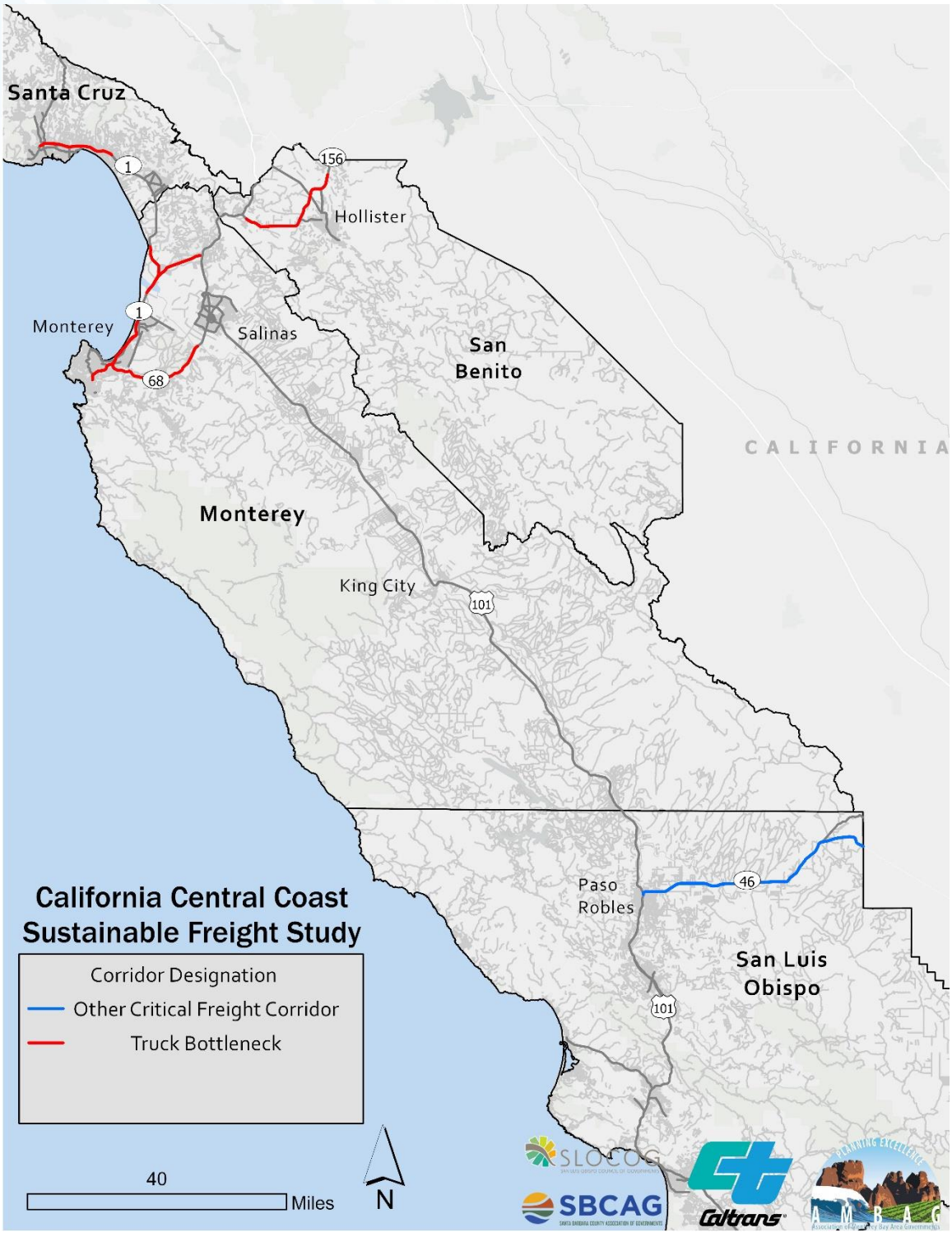
In addition to U.S. 101, bottlenecks on other corridors important for goods movement were identified. The bottlenecks are listed in Table 3 and depicted in Figure 10. Bottlenecks were identified on several of the region's primary east-west corridors – including SR 156, SR 46, and SR 68.

Table 3 Other Central Coast Truck Bottlenecks

Location	Length (mi)	Counties
SR 1 SB from Emilene St. to State Park Dr.	7.1	Santa Cruz
SR 1 NB from Rio Del Mar Blvd. to Commercial Way	6.2	Santa Cruz
SR 156 NB/SB between SR 1 and U.S. 101	5.8	Monterey
SR 1 NB/SB between Dolan Road and Del Monte Blvd. (North)	6.3	Monterey
SR 1 NB from Sloat Ave./Old Golf Course Rd. to Del Monte Blvd.-Reindollar Ave. Intersection	10.6	Monterey
SR 1 SB from Sloat Ave./Old Golf Course Rd. to Carpenter St.	10.5	Monterey
SR 68 EB/WB between SR 1 and Reservation Rd./River Rd.	13.4	Monterey
SR 156 NB/SB between Fairview Rd. and Lucy Brown Rd.	14.5	San Benito
SR 46 EB/WB between U.S. 101 and San Luis Obispo-Kern County Line	75.1	San Luis Obispo
SR 166 between U.S. 101 and San Luis Obispo-Santa Barbara-Kern County Lines	64	San Luis Obispo and Santa Barbara Counties

Source: National Performance Management Research Data Set, 2022; Cambridge Systematics.

Figure 10 Freight Bottlenecks



Source: National Performance Management Research Data Set; Cambridge Systematics.

3.2 Infrastructure Conditions

Poor pavement conditions can impact the cost and safety of travel for passengers and freight. Cracked and rutting roadway surfaces can cause additional wear and tear on freight vehicles as well as damage the goods they are transporting. They can also result in increased travel times and negatively impact safety if drivers maneuver into other lanes to avoid potholes or other condition-related hazards. Building and maintaining the freight network to a condition that facilitates the efficient movement of goods is a critical regionwide need.

About 84 percent of the region's pavements may be considered to be in Good to Fair condition. Poorer pavements are largely concentrated on the region's non-freeway/non-expressway principal arterials. These include corridors such as SR 1 in Santa Cruz County, SR 156 in San Benito County, SR 68 in Monterey County, SR 46 in San Luis Obispo County, and SR 1 in Santa Barbara County.

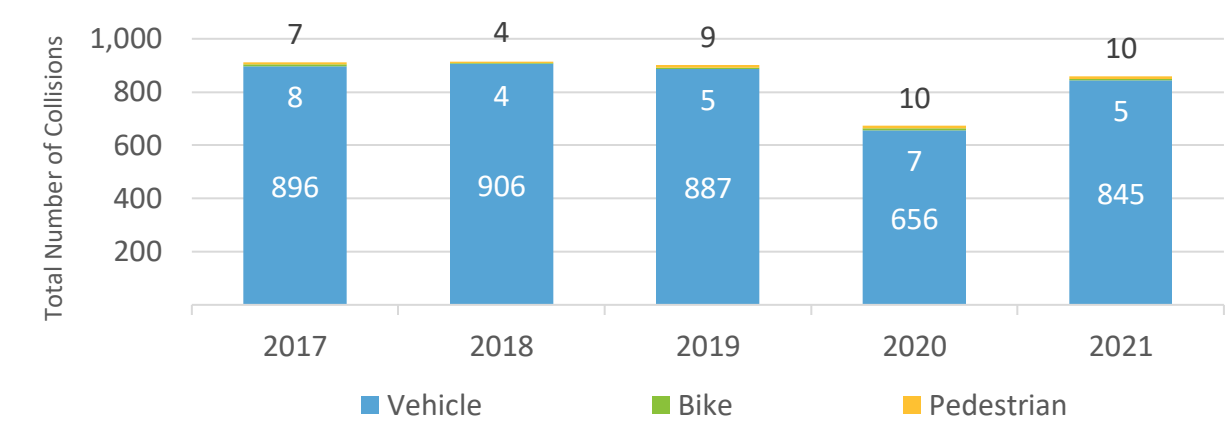
In addition to pavements, bridge conditions are also important to consider from a freight mobility perspective. Bridges that cannot handle typical truck sizes or weights may contribute to congestion and lead to significant re-routing as trucks find alternative detours. If a truck cannot pass over a bridge and does not have a close alternative route, the detour can prove costly in both time and money. Bridge conditions in the Central Coast region are primarily good as approximately 91 percent of the region's bridges were rated as being in Good to Fair condition.

3.3 Safety

Transportation safety is extremely important and is one of the highest priorities at all levels of transportation planning and engineering – national, statewide, regional, and local. Understanding freight safety and related performance is a critical component necessary for addressing frequency and severity of incidences and the overall impact they have on congestions and delays within the overall multimodal freight network.

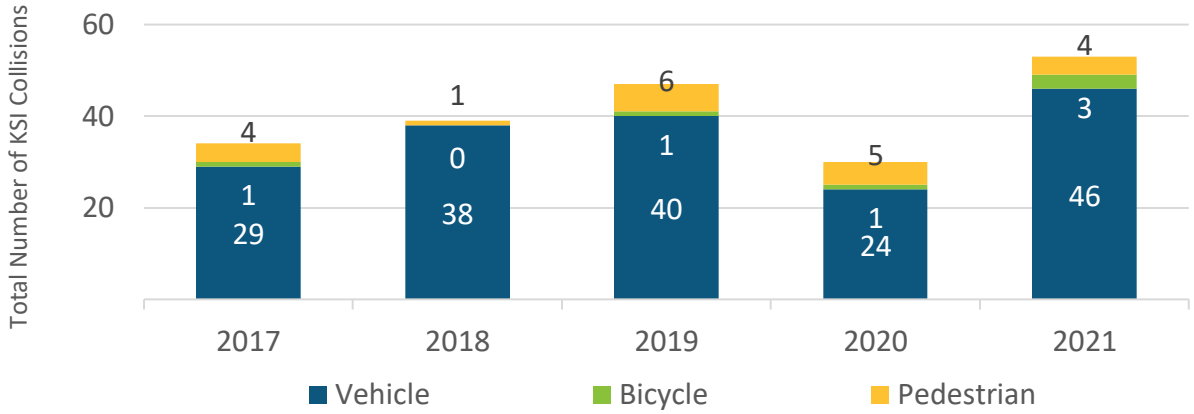
From 2017 to 2021, there were 4,259 total truck-involved collisions as shown in Figure 11. Figure 12 shows that among total truck-involved collisions, 203 (or 5 percent) included victims who were killed or severely injured (KSI). On average, thirteen people are killed year in truck-involved collisions each year in the California Central Coast. Overall, the number of truck-involved collisions across the region have declined in the last five years. However, KSI truck-involved collisions have steadily increased.

Figure 11 Truck-Involved Collisions by Year, 2017-2021



Source: Statewide Integrated Traffic Record System; Fehr & Peers.

Figure 12 Truck-Involved KSI Collisions by Year, 2017-2021



Source: Statewide Integrated Traffic Record System; Fehr & Peers.

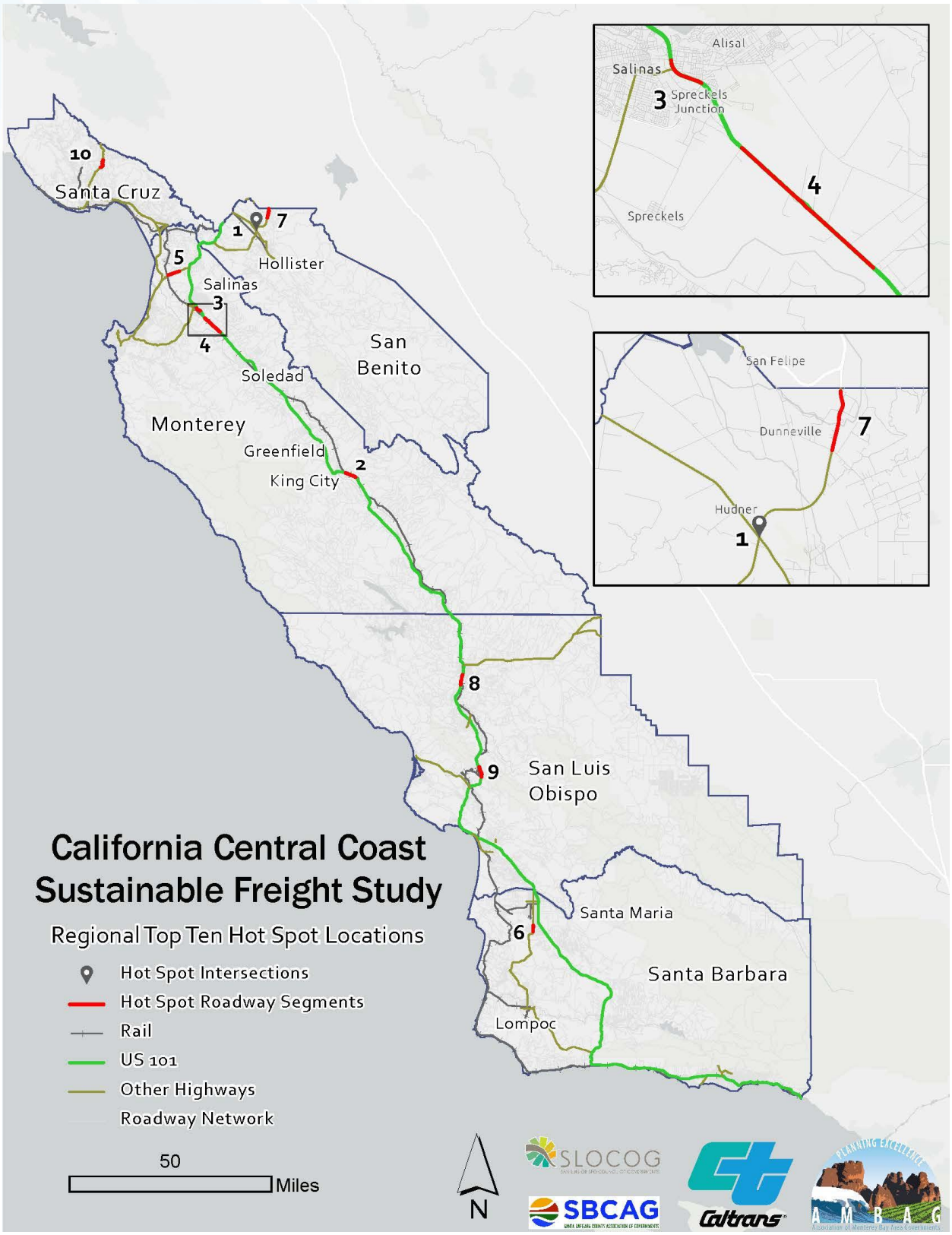
Hot spot analysis is a traditional safety approach that identifies high-risk locations based on collision history. Locations that account for a disproportionate share of collisions are identified as hot spots. The analysis identified the top ten locations in the region with the highest density of collisions resulting in severe injury or fatalities, and locations with the highest Weighted Collision Score, as shown in Figure 13. Additionally, the top three “hot spot” locations in each county are included, as shown in Table 4.

Table 4 Truck-Involved Collision Hot Spot Locations, 2017-2021

Top 10 Rank	Collision Hot Spot Locations	Length (mi.)	Collisions		Disadvantaged Community
			Total	KSI	
Santa Cruz County					
10	SR 17 between Vine Hill Road and Eagle Crest Drive	1.8	4	2	-
-	SR 129 between SR 1 and Lakeview Road	3.7	6	3	State & Federal
-	SR 1 and Main Street between San Andreas Road and Green Valley Road	6.4	10	3	-
Monterey County					
2	U.S. 101 between King City and Welby	2.3	6	5	-
3	U.S. 101 between Alisal Street and Sanborn Road	1.2	7	2	State & Federal
4	U.S. 101 between Harris Road and Potter Road	5.1	33	8	-
5	SR 156 between Castroville Boulevard and Oak Hills Drive	2.9	11	4	Federal
San Benito County					
1	Signalized Intersection of SR-156 & SR-25	-	17	4	Federal
7	SR-156 between Fairview Road and Barnheisel Road	2.3	5	3	Federal
-	U.S. 101/SR 156 between Chittenden Road and Rocks Road	3.2	10	3	-
San Luis Obispo County					
8	U.S. 101 between Niblick Road and Volpi Ysabei Road	2.6	11	3	-
9	U.S. 101 between West Cuesta Ridge Trailhead and Old Stage Coach Road	2.6	9	3	-
-	SR-46 between Davis Road and Antelope Road	4.7	8	5	-
Santa Barbara County					
6	SR-135 between Foster Road and Clark Avenue	3.0	11	3	Federal
-	U.S. 101 between Micheltorena St and Milpas Street	1.6	5	2	-
-	U.S. 101 between Los Carneros Road and San Marcos Pass Road	6.2	16	2	State

Source: Truck-Involved Injury Collisions from Transportation Injury Mapping System (TIMS), 2017-2021.

Figure 13 Top Ten Truck-Involved Collision Hot Spots, 2017-2021



Source: Truck-Involved Injury Collisions from Transportation Injury Mapping System (TIMS), 2017-2021.

3.4 Resiliency

The 2023 California Freight Mobility Plan (CFMP) observed that "resilience in the state's freight system is needed for California to meet its growing needs for efficient freight mobility, as well as to help meet challenges presented by California's changing climate and human threat landscape impacts." Transportation investments to improve resiliency are needed to prevent extreme weather events from resulting in faster deterioration of infrastructure, increased system disruptions, and a loss of economic competitiveness. The 2023 CFMP identified the implications of climate change for the resiliency of the State's multimodal freight network. Those potential outcomes are relevant for the Central Coast and are summarized in Table 5.

Table 5 Key Findings Adapted from California's Fourth Climate Change Assessment to Include Potential Impacts to Freight Systems

Climate Stressor	Future Change	Impacts to Freight
Temperature	**By 2100:** Estimated 5.6°to 8.8° increase in daily temperature	Increase in daily temperatures can lead to hotter warehouses and damage to truck tires and engines. Workers will need more protections from overheating (e.g., access to air conditioning, more frequent breaks, and shorter shifts).
Water	**By 2050:** Water supply from snowpack is projected to decline by two-thirds	Agricultural shortages could arise from the limited water supply, which would change patterns of freight from California's Central Valley to more reliance on food imports from other countries.
Wildfire	**By 2100:** Average land area burnt will increase by 77 percent	Road closures from damaged highways could results in freight trucks needing to be rerouted to other highways that may be further away, thus increasing delivery and shipping costs and times.
Sea Level Rise	**By 2100:** » 31%-67% of Southern California beaches may completely erode » $17.69 billion worth of residential and commercial buildings could be inundated statewide » The number of highway miles exposed to coastal flooding will triple	Inundation could cause relocation of container yards, commercial buildings, and warehousing, especially those found in coastal areas that have not Implemented adaptation measures. Impacts from sea level rise are projected to inhibit operations and accessibility for rail and vehicular facilities at all of California's ports. Flooding of highways will lead to road closures which could affect the trucking industry.

Source: Caltrans, California Freight Mobility Plan 2023.

While all of the climate stressors presented in Table 5 are relevant for the Central Coast, wildfires, sea level rise, and flooding are of particular concern.

- **Wildfires.** From 2017 to 2022 California experienced some of the most devastating fires in its history. These fire events interrupted freight rail and roadway mobility and closed freight-related

businesses. Figure 14 shows areas where there is an increased risk for wildfires associated with utilities such as overhead utility power lines and aerial communication facilities near power lines.[5]

- **Sea Level Rise.** Due to its geography, the Central Coast region's freight network will be susceptible to sea level rise in the future. Areas along the coast such as Elkhorn Slough, the Salinas River, and Castroville and Moss Landing (see Figure 15) are most susceptible to sea level rise, with only one foot of additional sea level enough to inundate most of these locations. However, sea level rise will not only affect areas of the Central Coast region closest to the ocean but inland areas as well, due in part to the potential for ocean water to enter drainage systems and cause flooding in areas far away from the ocean. The National Oceanic and Atmospheric Administration (NOAA) Center for Operational Oceanographic Products and Services estimates that the sea level around the Central Coast will increase between 1 to 6.25-feet between 2020 and 2100. [6]

- **Flooding.** Union Pacific railroad infrastructure has been impacted on multiple occasions by flooding and storm surge. In March 2023, flooding in the Watsonville area resulted in embargoed freight shipments as the route was impassable.[7] Washouts from heavy rail during this period forced Union Pacific to take track out of service from Santa Barbara to San Luis Obispo. Union Pacific has also had several instances of track closures in Santa Barbara County due to storm surge.[8]

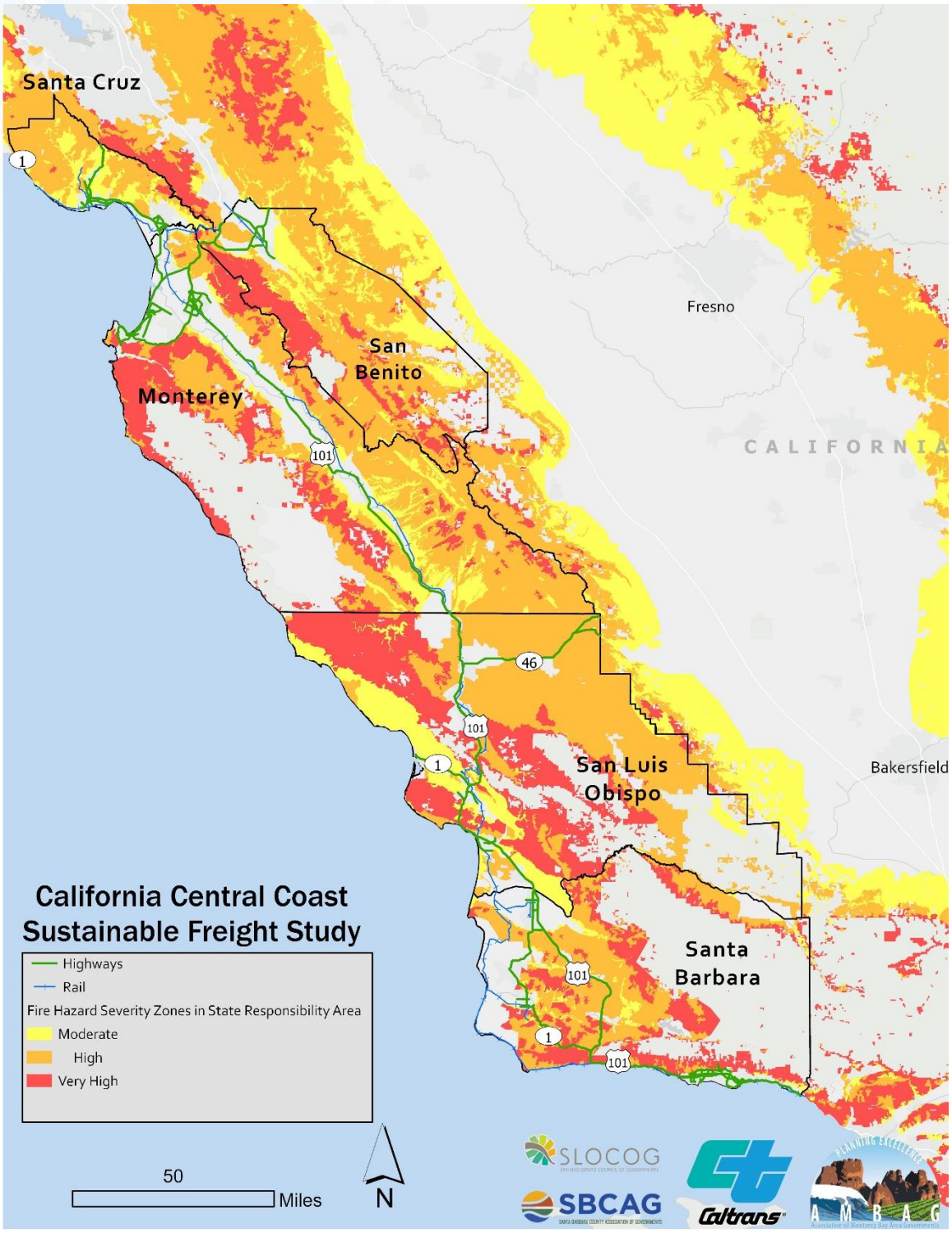
[5] https://www.cpuc.ca.gov/industries-and-topics/wildfires/fire-threat-maps-and-fire-safety-rulemaking

[6] https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=9413450#tab50yr

[7] https://www.up.com/customers/announcements/customernews/generalannouncements/CN2023-19.html

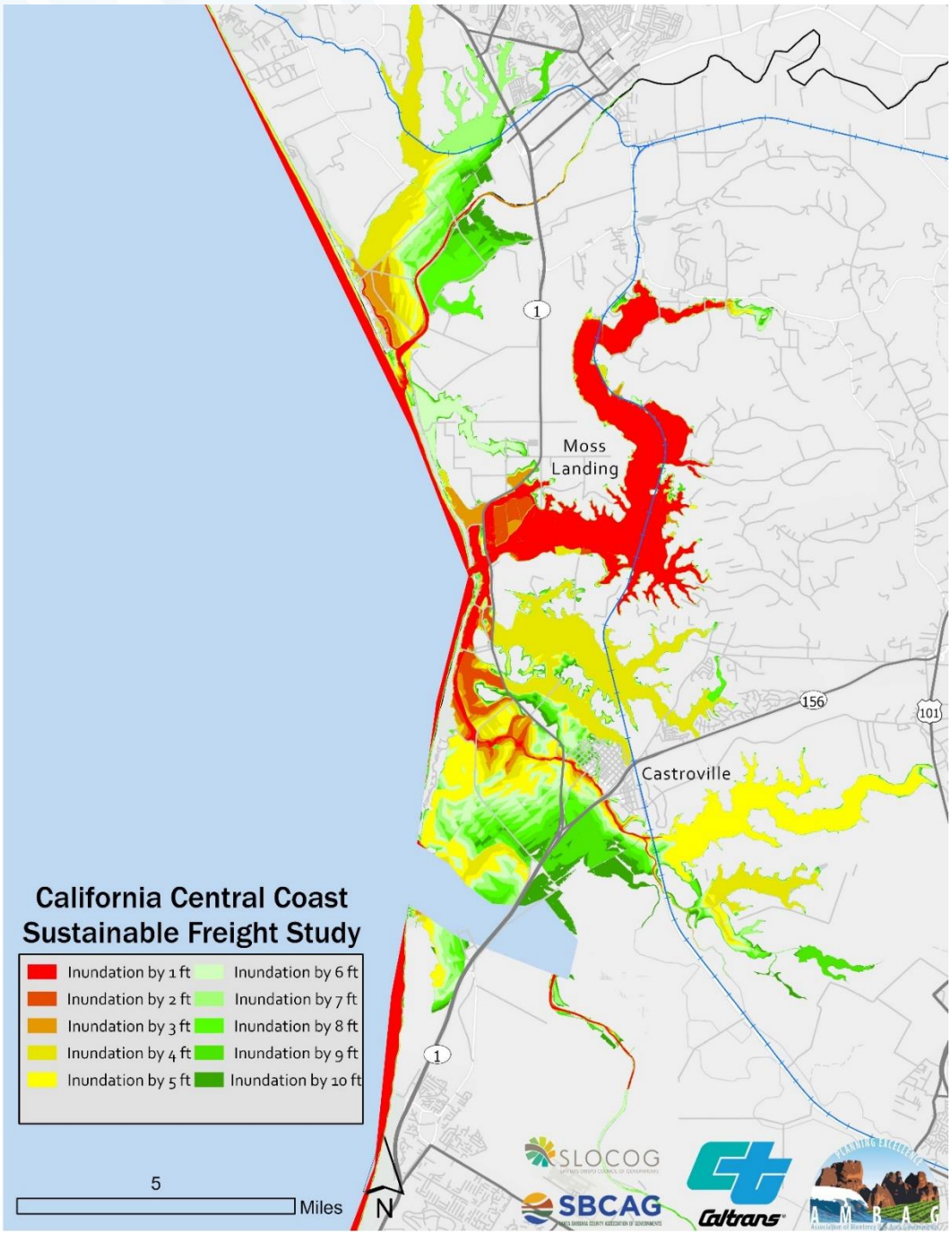
[8] https://www.independent.com/2023/01/11/planes-trains-and-automobiles-santa-barbara-gets-mostly-moving-again-after-storm/

Figure 14 Fire Risk Exposure



Source: California Public Utilities Commission, 2021.

Figure 15 Sea Level Rise Exposure –Moss Landing and Castroville



Source: National Oceanic Atmospheric Administration, 2022.

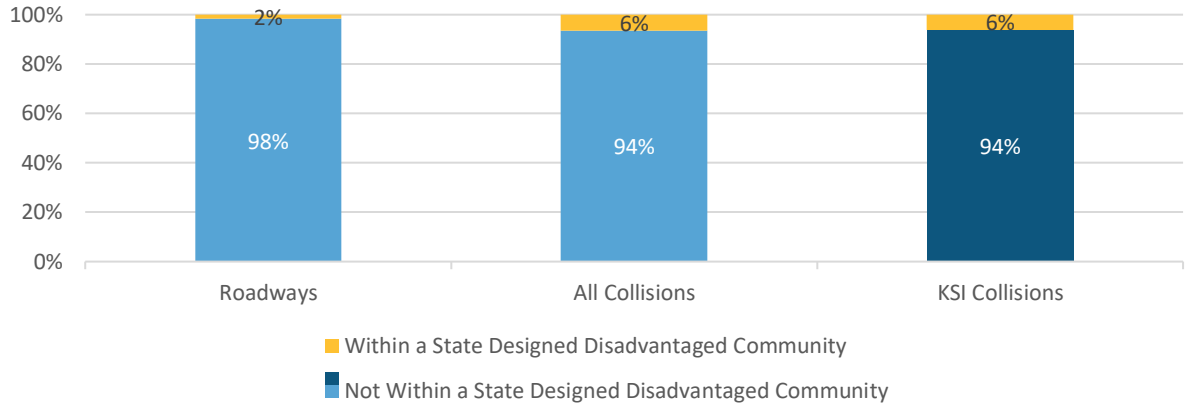
3.5 Equity and Community Impacts

Freight transportation brings positive and negative impacts to a community. Job creation and access to goods can improve quality of life, while exposure to pollutants and noise can be harmful to health outcomes. Increased traffic due to freight activity may also impact crash rates or severity, especially if

facilities are not designed to accommodate the mixing of freight, passenger, and non-motorized traffic. Transportation equity seeks fairness in mobility and accessibility to meet the needs of all community members[9]. A core tenet of transportation equity is ensuring that the benefits and burdens of the transportation system are equitably distributed.

On average, Historically Disadvantaged Communities[10], Areas of Persistent Poverty[11], and other State-designated equity focus areas[12] [13] experience higher levels of freight-related congestion than other parts of the Central Coast region. In addition, though only about 2 percent of the region's roadway miles are within an equity focus area, federally designated disadvantaged communities represent 23 percent of all truck-involved collisions and 20 percent of truck-involved collisions resulting in a fatality or serious injury. Furthermore, half of the region's top ten hotspots for truck-involved collisions overlap a federal- or State-designated disadvantaged community.

Figure 16 State Designated Disadvantaged Communities, 2017 – 2021



Source: Statewide Integrated Traffic Record System; Fehr & Peers.

[9] FHWA, Transportation Planning and Capacity Building. Transportation Equity. https://www.planning.dot.gov/planning/topic_transportationequity.aspx.

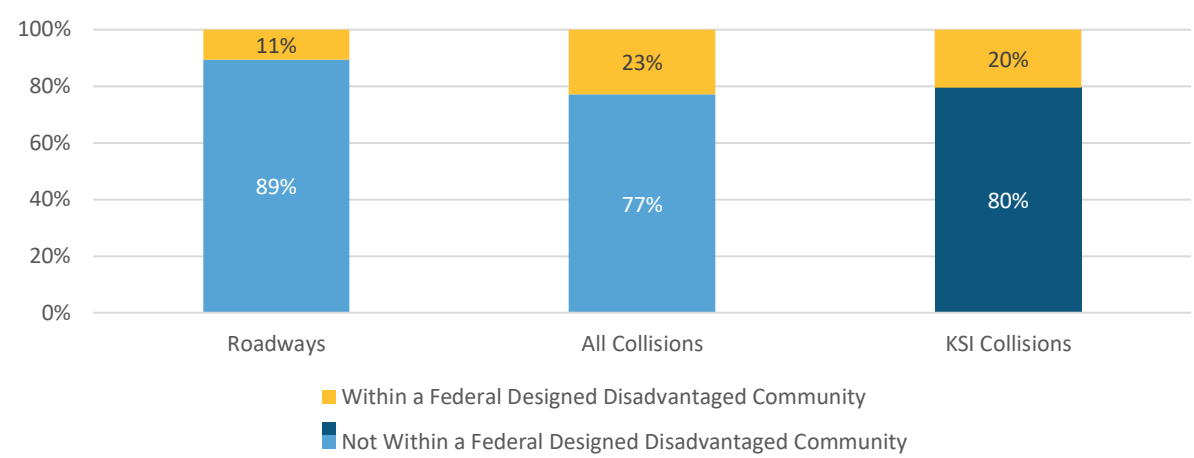
[10] Memorandum for the Heads of Executive Departments and Agencies, Memorandum No. M-23-09 (2023). https://www.whitehouse.gov/wp-content/uploads/2023/01/M-23-09_Signed_CEQ_CPO.pdf

[11] Ibid.

[12] CalEnviroScreen 4.0 Report, 2021. https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf.

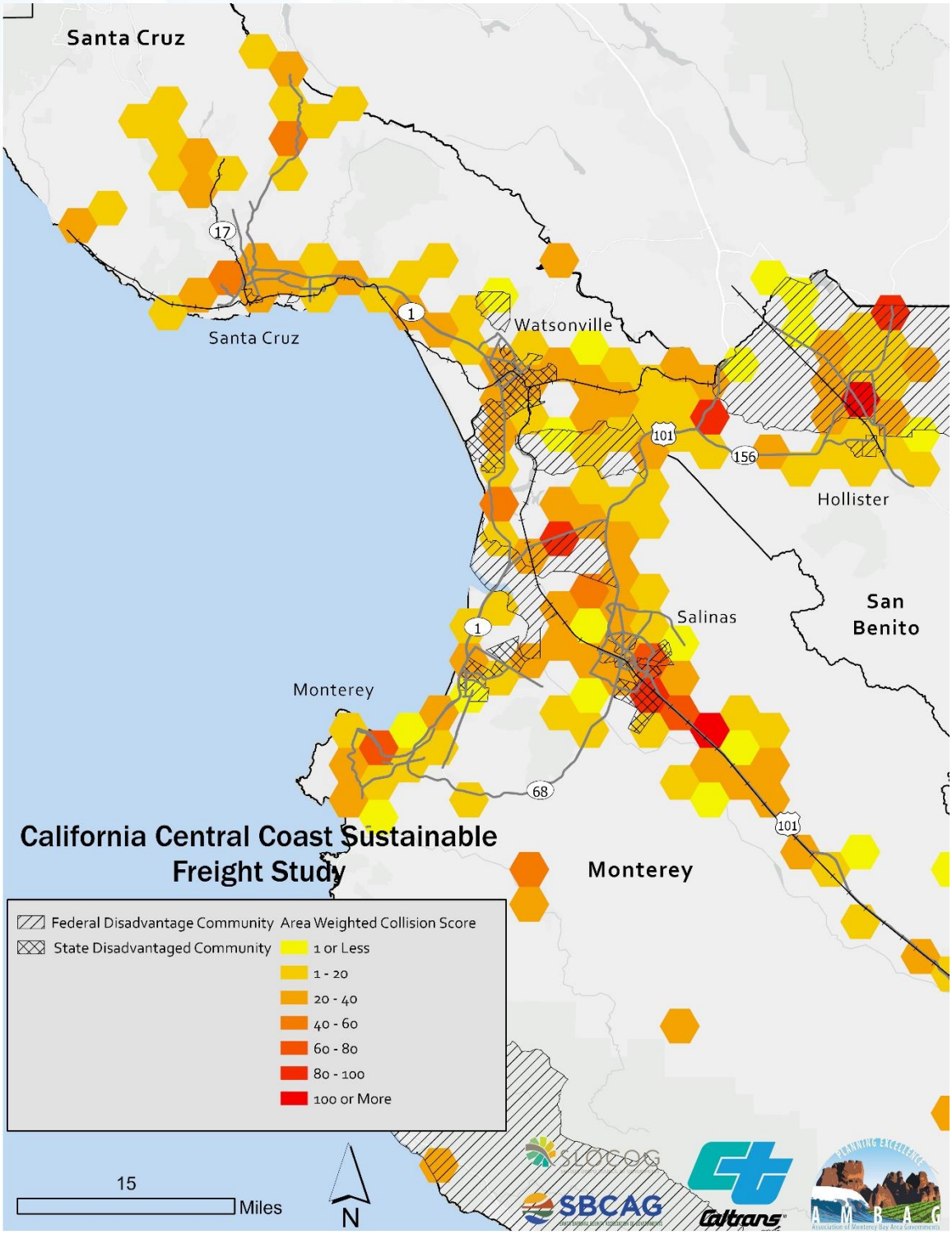
[13] Caltrans Transportation Equity Index (EQI), https://dot.ca.gov/programs/esta/race-equity/eqi.

Figure 17 Federal Designated Disadvantaged Communities, 2017 - 2021



Source: Statewide Integrated Traffic Record System; Fehr & Peers.

Figure 18 2017-2022 Truck-Involved Collisions and Equity Focus Areas - North Central Coast



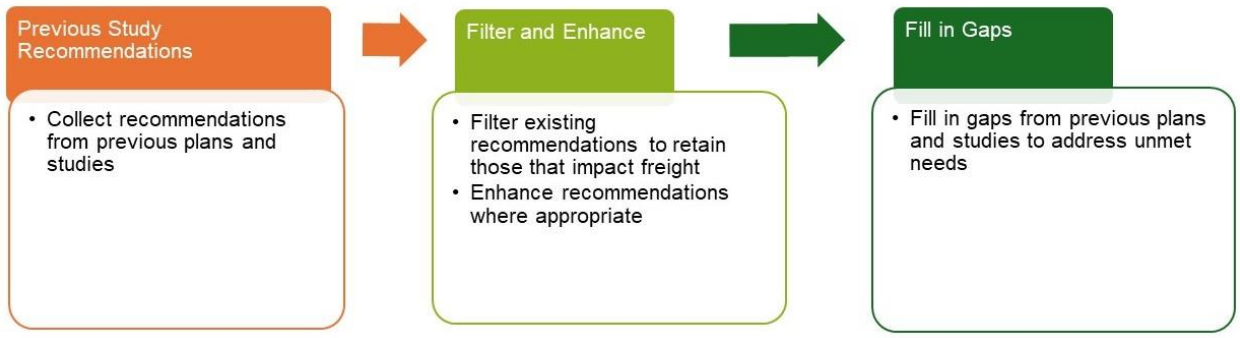
Source: Caltrans; Fehr and Peers.

4.0 STRATEGIES AND RECOMMENDATIONS

4.1 Project Identification and Alternatives Evaluation

The Sustainable Freight Study's recommendations and strategies were developed through stakeholder interviews, public meetings, discussions with the Central Coast Working Group, feedback from the Technical Advisory Committees of the region's MPOs, the findings of the needs assessment, and through a review of previous projects and studies. The project identification process is shown in Figure 19.

Figure 19 Project Identification Process



Source: Cambridge Systematics.

After project identification, the Sustainable Freight Study then evaluated the recommendations for the purpose of prioritizing projects. Projects were divided into tiers according to their ability to positively impact the transportation network and advance the region's freight transportation goals. Figure 20 shows the project prioritization factors and the Sustainable Freight Study goal areas they support. Generally, Tier 1 projects consist of high-impact projects that are programmed in either one of the region's Regional Transportation Improvement Programs (RTIPs) or one of the Federal Transportation Improvement Programs (FTIPs). Tier 2 projects are also high-impact but have not yet achieved the level of regional and statewide support, funding, or preliminary analysis needed to advance into the programming phase. Also, Tier 2 projects are generally located on or proximate to one of the freight bottlenecks identified in section 2 of this report. Lastly, Tier 3 projects are those that would advance the region's freight goals but would have a more modest impact on freight network level performance. However, it should be noted that many of these may be much more important from a passenger travel standpoint.

Figure 20 Project Prioritization Factors

Source: Cambridge Systematics.

Additionally, projects were separated into implementation time frames based on their potential complexity and cost. Short-term projects (0 – 5 years) are less complex and costly. Thus, they can be implemented on a shorter time frame. Mid-term projects (5-10 years) have moderate complexity and cost while long-term projects (10 years or more) are potentially very complex and costly. For projects sourced from previous initiatives, planning-level cost estimates from those efforts are reported in the Sustainable Freight Study. For newly recommended projects, planning-level cost estimates were developed as part of this effort.

4.2 Long-Term Implementation Plan

From the quantitative and qualitative analysis, the project identification process resulted in seven broad, overarching recommendations. Those seven recommendations are shown in Figure 21. Each overarching recommendation is comprised of a set of specific project, policy, and program recommendations. Project recommendations are those that make capital, operational, or technology investments on the multimodal freight network. Policy recommendations are those that provide guidelines or principles that shape the way the region approaches its freight needs. For purposes of the Sustainable Freight Study, policy recommendations also included solutions that require further study before a specific project recommendation is made. Programmatic recommendations are those that feature ongoing actions, initiatives, or activities.

Figure 21 Sustainable Freight Study Recommendations

Enhance Truck Capacity and Increase Network Connectivity	•Provide relief to existing bottlenecks and address future demand.
Operational Strategies to Improve Freight Mobility and Safety	•Enhance freight operations' ease, efficiency, and safety while minimizing network footprint impacts.
Enhance the Capacity, Operation, and Safety on the Freight Rail Network	•Ensure that shippers have access to alternative modes beside trucking and support economic competitiveness.
Adopt new Technology	•Leverage technology and information to reduce freight congestion and boost operations' mobility and efficiency.
Increase Access to Truck Parking and Charging Infrustructure	•Improve safety for truck drivers and provide solutions for areas that experience unauthorized truck parking.
Enhance Freight Network Resiliency	•Improve the freight network's ability to withstand and recover from disruptions.
Mitigate Freight Impacts on Communities and the Environment	•Mitigate the negative impacts of freight to communities and the environment.

Source: Cambridge Systematics.

5.0 CLOSING THOUGHTS

The Central Coast region has prospered in large part due to its position as one of the most important agricultural regions in the nation. In addition, it has successfully leveraged its proximity to the Silicon Valley in the north and the Los Angeles metropolitan region to the south to grow its manufacturing base as well as other industries. The region's multimodal freight network has helped to enable this success. However, the network faces challenges in the form of congestion and unreliability, resiliency, and safety, among others. The recommendations and action steps outlined in the Sustainable Freight Study are crucial to addressing these challenges and demonstrate the region's continued commitment to supporting economic development, environmental sustainability, equity, and improved quality of life for its residents and businesses.