Santa Cruz County
FIRE DEPARTMENT
California

November 2023

Long-Range MASTER PLAN

AP TRITON
VISION · INNOVATION · SOLUTIONS

Contents

Acknowledgments

AP Triton Consulting wishes to extend its sincere appreciation to each of those individuals whose contributions and assistance made this project possible.

Our sincere appreciation is extended to each of you…

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…and to each of the firefighters, officers, and support staff who daily serve the citizens and visitors of Santa Cruz County and surrounding communities.

Preface

The County of Santa Cruz engaged the services of AP Triton to conduct a Long-Range Fire Department Master Plan, inclusive of a Community Risk Assessment.

Purpose & Approach

The purpose of this study is to understand the department's position in relation to the risks the community faces today, anticipate community growth (and therefore risk growth), and recommend steps to position the department to address that growth in advance with appropriate resources and infrastructure. In short, this analysis is designed to prevent the Santa Cruz County Fire Department from lagging behind community growth, risks, and development, and to maintain or enhance service as the community grows. It also serves as an effective policymaking and budgeting tool. Knowing where and how the community will grow in the future, and what will be needed in terms of policy and budget support to address this growth well in advance, is a critical element of elected officials' deliberations.

The Triton Team analyzed the data provided by the department, as well as other sources, to determine the current levels of response performance. From this analysis, the team identified factors influencing risk and response performance, and pinpointed opportunities for delivery system improvement. This document evaluates the effectiveness of department resources and the deployment of those resources. It concludes with findings and recommendations categorized as short, medium, and long-term.

AP Triton does not expect the County and the department to implement all recommendations in the short term. Some may wait until economic conditions allow their implementation. However, all the recommendations offered chart a course to improve capability and service.

Section I-A:
EVALUATION OF CURRENT CONDITIONS

Overview of the Santa Cruz County Fire Department

In 1948, a cooperative services agreement was established between the Santa Cruz County Board of Supervisors and the California Department of Forestry & Fire Protection (CDF)—now called CAL FIRE—to provide structural fire protection to the unincorporated areas of rural Santa Cruz County. The County incurred the costs of up to seven months of winter coverage.

As a result of this "Amador" agreement, the Santa Cruz County Fire Department (SCCFD) was established. Currently, the contract continues, with CAL FIRE providing fire protection administration, support services, and operations staff. The service contract with CAL FIRE was renewed in July 2023 and will expire in June of 2024.

In Santa Cruz County, local government fire protection and emergency response are provided by incorporated cities, fire districts, volunteer agencies, or the Santa Cruz County Fire Department.

Given that Santa Cruz County falls within the CAL FIRE San Mateo-Santa Cruz Administrative Unit (CZU), the County of Santa Cruz benefits from the proximity of CAL FIRE facilities and resources essential for the management and day-to-day operation of CZU. Over 80% of Santa Cruz County's 607 square miles fall within the State's Responsibility Area (SRA). SRA is defined as: "areas of the state in which the financial responsibility of preventing and suppressing fires has been determined by the State Board of Forestry and Fire Protection to be primarily the responsibility of the state."

For many, it is difficult to distinguish between CAL FIRE and the Santa Cruz County Fire Department, but the distinction is important. The reader is encouraged to keep in mind that not all CAL FIRE resources in Santa Cruz County are paid for by the County and thus are not part of the Santa Cruz County Fire Department. The 607 square miles of SRA overlaps many of the fire district's boundaries and the unincorporated areas of the county, where the Santa Cruz County Fire Department, as the local fire service provider, is responsible for fire and emergency medical response.

Regardless of the time of year, CAL FIRE resources that are funded entirely by the state and committed to the state mission are operating in Santa Cruz County. These resources are not obligated to respond to structure fires, vehicle fires, or emergency medical calls, as that is not their mission. However, it is often the case that state-funded CAL FIRE equipment and personnel do respond, even though these emergencies are the responsibility of the local agency and the local fire service provider. CAL FIRE's response to these other types of fires and emergencies is primarily for the purpose of assisting the local government fire department and ensuring that these fires do not spread to the wildland and State Responsibility Area.

SCCFD Organizational Structure

Governance & Lines of Authority

SCCFD functions under the direction of the Santa Cruz County Fire Chief, who also serves as the CAL FIRE San Mateo-Santa Cruz Unit Chief. The Chief is accountable to the Santa Cruz County Board of Supervisors through the County's Department of General Services.

SCCFD is a combination fire department utilizing both career and volunteer personnel for emergency operations. For the purposes of this report, the term career personnel refer to full-time/paid CAL FIRE personnel contracted to provide service under the Cooperative Fire Service Agreement serving as the Santa Cruz County Fire Department. The term volunteer refers to "unpaid" Santa Cruz County Fire Department volunteer firefighters and Emergency Medical Responders. The following figure illustrates the current organizational structure of the Santa Cruz County Fire Department.

As shown, some positions are state-funded, while others are funded by Santa Cruz County. Nearly all SCCFD's command staff and upper management are state-funded.

Figure 1: SCCFD Organization Chart (Non-Peak Season)

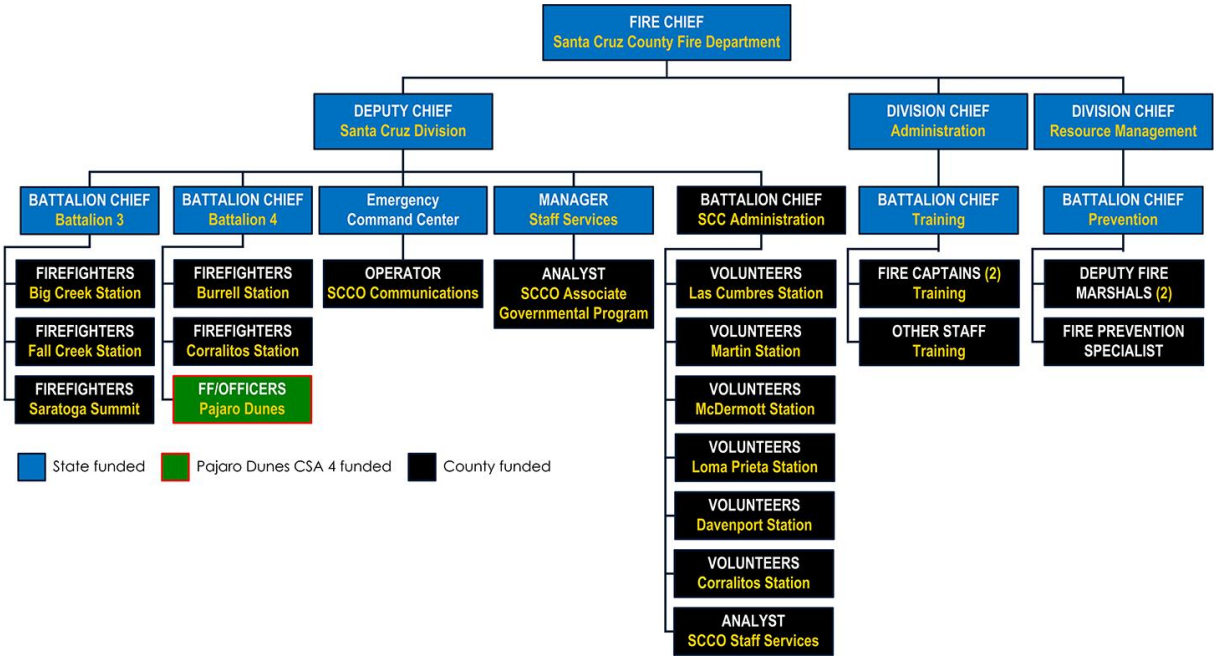
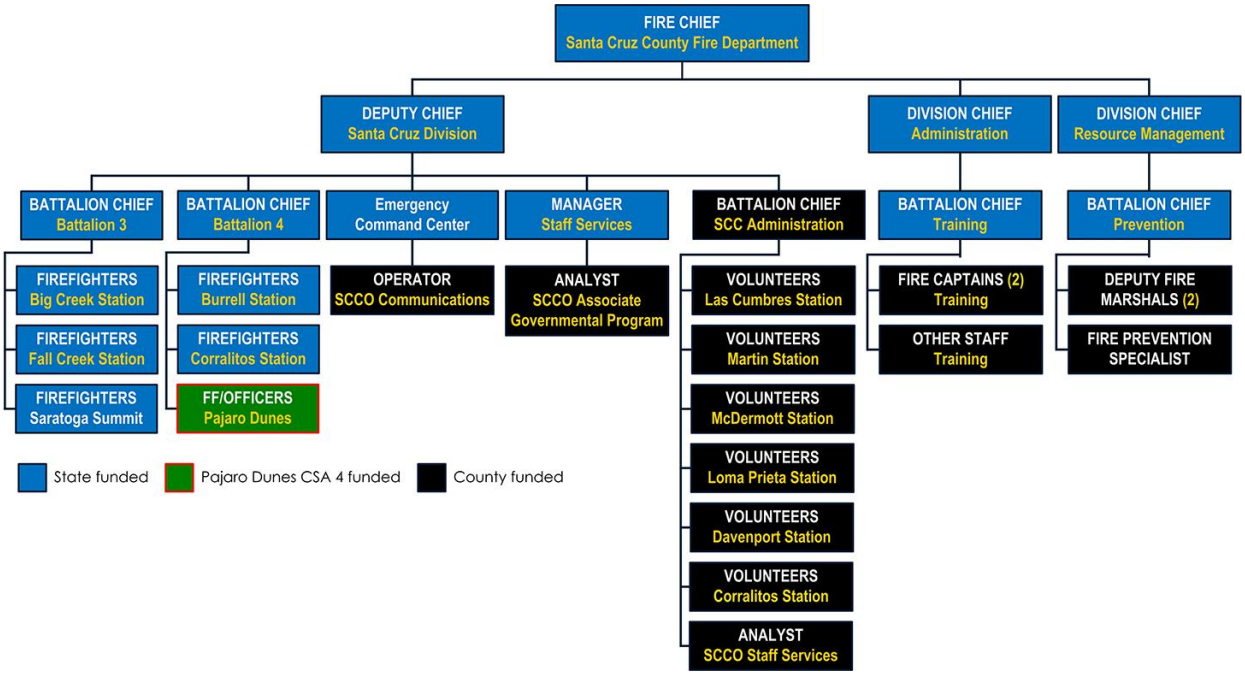


Figure 2: SCCFD Organization Chart (Peak Season)



Services Provided by the Santa Cruz County Fire Department

The Santa Cruz County Fire Department is an all-hazards public safety organization providing traditional fire protection, medical first response (MFR) at the Basic Life Support (BLS) level, technical rescue services, and hazardous materials response. In 2018, the Santa Cruz County Fire Department was assigned a Public Protection Classification (PPC®) grade of Class 4 by the Insurance Services Office (ISO).

In addition, SCCFD conducts fire inspections, plan reviews, fire-cause and arson investigations, and public education and prevention programs.

Operations & Deployment

As mentioned previously, SCCFD is a combination fire department, deploying its personnel and apparatus from 11 fire stations distributed throughout a 247 square mile service area. Of the 11 fire stations, seven are county or locally owned, with the remaining four owned by the State of California. The next figure lists the various fire stations in Santa Cruz County, who owns them, and their staffing.

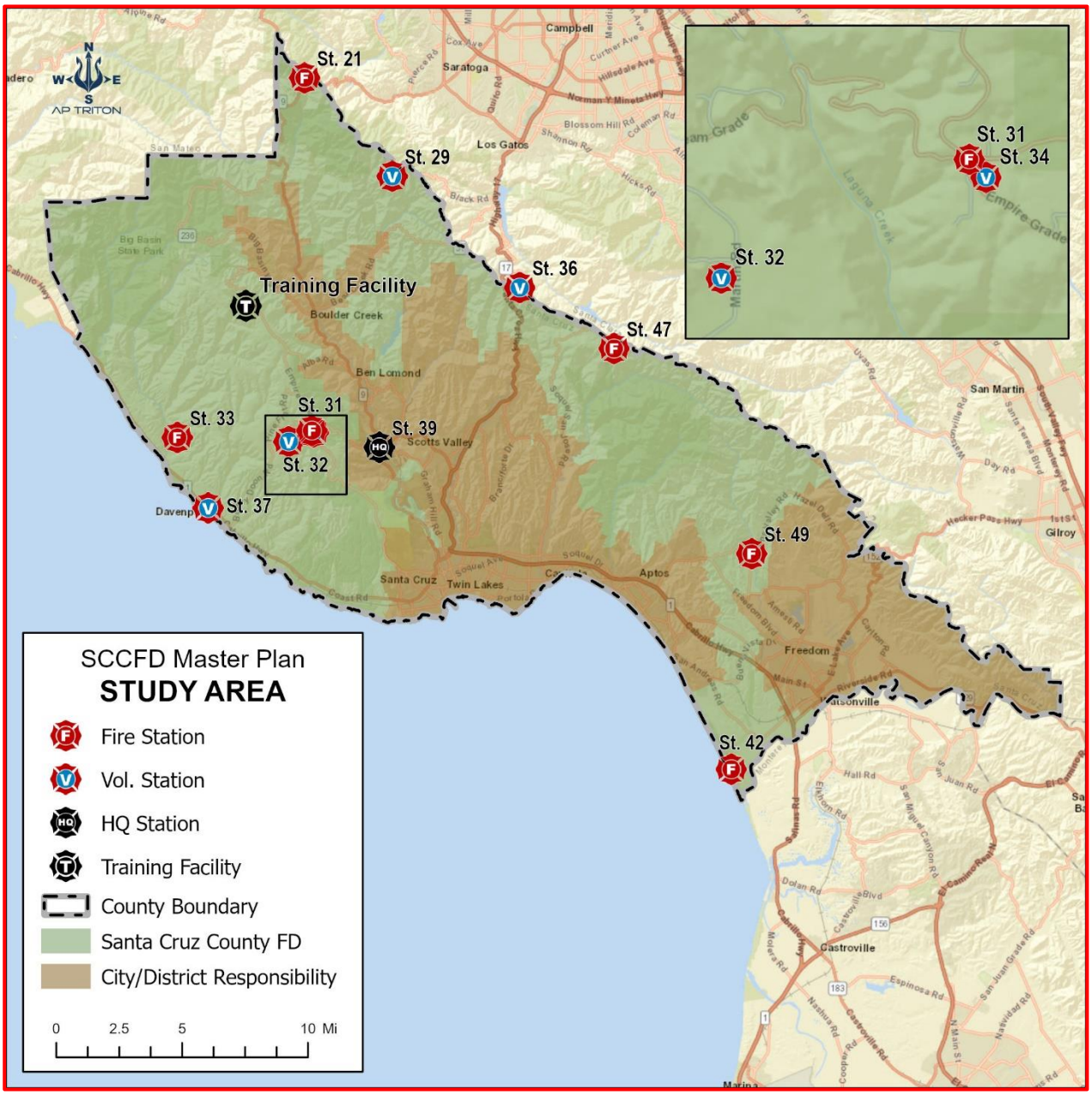
Figure 3: Fire Stations & Staffing in Santa Cruz County

Fire Station	Staffing
County/Locally Owned	
Station 29 (Las Cumbres)	Volunteer
Station 31 (Fall Creek)	Career/Amador
Station 32 (Martin)	Volunteer
Station 34 (McDermott)	Volunteer
Station 36 (Loma Prieta)	Volunteer
Station 37 (Davenport)	Volunteer
Station 42 (Pajaro Dunes)	Career
State-Owned (CAL FIRE)	
Station 21 (Saratoga Summit)	Career/Amador
Station 33 (Big Creek)	Career/Amador
Station 47 (Burrell)	Career/Amador
Station 49 (Corralitos)	Combination

Career stations with "Amador" staffing typically maintain minimum staffing during the winter months, with additional career personnel during the busier summer months.

The next figure is an illustration of the service area and fire station locations of the Santa Cruz County Fire Department.

Figure 4: Santa Cruz County Fire Department Study Area



Other Available Emergency Services Resources

Ground Emergency Medical Transport

Under the terms of agreement with the County of Santa Cruz administered by the Health Services Agency, American Medical Response (AMR) is the exclusive provider of Advanced Life Support (ALS) transport throughout Santa Cruz County. It is a private for-profit corporation based out of Scotts Valley.

In addition to AMR, the Central Fire Protection District (CFPD) can provide ALS transport, and the Zayante Fire Protection District (ZFPD) can provide BLS transport when AMR's availability is at "Level 0."

Air Medical Transport

Two organizations are available to SCCFD for air ambulance scene response: Stanford Life Flight and CALSTAR Air Medical Services. Life Flight is based at Stanford Hospital, and CALSTAR has multiple bases throughout California. Both are staffed with specially trained Flight Nurses and Paramedics to provide ALS-level care.

Mutual & Automatic Aid Resources

The next figure lists the primary mutual and automatic aid resources available to SCCFD.

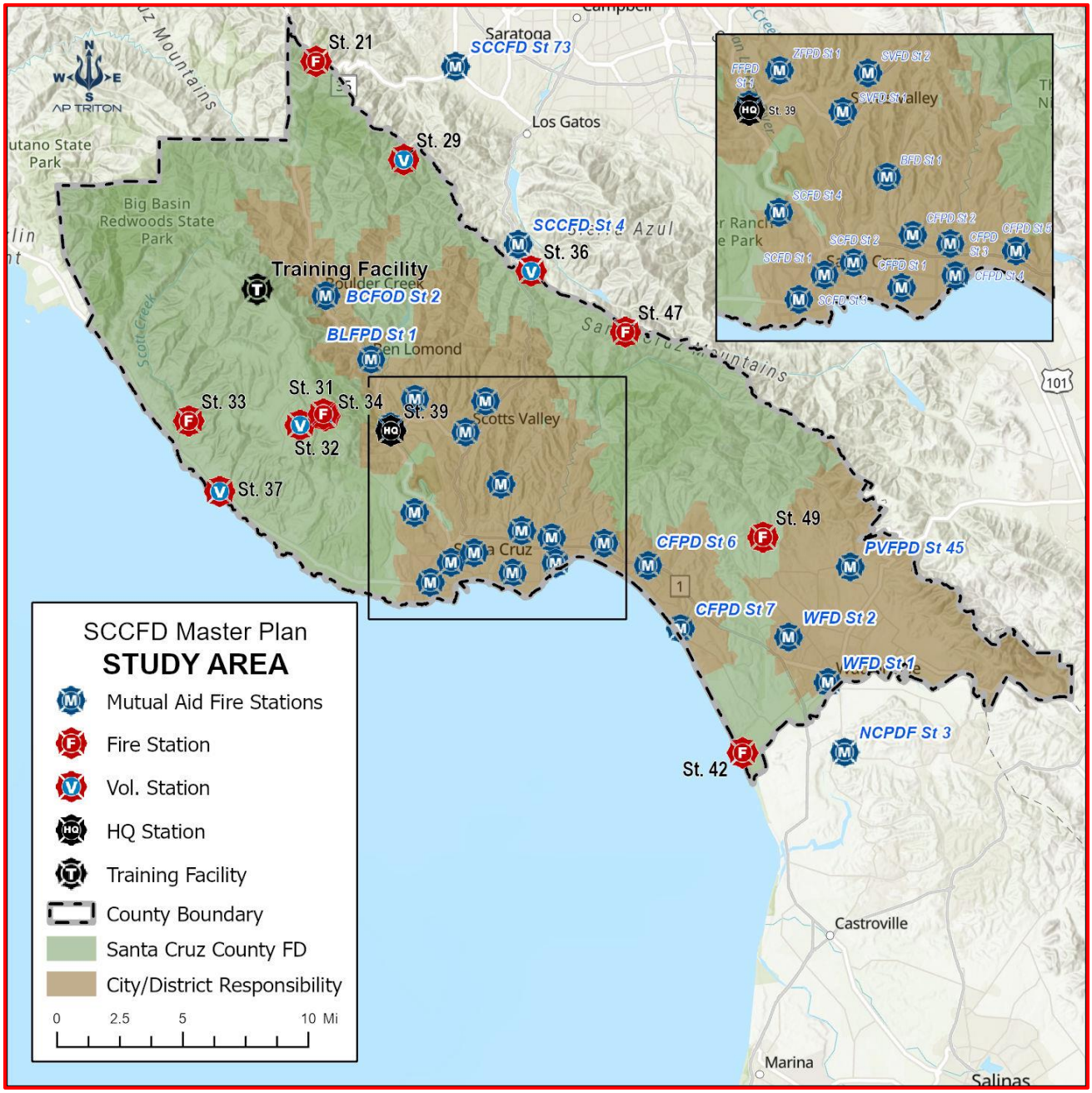
Figure 5: Primary Mutual & Automatic Aid Resources Available to SCCFD

Agency	Station No.	No. Engines	No. Aerials	Other Units	No. of Staff
Ben Lomond FPD (BLFPD)	#1	1	0	WT, reserve engine	V
Boulder Creek FPD (BCFPD)	#1	1	0	Rescue, Type 3, WT	V
Branciforte FPD (BFPD)	#1	1	0	Type 3, WT	2
Central FPD (CFPD)	#1	1	0	Rescue/Air Unit	3
Central FPD	#2	0	1	Tender	4
Central FPD	#3	1	0	Type 3	3
Central FPD	#4	1	0		3
Central FPD	#5	1	0	Type 3, Ambulance	3
Central FPD	#6	1	0	Tender	3
Central FPD	#7	1	0	Type 3	3
Felton FPD (FFPD)	#1	1	0	Tender, Air, Type 3	V
North County FPD (NCFPD)	#3	1	0		2
Pajaro Valley FPD (PVFPD)	#45	1	0	Tender	3
San Mateo County Fire (SMCFD)	#58	1	0	Tender, UTV, Type 3	3
San Mateo Fire	#59	1	0	Type 6 & Type 3	3
Santa Clara County (SCCFD)	#4[A]	1	0	Type 3, Utility Unit	3
Santa Clara County (SCCFD)	#73[B]	1	0	Rescue, Type 3	7
Santa Cruz City FD (SCFD)	#1	1	1		6
Santa Cruz City FD	#2	1	0		3
Santa Cruz City FD	#3	1	0		3
Santa Cruz City FD	#4	1	0	Type 3	3
Scotts Valley Fire (SVFD)	#1	1	0	Type 3, Tender, Type 1	3
Scotts Valley Fire	#2	1	0	Hazmat Unit	3
Watsonville FD (WFD)	#1	1	1		3
Watsonville FD	#2	1	0	Type 3	3
Zayante FPD (ZFPD)	#1	1	0	Type 3, Tender, Medic	2

V = Volunteer staffed. [A]Redwood Station. [B]Saratoga Station.

The preceding figure lists the larger primary mutual aid providers available to SCCFD. However, Boulder Creek FPD, Ben Lomond FPD, Felton FPD, Zayante FPD, Branciforte FPD, and North County FPD are all single-station fire agencies also available for mutual aid. The next figure illustrates the locations of the closest mutual aid fire stations.

Figure 6: Mutual Aid Fire Stations in the Study Area



Management Components

Creating appropriate management systems, policies, and philosophies is critical for modern fire service leaders. In addition, members, managers, and leaders need simple, consistent tools. Fire agencies that wish to improve and incorporate strategic thinking must have these systems thoroughly entrenched in their culture. When these principles and tools are present, agencies can more readily address management complexities such as organizational structure, staffing, and operational excellence.

Foundational Management Principles

Most successful organizations know why they exist and how they will improve. They understand what they feel their organization should be and what common values hold them together and accountable. Organizations collect these basic philosophies in their adopted mission, vision, and values statements. SCCFD has created and adopted mission, vision, and values statements to guide all levels of followers, leaders, and directors.

Mission Statement

Effective mission statements are concise statements that capture the reason an agency exists. It should be a brief statement that efficiently and effectively states why the agency exists and for whom they provide its services.[1] Answering these two questions can clarify why communities and members commit their time and other resources.

SCCFD adopted and published the following mission statement.[2]

> *"The mission of the Santa Cruz County Fire Department is to protect the life, property, and natural resources of its citizens and visitors through effective emergency response, preparedness, and prevention."*

This mission has the necessary elements of what they want to do, protect life, property, and natural resources, and adequately answers the question of who, citizens, and visitors. It also goes a little deeper into how they plan to do this. They will accomplish their mission through effective emergency response, preparedness, and prevention.

However, for this to be a helpful statement, they must define effective response, preparedness, and prevention. Members will struggle with applying this statement to their decision-making process without an achievable benchmark to determine effectiveness. This does not necessarily belong in the mission statement, but the members should have formal documentation as to its meaning.

Vision

Vision statements provide a direction for the entire organization and a common goal to work towards. The vision statement should succinctly articulate what the agency or its leaders see as the ultimate success in providing service. It should reflect where the organization is heading and provide an end state for decision-makers to use as a guide.[3] SCCFD adopted the following vision statement.[4]

> *"The vision of the Santa Cruz County Fire Department is to provide quality service to all communities in the county and to be a leader in fire protection, fire prevention, and emergency response."*

For SCCFD to have a vision is a positive asset. However, this vision statement is not concise and does not clearly articulate the organization's goals. Again, for full effectiveness and proper application, the subjective terms of quality and leadership must be clearly articulated and referenceable.

Guiding Values

For members of an organization to work together smoothly and to the same ends, they must share common values. Excellent agencies clearly state their organizational values and either create rules to defend them, a culture of value-driven decisions, or in most cases, both.[5] SCCFD adopted four core values, each with clarifying statements. These values appear effective. The following is the list of SCCFD's values in their handbook.[6]

Service

- We are committed to the safety and well-being of the public and our employees.
- We strive for excellence and professionalism.
- We maintain a "can-do" attitude and humility in the execution of our duties.

Cooperation

- We care about each other and our service to others, including cooperators, governing bodies, and the public.
- We build and maintain cooperative relationships across the county and state to benefit the public we serve.
- We allow every member of the Department a voice within a chain-of-command structure.

Protection

- We integrate county and state personnel to meet the mission of the department.
- We strive to ensure a high level of environmental protection in all our programs and operations.

Organizational Excellence

- We value the diversity among our employees and the vital functions they perform to enhance our mission.
- We exhibit calm resilience, professionalism, and the highest level of performance in the face of emergencies and disasters.
- We recognize the importance of clear and consistent communication.
- We embrace and support innovation.

Applied Management Principles

Understanding fundamental management principles, especially the mission, vision, and values, is critical for managers and leaders to create direction. A clear sense of who and what the agency is will help progressive leaders define their purpose, unify the members, and find opportunities to grow and improve. Applying these principles may come in day-to-day interaction with the members, deciding whom to hire, what to purchase, or other instances.

These foundational principles should also be applied when developing plans and goals and identifying gaps in performance and critical issues. In addition, reviewing strategic, operational, and other planning documents assists members and outside interested parties in understanding management's focus on the organizational mission, vision, and values.

Management Planning

SCCFD maintains an operational plan concerning budgets and annual goals. However, they have not completed a fire department-specific strategic plan or other documents that may speak to the future. Several plans exist throughout the county and state for emergency operations and wildfire mitigation.

Management Goals and Objectives

Management does not explicitly define goals and objectives, especially organizational improvement. Reviewing the budgets, recent annual reports, and other planning documents uncovered no official goals and objectives. However, management is aware of this and is attempting to rectify this shortcoming with this master plan.

Internal Assessment of Critical Issues

AP Triton asked for a list of the critical issues from the Fire Chief's perspective. The identified concerns are consistent with many agencies. However, the relationship with CAL FIRE makes some operational matters especially difficult. The following list is the critical issues from the Fire Chief's perspective.

- The SCCFD does not have a department identity and is often confused with CAL FIRE.
- There is a reliance on state-funded staffing to accomplish the mission rather than the participation of the volunteer staff.
- The Fire Department Advisory Commission (FDAC) is not an effective or productive group. In its current form, it hinders good relationships and goal attainment.
- There is a need to update, repair, and replace facilities, but no plan exists due to a lack of stable funding. Long-term finances are questionable.

Internal Assessment of Future Challenges

Based on their critical issues assessment, future challenges for SCCFD revolve primarily around funding and creating a cohesive organization. In addition, they have identified the need to give the fire department its identity, to be independent of its CAL FIRE identity. This will prove difficult as CAL FIRE fully integrates into the county service delivery model. Fostering cooperation and collective identity rather than alienating one or the other group will be essential.

Communication Process

Communications are the manager's primary tool to effect change and help members perform their best service for the community. There are several dimensions when working with communications. The sender/receiver dynamic, the context, and the content method are all required to ensure messages are delivered accurately and effectively. In addition, form and content typically change when communicating with internal and external customers. This change is especially true in the fire service industry since it relies heavily on industrial jargon and technical concepts.

Internal

Accomplishing internal communications is more straightforward due to the shared context of the sender and receiver. However, this familiarity can also cause a significant communication barrier as the internal sender has shared experience, historical, and emotional ties to the sender, the organization, or both. For this reason, managers must carefully choose their method when communicating with the members. They must also ensure the information is accurate, especially free from vague language that may allow for inference. The information must be consistent with previous statements and positions.

SCCFD utilizes several internal communications techniques. There are bi-monthly volunteer company officer meetings, they're in the process of establishing official e-mail addresses, and the organization has a stated chain of command. Still, it may not be well advertised or understood due to their close relationship with CAL FIRE. The leadership maintains an open-door policy. Written communications are accomplished through e-mail, policies, standard operating guidelines, and memorandum. SCCFD has allocated monies for Lexipol. Once implemented, information relative to policies and procedures will be communicated via the Lexipol system.

SCCFD does not utilize an intranet or publish a member newsletter. They also do not have a scheduled all-hands meeting. Instead, they choose to schedule one when needed.

External

Communicating with external customers carries challenges but can significantly reward the organization. A well-informed public can be an agency's champion, its harshest critic, or in many cases, both. Unlike internal customers, external customers have no inherent context with the terminology or historical perspective. Therefore, managers must approach each communique with external customers without assuming they know or understand fire service operations. For optimal communication with the public, management must use multiple methodologies.

In addition, external customers must get information with a consistent message that agrees with what internal customers receive. However, some information cannot be shared with external customers. In these cases, staff must know what information should be kept private and why privacy is necessary.

SCCFD utilizes several external communication techniques, including social media accounts such as Facebook, Twitter, and Instagram through the CAL FIRE accounts. In addition, SCCFD has a website that is actively managed and provides news and information to the public. The website is also used for recruiting and providing information about the Fire Department Advisory Commission (FDAC). However, the website does not contain essential documents, including studies, budgets, and annual reports. However, most public communications go through the FDAC.

Documentation

Fire service agencies produce a variety of information and documents in the ordinary course of daily business. These documents are maintained for regulatory and organizational needs and can significantly impact the agency's health. Therefore, agencies must produce policies and procedures to safeguard these documents and ensure that they contain adequate and valuable information.

Regulatory documents such as policy manuals, employee handbooks, standard operating guidelines, and incident reporting must be maintained, kept current, and protected from unauthorized use. In addition, informational documents such as official memorandums, agency performance reporting, and fire protection agency information should comply with the agency, local, state, and federal policies, and regulations.

Agencies should also understand their members, the public, and other stakeholders' informational needs. The agency must balance consumer needs, transparency, and organizational confidentiality. The agency must produce policies and procedures to direct information flow to internal and external consumers.

SCCFD maintains processes and policies to assist with document management, and communications with the county are done directly through Board of Supervisors, or through the County's Director of General Services.

Reporting

The SCCFD is a service the County of Santa Cruz provides through a contract with CAL FIRE. However, the lines of authority are not very clear. The fire department states they report to the County Board of Supervisors (the Board) through the county's Department of General Services. However, a review of the Fire Protection Services website shows they only provide "administrative support" to the fire department.

The administration reports its managerial and operational status annually to the County Board of Supervisors. However, they do not produce an annual report for distribution to the public. In addition, the administration attempts to keep the Board informed through the FDAC. However, a review of the FDAC public meeting minutes on January 18, 2023, indicates some issues with the FDAC meeting its obligations to the public. The critical components of a meeting with Mr. Manu Koening of the Board of Supervisors, were reported in Section 8, "Business Matters," item A(i). That report stated the Board had not heard any issues from the FDAC in two years. The lack of a well-established line of communication, the information from the FDAC meeting, and the chief's concerns, all indicate a lack of understanding, accountability, and support for the fire department.

Recordkeeping

SCCFD maintains records as federal, state, and local statutes and regulations require. In addition, they document their incident responses in a computer-based records management system.

The equipment records are maintained in multiple sites, depending on the equipment. For example, the vendor contracted to perform the tests maintains the self-contained breathing apparatus and air meter testing records. Other vendors accomplish hose, breathing air, and ladder testing, and documents are kept by those specific contractors. For example, SCCFD contracts with the Central Fire District of Santa Cruz County (CFD) for vehicle maintenance. CFD also manages pump testing and vehicle repair records.

Information Technology Systems

Information technology management and systems are a requirement of the modern fire service. Agencies need access to computers and data to record activities, provide modern communications, and maintain management awareness. Access should be available to those who create the information and those who need to use this data to complete evaluations or reports. Modern information technology systems must have a solid infrastructure, including data retention, back-ups, and hardware and software maintenance.

Infrastructure

SCCFD has computers, software, and network access available at all facilities. Infrastructure is maintained by the county, which supports the network, servers, and computers.

Management, Control, and Security

SCCFD technology is managed and secured within the County of Santa Cruz and CAL FIRE policies. Computers and software are password protected, and access is granted and maintained at the user level. In addition, electronic records are backed up remotely.

RMS/PCR Systems

SCCFD utilizes technology to document incident responses. For example, they use the CAL FIRE NFIRS reporting system. SCCFD has a contract in place and is transitioning to First Due software to record incidents in an NFIRS-based system. In addition to fire reporting, the system will house incident pre-plans, inspection records, equipment inventory, and serve as source for the community to access property information through First Due's community connect function.

Planning for Fire & EMS

Fire Service Planning Process Overview

Fire and emergency medical service delivery is constantly evolving and adjusting to meet the needs of our growing communities. To keep pace with this growth and ensure we are providing the necessary level of service, we must be proactive and plan. Standards to improve fireground safety, new technologies, or equipment require organizations evolve to meet changing regulations and grow along with our communities. This is best accomplished by developing a process to review how these rapid changes affect the organization. The development of a continual improvement process will assist in meeting future needs.

Improving service delivery can best be accomplished by identifying which programs are operating effectively and efficiently and which ones need to be modified or even discontinued. Organizational planning allows a department to create a vision that anticipates future changes in a systematic way, rather than being caught unprepared and forced to make changes suddenly. Proper planning plays a critical role in a successful decision-making process.

The first step in any planning process is to understand the current state. Agencies must evaluate and understand their risks, identify metrics to measure performance, and evaluate existing service levels.

Once the current situation is thoroughly understood and the vision defined, agencies should document steps to meet future needs. These steps are rarely published in a single plan. Typically, multiple planning documents are required to properly address both strategic and operational needs.

Strategic planning provides clear direction and understanding of future needs. Operational plans identify specific steps and resources needed to implement strategies. These can range from very short-term, dealing with the here and now, to long-term plans dealing with projections many years in the future.

The following figure lists the levels and plan types that fire and other public agencies typically employ.

Figure 7: Planning for the Future

Planning Level	Description	Time	Examples
Operational	These plans deal with specific resource needs, time frames, directions, or processes to meet strategic or mission requirements.	Immediate	• Standard operating procedures and policies • Incident tactical plans • Incident preplanning
		Short-Term	• Annual budgets • Annual project plans
		Mid-Term	• Apparatus Replacement • SCBA/Radio replacement schedules • Emergency Management plans
		Long-Term	• Facilities replacement plans
Strategic	This document category utilizes information about the future and the organization's mission, vision, and values. The plan creates a pathway to change and gives the agency its heading and fire protection directions.	Mid-Term	• 3–5 Year Strategic Plan
Master	This type is part operational and part strategic plan. It combines current and forecasted positions with potential and probable changes in the agency's environment to produce direction on maintaining operations.	Mid- & Long-Term Plans	• 5–20 Year Master Plan

In the preceding figure, the immediate plans define ongoing activities. Accomplishing short-term objectives requires only current resources. These plans get completed during the current budget cycle. Mid-term plans will spill over budget cycles but typically be completed by department leadership working with their governing bodies. Long-term plans will likely outlast the sitting government and, potentially, the current administration.

Agencies may produce or combine any number of plans to help them address challenges. They may have the resources to follow an internally developed or predefined process. On the other hand, they may need outside professional assistance to help them develop their plans and planning process. The key to success is not necessarily to follow one approach over another or create a standardized document. Instead, success comes through creating clear, concise, relevant information publicized and used by members and leaders in everyday decisions.

Effective plans incorporate ongoing review to ensure they are followed and meet defined goals and objectives. They are closely followed or changed as the situation warrants. They are updated periodically, reported to the governing body, and used as a leadership and decision-making tool.

Effectiveness of SCCFD's Planning Efforts

SCCFD is taking steps to create a more proactive change environment. It has completed many foundational planning steps, and this master plan document will help fill in a few of the gaps.

SCCFD planning efforts are both operational and strategic in nature. However, some strategic planning documents have expired, and their effectiveness is not readily apparent. This master plan document may help fulfill some strategic requirements for effective management. Still, the agency will benefit from expanded strategic planning efforts.

SCCFD's Planning Preparation

SCCFD maintains control and planning documents to assist management and the members with daily and near-term decisions. They have documented mission and vision statements, and by ordinance, the Fire Department Advisory Commission (FDAC) is tasked with the preparation and implementation of the Santa Cruz County Fire Department (County Fire) Master Plan (Santa Cruz County Code, Ch. 2.120, § 2.120.050 (A)). This Long-Range Master Plan has been prepared by AP Triton on behalf of the FDAC. Once complete and formally adopted, it will be the FDAC's responsibility to oversee implementation.

The stated objective of the master plan is to assist SCCFD in providing a high level of fire protection and life safety services within the limits of available resources. The plan is based upon a review of the twelve operational components of County Fire, and it provides recommendations for the improvement of each of these functions.

The master plan is intended to be a working document and reviewed quarterly by FDAC. The plan provides operational guidance to CAL FIRE and five volunteer fire companies who together provide all hazard fire and emergency protection as the Santa Cruz County Fire Department. The plan assigns responsibilities and costs associated with each of the twelve operational components.

SCCFD's Immediate Planning

Though not expressly tied to the master plan, SCCFD maintains a local operational plan between the San Mateo-Santa Cruz Unit of CAL FIRE and the County of Santa Cruz. The most recent and current plan is for the period of July 1, 2020, through June 30, 2023. The operational plan mirrors the twelve operational components laid out in the Master Plan, and it provides recommendations for the improvement of each of these functions.

Master Plan & Local Operational Plan Components

Financial

Continue to provide the highest level of service within the established fiscal parameters; balancing the use of available career and volunteer personnel to operate the County Fire Department in a cost-effective and efficient manner. Management will provide fiscal reports to the FDAC to ensure that financial goals have been met.

Management
Provide a coordinated management team, including a Unit Chief, Operational Deputy Chief, and an Administrative Assistant Chief, to effectively serve the needs of the entire County Fire Department. This management team is provided at an agreed cost to the County.

Volunteers
Strengthen recruitment and retention of an effective force of volunteer firefighters through improved publicity, working relationships, and benefits. Focused recruitment will be initiated in areas of marginal volunteer participation. Retention incentives will be studied for feasibility.

Jurisdiction
Evaluate and make recommendations for alternative service models as needed.

Facilities
Maintain existing facilities in a serviceable condition and prepare a recommended minor and major capital outlay plan for all County-owned facilities.

Vehicles & Equipment
Operate a comprehensive vehicle and equipment program addressing replacement, maintenance, and future purchases within budget parameters.

Fire Prevention
Provide a comprehensive fire prevention program that includes plan review, on-site residential and business inspections, educational training for the public and fire department personnel, and safety inspections for schools and care facilities.

Training
Ensure that all personnel are provided with mandated training to safely carry out their duties and responsibilities and are afforded opportunities to develop skills and abilities beyond the minimum requirements of the department.

Dispatch Services
Provide enhanced service to both the public and our emergency responders by proficiently dispatching the emergency providers. Strive to process and dispatch 90% of highest priority calls within 90 seconds and provide pre-alerts for 90% of all fire and medical incidents.

Fire Suppression

Manage the use of all fire suppression resources including State and County personnel/equipment as well as cooperating fire agencies in the County, to ensure that all fires are provided with an initial attack that is rapid, aggressive, and effective.

Emergency Medical Services

Provide a high level of pre-hospital emergency medical services.

Disaster Preparedness

Ensure that the Department's abilities to respond to major emergencies and disasters are maintained at an effective level.

Operational Planning

CAL FIRE has created and maintains a comprehensive strategic wildfire plan for the San Mateo-Santa Cruz Unit. The plan was developed through collaboration with federal, state, city, and county agencies within the unit.

The detailed plan identifies and prioritizes pre-fire and post-fire management strategies and tactics meant to reduce the loss of values at risk and serves as a companion document to the Santa Cruz County Community Wildfire Protection Plan (CWPP). A copy of the current CWPP can be found on the Santa Cruz County Fire Department's website. In addition, Santa Cruz County recently updated the Local Hazard Mitigation Plan. A copy of the current Hazard Mitigation Plan can be found on Planning Department's section of the Santa Cruz County website.

Pre-incident plans must be easy to use under intense operational situations and readily available to all arriving companies and incident commanders. These plans should contain information that is useful for responders and include information such as:

- Building layout and specific characteristics
- Building construction
- Occupant characteristics
- Location and types of fire protection and hazard containment systems
- Water supply volume and access locations
- Exposures

Also, there needs to be an indication of the employee or industrial response personnel capabilities.

Typically, developing a process from a pre-established system or program has the highest probability of success and adoption. Resources such as NFPA 1620 are available and provide detailed information on developing and using pre-incident plans.

While the wildland fire plans appear well-studied, SCCFD's pre-fire planning process or pre-incident aids for responders in the urban corridor are only available in hard copy and not easily accessible during emergency incidents. These plans can be a valuable and effective tool for all-size buildings and occupancies. At a minimum, they should exist for target hazard facilities. Target hazards are buildings defined by:

- Large potential occupant loads.
- Populations that are wholly or partially non-ambulatory.
- Institutionalized people with limited access.
- Larger than 12,000 square feet.
- Those that contain hazardous materials, equipment, or hazardous storage.

SCCFD is in the process of implementing elements of the First Due Fire & EMS software platform. Once up and running, electronic pre-plans can be developed and integrated into other online tools making the information more accessible to SCCFD personnel and cooperating agencies providing mutual aid.

Strategic & Master Planning

SCCFD's Short-Term Planning

SCCFD creates and operates under an annual budget. At the end of each calendar year, the Fire Chief solicits input from program managers and CAL FIRE Battalion Chiefs to ensure equipment and projects that were budgeted for are either completed or on track for completion before the end of the fiscal year.

The CAL FIRE BCs and each of the volunteer companies are then surveyed for any budget requests for the upcoming year. The SCCFD analyst collects the requests and incorporates them into the proposed budget. The CAL FIRE Deputy Chief and SCCFD Battalion Chief review all budget requests and any proposed changes to items already approved in prior budgets. The SCCFD Fire Chief has final approval for any changes or additions. This process complements the local operational plan, and master planning elements.

SCCFD's Mid-Term Planning

The SCCFD 2021/2023 Local Operational Plan is current, yet due to expire at the end of June 2023. The 3-year plan is a useful guide, but it lacks specificity. To increase the likelihood of success, goals need to be supported by objectives that are clear, concise, and measurable. Objectives then can be broken down into manageable tasks that can be used as a guide to ensure individual tasks are completed.

The process helps ensure goals are met and remain on budget, and on schedule and that each supports the organization's Mission and Vision. The Local Operational Plan is at the end of its useful life span, and an update is necessary.

Long-Term Planning

As previously mentioned, the FDAC is tasked with the preparation and implementation of the Santa Cruz County Fire Department (County Fire) Master Plan. The most recent version of the Master Plan was completed in early 2012 and covered the 3-year period from mid-2012 to mid-2015. Though well beyond its useful lifespan, this comprehensive document serves as an excellent example of an effective long-range planning tool.

Goals articulated in the Local Operational Plan are mirrored in the Master Plan, creating a close tie between each of these planning tools and providing important detail on each of the goals, objectives, and tasks. More importantly, each of the tasks is assigned to either CAL FIRE or SCCFD personnel, ensuring someone is responsible for completion.

The assignment of tasks provides greater clarity and ensures accountability which increases the likelihood of completion. This master plan will serve as an additional resource and important reference document for the FDAC and SCCFD leadership when developing future planning documents.

Staffing & Personnel

An efficient and effective fire protection and emergency medical response system requires enough personnel to be available, well-equipped, and properly distributed to meet the service demands of the community they serve. To meet this objective, the County of Santa Cruz contracts with the California Department of Forestry and Fire Protection (CAL FIRE) for fire protection services as the Santa Cruz County Fire Department (SCCFD).

Over 80% of Santa Cruz County's 607 square miles fall within the State's Responsibility Area (SRA). SRA is defined as: "areas of the state in which the financial responsibility of preventing and suppressing fires has been determined by the State Board of Forestry and Fire Protection to be primarily the responsibility of the state."

That statement, from the California Public Resources Code (PRC), Sec. 4125-4137, refers to the state's responsibility for the suppression of wildland fires. More specifically, wildland fires threatening or impacting the state's watershed. Other types of fires, like structure fires, vehicle fires, and dumpster fires, are the responsibility of the local agency and the local fire service provider. In Santa Cruz County, CAL FIRE's response to these other types of fires is primarily for the purpose of assisting the local government fire department and ensuring these fires do not spread to the wildland and State Responsibility Area.

In Santa Cruz County, local government fire protection and emergency response is provided by one of the incorporated cities, fire protection districts, volunteer agencies, or the Santa Cruz County Fire Department.

Given the geographical boundaries of the Santa Cruz County Fire Department fall entirely within the CAL FIRE San Mateo-Santa Cruz Administrative Unit (CZU), the County of Santa Cruz benefits from the proximity to CAL FIRE facilities and resources essential for the management and day-to-day operation of CZU in performance of their statutory obligation.

That said, it is difficult to differentiate CAL FIRE from Santa Cruz County Fire Department. This becomes important when discussing staffing, as the number of stations being staffed, along with the total number of available personnel, varies based on CAL FIRE's assessment of the wildfire risk and the need for additional staffing for the protection of the SRA.

For clarity, staffing is divided into two broad categories. Administrative/support staffing and operational staffing. Operational staffing will be further broken down into several distinct categories to better illustrate how the individual components fit together as part of a fire protection and emergency response system. Operational staffing must also be further broken down into two specific periods of time, differentiating Peak Fire Season from Non-Peak Fire Season.

Where possible, it will be made clear that staffing is provided under the terms of the cooperative fire protection agreement. At times, it can be difficult to fully understand where the state's contractual obligation to provide service ends, and whether services are being provided to the local agency as an act of goodwill or as a matter of mutual convenience.

Administrative & Support Staffing

Administrative and support personnel provide the management, oversight, and support necessary to ensure effective and efficient delivery of emergency services to the community. Administrative and support staff are comprised of the executive officer, their staff, and the administrative support team who are responsible for planning, organizing, directing, coordinating, and evaluating the various programs necessary to support the needs of the Santa Cruz County Fire Department.

The following figure illustrates the administrative and support staffing for SCCFD.

Figure 8: SCCFD Administrative & Support Staffing

Position Title	No. Positions
Staff Services Analyst	1.3
Fire Captains	2
Deputy Fire Marshal	1.5
Battalion Chief	1
Fire Prevention Specialist II	1
Assoc Govt. Program Analyst	1.3
Communications Operator	1

Emergency Response Staffing

Year-Round Staffing

The Santa Cruz County Fire Department staffs one station 24 hours per day, 365 days a year, with firefighters working a 72-hour work week at the CSA 4—Pajaro Dunes Fire Station. Personnel assigned to the station rotate on and off shift based on their individual schedule. The rotation of personnel and their overlapping schedules means the makeup of the crew changes each day. The engine is typically staffed with a minimum of two personnel and the crew is comprised of one Fire Captain and one Engineer.

In addition to the one full-time station Pajaro Dunes, the Santa Cruz County Fire Department utilizes volunteer firefighters to augment CAL FIRE's response. Volunteers respond to and/or from one of six stations spread throughout Santa Cruz County. There are approximately 70 volunteers with varying levels of certification. Many are qualified to drive and operate fire apparatus, but every volunteer is trained and equipped to perform on the fireground and emergency scene.

Seasonal Staffing

During the non-peak season (winter months outside of fire season), CAL FIRE adjusts its staffing model and reduces the number of staffed stations due to the lower likelihood of vegetation fire. This reduction in staffing makes CAL FIRE personnel available for other assignments and programs. The County of Santa Cruz takes advantage of this available workforce to add an additional five stations to Santa Cruz County Fire Department's operational staffing under CAL FIRE's Amador Program. Amador engines are typically staffed with three personnel and crews are comprised of one Fire Captain or Engineer, and two Firefighters. The Captain or Engineer remains funded by CAL FIRE while SCCFD funds the firefighters.

As previously stated, it can be difficult to differentiate CAL FIRE staffing from Santa Cruz County Fire Department staffing. To better understand each, a brief description is instructive.

Schedule A Operational Staffing

Schedule A refers to the cost/reimbursement schedule for CAL FIRE personnel provided under a Cooperative Fire Programs, Fire Protection Reimbursement Agreement between Santa Cruz County, and the State of California. The contract provides for operational staffing for a single station/engine 24/7, 365 days per year.

Under the terms of the agreement, Schedule A resources/personnel provide the local agency with all hazard emergency fire protection, medical, and rescue response. This apparatus and the CAL FIRE personnel assigned to it are committed to their local government/all hazard mission as a priority and are a dedicated operational resource of the Santa Cruz County Fire Department.

The following figure shows the year-round Santa Cruz County Fire Department operational staffing provided by CAL FIRE under Schedule A.

Figure 9: SCCFD Schedule A Staffing

Station	Apparatus	Staffing
Pajaro Dunes	Engine 4211	2
	Total:	**2**

Volunteer Operational Staffing

Volunteer firefighting personnel make up a significant portion of the operational staffing for the Santa Cruz County Fire Department. Volunteer stations, apparatus, and personnel are spread out over Santa Cruz County. Volunteer personnel and equipment augment paid staffing levels on emergency incidents in much of the Santa Cruz County Fire Department service area. Though volunteer personnel maintain a strong affiliation with their individual stations and companies, volunteers are trained and encouraged to respond as part of any of Santa Cruz County Fire Department's six volunteer stations.

When discussing volunteer staffing, it must be understood that volunteers do not represent dedicated staffing 24/7, nor do they represent on-duty staffing available for immediate response. Even when there is volunteer response, turnout is typically low and there is a lag in response time due to volunteer personnel needing to respond to the station, form up as a crew and respond to the incident.

The following figure shows the approximate number of personnel available by agencies with volunteers.

Figure 10: SCCFD Volunteer Staffing

Station Name	Equipment	Staff
Las Cumbres	Engine 2911	≅ 11
	Engine 2936	
	Water Tender 2951	
	Rescue 2991	
Bonny Doon	Engine 3222	≅ 16
	Engine 4121	
McDermott	Engine 3211	
	Water Tender 3251	
	Rescue 3261	
Loma Prieta	Engine 3611	≅ 16
	Engine 3638	
	Water Tender 3651	
	Rescue 3661	
Davenport	Engine 3711	≅ 9
	Engine 3721	
	Water Tender 3951	
	Rescue 3761	
Corralitos	Engine 4111	≅ 18
	Water Tender 4151	
	Rescue 4161	
	Total:	**≅ 70**

Amador Staffing

Amador staffing refers to CAL FIRE personnel provided under the Cooperative Fire Programs Agreement with Santa Cruz County for continuous staffing of five CAL FIRE stations/apparatus 24/7 during non-peak fire season. When CAL FIRE determines it prudent to reduce staffing levels due to the reduced threat of wildfire, these CAL FIRE stations, and apparatus, are staffed to augment local agency staffing and serve as part of the Santa Cruz County Fire Department.

It must be noted, however, that CAL FIRE resources provided under Amador agreements remain obligated to their state wildland mission first and are available for immediate deployment to incidents anywhere in the State of California should the need arise.

The following figure shows the additional staffing provided by CAL FIRE to the Santa Cruz County Fire Department during non-peak fire season under an Amador agreement.

Figure 11: SCCFD Amador Staffing

Station	Apparatus	Staff
Saratoga Summit	Engine 1762	3
Fall Creek	Engine 1776	3
Big Creek	Engine 1767	3
Burrell	Engine 1768	3
Corralitos	Engine 1774	3
* engine identifiers are subject to change based on maintenance, rotation, etc.	**Total Staff:**	**15**

CAL FIRE provides staffing to Santa Cruz County Fire Department for five engines to remain in service during this non-peak season. Amador agreements are set for a period of up to seven months. Should CAL FIRE determine a need to remain in peak season staffing longer or return to peak-season staffing early, the cost for staffing borne by the County is backed out, and the state assumes responsibility for the entire cost.

The following figure shows the Amador period during non-peak fire season for the past three years.

Figure 12: SCCFD Historical Amador Period

Amador Staffing		2019/2022	2020/2021	2021/2022
Saratoga Summit	Engine 1762	Dec 9, 2021 to April 2021	Dec 28, 2020 to April 17, 2021	Jan 3, 2022 to April 26, 2022
Fall Creek	Engine 1776			
Big Creek	Engine 1767			
Burrell	Engine 1768			
Corralitos	Engine 1774			

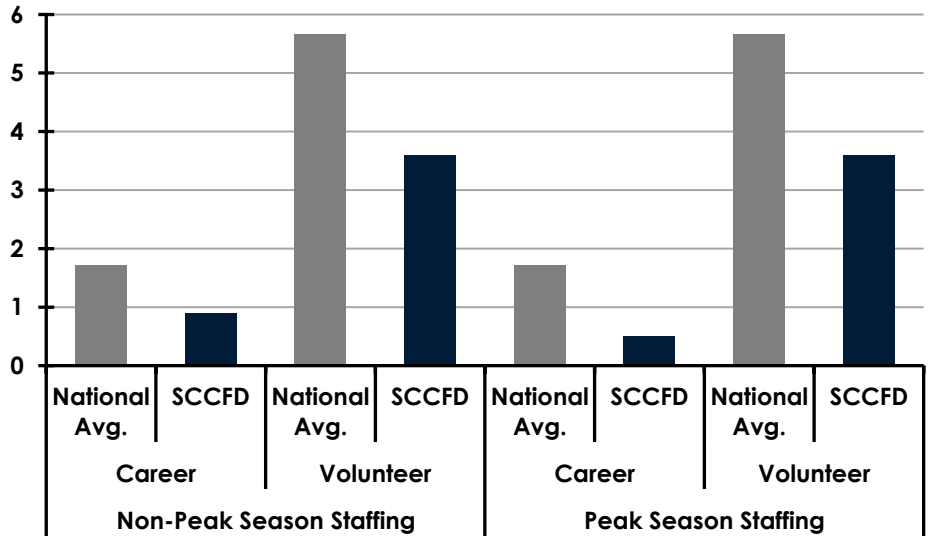
NFPA 1710 is frequently cited as an authoritative document addressing fire department staffing. In comparing the number of firefighters per 1,000 population of the service area, the following figure illustrates the staffing of the Santa Cruz County Fire Department as compared to national averages within the National Fire Protection Association's 2020 United States Fire Department Profile.

During Peak Fire Season, the career staffing level for Santa Cruz County Fire Department is 0.5 per 1,000 population, which falls well below the national average of 1.72. Volunteer staff available for emergency operations is 3.6 and below the national average of 5.66.

During Non-Peak Fire Season, when five additional engines are staffed under the Amador Program, the career staffing level for Santa Cruz County Fire Department is 0.9 per 1,000 population, which is still below the national average of 1.72. Volunteer staff available for emergency operations is unchanged and below the national average.

The following figure shows the number of Santa Cruz County Firefighters per 1,000 Population as compared to the national average.

Figure 13: SCCFD Firefighters per 1,000 Population (2020)



CAL FIRE CZU Emergency Response Staffing

For clarity, a discussion about staffing must include a brief description of CAL FIRE's emergency response staffing for the San Mateo-Santa Cruz Unit (CZU).

CAL FIRE CZU encompasses two counties, including Santa Cruz and San Mateo, covering approximately 1,351 square miles. CAL FIRE resources located within Santa Cruz County are deployed in a manner to best meet the state's fire protection needs for the State Responsibility Area (SRA) in Santa Cruz County, CZU, and throughout the state.

Schedule B

Schedule B refers to CAL FIRE personnel fully funded by the state expressly for the purpose of meeting their statutory obligation for protection of the SRA under Section 4125-4137 of the California Public Resources Code. Schedule B stations, apparatus, and personnel are always obligated to their state wildland/watershed protection mission first and are available for immediate deployment to incidents anywhere in the State of California.

Peak Fire Season Staffing

Peak fire season is the period during which the threat of wildland fire is considered highest. During this period, CAL FIRE increases staffing to levels considered necessary to prevent and suppress fires on lands that are primarily the responsibility of the state of California.

It is important to understand that while CAL FIRE's staffing increases due to the threat of wildfire during the peak season, these additional resources are not dedicated to the Santa Cruz County Fire Department, however, they do respond to calls for service that are the responsibility of Santa Cruz County Fire Department.

The following figure shows CAL FIRE CZU's operational staffing within Santa Cruz County.

Figure 14: CAL FIRE CZU Operational Staffing

Station	Apparatus	Staffing
Saratoga Summit	Engine 1762	3
	Engine 1769	3
Jamison Creek	Engine 1760	4
Fall Creek	Engine 1776	4
Big Creek	Engine 1767	4
Felton	Engine 1764	4
Burrell	Engine 1768	4
Corralitos	Engine 1766	3
	Engine 1774	3
	Total Staff:	**32**

Personnel Management

Personnel is the single most important component of any organization. Efficient and effective management ensures that personnel are properly trained, equipped, and prepared to serve the needs of the community. Proper personnel management is considered an essential function and key to the department's success.

Policies, Rules & Regulations, & Guidelines

SCCFD and CAL FIRE maintain policies, procedures, and guidelines in electronic format to ensure accessibility for all personnel. CAL FIRE personnel have access to the CAL FIRE specific information via a secure department intranet.

Job Descriptions

Job descriptions for all CAL FIRE positions including those within the Santa Cruz County Fire Department are maintained by the California Department of Human Resources (CalHR). CalHR is responsible for issues related to employee salaries and benefits, job classifications, civil rights, training, exams, recruitment, and retention. For most employees, many of these matters are determined through the collective bargaining process managed by CalHR.

Job descriptions for volunteer positions can be found in the Volunteer Firefighter Handbook. Job descriptions provide detailed information on duties, authorities, accountability, knowledge, skills, abilities, and any other pertinent requirements for the positions.

Compensation

Civil service pay scales and salary schedules for all full-time SCCFD employees are available electronically on the CalHR website. The website provides compensation and benefits information available to all state employees and is fully accessible to the public. The information available on the website is well-maintained and updated on a regular basis. The listed pay scales were last updated on February 8, 2023.

The most recent Memorandum of Agreement (MOA) between CAL FIRE Local 2881 and the State of California (7/1/22–6/30/24) can be found on the CalHR website along with all other bargaining agreements and contracts for state employee groups.

Stipends paid to volunteers are authorized by the Santa Cruz County Board of Supervisors, and the criterion for payment is outlined in Section 2: Volunteer Stipend Policy, of the Volunteer Firefighter Handbook. Stipend payments follow a well-documented and established eligibility process and are divided into response member classifications based on rank, training, and emergency response.

Disciplinary Process

The disciplinary process for full-time SCCFD personnel is well documented and outlined in the Professional Standards and Employee Conduct Handbook. The Supervisor's Guide to Progressive Discipline and The Adverse Action Process provide very detailed information on all aspects of the corrective action process. The process is consistent with the Memorandum of Understanding between CAL FIRE and Local 2881 (July 1, 2022–June 30, 2024). The disciplinary processes for SCCFD volunteers are well documented and outlined in Section 2.5: Complaint and Disciplinary Procedures, of the Volunteer Firefighter Handbook.

Disciplinary matters and personnel-related decisions subject an organization to exposure and potential liability. Access to legal counsel can significantly reduce this liability. Accordingly, as necessary, SCCFD consults with legal counsel from the State of California on personnel-related matters.

CalHR's Legal Division offers House Counsel service. It is designed to assist state departments and agencies in navigating employment issues by providing cost-efficient, expert guidance and mentoring, training, investigative services, and legal representation. The team is comprised of experienced labor and employment attorneys, personnel experts, seasoned investigators, and expert trainers who provide support for departments to navigate and address employment issues in the state workplace.

Counseling Services

The SCCFD provides all employees and volunteers with access to an employee assistance program (EAP). The EAP provides a confidential short-term assessment, counseling, and referral program. The program supports the emotional well-being and mental health of firefighters and their families.

Application, Recruitment, & Promotional Process

All full-time positions for the Santa Cruz County Fire Department are filled by CAL FIRE employees provided under the terms of the Cooperative Fire Programs, Fire Protection Reimbursement Agreement. Recruitment for entry-level positions and promotions within the organization are managed by the State of California.

CalHR is responsible for all employee-related issues, including, salaries and benefits, job classifications, civil rights, training, exams, recruitment, and retention. CalHR creates and administers civil service exams to fill positions throughout the state.

Recruitment for volunteer positions is managed independently by each of the volunteer companies and supported by SCCFD. The recruitment processes for SCCFD volunteers are well documented and outlined in Section 2.1: Becoming a Volunteer, of the Volunteer Firefighter Handbook.

Performance Evaluations

Performance appraisals are required on an annual basis for all permanent employees. The process for completing the appraisal is outlined in the CAL FIRE 800 Manual along with the required form (STD. 638). If warranted by performance-related issues, appraisals may be done more frequently.

Health & Safety

Health

To ensure the health of department personnel, SCCFD provides a comprehensive medical evaluation for all employees and volunteers. The Department's medical exam is compliant with NFPA 1582 (Standard on Comprehensive Occupational Medical Program for Fire Departments) and OSHA 29 CFR 1910.134 (Respiratory Protection). Exams are completed biannually by all personnel, and annually by those having a medical necessity, or assigned to the hazardous materials program.

Safety

The Santa Cruz County Fire Department does not maintain its own Safety Committee or Injury and Illness Protection Program. Rather, SCCFD communicates with employees on issues related to occupational health and safety through CAL FIRE CZU's established system of management safety committees. Safety committees assist management with the administration of the Injury and Illness Prevention Program and serve as a point of contact for employee safety concerns and/or suggestions. The duties and responsibilities of these safety committees is well documented in CAL FIRE Policy 1703.

Introduction to the Stakeholder Interviews

Triton interviewed a wide variety of the Santa Cruz County Fire Department internal and external stakeholders. The purpose of these interviews was to gain a better understanding of issues, concerns, and options regarding the emergency service delivery system, opportunities for shared services, and expectations from community members.

It is important to note that the information solicited and provided during this process was in the form of "people inputs" (stakeholders individually responding to our questions), some of which are perceptions reported by stakeholders. All information was accepted at face value without an in-depth investigation of its origination or reliability. The project team reviewed the information for consistency and frequency of comments to identify specific patterns and/or trends. Multiple sources confirmed the observations, and, based on the information reviewed, the team identified a series of observations and recommendations they felt were significant enough to be included in this report.

Stakeholders were identified within the following groups: Community Leaders, Citizens, Fire Department Advisory Committee, Chief Officers, Labor Leaders, Volunteer Firefighters, Rank & File, and Administrative Staff. Detailed responses are listed in Appendix A.

Financial Overview

The County includes the revenue and costs related to the operation of its fire protection system in a group of funds labeled Other County Funds which are included in the Total County-Wide Budget. County fire protection services include the area designated as CSA 48 and a separate area, CSA 4, Pajaro Dunes, both are serviced by the Santa Cruz County Fire Department. Each area receives independent funding and under State law, each must maintain a separate budget, and one budget may not be used to provide services within the others' boundaries.[7]

General Overview

Santa Cruz County Fire Department (SCCFD) operates under the guidance and direction of the Santa Cruz County Board of Supervisors. It provides fire protection for the unincorporated areas of the County that are not included in an autonomous fire district. Included as a separate component of the system is the County Service Area (CSA 4) Pajaro Dunes community. Another service area, CSA 48, was established to finance the costs of fire protection in the unincorporated areas of the County which are not within the boundaries of autonomous fire districts. CSA 48 transfers its revenues to the County Fire Department annually.

In January 2020, CSA 48 obtained voter approval for an additional assessment to increase staffing in its boundaries from two persons to three persons per engine. The Santa Cruz County Fire Department provides services to its communities through a contract with CAL FIRE. The County prepares an annual operating budget based on a July through June fiscal year and includes the budgeted amounts CAL FIRE has projected for its operations.

Consolidated Service Area Historical Financials

While the two service areas cannot be combined for accounting purposes, it is helpful to review the entire county funded fire service expense. This is typically presented as the fire protection services budget during the budget season and is reported under the summary Unit 34. This consolidation is the total fire services cost for the county. Surplus funds are returned to the county whereas the deficits must be made up from other county funds.

The following figure combines the historical revenues and expenditures of the two budget areas, CSA 48 (referred to typically as County Fire) and CSA 4 (Pajaro Dunes). However, it should be noted that revenues from special assessments within CSA 4 and CSA 48 may only be spent on providing services within those respective areas. The following figure shows the consolidated historical budget data.

Figure 15: Consolidated Agencies Revenues & Expenditures

Revenue/Expenses	FY 17/18 (Actual)	FY 18/19 (Actual)	FY 19/20 (Actual)	FY 20/21 (Actual)	FY 21/22 (Estimates)
Recurring Revenue	6,116,896	6,401,236	6,487,674	10,439,592	9,512,596
Other Revenues	42,854	67,095	51,049	118,983	38,177
Total Revenues:	**6,159,750**	**6,468,331**	**6,538,723**	**10,558,575**	**9,550,773**
Salaries & Benefits	150,251	148,687	127,018	235,138	98,386
CAL FIRE Contract	3,845,198	4,186,448	4,664,705	6,112,425	6,480,359
Services & Supplies	790,795	931,556	1,036,459	952,408	2,545,525
County Overhead	5,675	3,294	4,104	6,447	11,506
Total Recurring	4,791,919	5,269,985	5,832,286	7,306,418	9,135,776
Capital & Other	70,685	412,835	131,198	364,354	4,494,849
Total Non-Recurring	70,685	412,835	131,198	364,354	4,494,849
Total Expenditures:	**4,862,604**	**5,682,820**	**5,963,484**	**7,670,772**	**13,630,625**
Total Surplus (Deficit):	**1,297,146**	**785,511**	**575,239**	**2,887,803**	**(4,079,852)**

Consolidated Service Areas Financial Projection

These general revenue and expense sections are found in the individual service areas as well. The following figure shows the consolidated revenues and expenses through fiscal year 2027/2028.

Figure 16: Projected Revenue & Expenditures

Description	FY 22/23 Budget[8]	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28
Revenue	9,893,676	10,348,521	10,700,089	11,069,274	11,451,993	11,848,763
Expenditures	9,521,354	9,160,191	9,467,402	9,785,796	10,115,795	10,457,841
Net Surplus (Deficit)	**372,322**	**1,188,330**	**1,232,687**	**1,283,478**	**1,336,198**	**1,390,922**

Santa Cruz County Service Area 48—SCCFD

A significant amount of information was provided by County staff and was reviewed to develop a financial trend analysis for the preceding five-year period, from fiscal year 2018 through the fiscal year 2022.[9] This review of the historical information of Fire Protection Funds (FPF) for County Service Area 48 revenues revealed recurring revenues increased from $3,799,553 in FY 2018 to an estimated $5,526,358 in FY 2022, a 45.5% overall increase or an annualized increase of approximately 11.4%.

The Fire Protection Fund (FPF) is the bookkeeping vehicle utilized by the County of Santa Cruz to capture and account for the service fees collected for CSA 48. A historical review of the information developed from the FPF for County Fund 304400 revenues revealed recurring revenues increased from $1,151,000 in FY 2018 to an estimated $2,652,000 in FY 2022, a 130% overall increase or an annualized increase of approximately 32.6%. The significant increase occurred in FY 2021 with the passage of a CSA 48 2020 ballot measure that more than doubled the revenue stream on an annual basis. The special assessment funds are tracked here but appear as revenue for CSA 48, account 34100.

Additionally in 2021, the SCCFD (CSA 48) received a cost recovery of $877,000, for apparatus use on a large-scale wildfire, further distorting the revenue trend line between FY 2020, FY 2021, and FY 2022.

As the Santa Cruz County Fire Department provides services through a contract with CAL FIRE, cost recovery opportunities may be limited. The Department has no direct cost for which to seek cost recovery. The Fire Protection Fund expends funds for accounting and audit services and the service contract with CAL FIRE.

The most significant annual expenditure of County Service Area 48 (CSA 48) is for its service agreement with CAL FIRE. This expenditure typically requires almost 100% of the annual recurring expenditures. Due to the source of its funding streams, the COVID-19 pandemic had no significant negative impact on revenues in FY 2020 and FY 2021.

Santa Cruz County provides fire protection for County Service Area 48 under a contract with CAL FIRE. The County assesses and collects a Fire Protection Fee within the boundaries of CSA 48. The County accounts for the revenues and expenditures separately within its accounting system using the fund accounting concept of reporting. The County prepares an annual operating budget based on a July through June fiscal year. Services to the service area are provided through a contract with the State of California (CAL FIRE).

The significant portion of the funds provided through these assessments pay for the services provided under the Cooperative Fire Protection Agreement with CAL FIRE.

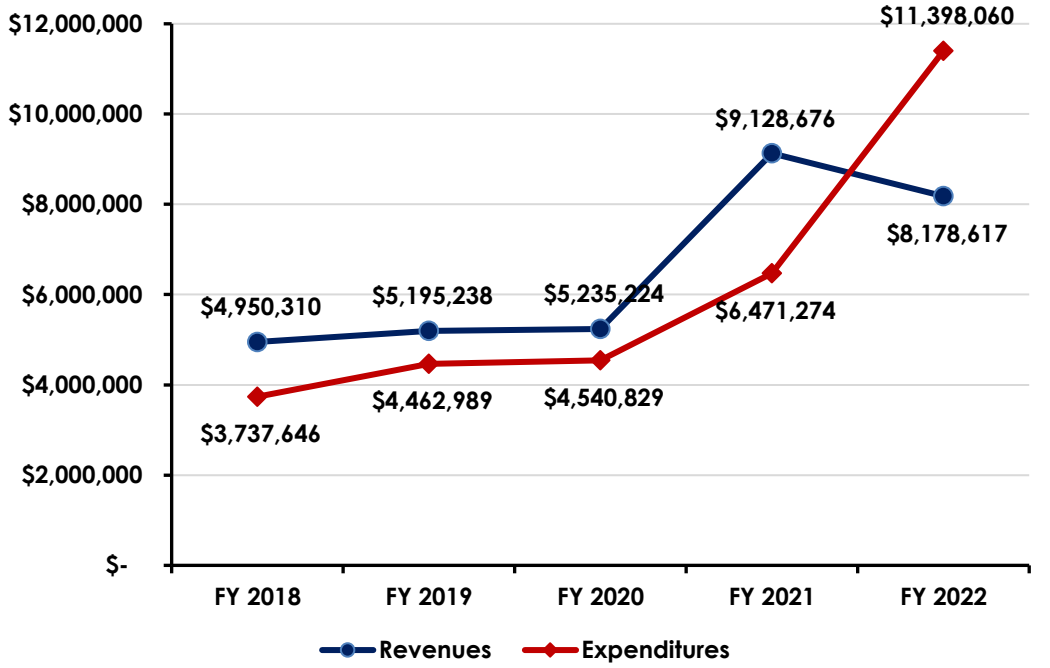
The following figure represents the historical revenues and expenditures of the department.

Figure 17: CSA-48—SCCFD Summarized Fire Protection Fund Revenues & Expenses (FY 2018–FY 2022)

Revenue/Expenses	FY 17/18 (Actual)	FY 18/19 (Actual)	FY 19/20 (Actual)	FY 20/21 (Actual)	FY 21/22 (Estimates)
Recurring Revenue	4,924,523	5,156,162	5,210,246	9,081,276	8,163,937
Other Revenues	25,787	39,076	24,978	47,400	14,680
Total Revenues:	**4,950,310**	**5,195,238**	**5,235,224**	**9,128,676**	**8,178,617**
CAL FIRE Contract	2,884,875	3,095,767	3,441,380	5,016,961	5,101,359
Salaries & Benefits	79,334	99,116	99,868	137,551	98,386
Services & Supplies	718,726	855,271	876,880	952,408	2,382,260
Total Recurring Expenses	3,682,935	4,050,154	4,418,128	6,106,920	7,582,005
Capital Outlay	54,711	412,835	122,701	364,354	3,761,055
Contingencies	—	—	—	—	55,000
Total Non-Recurring Expenditures	54,711	412,835	122,701	364,354	3,816,055
Total Expenditures:	**3,737,646**	**4,462,989**	**4,540,829**	**6,471,274**	**11,398,060**
Total Surplus (Deficit):	**1,212,664**	**732,249**	**694,395**	**2,657,402**	**-3,219,443**
Beginning Reserves	3,531,923	4,744,587	5,476,836	6,171,230	8,828,632
Ending Reserves:	**4,744,587**	**5,476,836**	**6,171,231**	**8,828,632**	**5,609,189**

The following figure displays this data and indicates CSA 48's historical revenues and expenditures.

Figure 18: CSA 48—Summarized Fire Protection Fund Revenues & Expenses



Financial Projections

The FY 2023 budget forecasts a total revenue growth rate of 2.95% from FY 2022. Property tax revenue and fire protection services are forecast to increase by 3% between the FY 2022 and FY 2023 budgets. Property tax-related revenues will be forecast to increase at 3% using the FY 2023 budget as a base year. Interest revenue is forecast at 4% based on the ending reserve balance. Other revenues are forecast to remain consistent.

As previously discussed, the service agreement between the County and CAL FIRE is the largest single item in the budget, consuming approximately 91% of the budgeted recurring expenditures in FY 2023. The CAL FIRE service contract is expected to increase by approximately 3% annually using FY 2023 as the base year. The County anticipates savings, based on historical information, of approximately $1,300,000 between the budgeted amount and the actual billings to be received from CAL FIRE.

The operating costs of the fire department are forecast to increase 3% annually based on the FY 2023 adopted budget amounts. Capital outlay is budgeted at $970,000 in FY 2023 and forecast at $25,000 annually thereafter. Contingencies, included in expenditures, are forecast at $200,000 annually.

The following projections were developed from the historical trends identified in the financial analysis. As indicated, the financial projections forecast a significant surplus between revenues and expenditures.

Figure 19: CSA 48—County Fire Projections

Description	FY 22/23 Budget[10]	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28
Revenue	8,482,066	8,888,330	9,194,295	9,511,501	9,840,376	10,181,370
Expenditures	7,819,371	7,411,649	7,670,903	7,939,902	8,219,024	8,508,667
Net Surplus (Deficit):	**662,695**	**1,476,681**	**1,523,392**	**1,571,599**	**1,621,352**	**1,672,703**

The FY 2023 budget forecasts a growth rate of 5.3% from FY 2022 in the FPF but to remain conservative, recurring revenues are forecast to grow at 4.5% annually using FY 2023 as the base period. Other revenues are forecast to remain consistent.

Capital Planning

Santa Cruz County has developed a Fire Department Capital Outlay Plan that only includes fleet vehicles, but no source of funding for the purchases was identified in the materials provided.[11] The County of Santa Cruz owns four stations (Sta. 31-Fall Creek, Sta. 32-Bonny Doon/Martin, Sta. 34-Bonnty Doon/McDermott, and Sta. 37-Davenport).

Santa Cruz County CSA-4—Pajaro Dunes

Financial Overview

Santa Cruz County provides fire protection for the Pajaro Dunes community under a contract with CAL FIRE. The County assesses and collects various types of property taxes, including a Fire Protection Tax, within the boundaries of County Service Area 4. The County accounts for the revenues and expenditures separately within its accounting system using the fund accounting concept of reporting. The County prepares an annual operating budget based on a July through June fiscal year. Services to the community are provided through a contract with the State of California (CAL FIRE).

The CAL FIRE Agreement requires the County to provide for the costs to maintain equipment and property that it owns but is utilized by CAL FIRE in the performance of its contractual obligations to the County.

Fire Protection Fund Recurring Revenues & Expenses

A significant amount of information was provided by County staff and was reviewed to develop a financial trend analysis for the preceding five-year period, from fiscal year 2018 through fiscal year 2022.[12] This review of the historical information of Fire Protection Fund (FPF) for County Fund 304300 revenues revealed recurring revenues increased from $1,192,000 in FY 2018 to a budgeted $1,349,000 in FY 2022, a 13.1% overall increase, or an annualized increase of approximately 6.6%.

Property tax revenues are the most significant source of Fire Protection Fund Revenues, followed by a special assessment Fire Protection Tax which is not restricted to certain uses. Combined, these two sources account for almost 98% of Fire Protection Fund Revenues from the Service District. Other sources of revenue include charges for services, interest, and other sources.

The Fire Protection Fund expends funds for extra help salaries and benefits, the service contract with CAL FIRE, services and supplies, allocation of county overhead, capital expenditures, and contingencies. In FY 2022, a new Type I engine was acquired. Per CAL FIRE, Type 1 apparatus have an expected useful life of 15 years.

The most significant annual expenditure of County Service Area 4 (CSA 4) is for its service agreement with CAL FIRE. This payment typically requires approximately 90% of the annual recurring expenditures.

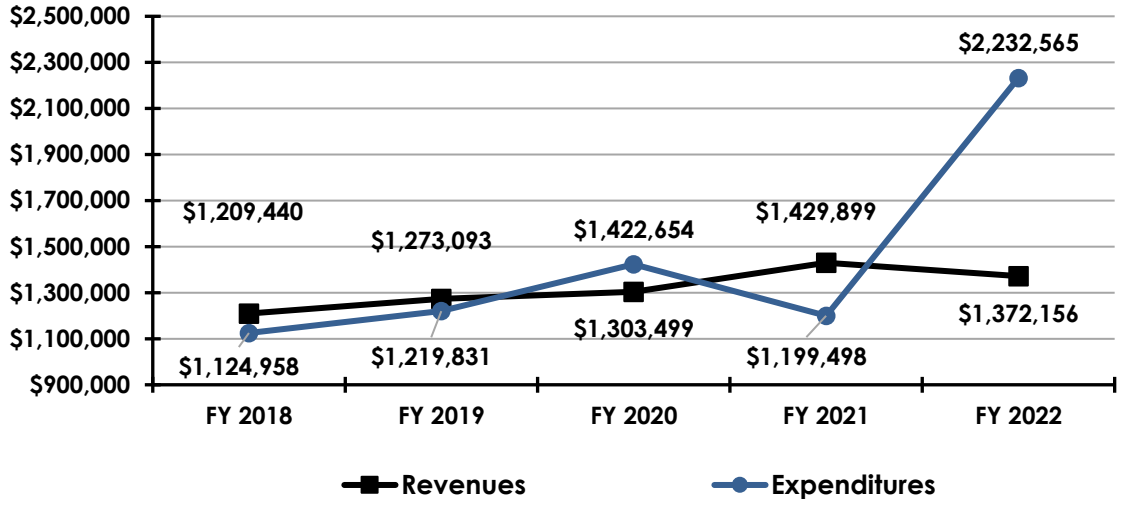
Due to the source of its funding streams, the COVID-19 pandemic had no significant negative impact on revenues in FY 2020 and FY 2021. The following figure represents the historical revenues and expenditures of the department.

Figure 20: Santa Cruz CSA 4 Summarized FPF Revenues & Expenses

Revenue/Expenses	FY 17/18 (Actual)	FY 18/19 (Actual)	FY 19/20 (Actual)	FY 20/21 (Actual)	FY 21/22 (Estimates)
Recurring Revenue	1,192,373	1,245,074	1,277,428	1,358,316	1,348,659
Other revenues	17,067	28,019	26,071	71,583	23,497
Total Revenues:	**1,209,440**	**1,273,093**	**1,303,499**	**1,429,899**	**1,372,156**
Salaries and benefits	70,917	49,571	27,150	-—	—
CAL FIRE contract	960,323	1,090,681	1,223,325	1,095,464	1,379,000
Services & supplies	72,069	76,285	159,579	97,587	163,265
Allocated county overhead	5,675	3,294	4,104	6,447	11,506
Total Recurring:	**1,108,984**	**1,219,831**	**1,414,158**	**1,199,498**	**1,553,771**
Capital & other	15,974	—	8,497	—	678,794
Total expenditures	1,124,958	1,219,831	1,422,655	1,199,498	2,232,565
Total Surplus (Deficit)	**84,482**	**53,262**	**(119,154)**	**230,401**	**(860,409)**
Beginning Reserves	925,446	1,009,928	1,063,190	944,036	1,174,437
Ending Reserves:	**1,009,928**	**1,063,190**	**944,036**	**1,174,437**	**314,028**

The following figure displays this data and indicates CSA 4's historical revenues and expenditures.

Figure 21: Summarized Fire Protection Fund Revenues & Expenses



Financial Projections

Property tax revenue growth has averaged approximately 3.3% between FY 2018 and FY 2022. The FY 2023 budget forecasts a growth rate of 3.1% from FY 2022 but, to remain conservative and consistent with the more recent trend, recurring revenues are forecast to grow at 3% annually using FY 2023 as the base period. Fire Protection Tax collections have shown an annual growth rate of 4.7% during the historical analysis study period and are forecast to continue to grow at 4.2% annually. Other revenues are forecast to remain consistent.

As previously discussed, the service agreement between CSA 4 and CAL FIRE is the largest single item in the budget, consuming approximately 90% of the budgeted expenditures annually. CAL FIRE projects their operating costs for each budget cycle but invoices only for those amounts expended in each category, which are typically less than the projected amounts. The County's staff have projected the cost savings of labor based on historical experience. The costs of this service increase and decrease dependent on significant incidents in the department and growth in wages and benefits. This study will forecast growth in this category at 3% annually, again using the FY 2023 budgeted amounts as a base year. Other services and supplies are also forecast at 3% annually. Non-recurring expenditures are forecast at $50,000 annually for capital outlay and $100,000 for contingencies.

The following projections were developed from the historical trends identified in the financial analysis. As indicated, the financial projections forecast a significant deficit between revenues and expenditures.

Figure 22: Santa Cruz CSA 4 FPF Summarized Projected Revenues & Expenditures

Description	FY 22/23 Budget[13]	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28
Revenue	1,411,610	1,460,191	1,505,794	1,557,773	1,611,617	1,667,393
Expenditures	1,701,983	1,748,542	1,796,499	1,845,894	1,896,771	1,949,174
Net Surplus (Deficit):	**(290,373)**	**(288,352)**	**(290,705)**	**(288,120)**	**(285,154)**	**(281,780)**

Capital Planning

An overall Capital Improvements/Replacement Plan was not observed in the documentation provided by the County, but an apparatus list provided by the County indicated a significant number of assets appear to be approaching their expected useful life. CSA 4 owns Sta. 42-Pajaro Dunes.

Capital Facilities & Apparatus

Trained personnel, apparatus and vehicles, firefighting and emergency medical equipment, and fire stations are the essential capital resources necessary for a fire department to carry out its mission. No matter how competent or numerous the firefighters are, if appropriate capital equipment is not available for operations personnel, it would be impossible for the Santa Cruz County Fire Department to perform its responsibilities effectively. The essential capital assets for emergency operations are facilities, apparatus, and other emergency response vehicles. This report section assesses SCCFD's (and CAL FIRE) fire stations, vehicles, and apparatus—although CAL FIRE apparatus and vehicles were not included in this review.

Fire Stations Features

Fire stations play an integral role in delivering emergency services for several reasons. To a large degree, a station's location will dictate response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure, or survival from sudden cardiac arrest. Fire stations also need to be designed to adequately house equipment and apparatus and meet the needs of the organization and its personnel.

Fire station activities should be closely examined to ensure the structure is adequate in size and function. Examples of these functions can include the following:

- Kitchen facilities, appliances, and storage
- Residential living space and sleeping quarters for on-duty personnel (all genders)
- Bathrooms and showers (all genders)
- Training, classroom, and library areas
- Firefighter fitness area
- The housing and cleaning of apparatus and equipment, including decontamination and disposal of biohazards
- Administrative and management offices, computer stations, and office facilities
- Public meeting space

In gathering information from SCCFD, Triton asked the department to rate the condition of its fire stations using the criteria from the following figure. The results will be seen in the figures after that.

Figure 23: Criteria Utilized to Determine Fire Station Condition

Excellent	Like new condition. No visible structural defects. The facility is clean and well-maintained. The Interior layout is conducive to function with no unnecessary impediments to the apparatus bays or offices. No significant defect history. Building design and construction match the building's purposes. Age is typically less than ten years.
Good	The exterior has a good appearance with minor or no defects. Clean lines, good workflow design, and only minor wear on the building interior. The roof and apparatus apron are in good working order, absent any significant full-thickness cracks, crumbling of the apron surface, or visible roof patches or leaks. Building design and construction match the building's purposes. Age is typically less than 20 years.
Fair	The building appears structurally sound with a weathered appearance and minor to moderate non-structural defects. The interior condition shows normal wear and tear but flows effectively to the apparatus bay or offices. Mechanical systems are in working order. Building design and construction may not match the building's purposes well. Showing increasing age-related maintenance but with no critical defects. Age is typically 30 years or more.
Poor	The building appears to be cosmetically weathered and worn with potentially structural defects, although not imminently dangerous or unsafe. Large, multiple full-thickness cracks and crumbling of concrete on the apron may exist. The roof has evidence of leaking and multiple repairs. The interior is poorly maintained or shows signs of advanced deterioration with moderate to significant non-structural defects. Problematic age-related maintenance and major defects are evident. It may not be well-suited to its intended purpose. Age is typically greater than 40 years.

State & County Fire Stations

The following figures illustrate the details of each of the fire stations.

Figure 24: CAL FIRE Station 21 (Saratoga Summit)

Address/Physical Location:	12900 Skyline Blvd, Los Gatos, CA 95030
	**General Description:** This facility is one of the oldest CALFIRE stations in Santa Cruz County and it consists of several independent and adjacent structures. The living quarters appear to be well-maintained and conform to CAL FIRE operations and the housing of both male and female firefighters.

Structure						
Date of Original Construction	1930s					
Building Owner	State of California					
General Condition	Fair					
Seismic Protection	Yes					
Auxiliary Power	Generator					
ADA Compliant	Apparatus Bay-Yes; Barracks/Day Room-No					
Number of Apparatus Bays	Drive-Throughs	0	Back-Ins	3	Total Bays:	3
Total Square Footage	5,500					
Facilities Available						
Sleeping Quarters	Bedrooms	3	Beds	3	Dorm Beds	11
Maximum Staffing Capability	14	(Total number of staff that can be housed at station)				
Bathroom/Shower Facilities	Yes					
Gender Segregation (Y/N)	Bathrooms	Y	Showers	Y	Bedrooms	Y
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Training/Meeting Rooms	No					
Washer/Dryer/Extractor	Yes					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	Yes					
Decon & Biological Disposal	No					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 25: Santa Cruz County FD Station 29 (Las Cumbres)

Address/Physical Location:	18269 Las Cumbres Rd., Los Gatos, CA 95003

General Description:

This fire station is more than 35 years old and consists of two back-in apparatus bays in addition to a small meeting and office space.

An additional back-in garage building is located to the rear and has a space to adequately house two utility vehicles.

Structure						
Date of Original Construction	1986					
Building Owner	Community					
Seismic Protection	Yes					
Auxiliary Power	Generator					
General Condition	Fair					
Number of Apparatus Bays	Drive-through Bays	0		Back-in Bays	4	
ADA Compliant	No					
Total Square Footage	2,200					
Facilities Available						
Sleeping Quarters	0	Bedrooms	0	Beds	0	Dorm Beds
Maximum Staffing Capability	All Volunteer					
Exercise/Workout Facilities	No					
Kitchen Facilities	No					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Bathroom, no shower					
Training/Meeting Rooms	Yes					
Washer/Dryer/Extractor	No					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	No					
Decon & Biological Disposal	No					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 26: CAL FIRE Station 31 (Fall Creek)

Address/Physical Location:	7272 Empire Grade Rd, Santa Cruz, CA 95060

General Description:
This is a CAL FIRE wildland fire station with a single back-in apparatus bay. The firefighter living quarters and office space are in a separate adjacent one-story wood frame structure. The buildings appear to be well maintained and upgraded to accommodate all genders who may live and work on-site.

Structure							
Date of Original Construction	1990s						
Building Owner	State of California						
General Condition	Fair						
Seismic Protection	Yes						
Auxiliary Power	Generator						
ADA Compliant	No						
Number of Apparatus Bays	Drive-Throughs	0	Back-Ins	1	Total Bays:	1	
Total Square Footage	1,900						
Facilities Available							
Sleeping Quarters	Bedrooms	3	Beds	6	Dorm Beds	0	
Maximum Staffing Capability	6	(Total number of staff that can be housed at station)					
Bathroom/Shower Facilities	Yes						
Gender Segregation (Y/N)	Bathrooms	3	Showers	3	Bedrooms	3	
Exercise/Workout Facilities	Yes						
Kitchen Facilities	Yes						
Individual Lockers Assigned	Yes						
Training/Meeting Rooms	No						
Washer/Dryer/Extractor	Yes						
Safety & Security							
Station Sprinklered	No						
Smoke Detection	Yes						
Decon & Biological Disposal	Extractor for decon; no disposal						
Security System	No						
Apparatus Exhaust System	No						

Figure 27: Santa Cruz County FD Station 32 (Martin)

Address/Physical Location:	975 Martin Rd, Santa Cruz, CA 95060

General Description:
This fire station is a 52-year-old wood-frame single-story facility. It has been adequately maintained and appears to provide appropriate facilities for the volunteer firefighters and equipment assigned to it.

Structure						
Date of Original Construction	1972					
Building Owner	County of Santa Cruz					
Seismic Protection	Yes					
Auxiliary Power	Generator					
General Condition	Fair					
Number of Apparatus Bays	Drive-through Bays	1		Back-in Bays	3	
ADA Compliant	Yes					
Total Square Footage	2,800					
Facilities Available						
Sleeping Quarters	1	Bedrooms	1	Beds	0	Dorm Beds
Maximum Staffing Capability	All Volunteer					
Exercise/Workout Facilities	No					
Kitchen Facilities	Yes					
Individual Lockers Assigned	No					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer/Extractor	Washer and dryer. No Extractor					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	Yes					
Decon & Biological Disposal	No					
Security System	Camera in apparatus bay					
Apparatus Exhaust System	Yes					

Figure 28: CAL FIRE Station 33 (Big Creek)

Address/Physical Location:	240 Swanton Rd, Davenport, CA 95017

General Description:
This facility is a CAL FIRE wildland fire station. It is an attached one-story wood-frame building with living quarters and a two-bay, back-in apparatus storage structure.

Structure						
Date of Original Construction	1977					
Building Owner	State of California					
General Condition	Fair					
Seismic Protection	Yes					
Auxiliary Power	Generator					
ADA Compliant	Yes					
Number of Apparatus Bays	Drive-Throughs	0	Back-Ins	2	Total Bays:	2
Total Square Footage	2,785 square feet					
Facilities Available						
Sleeping Quarters	Bedrooms	1	Beds	8	Dorm Beds	8
Maximum Staffing Capability	8	(Total number of staff that can be housed at station)				
Bathroom/Shower Facilities	Yes					
Gender Segregation (Y/N)	Bathrooms	2	Showers	8	Bedrooms	1
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Training/Meeting Rooms	In kitchen area					
Washer/Dryer/Extractor	Washer/dryer; no extractor					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	Yes					
Decon & Biological Disposal	No					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 29: Santa Cruz County FD Station 34 (McDermott)

Address/Physical Location:	7276 Empire Grade Rd, Santa Cruz, CA 95060

General Description:
Station 34 is a 19-year-old two-story metal frame structure (fire sprinklered). The ground floor is occupied by volunteer quarters (kitchen, day room and office spaces) in addition to two back-in apparatus bays. The second floor is primarily used for equipment storage.

Structure						
Date of Original Construction	2004					
Building Owner	County of Santa Cruz					
Seismic Protection	Yes					
Auxiliary Power	Generator					
General Condition	Good					
Number of Apparatus Bays	Drive-through Bays	0	Back-in Bays	3		
ADA Compliant	Yes					
Total Square Footage	3,300					
Facilities Available						
Sleeping Quarters	0	Bedrooms	0	Beds	0	Dorm Beds
Maximum Staffing Capability	All Volunteer					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	No					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer/Extractor	Washer and dryer; no extractor					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	No					
Decon & Biological Disposal	No					
Security System	Camera in apparatus bay					
Apparatus Exhaust System	Yes					

Figure 30: Santa Cruz County FD Station 36 (Loma Prieta)

Address/Physical Location:	17445 Old Summit Road, Los Gatos, CA 95033

General Description:
Station 36 is a 24-year-old one-story, metal-framed, fire sprinklered structure. It has three back-in apparatus bays.

Structure						
Date of Original Construction	1999					
Building Owner	Loma Prieta Volunteer Fire and Rescue, a 501(c)3					
Seismic Protection	Yes					
Auxiliary Power	Generator					
General Condition	Good					
Number of Apparatus Bays	Drive-through Bays	0	Back-in Bays	2		
ADA Compliant	Yes					
Total Square Footage	2,500					
Facilities Available						
Sleeping Quarters	0	Bedrooms	0	Beds	0	Dorm Beds
Maximum Staffing Capability	All Volunteer					
Exercise/Workout Facilities	No					
Kitchen Facilities	Yes					
Individual Lockers Assigned	No					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer/Extractor	No					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	No					
Decon & Biological Disposal	No					
Security System	Cameras					
Apparatus Exhaust System	Yes					

Figure 31: Santa Cruz County FD Station 37 (Davenport)

Address/Physical Location:	76 Marine View Ave, Davenport, CA 95017

General Description:
Station 37 is more than 40 years old and has three drive-through apparatus bays, an equipment storage loft, and a small meeting room and office for use by the volunteer firefighters assigned to this fire station.

Structure						
Date of Original Construction	1980s					
Building Owner	County of Santa Cruz					
Seismic Protection	Yes					
Auxiliary Power	Generator					
General Condition	Fair					
Number of Apparatus Bays	Drive-through Bays	3	Back-in Bays	0		
ADA Compliant	Yes					
Total Square Footage	3,150					
Facilities Available						
Sleeping Quarters	0	Bedrooms	0	Beds	2	Dorm Beds
Maximum Staffing Capability	All Volunteer					
Exercise/Workout Facilities	No					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes/Yes					
Training/Meeting Rooms	Yes/Yes					
Washer/Dryer/Extractor	Washer and dryer; no extractor					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decon & Biological Disposal	No					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 32: Santa Cruz County FD Station 42 (Pajaro Dunes)

Address/Physical Location:	50 Rio Boca Rd, Watsonville, CA 95076

General Description:
Station 42 is a two-story wood frame, fire sprinklered facility with a small office/public area and a kitchen/day room. The second floor is accessible by an interior staircase and exterior stairs leading down to the rear of the building's exterior. The sleeping area is located on this floor.

Structure							
Date of Original Construction							
Building Owner	CSA 4						
General Condition	Good						
Seismic Protection	Yes						
Auxiliary Power	Generator						
ADA Compliant	Office yes, Living quarters no						
Number of Apparatus Bays	Drive-Throughs	2	Back-Ins	0	Total Bays:	2	
Total Square Footage	2,400						
Facilities Available							
Sleeping Quarters	Bedrooms	3	Beds	3	Dorm Beds	0	
Maximum Staffing Capability	3	(Total number of staff that can be housed at station)					
Bathroom/Shower Facilities							
Gender Segregation (Y/N)	Bathrooms	Y	Showers	Y	Bedrooms	Y	
Exercise/Workout Facilities	Yes						
Kitchen Facilities	Yes						
Individual Lockers Assigned	Yes						
Training/Meeting Rooms	No						
Washer/Dryer/Extractor	Yes/Yes/No						
Safety & Security							
Station Sprinklered	Yes						
Smoke Detection	Yes						
Decon & Biological Disposal	Yes						
Security System	No						
Apparatus Exhaust System	Yes						

Figure 33: CAL FIRE Station 47 (Burrell)

Address/Physical Location:	2050 Highland Way, Los Gatos, CA 95030

General Description:
This is a CAL FIRE wildland fire station. It consists of several independent and adjacent structures, including a dormitory/sleeping facility, kitchen, day room, and a remote two-bay back-in apparatus garage.

Structure							
Date of Original Construction	1948						
Building Owner	State of California						
General Condition	Fair						
Seismic Protection	Yes						
Auxiliary Power	Generator						
ADA Compliant	Yes						
Number of Apparatus Bays	Drive-Throughs	2	Back-Ins	1	Total Bays:	3	
Total Square Footage	4,530						
Facilities Available							
Sleeping Quarters	Bedrooms	4	Beds	6	Dorm Beds	0	
Maximum Staffing Capability	6	(Total number of staff that can be housed at station)					
Bathroom/Shower Facilities	Yes						
Gender Segregation (Y/N)	Bathrooms	Y	Showers	Y	Bedrooms	Y	
Exercise/Workout Facilities	Yes						
Kitchen Facilities	Yes						
Individual Lockers Assigned	Yes						
Training/Meeting Rooms	No						
Washer/Dryer/Extractor	Yes						
Safety & Security							
Station Sprinklered	No						
Smoke Detection	Yes						
Decon & Biological Disposal	Yes						
Security System	No						
Apparatus Exhaust System	Yes						

Figure 34: CAL FIRE Station 49 (Corralitos)

Address/Physical Location:	120 Eureka Canyon Rd, Watsonville, CA 95076

General Description:
This fire station is a 50-year-old one-story wood-framed facility. It includes five drive-through apparatus bays, and firefighter living quarters adequate to accommodate at least two fire companies. Facilities are adequate to support volunteer firefighters assigned to it. This facility is shared by both the Corralitos Station 41 volunteers and the Station 49 personnel.

Structure						
Date of Original Construction	1970					
Building Owner	State of California					
Seismic Protection	Yes					
Auxiliary Power	Generator					
General Condition	Fair					
Number of Apparatus Bays	Drive-through Bays	5	Back-in Bays	1		
ADA Compliant	Yes					
Total Square Footage	6,000					
Facilities Available						
Sleeping Quarters	7	Bedrooms	13	Beds	0	Dorm Beds
Maximum Staffing Capability	13					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer/Extractor	Yes					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	Yes					
Decon & Biological Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Summary of the Fire Stations in the SCCFD Service Area

Santa Cruz County Fire Department utilizes a mixture of county-owned (Volunteer) and state-owned (CAL FIRE) stations to house fire apparatus and support emergency response personnel. The fire stations were evaluated using the National Fire Protection Association's Standard: Fire Department Occupational Safety, Health, and Wellness Program as a guide. A walkthrough inspection of each facility was completed during site visits in December 2022.

Overall, the County's fire stations are older and do not meet the requirements of today's modern fire service. As the firefighting environment has changed, the technology, equipment, and safety systems have also changed to meet new demands. Older buildings do not typically have the space or engineered systems to meet that new environment. Modern living also requires much more access to electrical outlets and technology than was designed in facilities constructed decades ago.

Older buildings typically do not meet the requirements, due to the need to decontaminate personnel and equipment after many of the responses in the current firefighting context. Every crew member should have access to facilities to decontaminate immediately after a fire or hazardous event, and showers should allow for gender separation. In addition, there needs to be enough partitioned space to allow for gear and equipment to be thoroughly washed and decontaminated without causing exposure to both the living and working spaces of the fire station. Many of the facilities currently utilized by SCCFD do not meet this need.

While all structures require routine maintenance, staffed fire stations require even more maintenance due to their continuous occupancy by a minimum of three or more firefighters. Volunteer stations although not occupied on a 24-hour basis, still require the same high degree of ongoing maintenance because they are essential public safety facilities. It appears the fire stations are being adequately maintained despite their age and frequency of use. County-owned volunteer facilities were often cluttered and disorganized which could be attributed to a lack of available storage space, or dedicated locations for equipment maintenance. Most stations were supplied with an apparatus exhaust removal system. During the inspection, it was noted that only a few of the apparatus located in stations were attached and utilizing the exhaust removal equipment.

The following figure is a summary list of some of the primary features of the various county and state-owned fire stations located throughout the SCCFD service area.

Figure 35: Summary of the Fire Stations in the SCCFD Service Area (2023)

Station	Square Footage	Apparatus Bays	Minimum Staffing	General Condition	Station Age	County or State[A]
Station 21	5,500	6	6	Fair	88 years[B]	S
Station 29	2,200	4	Volunteers	Fair	37 years	C
Station 31	1,900	2	3	Fair	28 years	S
Station 32	2,800	4	Volunteers	Fair	51 years	C
Station 33	2,785	4	3	Fair	46 years	S
Station 34	3,300	3	Volunteers	Good	19 years	C
Station 36	2,500	2	Volunteers	Good	24 years	C
Station 37	3,150	3	Volunteers	Fair	38 years[B]	C
Station 42	2,400	2	2	Good		C
Station 47	4,530	5	3	Fair	75 years	S
Station 49	6,000	5	13[C]	Fair	53 years	S
Totals:	**34,665**	**38**	**28+**	**Average:**	**46 years**	

[A] C = County-owned, S = State-owned. [B] Approximate age. [C] Includes volunteers and CAL FIRE staff.

As shown in the preceding figure, fire stations owned by the State of California have a combined average age of 58 years as of 2023, while those owned by Santa Cruz County averaged nearly 34 years.

Station 21—Saratoga Summit

Station 21 is a CAL FIRE facility built in 1930 and modeled on a design utilized by the State to house personnel and fire apparatus remotely throughout the rural areas of California. Separate and remote buildings were built to house personnel (dormitory/living quarters/kitchen/dining) and fire apparatus. The facilities appear to have been remodeled in the last decade to accommodate both male/female firefighters and increased crew sizes. The station appeared to be clean, well-maintained, and adequate to support the currently assigned personnel.

Station 29—Las Cumbres

Station 29 is staffed by Volunteer firefighting personnel serving the Las Cumbres Community. The station was built in 1986 and consists of two buildings. One building is designed expressly to house fire apparatus and equipment to support a small volunteer fire company. The facility does not have adequate space to accommodate full-time 24 hr. personnel. The building is a wood frame one-story structure with two apparatus bays (back-in type). An additional one-story newer metal building housing one apparatus bay is located behind the primary fire station. Both budlings appear to be well-maintained and adequate to serve the volunteer firefighters and equipment located at this station.

Station 31—Fall Creek

This is a CAL FIRE station co-located with Bonny Doon Volunteer Station 34 (McDermott). Station 31 is one of the five Amador-funded stations as part of the CAL FIRE cooperative agreement during the non-peak fire season.

The station consists of a single-story building that serves as a storage building for fire apparatus and a meeting location for volunteer personnel. The building has been recently upgraded to a metal shed style with concrete floors. The firefighter living quarters and office space are in a separate adjacent one-story wood frame structure. Neither of the buildings is protected by a fire suppression/detection system. An emergency generator has been installed to provide uninterrupted power. The layout of the station is consistent with other CAL FIRE wildland fire station facilities. The buildings appear to be well-maintained and upgraded to accommodate both male and female firefighters living and working on-site.

Station 32—Martin

The Martin Station, built in 1972, is a one-story 2,800 sq. ft. wood frame structure with four apparatus bays. One bay is configured to provide drive-through capability. The facility has a generator capable of providing emergency power when required. It is one of two fire stations used by Bonny Doon Volunteers. Several fire apparatus are housed here to cover the western portions of the Bonny Doon community. In addition to the apparatus storage area, the fire station has a small office, a shop/storage room, a restroom, a kitchen, and a multi-purpose meeting/training room. A small apartment-like living area is located on the second floor. This area is accessed by a staircase leading from the Northwest corner of the apparatus storage area. This portion of the fire station is not ADA-compliant. The overall condition of the station was fair and well-maintained.

Station 33—Big Creek

This is a State-owned wildland fire station that supports the Santa Cruz County Fire Department countywide response. Station 33 is one of the five Amador-funded stations as part of the CAL FIRE cooperative agreement during the non-peak fire season.

The station is a one-story wood-frame building built in 1977. It consists of a residential structure attached to a large two-bay garage designed to house two fire apparatus. The facility has on-site fuel storage/dispensing equipment. An emergency generator is located on the property for use when the area experiences an interruption in electrical service.

Station 34—McDermott

This fire station is co-located with Station 31 on a parcel at the intersection of Empire Grade, Ice Cream Grade, and Felton-Empire Road. The two-story metal structure station was built in 1984 and is comprised of three large back-in apparatus bays, an attached office area, a commercial-style kitchen, a general-purpose training/meeting room, restrooms, and shower facilities on the ground floor. Portions of the first floor are ADA-compliant, and the facility is protected by an automatic fire sprinkler system. Portions of the second story include a recreation area, a large fitness center, and a storage area. This area is not ADA-compliant. The station is also supported by an emergency generator, a commercial-size propane storage tank, in addition to a large above-ground water storage tank.

Station 36—Loma Prieta

Station 36 is a single-story building constructed in 1999. The station is a single-story metal building that serves as a storage building for fire apparatus and a meeting location for volunteers. The facility is sprinklered and consists of three back-in apparatus bays and a small office/storage area with a gender-neutral restroom. This station is located on a small parcel of land and has limited parking to accommodate responding volunteer firefighter vehicles during emergencies. A security camera system has been installed in addition to an emergency generator to address potential electrical power interruptions.

Station 37—Davenport

Station 37 is a one-story wood frame structure. The building is fully sprinklered and supported by a propane generator. The station is situated on a parcel that provides quick access to Highway 1. The facility has three drive-through apparatus bays, a small meeting/office space, and limited storage for fire equipment and supplies. A large, paved area behind the facility serves as parking and a training ground for volunteer firefighters.

Station 42—Pajaro Dunes

Located at the entrance to the Pajaro Dunes beachside residential community, this two-story wood-frame fire station is approximately 40 years old. The station is protected by an automatic fire sprinkler system and supported by an emergency generator. Two drive-through fire apparatus bays provide storage for the fire engines and equipment assigned to this station. The building appears to be well maintained and adequate to meet the needs of the two-person engine company assigned to protect the Pajaro Dunes community.

Station 47—Burrell

Station 47 is a CAL FIRE wildland fire station located on Highland Way in Los Gatos, CA. The station is one of the five Amador stations that serve Santa Cruz County FD as part of the CAL FIRE cooperative agreement during the non-peak fire season. The facility is typical of the state's wildland fire station design. The crew quarters and kitchen/living areas are housed in separate buildings and remote from the fire apparatus storage building. The facilities have been remodeled over the years to accommodate the changes in CAL FIRE staffing demographics. The facility has the capacity for six firefighters and two engines. The station is supported by an emergency generator.

Station 49—Corralitos

This fire station, built in 1970, is a large one-story wood-frame building shared by CAL FIRE and the Corralitos Volunteer Fire Company (Station 41). The facility has five drive-through apparatus bays. The station is ample size and has capacity for up to 13 personnel, in addition to the volunteers assigned to the station. The fire station is supported by an emergency generator.

Apparatus & Vehicles Inventory

Fire apparatus, ambulances, and other emergency response vehicles must be sufficiently reliable to transport firefighters and equipment rapidly and safely to an incident scene. In addition, such vehicles must be properly equipped and function appropriately to ensure that the delivery of emergency services is not compromised.

As a part of this study, AP Triton requested that the Santa Cruz County Fire Department provide a complete inventory of its fleet (suppression apparatus, ambulances, command and support vehicles, specialty units, etc.). For each vehicle listed, SCCFD was asked to rate its condition utilizing criteria described in the next figure—the results of which will be shown in the subsequent apparatus inventory figures.

Figure 36: Criteria Used to Determine Apparatus & Vehicle Condition

Components	Points Assignment Criteria	
Age:	One point for every year of chronological age, based on the date the unit was originally placed into service.	
Miles/Hours:	One point for every 10,000 miles or 1,000 hours	
Service:	1, 3, or 5 points are assigned based on service type received (e.g., a pumper would be given a 5 since it is classified as severe duty).	
Condition:	This category considers body condition, rust, interior condition, accident history, anticipated repairs, etc. The better the condition, the lower the assignment of points.	
Reliability:	Points are assigned as 1, 3, or 5, depending on the frequency a vehicle is in for repair (e.g., a 5 would be assigned to a vehicle in the shop 2 or more times per month on average, while a 1 would be assigned if in the shop on average once every 3 months or less.	
Point Ranges	**Condition Rating**	**Condition Description**
Under 18 points	Condition I	Excellent
18–22 points	Condition II	Good
23–27 points	Condition III	Fair (consider replacement)
28 points or higher	Condition IV	Poor (immediate replacement)

The next figure lists the inventory of SCCFD's current frontline apparatus and staff vehicles. Note that several engines and rescues are being replaced or new ones ordered.

Figure 37: SCCFD Apparatus Inventory (2022)

Unit	Type	Year	Condition	Features
Engines				
Engine 2911	Type 1	2009	Good	1500 gpm/650 gal.
Engine 2936	Type 3	2018	Good	500 gpm/500 gal.
Engine 3211	Type 1	2010	Good	1250 gpm/500 gal.
Engine 3222	Type 2	1991	Poor	1000 gpm/500 gal. Being removed from service
Engine 3611	Type 1	2015	Good	1500 gpm/600 gal.
Engine 3638	Type 3	2018	Good	500 gpm/500 gal.
Engine 3641	Type 2	2001	Fair	
Engine 3661	Type 2	1996	Fair	Being removed from service
Engine 3711	Type 1	2022	Excellent	1500 gpm/600 gal.
Engine 3931	Type 3	2022	Excellent	Engine ordered
Engine 3937	Type 3	2022	Excellent	Engine ordered
Engine 4111	Type 1	2022	Excellent	1500 gpm/600 gal.
Engine 4121	Type 2	1991	Fair	1000 gpm/500 gal.
Water Tenders				
Water Tender 2951	Tender	2010	Good	3000 gallons
Water Tender 3251	Tender	2003	Good	3000 gallons
Water Tender 3651	Tender	2018	Fair	2000 gallons
Water Tender 3951	Tender	1994	Good	3000 gallons
Water Tender 4151	Tender	2020	Excellent	2000 gallons
Rescues				
Rescue 2961	Rescue	1995	Fair	Being replaced
Rescue 3261	Rescue	2003	Fair	
Rescue 3661	Rescue	1993	Poor	Being replaced
Rescue 3961	Rescue	2022	Excellent	
Rescue 3967	Rescue	2022	Excellent	

It must be noted that the preceding inventory figure includes apparatus owned by Santa Cruz County and does not account for the various apparatus utilized in Santa Cruz County that are owned and operated by CAL FIRE. SCCFD also maintains one Type 2 engine in reserve, and two Type 1 engines assigned to the Training Division.

The following figure lists the inventory of command and staff vehicles.

Figure 38: SCFD Command & Staff Vehicles Inventory

Unit	Assigned To	Manufacturer	Year	Condition
C1700	Fire Chief	Chevrolet	2018	Excellent
B3905	Battalion Chief	Dodge	2023	Excellent
P3981	Prevention Captain	Ford	2022	Excellent
P3982	Prevention Captain	Ford	2022	Excellent
T1752	Training Captain	Chevrolet	2015	Good
T3907	Training Captain	Ford	2022	Excellent

In the preceding inventory, replacements for P1726 and T1753 have been purchased. Not listed, are four different utility vehicles.

Apparatus Maintenance & Replacement Planning

No piece of mechanical equipment or vehicle can be expected to last indefinitely. As apparatus and vehicles age, repairs tend to become more frequent and more complex. Parts may become more difficult to obtain and downtime for repair and maintenance increases. Given that fire protection, EMS, and other emergencies prove critical to a community, downtime is one of the most frequently identified reasons for apparatus replacement.

Because of the expense of fire apparatus and medic units (ambulances), most communities develop replacement plans. To enable such planning, fire departments often turn to the accepted practice of establishing a life cycle for apparatus that results in an anticipated replacement date for each vehicle.

The reality is that it may be best to establish a life cycle for planning purposes, such as the development of replacement funding for various types of apparatus yet apply a different method (such as a maintenance and performance review) for determining the actual replacement date, thereby achieving greater cost-effectiveness when possible.

Apparatus Maintenance at SCCFD

Most of SCCFD's fleet maintenance is provided by the Fleet Services Division of the Central Fire District of Santa Cruz County (CFD). The Division's staff are certified as Emergency Vehicle Technicians (EVT) in accordance with NFPA 1071: *Standard for Emergency Vehicle Technician Professional Qualifications*.

Preventative maintenance checks are conducted regularly, and maintenance records are consistently completed for all vehicles and apparatus. In addition, pump tests are performed annually in accordance with NFPA 1911: *Standard for the Inspection, Maintenance, Testing, & Retirement of In-Service Emergency Vehicles*.

Economic Theory of Apparatus Replacement

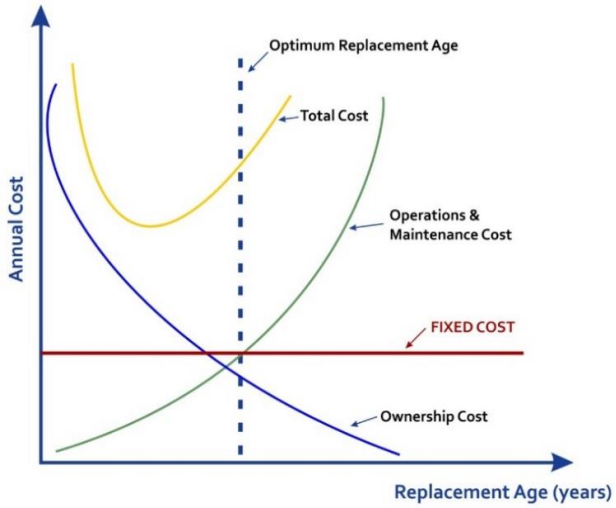
A conceptual model utilized by some fire districts is the *Economic Theory of Vehicle Replacement*. As a vehicle ages, the theory states that the cost of capital diminishes, and its operating costs increase. The combination of these two costs produces a total cost curve. The model suggests that the optimal time to replace any apparatus is when the operating costs begin to exceed the capital costs. This optimal time may not be a fixed point but rather a range of time.

Shortening the replacement cycle to this window allows an apparatus to be replaced at optimal savings to the fire district. If an organization does not routinely replace equipment promptly, the overall reduction in replacement spending can quickly increase maintenance and repair expenditures. Fire officials, who assume that deferring replacement purchases is a good tactic for balancing the budget, need to understand two possible outcomes may occur because of that decision:

- Costs are transferred from the capital budget to the operating budget.
- Such deferral may increase overall fleet costs.

The next figure is a representation of the *Economic Theory of Vehicle Replacement*.

Figure 39: Economic Theory of Vehicle Replacement



Regardless of its net effect on current apparatus and vehicle costs, the deferral of replacement purchases unquestionably increases future replacement spending needs. The deferral may also impact operational capabilities, including the safe and efficient use of apparatus.

Future Apparatus Serviceability

An important consideration for fire departments is the cost associated with the future replacement of major equipment. Apparatus service life can readily be predicted based on factors including vehicle type, call volume, age, and maintenance considerations.

NFPA 1901: Standard for Automotive Fire Apparatus recommends that fire apparatus 15 years of age or older be placed into reserve status, and that apparatus 25 years or older be replaced. This is a general guideline, and the standard recommends using the following objective criteria in evaluating fire apparatus lifespan:

- Vehicle road mileage.
- Engine operating hours.
- Quality of preventative maintenance program and replacement parts availability.
- Quality of the driver-training program.
- Whether the fire apparatus was used within its design parameters.

- Whether the fire apparatus was manufactured on a custom or commercial chassis.
- Quality of workmanship by the original manufacturer.
- Quality of the components used in the manufacturing process.

It is important to note that age is not the only factor for evaluating serviceability and replacement. Vehicle mileage and pump hours on engines must also be considered. A two-year-old engine with 250,000 miles may need replacement sooner than a 10-year-old one with 2,500 miles.

Service Delivery & Performance

This section will give SCCFD a general understanding of relevant response information. It is developed to assist the department with identifying its recent performance and creating a baseline performance expectation. SCCFD, county, and political leaders can then use this information to understand how their decisions, policies, and outside pressures affect performance.

As previously stated, it can be difficult to distinguish between CAL FIRE and the Santa Cruz County Fire Department, but the distinction is very important. As this is a long-range master plan for the Santa Cruz County Fire Department, it is essential for the reader to view the resources provided by CAL FIRE and paid for by Santa Cruz County as a separate entity. Figures, graphs, and maps used to display information specific to the service delivery and performance of the Santa Cruz County Fire Department refer to facilities (stations), apparatus and personnel as SCCFD and are labeled accordingly.

Research Information

The information within this section was developed from various sources provided by SCCFD. Detailed information was provided between January 1, 2018, and December 31, 2022. In addition, less comprehensive total incident volumes were provided between January 1, 2013, through December 31, 2022, to identify long-term trends.

Statistics Discussion

Mathematical and technological methodologies must be used judicially to evaluate something as complex as an emergency incident response. Unfortunately, there are instances of incorrect evaluations leading to severe consequences. This analysis is designed to quantify and analyze available information. The agency should use it as a starting place as they seek to improve performance.

Statistical Tools

Various statistical and analytical tools were employed to create this section. The fundamental tools were categorization, percentile, and regression analysis. This helps paint a picture of historical performance, with some inferences that may help leaders identify positive and negative performance trends.

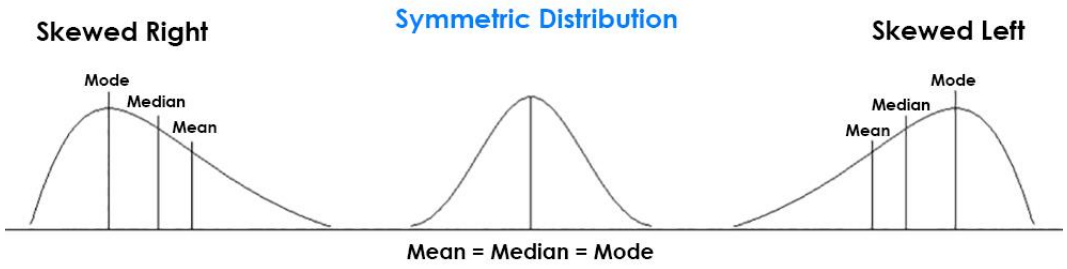
90th Percentile

The time performance measures for this report are done using the 90th percentile measure. While discussing the mathematics behind this measure is outside this report's scope, it is helpful to understand why it is utilized.

The most common reason to use this measure is that the fire service has adopted it. If a fire agency wishes to judge its performance against standards or other agencies, it must use the 90th percentile. For example, the National Fire Protection Association (NFPA) utilizes the 90th percentile measure in most of its standards. In addition, the Commission on Fire Accreditation International (CFAI) requires reporting performance measures at 90%.

The statistical reason to use the measure is that it more fully captures performance and will identify trends in performance more quickly. Unfortunately, the time performance data used in this study has a skew, making other statistical measures less sensitive and representative. The following figure is a general example of data skew.

Figure 40: Data Skew[14]



In a symmetric distribution, the mean (average), median (middle of the data), and mode (the most frequent) are all equal. When the distribution skews, these three measures of the middle shift. Using the average, or mean, in left-skewed data would underrepresent the bulk of the performance. While the opposite is true when skewed right. In SCCFD's case, the time-performance data exhibits a pronounced right skew. In this case, using the average would over-represent the performance. This is not uncommon in the emergency response services. It is rare that the placement of stations creates a symmetric distribution, rather many responses happen near the station but as the travel time extends away from the station the response times get higher, creating this right skew.

Data Discussion

Detailed data was provided from SCCFD's primary incident reporting system (RMS) and the computer-aided dispatch (CAD) system. RMS information was obtained from the California State Fire Marshal's data evaluation unit. The CAD data came from CAL FIRE's Felton Emergency Command Center (ECC). These different database tables were combined utilizing proven data engineering techniques into one analytical data set.

Data Engineering Findings

The number of incident records for the RMS and CAD systems differed. At AP Triton's request, all incidents dispatched by the ECC for the county were included due to additional work being done within the county. This included all state missions as well as Pajaro Valley Fire Protection District. This resulted in a total of 133,878 CAD records to be matched to the 9,906 RMS reports. Removing duplicate events and those state-mission incidents left 9,311 incidents in the RMS. When both systems were combined, 34,536 unit records were matched to the 9,292 incidents. The 19 incidents without unit information remain for general counts but were not included in the time evaluations.

Data Error Handling

Data collection within the various data sets has the potential for significant errors. Although there can be many reasons for incorrect information, these errors are typically a combination of human input and collection errors. Various methods exist to manage these errors, including statistical exclusion, real-time exclusion, formula manipulation, and logic testing.

For SCCFD, the information in the data fields was very error prone. Therefore, most of the data required statistical intervention. Interventions were limited to excluding data by formula or logic tests. For example, the time segment math utilized a logic tree to eliminate less than zero results and null sets.

Emergency Command Center Performance Data

The data reported by the ECC typically used to evaluate call processing performance was incomplete and error prone. As a result, there was very little confidence that the data points delivered showed actual performance. In addition, the call processing section, customarily included in this analysis, was not performed. This will be discussed in more detail later in this section.

Service Demand

The first dimension of the analysis is the overall system call load. Because this is a simple count of the incidents by type and location, no data was excluded after engineering. Therefore, detailed data from the two previously discussed systems will be used for most of this analysis, except for the volume projection.

Volume Analysis

A simple volume analysis can indicate how often the department is called upon to respond to an incident. The first look is at the overall call counts grouped by primary categories in the National Fire Incident Reporting System (NFIRS). Establishing the incident jurisdiction required a match between the geocoded information and the provided geographic boundaries. The following figure is the total number of responses recorded by the agency for the entire data set and the percentage of the categorized responses.

Figure 41: Total Incident Count (2018–2022)

Incident Type (NFIRS Grouping)	Number of Responses	Percent of Total Responses
SCCFD Total Responses		
Fire (100)	337	3.6%
Overpressure (200)	9	0.1%
Rescue-Medical (300)	4,479	48.1%
Hazardous condition (400)	699	7.5%
Service (500)	866	9.3%
Good Intent (600)	1,728	18.6%
False Alarm (700)	1,097	11.8%
Disaster (800)	22	0.2%
Special (900)	54	0.6%
Total Responses:	**9,311**	**100.0%**
Aid Given & Received		
Auto and Mutual Aid Received	6,953	74.7%
Auto and Mutual Aid Given	1,183	12.7%

The apparent reliance on mutual aid throughout the county stands out in the preceding figure. This will be discussed in more detail in the unit part of this section, as will the CAL FIRE relationship with SCCFD.

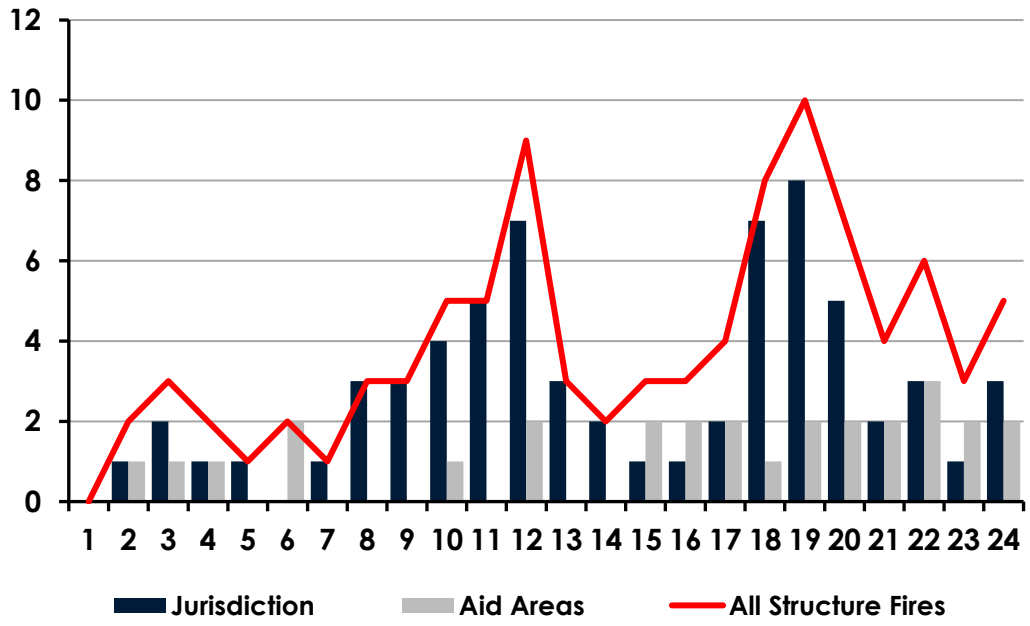
Incident Type Analysis

The fire service responds to various incidents and is usually the de facto response service for any situation. However, two incident types are typically evaluated in depth during performance analysis. First, fire situations are some of the most dangerous events firefighters face. At the same time, emergency medical incidents tend to be the most voluminous incident type.

Structure & WUI Fire

A resource-intensive set of incidents, the structure and wildland-urban interface (WUI) fire demand loads are essential to understand. On average, SCCFD units participate in 1.5 fire or WUI incidents a month, with one being within jurisdictional boundaries. These fires happen at any time throughout the day, with a slightly higher probability in late morning and early evening. The following figure shows the structure and WUI fire events by the hour, separated by jurisdictional boundaries.

Figure 42: Structure & WUI Fire Demand by Hour

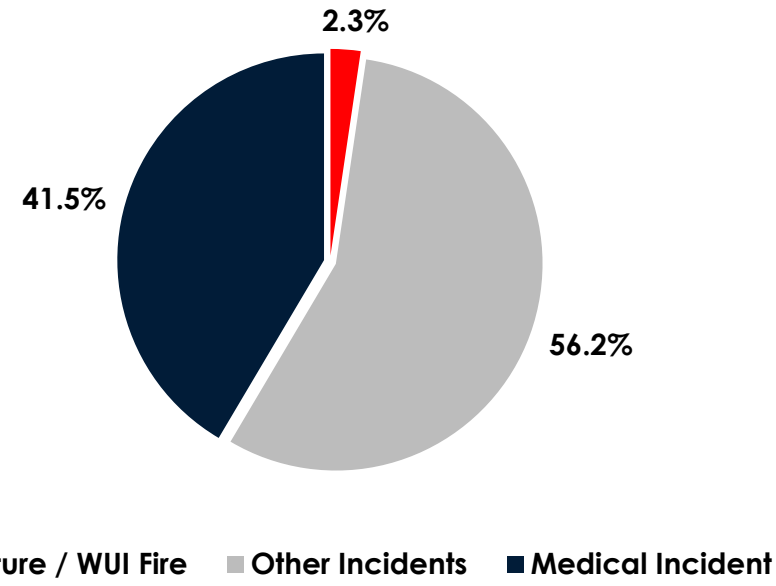


Emergency Medical Services (EMS)

The category of incidents with the most significant volume for SCCFD is emergency medical incidents. The fire service is an integral part of EMS, often acting as the first responders and sometimes as the specialist or advanced life support systems. SCCFD firefighters act as basic life support (BLS) responders, and CAL FIRE firefighters are certified as Emergency Medical Technicians (EMT). Volunteers have various training levels but are expected to perform at the responder level of service.

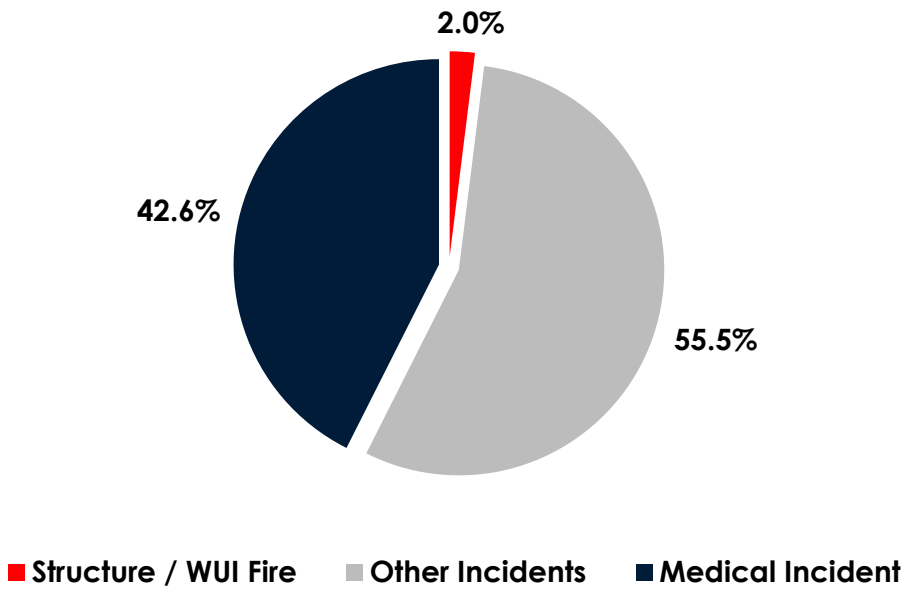
SCCFD does not go to all medical incidents within the jurisdiction. Instead, they respond to specific, high-acuity incidents as determined by the medical dispatch center. These higher acuity calls include potential life-threatening situations like cardiac events, difficulty breathing, or significant traumatic injuries. The following figure shows the distribution of EMS versus fire and all other incidents within the jurisdiction during the study period.

Figure 43: Incident Type Distribution (2018–2022)



Often these types of analyses will find that even though EMS incidents are the most significant volume of incidents, they take less staff time overall. In SCCFD's case, the distribution of the incidents and the distribution of the time committed are very similar. The following figure shows the unit committed time distribution for all incidents.

Figure 44: Unit Time Distribution by Incident Type (2018–2022)

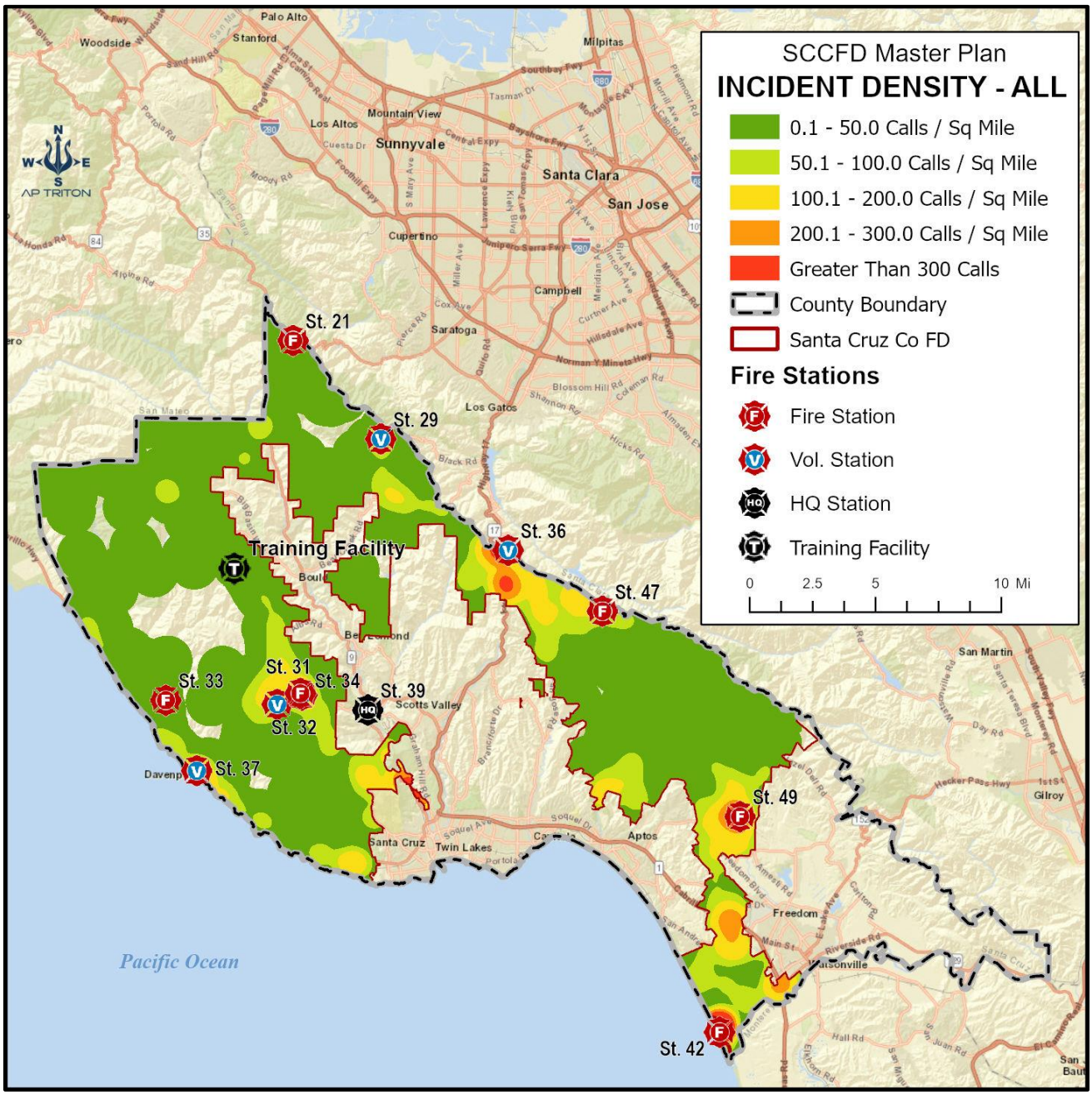


Geographic Analysis

A call density analysis is helpful when reviewing the best location for apparatus placement. It is also useful when evaluating where the prevention programs may have the most impact.

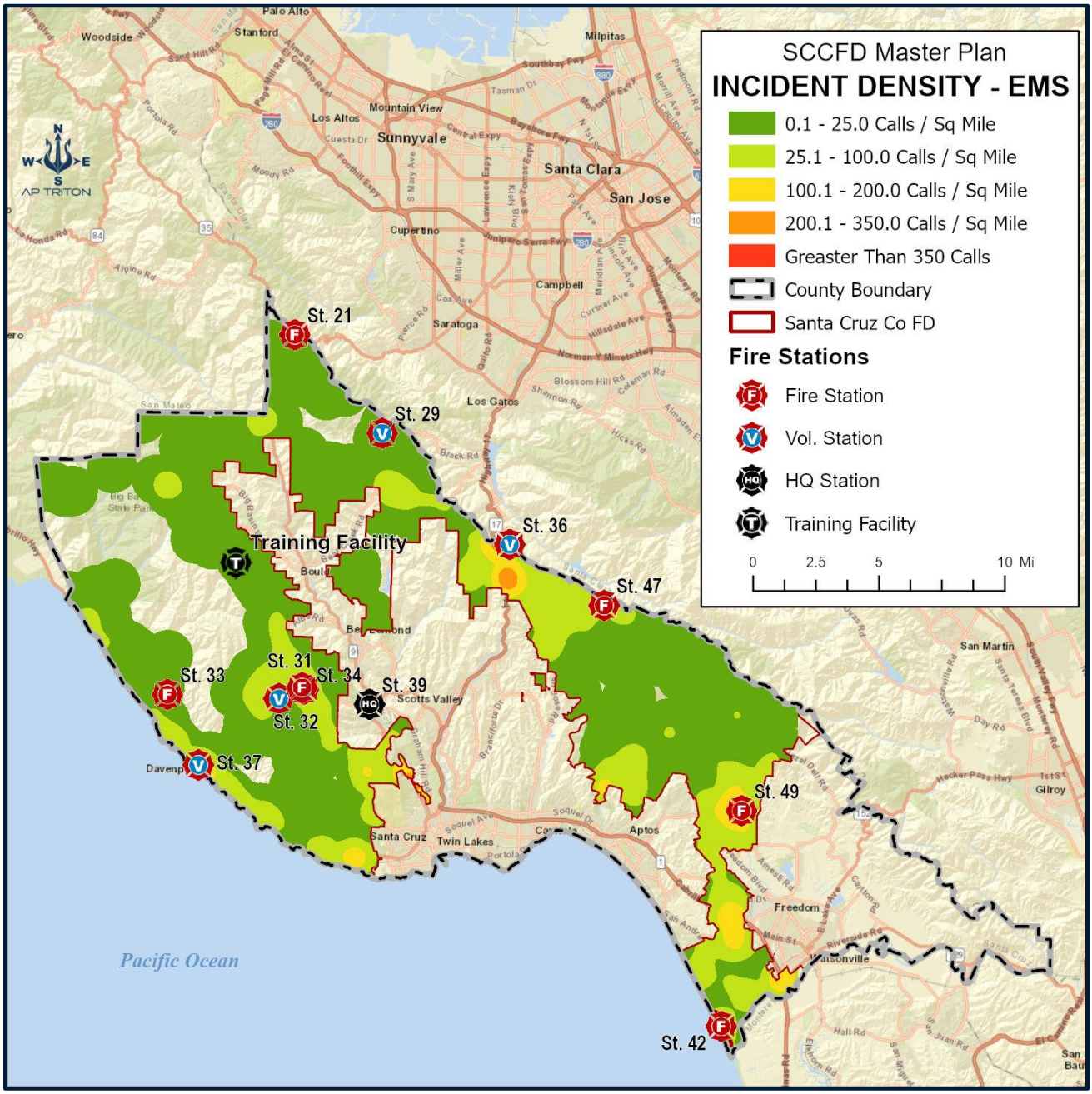
The following figure geographically represents the incident density for the study period.

Figure 45: Overall Incident Density (2018–2022)



As indicated in the previous figure, incident density is most concentrated in populated areas, such as the coast, along Highway 17, the area surrounding Watsonville, and Pajaro Dunes. This density is telling. However, it is primarily driven by the volume of emergency medical service (EMS) incidents. The following figure shows the EMS incident concentration for the same period.

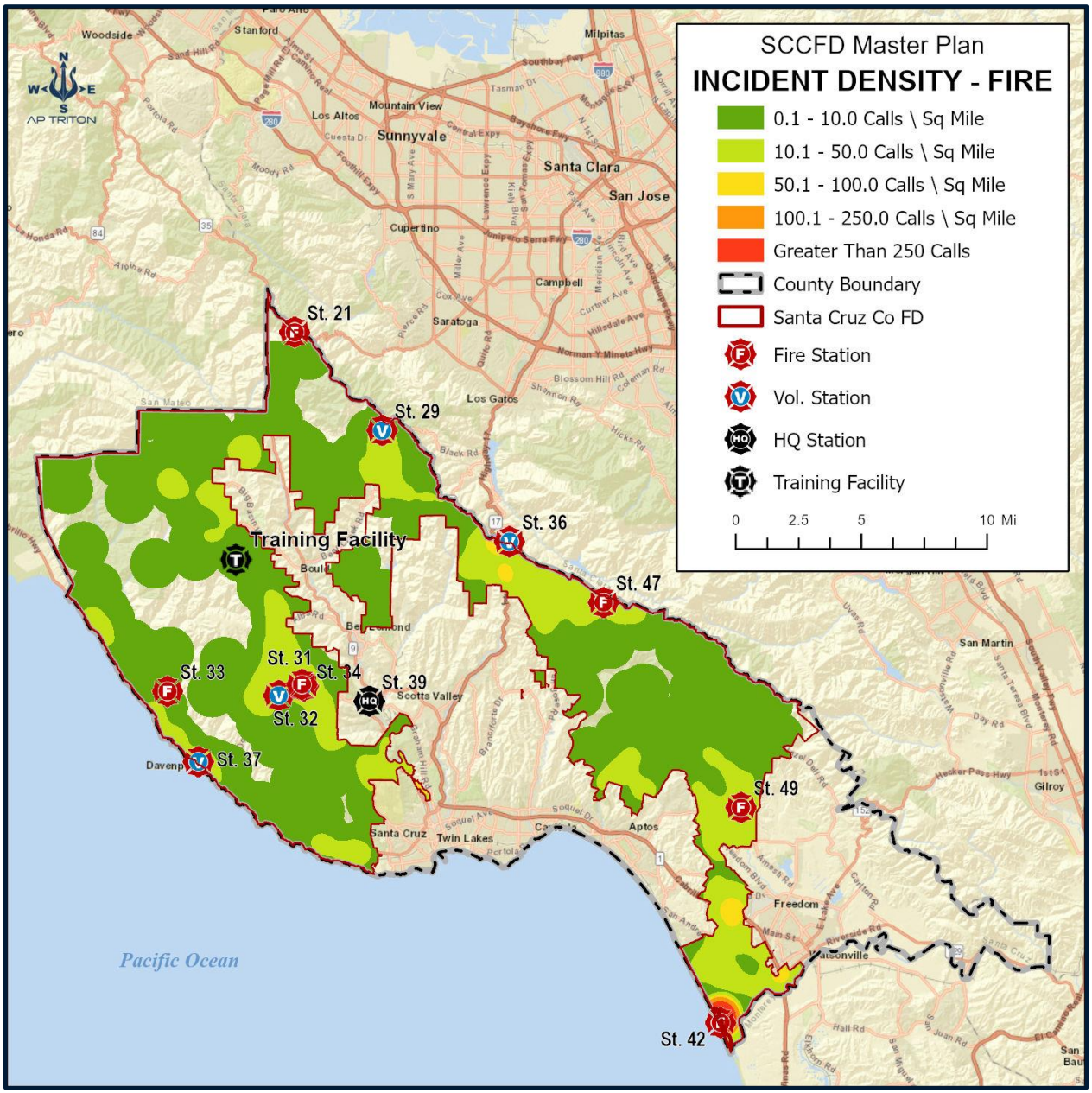
Figure 46: EMS Incident Density (2018–2022)



This indicates a strong correlation between the EMS incidents and the total call volume. While this may give a general idea of where to focus medical prevention efforts, it does not address the more hazardous incident types. For example, structure and WUI fires are much more dangerous to firefighters and the general population.

The following figure is the incident density for fire incidents within the study period.

Figure 47: Fire Incident Density (2018–2022)

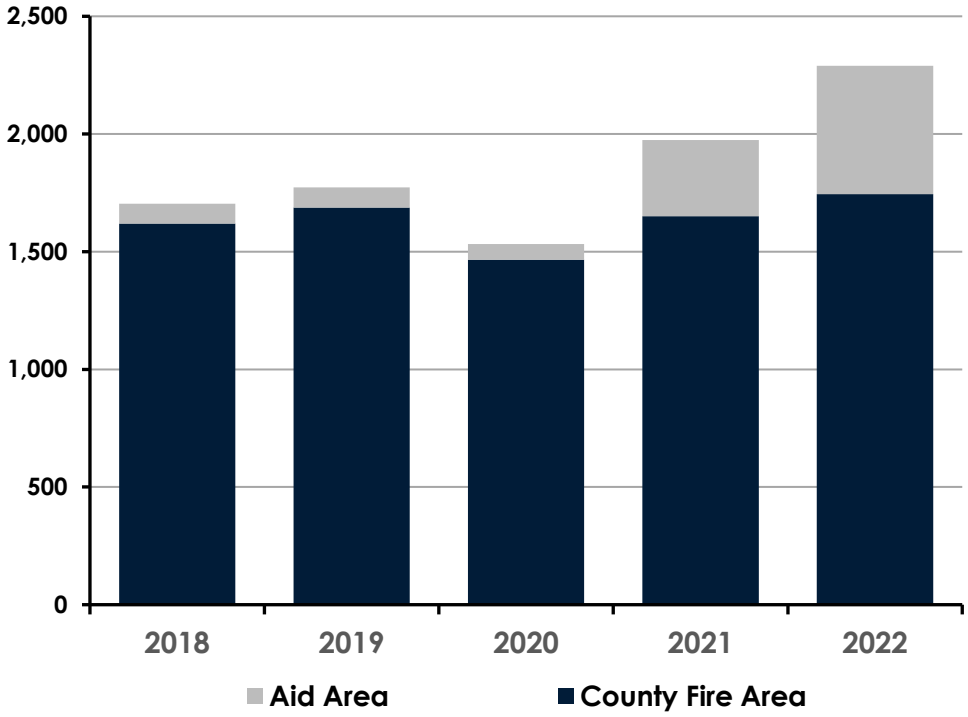


Due to the limited number of structure and WUI fire incidents in the data set, only 646 in the county service area, densities are not as well established. Instead, small pockets of what appear to be multiple events show up when there are very few incidents. This leaves the fire prevention effort with less information on historical data. Still, it does indicate the entire service area is at risk for structure fires.

Temporal Analysis

Annual call volumes for the SCCFD have fluctuated over the past five years. If 2020 is removed, the incident volume appears to increase annually. Unfortunately, the trends are not as evident due to the COVID-19 pandemic, and the dip in incident volume in 2020 leads to reduced predictive reliability. The following figure shows the annual incident volume for all 5 years with the responses into aid areas identified.

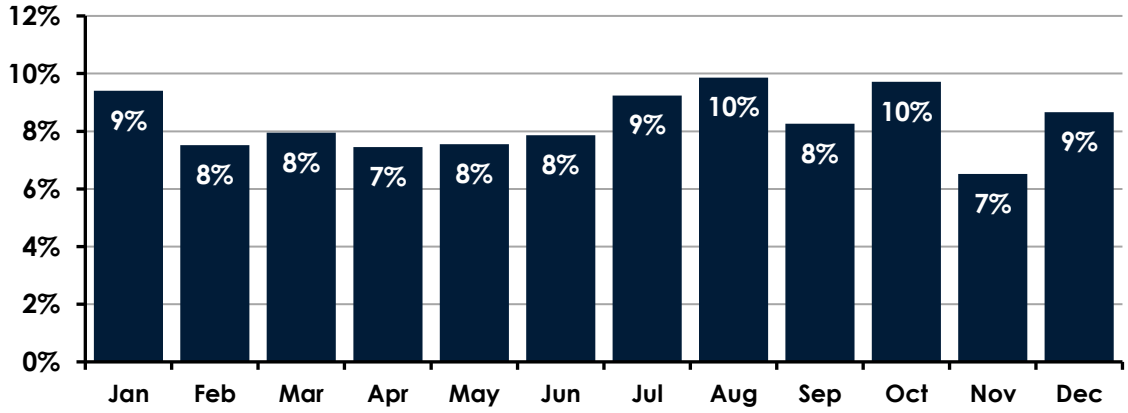
Figure 48: Annual Incident Volume (2018–2022)



Analyzing the incident volume by month, day of the week, and hour is valuable when attempting to schedule events or add staffing. Additionally, months may reveal seasonality for the service needs. At the same time, days and hours may indicate the population movement and activities throughout the days.

The following figure shows incident percentages (rounded to the nearest integer) by month for 2018 through 2022.

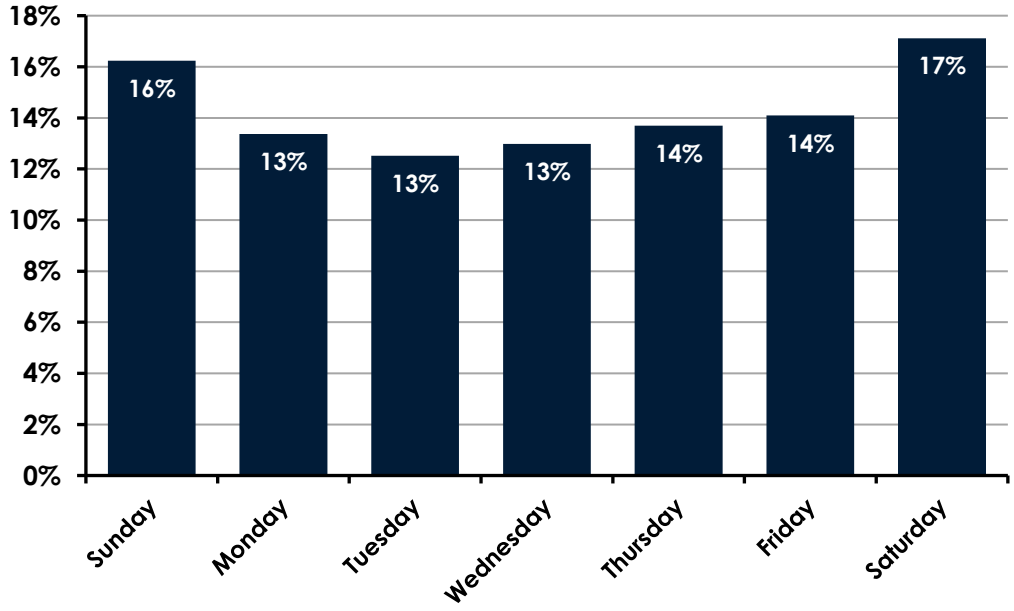
Figure 49: Incident Percentages by Month (2018–2022)



As indicated in the figure above, there are some monthly variations. However, whether this is due to the susceptibility of swings in smaller data sets, or some incident seasonality is unclear. Nevertheless, there does appear to be a few notable increases. For example, elevations appear in July and August and slightly decrease in the spring.

Another dimension for temporal evaluation is the percentage of incidents that happen by day of the week. The following figure is the percentage of incidents that occur by the weekday and includes all five years of the data.

Figure 50: Percent of Incidents by Weekday (2018–2022)



There does appear to be an increase in incident volume during the weekends. However, Monday through Friday seem to follow normal distributions, with Saturday and Sunday showing a slight increase in demand.

It can be helpful to combine the month and day dimensions to identify potentially significant combinations of the month and weekday. For example, a high variation during the weekends during summer months may indicate the need for additional staffing or readiness levels.

The following figure shows the density of call volume by month and weekday from 2018 through 2022.

Figure 51: Incident Volume by Month and Weekday (2018–2022)

Month	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Jan							
Feb							
Mar							
Apr							
May							
Jun							
Jul							
Aug							
Sep							
Oct							
Nov							
Dec							

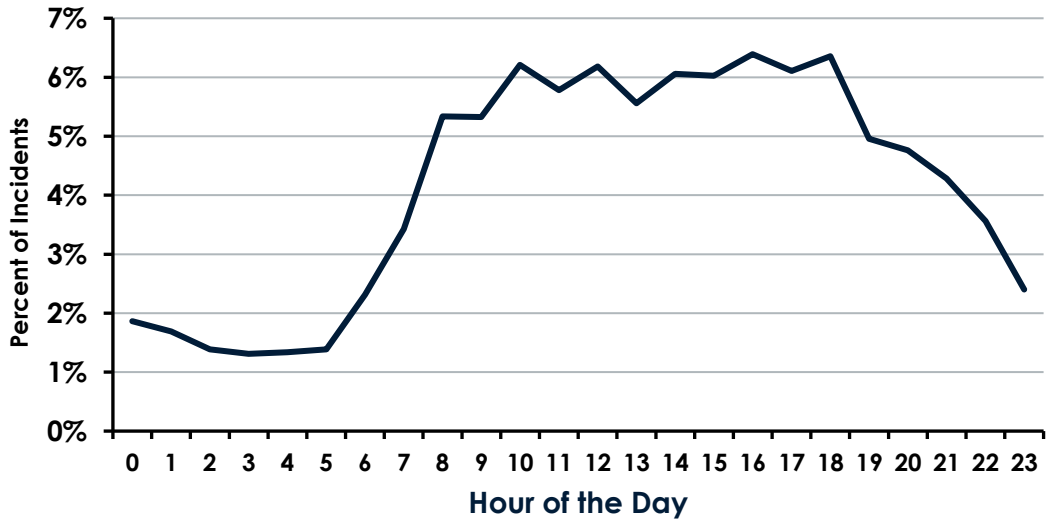
Color	Incidents
	77–83
	66–76
	58–65
	52–57
	47–51
	40–46
	35–39

Nothing can be conclusively stated here except that the weekend volumes are higher from January through October. There were no other trends, as the remaining incident volume does not follow any set pattern. However, it could be concluded from all the month and weekday charts that the weekends in July, August, and October show the highest concentration in response data.

Another temporal dimension is to evaluate call volume throughout the hours of the day. For example, fire and EMS incidents are distributed unequally throughout most systems throughout the day. The daytime is typically more active than the evening, night, and early morning. The driving force behind this phenomenon is likely that people are awake and moving.

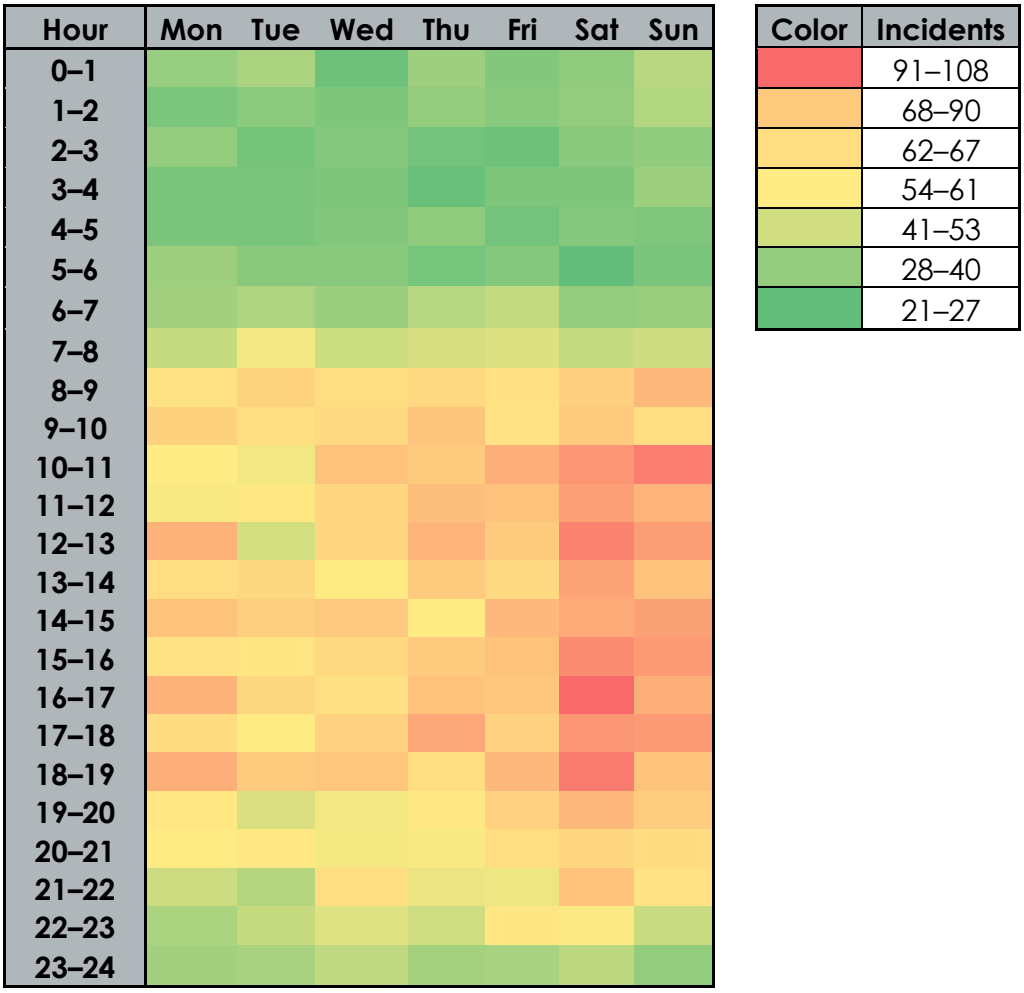
The following figure indicates that SCCFD closely follows this daytime pattern, with approximately 70% of incidents occurring between 8 a.m. and 8 p.m.

Figure 52: Percent of Incidents by Hour (2018–2022)



It is essential to understand the combination of the hour of the day and the day of the week. By evaluating that density, some hot spot times can be identified. In SCCFD's case, the evaluation shows a consistent and statistically significant pattern of daytime calls, regardless of the day of the week. The following figure indicates incident density by the hour and day of the week for all incidents.

Figure 53: Incident Volume by Day and Hour (2018–2022)



Resource Distribution

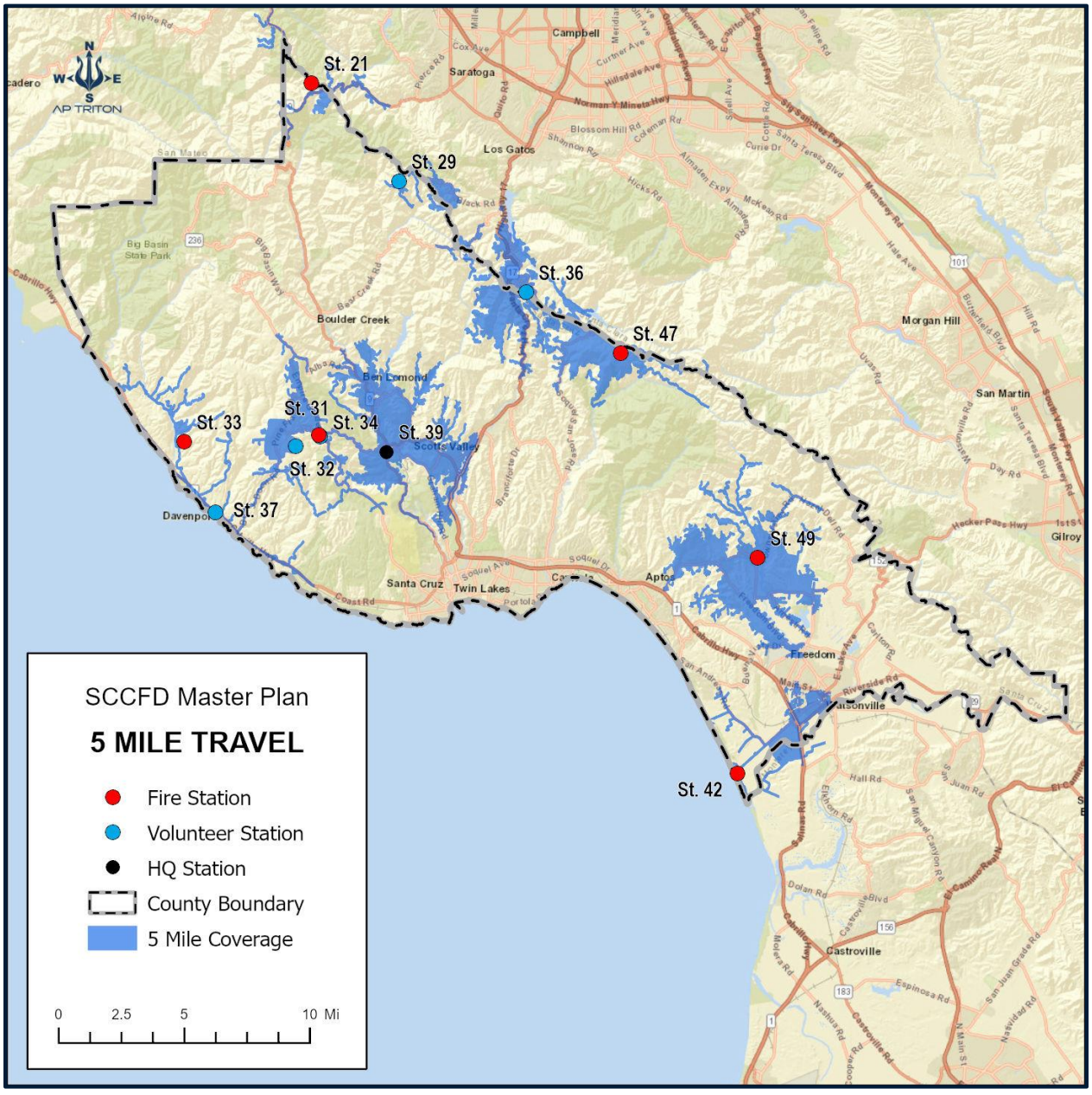
Several key performance metrics can help identify the effectiveness of resource distribution. A broad allocation of resources allows for a more rapid first response to any given area. However, the first unit is only a portion of the deployment question. It is critical to have enough units to respond to incidents' volume, type, and severity. It is also essential to attempt to equalize the unit responses.

Geographic Distribution Analysis

Units and stations should be distributed to allow the best chance of reaching an incident in its earliest stages. There are two primary sources for performance standards that address this geographic distribution. The Insurance Services Office, Inc. (ISO) defines distance, while the National Fire Protection Association (NFPA) utilizes time as a criterion.

The ISO uses five miles from a fire station as its standard. The following figure shows the 5-mile travel distance from a fire station.

Figure 54: 5-Mile Travel Distance from Stations



For full credit in an ISO Fire Suppression Rating Schedule (FSRS), any building within the jurisdiction should be within 1.5 miles of an engine company and 2.5 miles of a truck company.[15] SCCFD does not have a truck company and relies on aid apparatus from other jurisdictions. The SCCFD also has a large coverage area with very few stations. The following figure shows the 1.5-mile travel distance from each station as they house engine companies.

Figure 55: 1.5-Mile Travel Distance from Stations

Unit Workload Analysis

Unit workload should be balanced to maintain readiness, resiliency, and service availability. While it is prevalent for one unit to be busier than others, no crew should carry too heavy a load, making them less effective.

The County of Santa Cruz has forged multiple relationships to provide fire coverage to the two response areas. County service areas (CSA) 48 and 4 agreements are complicated and affect service performance. It is also evident that every jurisdiction within the county relies heavily on aid from neighboring communities. Every attempt was made to separate county-funded assets from those providing aid to accommodate these complex relationships. For example, if one of the six CAL FIRE engines was acting under county funding, it was counted as an SCCFD unit. In addition, similar rules applied to the Santa Cruz Fire Department (SCFD) and Central Fire District of Santa Cruz County (CFD).

When these agencies responded to their respective contract areas, the Paradise Park, or the Aptos Hills areas, they were also considered county assets. The partially funded battalion chief and fire prevention positions are the two exceptions. This analysis did not include these as there was no way to establish funding mechanisms in the response data. The CAL FIRE units on state funding and other units not funded by the county are considered aid units. In addition, units are grouped into staffed and volunteer units due to the dramatic difference in time performance.

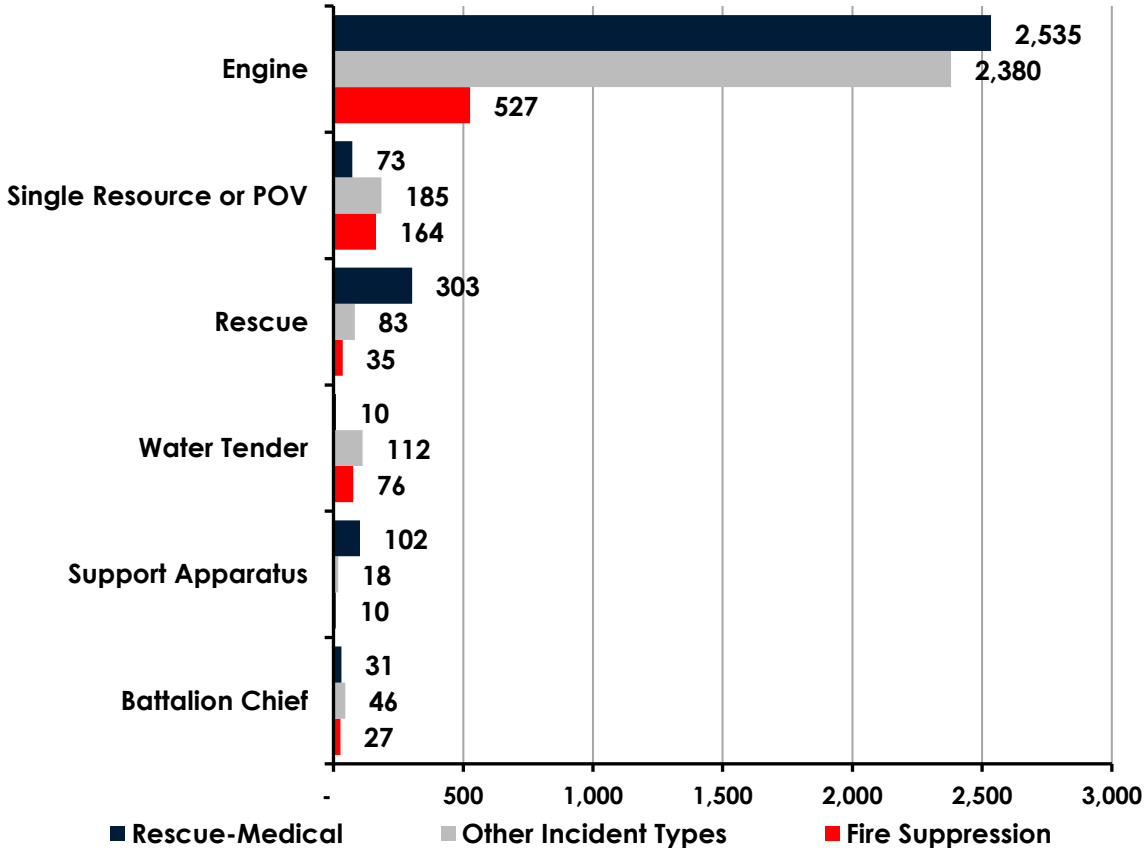
Incidents by Unit

SCCFD had many units responding to all incidents within the data set. These include single resources, privately owned vehicles, and many aid chiefs from surrounding jurisdictions and CAL FIRE. However, due to the limited information available for some responding units, the analysis is general only, limited to front-line engines, rescues, and water tenders. Where utility vehicles, and single resources such as volunteer captains and private vehicles, could be accounted for, they are included.

Of the responding vehicles, the engines are responsible for most responses. However, several different types of apparatus and equipment provide service to the county.

The following figure is a count of responses by county assets, including Amador engines and contract apparatus.

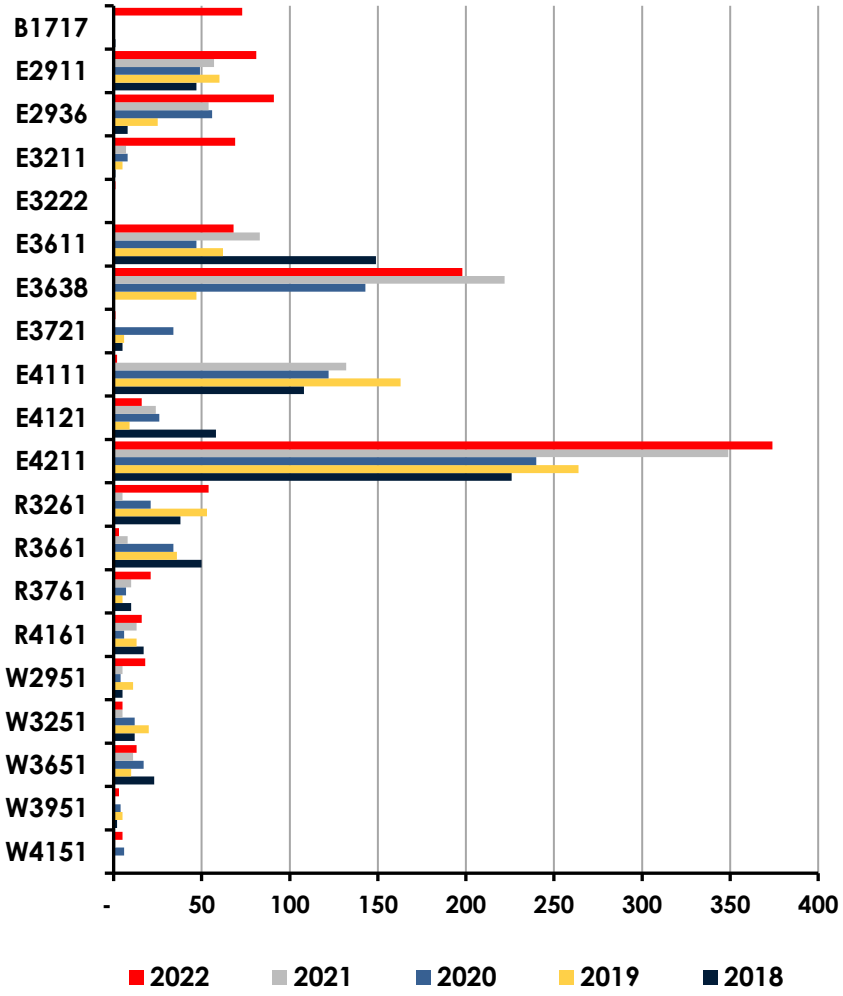
Figure 56: County Units Responding by Unit Type (2018–2022)



When all unit responses are summed up, they do not equal the number of incidents within the system. This indicates SCCFD relies heavily on mutual and automatic aid for coverage. These aid units are from other jurisdictions and CAL FIRE units that are not under county funding at the time of the response. In addition, some additional single resources, or private vehicles (POV) may have responded and were not captured in the data. Capturing this information would help definitively identify if SCCFD-funded units are covering its area effectively.

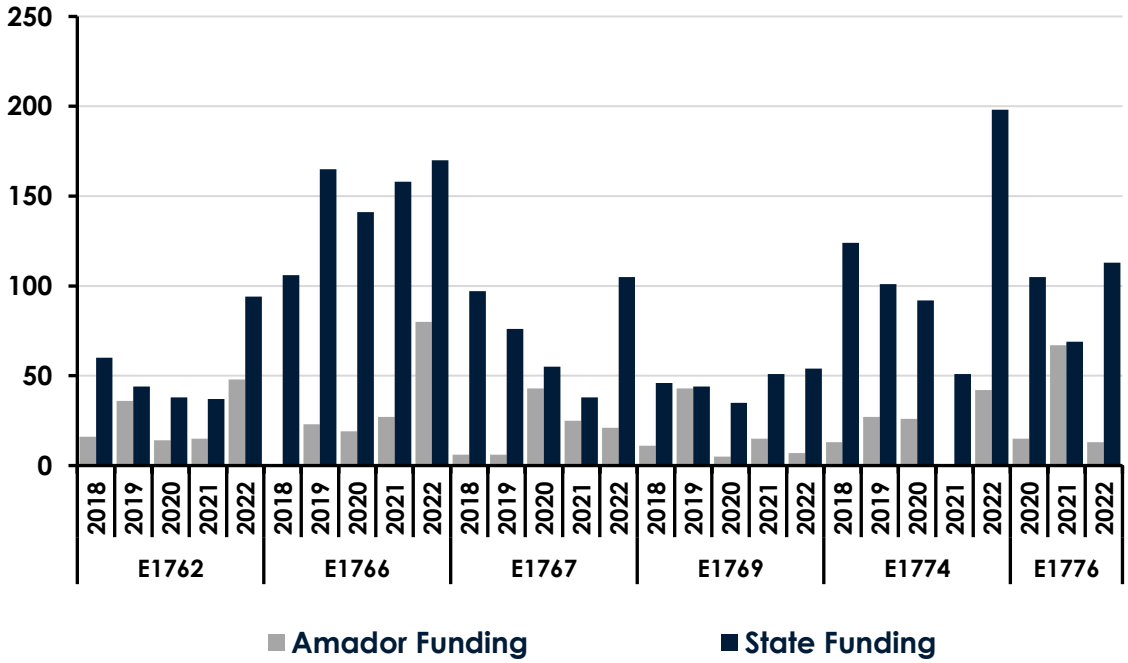
The CAL FIRE staffed unit at Pajaro Dunes, Engine 4211, has the most significant volume of all the fully county-funded units. Engine 3638 is the most consistently busy volunteer engine, and Engine 3222 is rarely used. The following figure shows the SCCFD fully funded apparatus with responses in 2018 through 2022.

Figure 57: Annual Unit Call Volume (2018–2022)



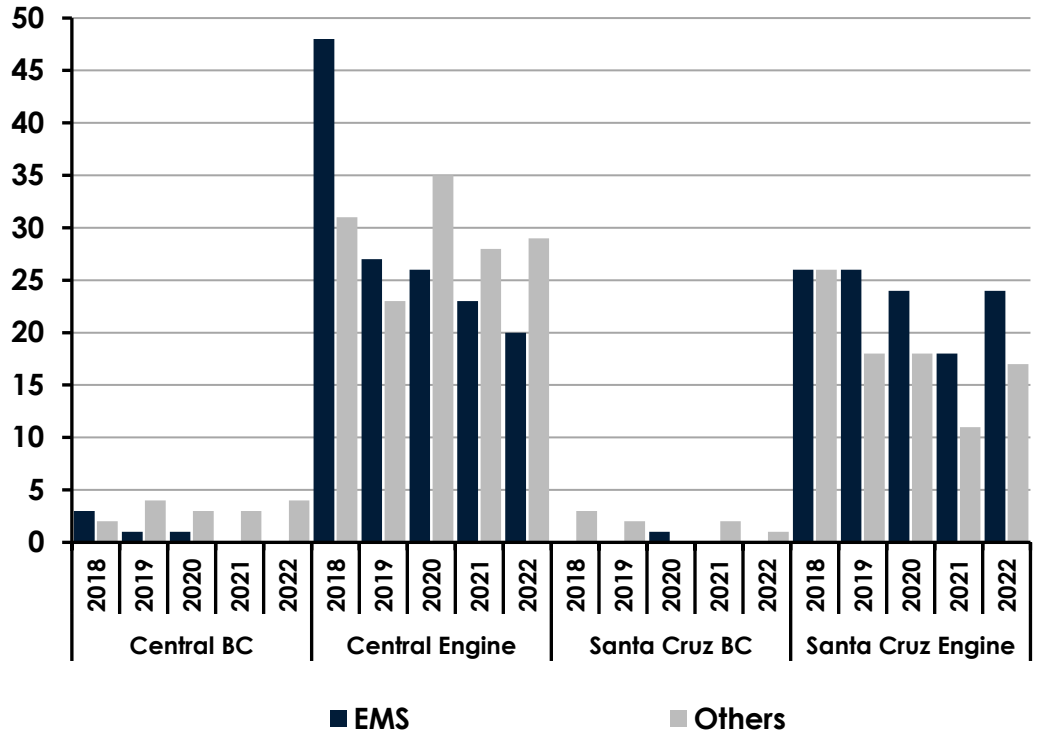
SCCFD funds other responses as well, although not entirely. The most significant volume of these responses comes from the five Amador engines assigned to stations throughout the county. While they are only funded for specific periods throughout the year, they always respond if available. The following figure shows the total responses by these units separated into the timeframes when they are under state funding versus SCCFD funding.

Figure 58: Amador Unit Responses (2018–2022)



In addition, SCCFD pays SCFD and the Central Santa Cruz Fire Protection District (CSCFPD) to respond to specific county coverage areas. The following figure shows the total number of responses to these contractual areas without identifying specific agency units.

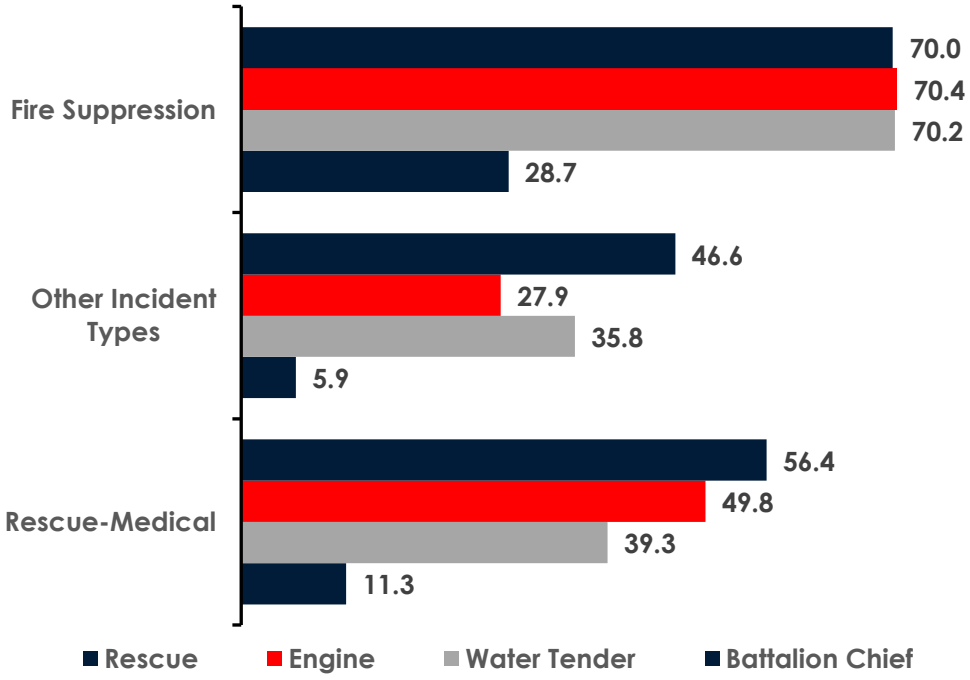
Figure 59: Contractual Responses by Agency (2018–2022)



Each incident requires a unit to remain on scene to handle the situation. For example, historically, the average time a front-line apparatus is assigned to a fire suppression response is close to 70 minutes. Therefore, a general idea of how long a specific crew will stay on the incident can assist operational planning. In the SCCFD data, 2018 times inflated the overall usage minutes and were therefore removed for analysis.

The following figure identifies the average time a unit is assigned to specific response types.

Figure 60: Average Time Committed to a Scene by Incident Type (2019–2022)



One final dimension of unit workload is how much time each unit is committed to incidents throughout the year. The unit hour utilization (UHU) calculation evaluates how much time a crew is committed to an incident throughout a specific time frame. The desire is for the primary unit at a station, typically an engine or quint company, the most flexible response unit, to be under 10% UHU. Maintaining 10% UHU should indicate the area has 90% availability from unscheduled events. Stations with multiple engines and quint companies should aggregate to less than 10% UHU for all similar units.

SCCFD does not have a busy system, and the incident workload is evenly distributed among the volunteer units. The one full-time staffed unit is also not overly taxed regarding the time committed on an incident. The following figure shows the UHU for each apparatus, sorted by station.

Figure 61: Unit Hour Utilization Percentage

Apparatus	2018	2019	2020	2021	2022	Average
E2911	0.5%	0.6%	0.5%	0.5%	0.8%	**0.6%**
E2936	0.1%	0.3%	0.9%	0.8%	0.8%	**0.6%**
W2951	0.2%	0.1%	0.0%	0.1%	0.3%	**0.1%**
E4121	0.5%	0.1%	0.3%	0.1%	0.1%	**0.23%**
E3211	0.0%	0.1%	0.1%	0.0%	0.6%	**0.2%**
R3261	0.3%	0.6%	0.2%	0.1%	0.5%	**0.3%**
W3251	0.2%	0.2%	0.1%	0.0%	0.0%	**0.1%**
E3611	1.4%	0.6%	0.4%	0.7%	0.6%	**0.7%**
E3638	N/A	0.5%	1.4%	2.2%	2.0%	**1.5%**
R3661	0.4%	0.3%	0.4%	0.1%	0.0%	**0.2%**
W3651	0.2%	0.1%	0.2%	0.0%	0.1%	**0.1%**
E3721	0.1%	0.0%	0.4%	N/A	0.0%	**0.1%**
R3761	0.1%	0.1%	0.1%	0.1%	0.3%	**0.1%**
W3951	0.5%	0.1%	0.1%	N/A	0.0%	**0.2%**
E4111	1.1%	1.5%	1.0%	1.0%	0.0%	**0.9%**
R4161	0.2%	0.1%	0.1%	0.1%	0.1%	**0.1%**
W4151	0.0%	0.0%	0.1%	0.0%	0.1%	**0.0%**
E4211	1.3%	1.2%	1.4%	1.6%	1.8%	**1.5%**

The close association of the CAL FIRE Amador units to the county must also be considered. However, these units can spend several days deploying to state incidents. Therefore, to account for these state missions and not overstate their commitment to SCCFD, the upper incident usage limit was set to 24 hours, and wildland fires were eliminated. The following figure shows the UHU for these Amador-funded units responding to SCCFD incidents, separated by funding source.

Figure 62: CAL FIRE SCCFD Apparatus UHU

Apparatus	2018	2019	2020	2021	2022	Average
E1762 (Total UHU)	**0.7%**	**0.8%**	**0.4%**	**0.4%**	**1.3%**	**0.6%**
Amador Funding	0.4%	0.9%	0.4%	0.3%	1.6%	0.6%
State Funding	0.8%	0.7%	0.4%	0.5%	1.2%	0.1%
E1766 (Total UHU)	**0.7%**	**1.2%**	**1.2%**	**1.2%**	**1.6%**	**0.23%**
Amador Funding	0.0%	0.3%	0.3%	0.6%	1.9%	0.2%
State Funding	1.0%	1.9%	1.7%	1.5%	1.5%	0.3%
E1767 (Total UHU)	**0.9%**	**0.9%**	**1.1%**	**0.7%**	**1.3%**	**0.1%**
Amador Funding	0.1%	0.1%	1.0%	0.8%	0.8%	0.7%
State Funding	1.2%	1.5%	1.1%	0.6%	1.5%	1.5%
E1769 (Total UHU)	**0.6%**	**1.0%**	**0.4%**	**0.7%**	**0.6%**	**0.2%**
Amador Funding	0.4%	1.2%	0.1%	0.5%	0.2%	0.1%
State Funding	0.6%	0.8%	0.6%	0.7%	0.7%	0.1%
E1774 (Total UHU)	**1.1%**	**1.2%**	**0.8%**	**0.3%**	**1.6%**	**0.1%**
Amador Funding	0.3%	0.9%	0.4%	0.0%	1.1%	0.2%
State Funding	1.5%	1.4%	1.1%	0.5%	1.9%	0.9%
E1776 (Total UHU)	**0.0%**	**0.0%**	**1.0%**	**1.4%**	**1.1%**	**0.1%**
Amador Funding	0.0%	0.0%	0.4%	1.9%	0.2%	0.0%
State Funding	0.0%	0.0%	1.5%	1.1%	1.6%	1.5%

None of the units within the SCCFD funding system are overtaxed. As the previous figure shows, they are well below the 10% UHU recommended for adequate coverage.

Concurrency Analysis

Incidents that happen simultaneously can impact an agency's ability to respond. While SCCFD maintains multiple units at most stations, there may be times when all crews are engaged, leaving the jurisdiction more heavily reliant on outside aid.

The first dimension of the concurrency evaluation is how often, within SCCFD's primary jurisdiction, there is more than one incident at any given time. For example, if an incident is happening in Pajaro Dunes, and a second incident starts near Bonny Doon before the Pajaro Dunes incident is resolved, this analysis does not consider what jurisdiction or type of units respond. Still, it does count the percentage of time incidents happen concurrently within the jurisdiction. The following figure shows the percentage of times multiple incidents occurred together.

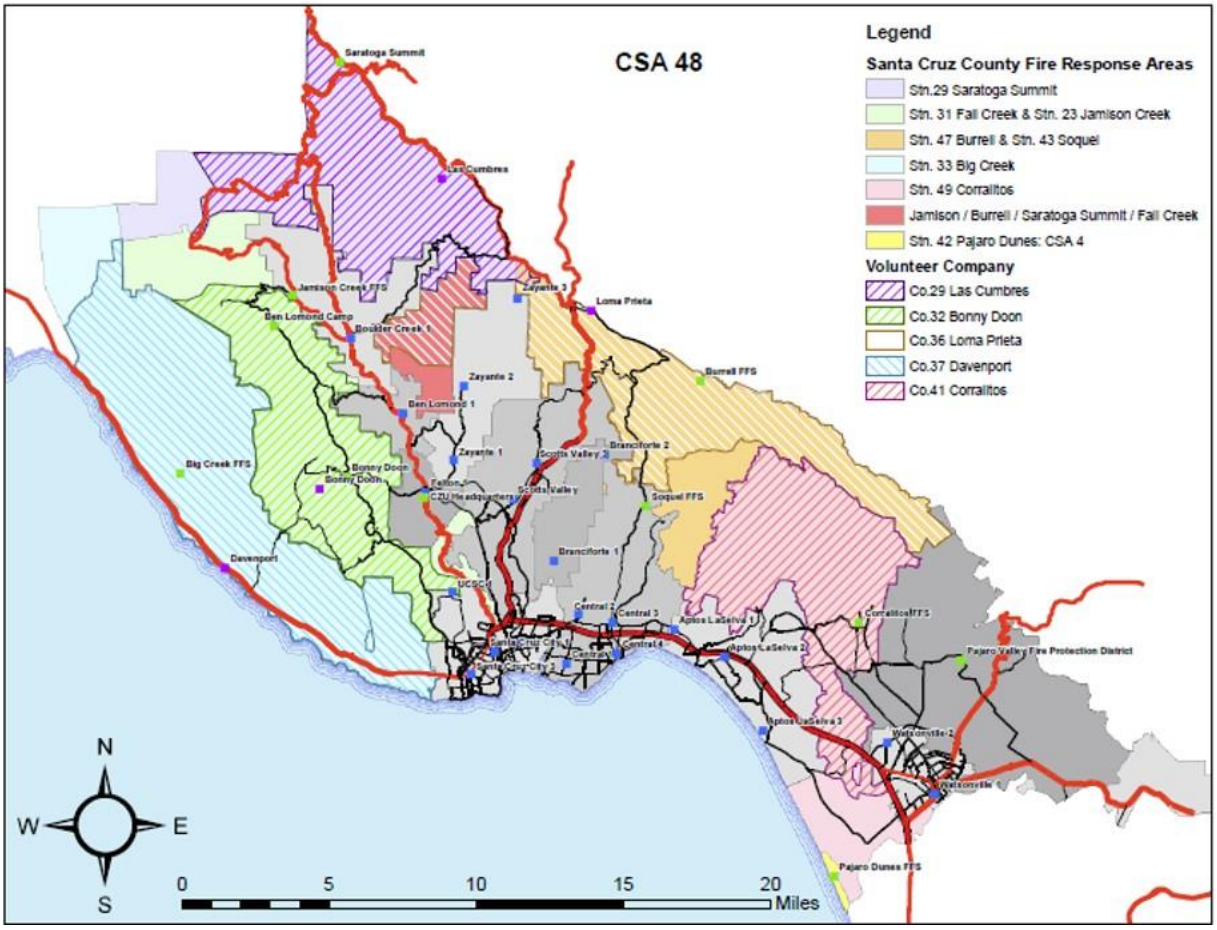
Figure 63: Concurrent Incidents within Jurisdiction (2018–2022)

Incidents in Process	Percent Occurrence
1	31.0%
2	26.5%
3	17.6%
4	12.8%
5	6.3%
6	2.3%
7	1.3%
8	1.1%

As is evident, the most common occurrence is to have one incident in operation at a time. The maximum number of incidents that happened concurrently in the records was 11. However, the chances of having more than eight simultaneous incidents are less than 1%. In addition, it is prevalent for the system to have more than one incident working simultaneously but a less than 6% chance of more than five incidents working concurrently.

The next dimension of the analysis is determining how often calls happen concurrently within the same response area. For this analysis, the dispatch data had response zones that could be associated with specific regions advertised by SCCFD as coverage areas. For simplicity, those areas covered by the same company as the station area are grouped together. The following figure is a map published by SCCFD on their website that identifies their response areas.

Figure 64: SCCFD Defined Response Areas[16]



Each area was evaluated separately, and if an incident happened simultaneously within those response areas, it was captured as a concurrent incident. The area with the most frequent concurrent incidents was Company 36 along the eastern central portion of the county. The zone with the most incidents simultaneously for Company 36 was five. The maximum number of responses operating concurrently in the same area fell to the site protected by Company 37 along the northern coastal area of the county.

The following figure identifies the percentage of times concurrent incidents happen in any given response area.

Figure 65: Concurrent Incidents in Sub-Response Area

Incidents in Process	Percent Occurrence
1	31.0%
2	51.5%
3	14.9%
4	2.3%
5 & 6	Less Than 0.3%

The final dimension of the concurrency analysis is how often SCCFD units respond to any incident. Again, the maximum commitment time was limited to 24 hours for this analysis. The intent is to ensure that only normal operations are captured in the analysis since deployments may last days. The typical operations are for backfill and overtime to cover during these events. The following figure shows the total number of concurrent responses by any SCCFD unit throughout the region.

Figure 66: Concurrent Events with SCCFD Units Responding

Incidents in Process	Percent Occurrence
1	70.5%
2	22.3%
3	6.2%
4	0.9%
5	0.1%

It seems counter-intuitive that the number of concurrent units responding would be less than the multiple jurisdictional incidents. However, the SCCFD and many surrounding agencies rely heavily on one another to provide coverage. In addition, some units, like private vehicles, are not captured in the figure. Therefore, it still appears that the number of apparatus capable of responding is less than those needed to respond to concurrent incidents.

When trying to understand concurrency, it is often helpful to try and see those specific addresses that require frequent emergency visits. The following figure shows the top 10 addresses which needed the most frequent responses.

Figure 67: Top Ten Most Frequent Incident Locations

Location	Location Type	Response Area	No.
101 Shell Dr., Pajaro Dunes	Resort	42 - Pajaro Dunes	517
2661 W. Beach Rd, Pajaro Dunes	Fire Station	42 - Pajaro Dunes	291
270 Hames Rd., Corralitos	Mobile Home Park	Company 41	82
22397 HWY 17, Burrell	Unidentified	Company 36	74
1401 Coast Rd. Wilder Ranch	State Park	Company 37	70
460 Eureka Canyon Rd., Corralitos	Assisted Living	Company 41	65
NB HWY 17/Glenwood Dr., Burrell	Roadway	Company 36	44
Panther Beach HWY 1, Davenport	State Park	Company 37	36
90 Rountree Ln. Buena Vista	County Corrections	Station 49	29
14505 Stetson Rd., Burrell	Resort	Company 36	28

Performance Review

When evaluating a system, having a set of objectives or standards to judge performance against is helpful. While national and state standards may be recommended, in California, it is up to the authority having jurisdiction to adopt specific ones. In this case, neither the County of Santa Cruz nor the SCCFD has adopted performance requirements. Therefore, as a reference, National Fire Protection Association (NFPA) standards will be utilized as a reference where appropriate. This will include the NFPA 1710 *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (NFPA 1710).

In addition, it will reference the NFPA 1720 *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* (NFPA 1720) and NFPA 1225 *Standard for Emergency Services Communications* (NFPA 1225) where applicable.

Evaluating overall performance requires an understanding of the lifecycle of an incident. It starts with a normal state and should end with a new normal state, but there are many measurable time segments in between. Some elements, such as call processing time and turnout time, can be improved by tactical management techniques such as training and policy. However, other time segment performances, such as travel time, are typically managed by a strategic methodology such as station location. The following figure identifies each time segment in the incident lifecycle, an example of a key performance indicator (KPI), and the applicable NFPA standards.

Figure 68: Incident KPI Segments

Segment	Key Performance Metric		Standard	Comments
Normal State	Community demographics		N/A	This base state needs to be defined. Prevention mainly affects this.
Incident Initiation	Incident Counts			
Incident Detection				
Notification Action	PSAP Answer		NFPA 1225	15 sec., 90% or 20 sec., 95%
PSAP Notification				
PSAP Interrogation	PSAP Transfer & Agency Answer		NFPA 1225	30 sec. 90%
Agency Notification				
Agency Interrogation	Call Processing[1]	Total Response Time	NFPA 1225	60 sec., 90%
FD Notified				
FD Unit Dispatched	> Turnout Time		NFPA 1710 & 1720	60–80 sec., 90%
FD Unit Responding	> Travel Time[2]			240 sec., 90%
FD 1st Unit Arrives	Total time			455–475 sec., 90%
FD ERF Dispatched	ERF Travel & Total Time[3]		NFPA 1710 & 1720	
FD ERF Arrives				480 sec., 90%
FD Units Clear Incident	From dispatch to clear, total time translates into unit utilization		N/A	Used to evaluate unit workload and availability.
Normal State	The outcome of the incident response is the gold standard for service delivery analytics. However, this advanced study is outside the scope of this report and requires unconventional research and analytic methods.			

[1] Certain incident types are exempt from the new NFPA 1225 time standard.

[2] NFPA has different travel time standards for volunteers versus career and other demographics.

[3] NFPA has different total time requirements for volunteer versus career and other demographics.

The incident data provided did not allow for analysis of all time segments in the above list. However, enough information was provided to analyze turnout, travel, and total response time. In addition, SCCFD has not adopted general performance standards. Therefore, the NFPA standards will be used as a performance benchmark reference.

The time segment performance standards are evaluated as a percentile. This will allow SCCFD to compare its performance against other agencies and the standard with a similar statistical technique.

Call Processing Analysis

There are several time measures of a dispatch center. The metrics identified in NFPA 1225 are ring time and call processing. Ring time measures when the phone in dispatch begins to ring until someone answers. NFPA 1225 requires the ring time to be less than 15 seconds, 90% of the time, and less than 20 seconds, 95% of the time. The ECC provided summary reports for this information, and they report a compliance of 99.08% answered within 15 seconds, and 99.5% within 20 seconds for the incoming 911 calls. The 10-digit tie lines and non-emergency communications are similar at 98.95% within 15 seconds, and 99.6% within 20 seconds.

Call processing indicates the time it takes from when a person answers the call for help until the first responder is notified during an incident. Call processing should start from when the phone is answered until the first, preferably correct, unit has been notified an incident is in progress. However, there is typically a short period, seconds usually, from when the phone is answered, and the incident starts in the computer-aided dispatch system. Typically, this additional time is small enough to not affect the whole data to be analyzed. The NFPA 1225 standard indicates that high-priority incidents should be processed within 60 seconds, 90% of the time. This standard exempts certain incident types, including those requiring emergency medical questioning, hazardous materials, and technical rescue incidents. Other exceptions exist for persons needing translation, calls from devices used by hard-of-hearing individuals, text messages, and calls requiring location determination. NFPA 1221, superseded by NFPA 1225, set the time performance for these exemptions at 90 seconds, 90% of the time, and 120 seconds, 99% of the time.

AP Triton attempted to analyze the incident call processing time based on two different incident data sets delivered by the communications center. Unfortunately, the data set that includes all the unit responses merged in this analysis did not have an incident start date and time stamp. This data set started with an incident date, and the first unit dispatched date-time. An additional data set was delivered early in this analysis with an incident date and time stamp labeled "Alarm Date." However, it did not indicate the first unit dispatched, only the first SCCFD company to be notified. An attempt was made to merge the earlier data set with the complete data set to find the first unit dispatched.

When this was accomplished, the combined data set was analyzed. However, only 1,109 incidents, or 12%, had greater than zero seconds in their results and a total time of less than one hour. This indicated severe flaws in the data. In addition, analyzing these call processing times suggested some unreasonable results. The overall average incident call processing time was 9 minutes, 26 seconds (09:26).

The 90th percentile processing time result was 17 minutes, 4 seconds (17:04), indicating the data was flawed and reporting such extreme and potentially inaccurate call processing times would be irresponsible. Therefore, the call processing evaluation was not completed. However, the ECC must ensure adequate service to the contracted agencies. It is up to the agencies to audit and demand a demonstration of that performance.

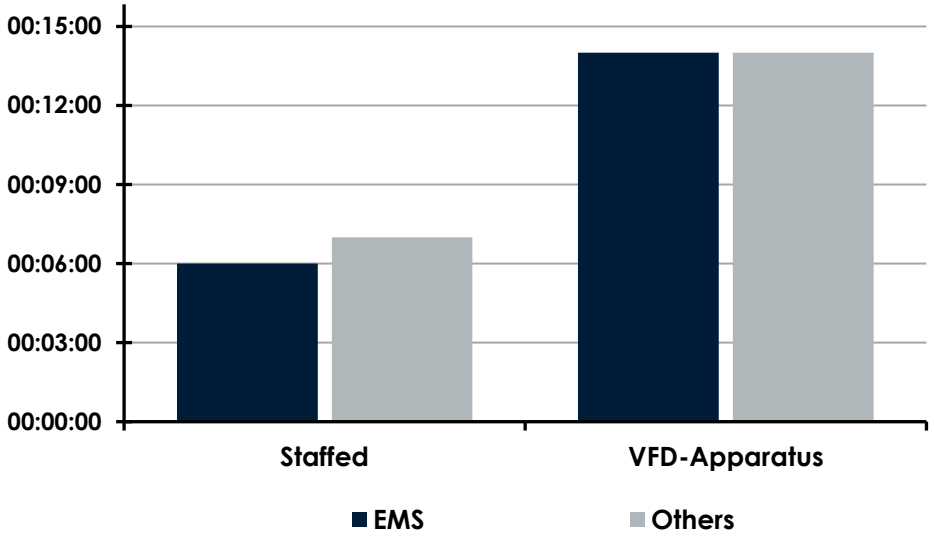
Turnout Time Analysis

Turnout time is the difference between when the unit is notified of an incident and when they start to respond. NFPA 1710 indicates the performance measure for this time segment is 60 seconds for medical incidents and 80 seconds for fire incidents. NFPA 1720 publishes a similar standard of 90 seconds for special operations and 60 seconds for EMS. For this analysis, the incidents will be grouped by EMS incidents and all others and by volunteer and staffed front-line apparatus.

The data was analyzed for statistical reliability, and 12,440 records could be measured. This represents over 62% of the recorded information, which is typical reliability for this data point. Further steps were taken to ensure only those units assigned to or funded by SCCFD were evaluated, which resulted in a smaller data set of 7,621 records. In addition, to ensure the responding crew was facing an urgent situation, only incidents classified as emergent were evaluated.

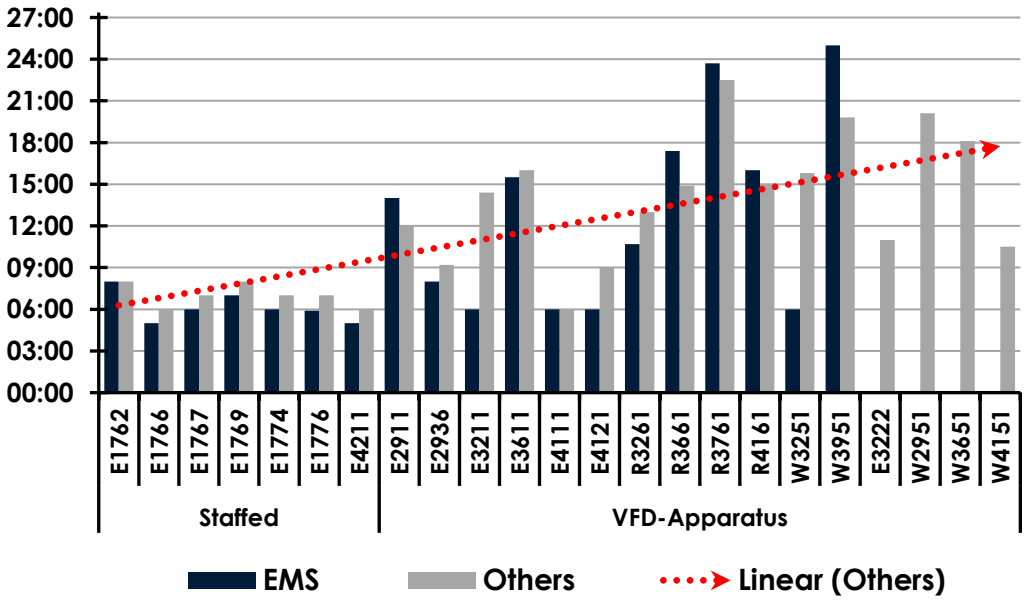
Overall, SCCFD staffed apparatus had a turnout time of just over 6 minutes at the 90th percentile, while the volunteer company performance was 14 minutes. It should be noted the policy of the ECC is to capture the en route time after all units have checked in for the incident. This policy limits the reliability of the analysis, as the turnout time will be an aggregate of the slowest responding unit, not necessarily the actual performance of the apparatus if multiple units are dispatched. This will place more emphasis on the total response time analysis. The following figure shows the turnout times by status and EMS versus other incident categories.

Figure 69: Turnout Time by General Category (2018–2022)



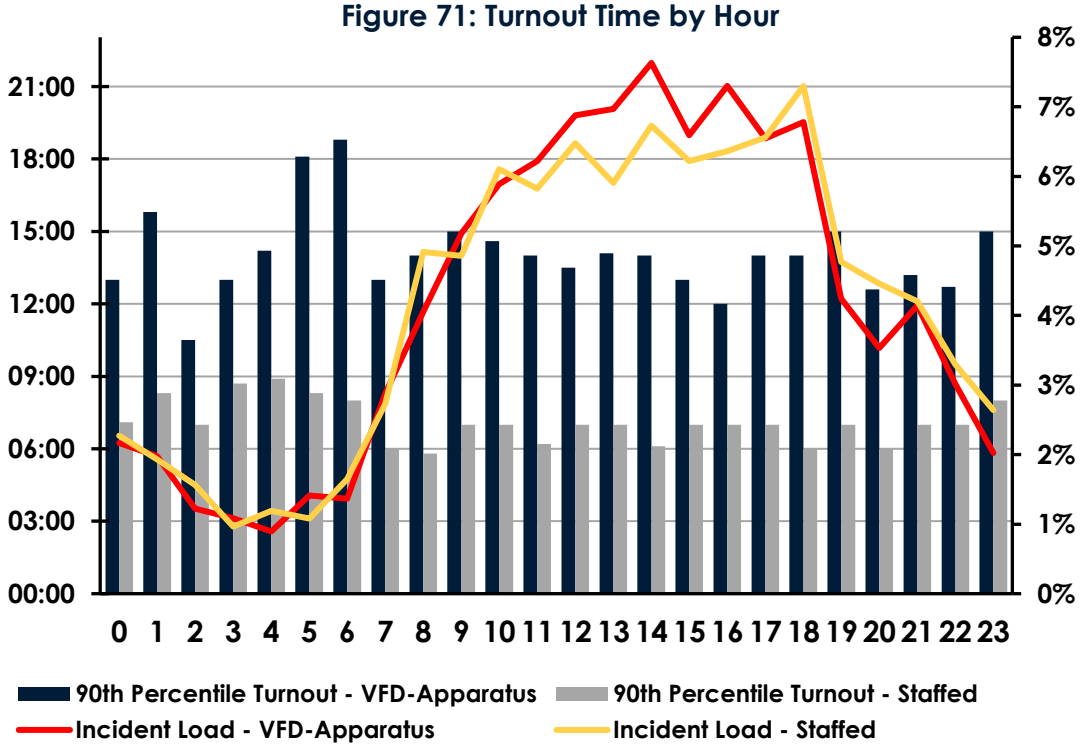
Each apparatus was also evaluated for individual turnout times. Turnout time was limited to 25 minutes, the outer quartile for the volunteer responses. It should also be noted that the data did not include seconds, so the evaluation is to the nearest minute. However, all times can be assumed to be plus or minus 1 minute. The following figure shows the turnout time 90th percentile for each unit grouped by general incident type, with the staffed stations organized on the left side and the volunteer companies to the right.

Figure 70: Turnout Time by Unit (2018–2022)



One final dimension of the turnout time analysis is the changes in the percentile by the hour of the day. It can be expected that crews on duty can try and sleep at night. However, asleep personnel can impact how fast they can get to the apparatus and begin to respond. The same can be said for volunteers responding from home after hours. In addition, the lower incident volume at night can leave the results more sensitive to outlier data. The following figure shows the turnout percentile by the hour of the day, with the workload by general incident type added for reference.

Figure 71: Turnout Time by Hour



While there is a slight inverse relationship between incident volume and turnout time, the hour does not affect performance. The volunteer performance slightly decreases after hours, as would be expected. The primary conclusion of this analysis is the turnout time for both volunteer and career units are significantly higher than expected and exceeds NFPA recommendations.

Travel Time Analysis

NFPA 1710 and NFPA 1720 list several travel time requirements for apparatus. NFPA 1710 first defined travel time as the first unit, either an engine or a truck that can operate as an engine for 4 minutes. The second-due engine should travel 6 minutes, and the first alarm should arrive within 8 minutes for a moderate-risk structure fire.[17] NFPA 1720 utilizes a different standard that defines minimum staffing and response time for a structure fire. The following figure summarizes the staffing and response time.[18]

Figure 72: NFPA 1720 Staffing and Response Time

Demand Zone [a]	Demographics (Pop/mi2)	Minimum Response Staff[b]	Response Time (min)[c]	Meets Objective
Urban	> 1,000	15	9	90th percentile
Suburban	500–1,000	10	10	80th percentile
Rural	< 500	6	14	80th percentile
Remote	Travel > 8 mi	4	Distance	90th percentile
Special Risks [d]	AHJ	AHJ	AHJ	90th percentile

[a] Jurisdictions can have more than one demand zone.

[b] Minimum staff includes department and automatic aid.

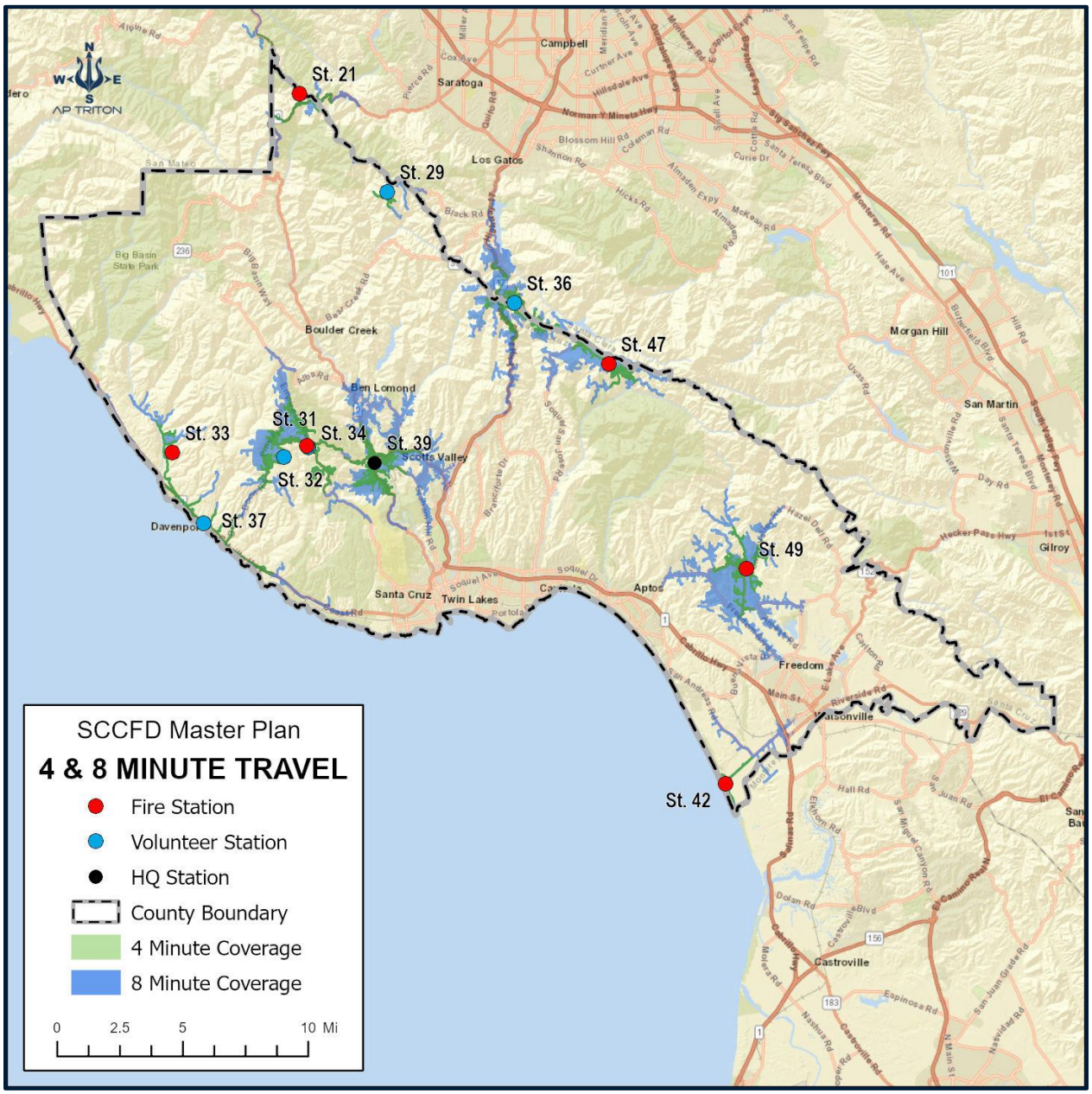
[c] Interval from dispatch to arrival per the chart.

[d] Defined and set by the authority having jurisdiction (AHJ).

Most SCCFD response areas are suburban, rural, and remote, with small pockets of urban population density. However, it was not possible to evaluate the data based on demographics. Every attempt will be made to show travel times in a way that allows for operational decision-making. However, reviewing performance against a standard will require additional effort on SCCFD's part moving forward.

Travel time is the difference between unit checking en route until they arrive on scene. The following figure shows the 4 and 8-minute travel times from SCCFD's fire stations.

Figure 73: 4- & 8-Minute Travel Times from SCCFD Stations



The previous figure shows that much of the county response area does not enjoy a rapid response. However, many of the populated regions do have some good coverage. Still, areas of higher call density are not easily accessible with the current deployment.

Theoretic models are beneficial when evaluating what can happen. However, considering the actual performance may give a better understanding of what the agency can provide.

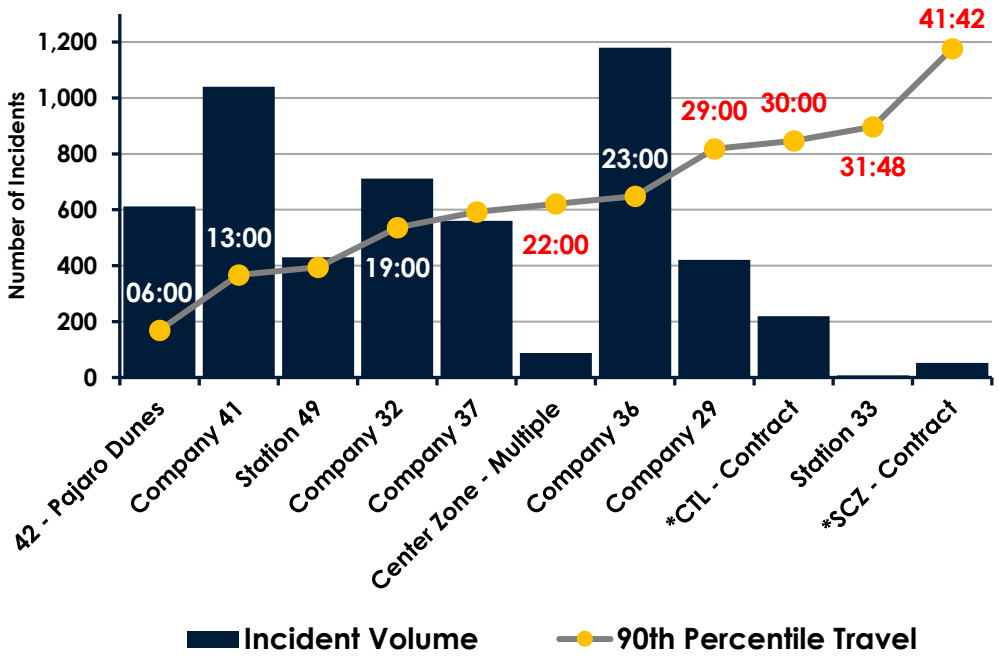
First Due Apparatus

An evaluation of the data required several filters and rules to be applied. There were 7,253 first-unit arrival times in the data. This is approximately 79% of all incidents. The travel time was further limited to only emergent-type incidents and emergent arrivals. The final two filters were to restrict the upper travel time allowed to 1 hour and remove zero times for the travel time. With these filters in place, the final analytic for travel time resulted in 5,475 incidents in SCCFD's jurisdiction. These changes left approximately 60% of the incidents to evaluate, well within the expected number. However, the incident time information did not include seconds, leaving a plus or minus 1-minute error due to data structure.

The first due travel performance for SCCFD is 20 minutes overall at the 90th percentile. It should be noted that the first due to the SCCFD area is accomplished by SCCFD units, including the contractual units, only 54% of the responses. Ambulances cover 8%, and 38% are completed by aid units. These aid companies include the surrounding jurisdictions and CAL FIRE apparatus not acting within the Amador-funded season. It is also interesting to note that according to the volunteer logs provided, the volunteer companies logged 4,961 responses, only 90% of the incidents in the record. Of their recorded responses, they arrived on the scene only 38% of the time. The rest were canceled units, 26%, no response or no driver available 20%, and standby for station coverage 9% of the time.

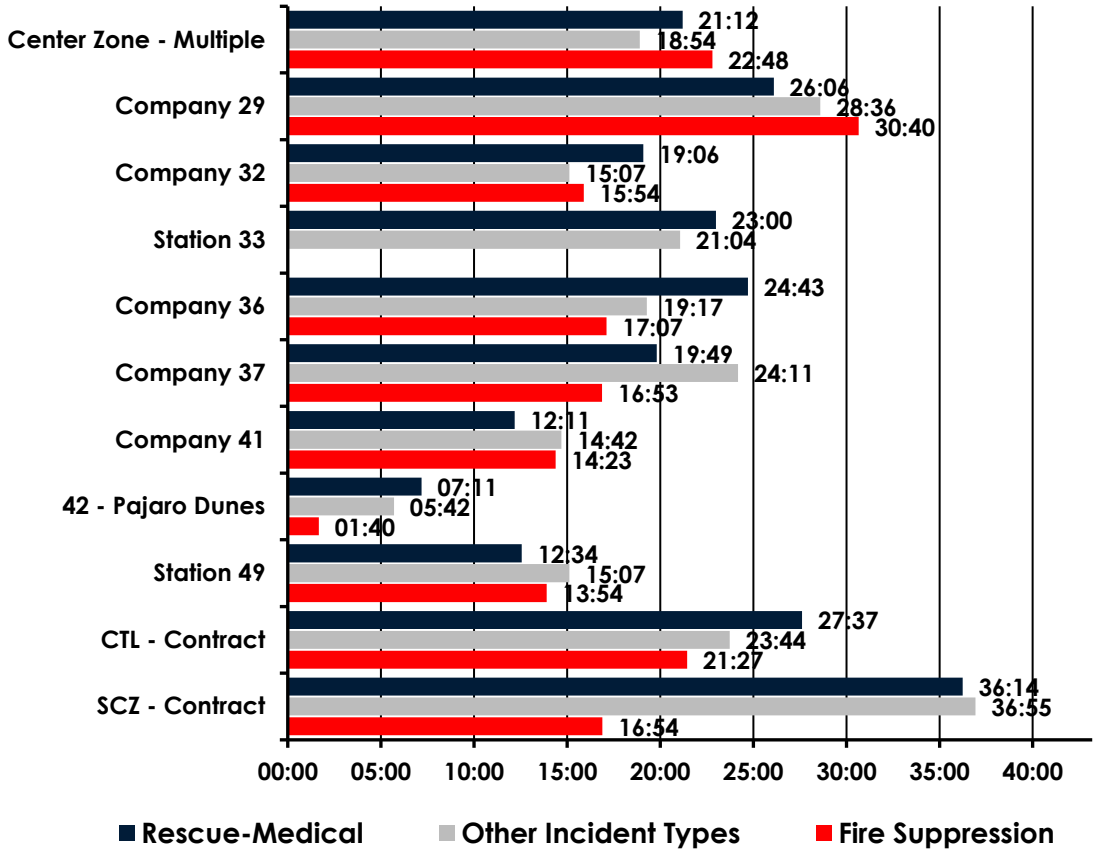
Each zone was grouped using the technique described previously in this section based on the county-provided area map. The following figure lists the number of responses and the 90th percentile, first due travel time, based on those zones.

Figure 74: Incident Count & First-Due Travel (2018–2022)



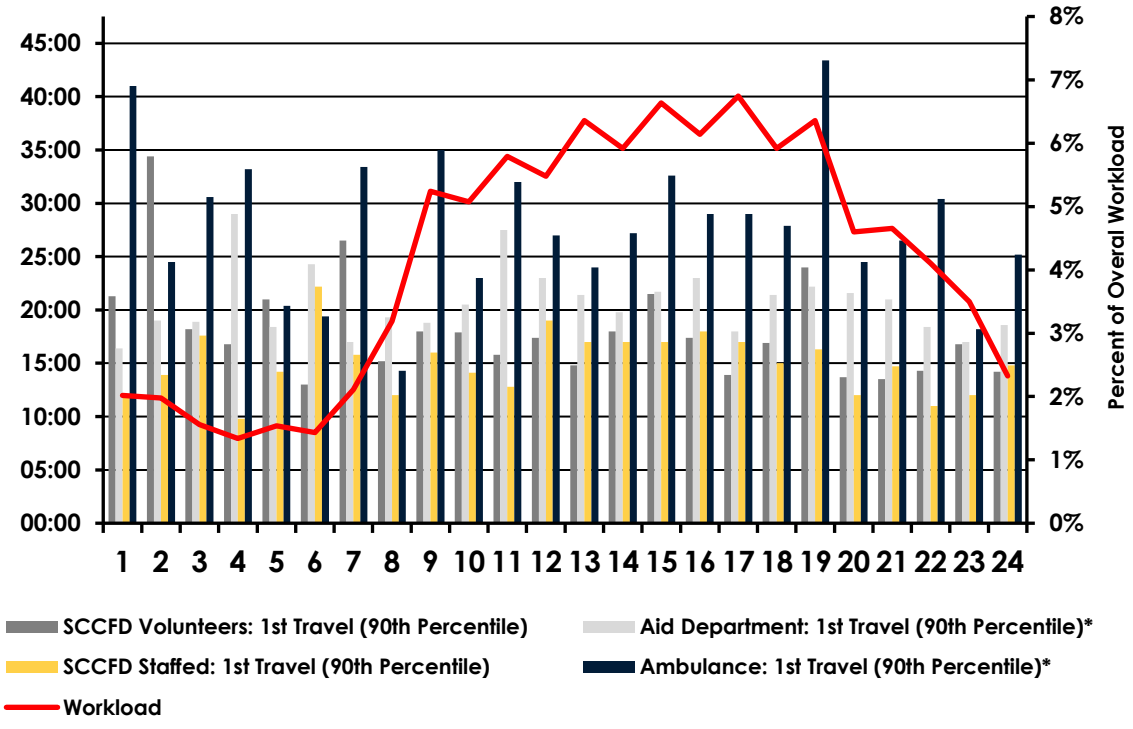
By contract Central Santa Cruz and Santa Cruz Fire Department cover various SCCFD areas. These two agencies are dispatched through the regional 9-1-1 center and maintain radio contact with that center. However, the data analyzed was the data received from the ECC. Because of the potential differences between these two systems, this analysis should not be used for contractual performance evaluations. The following figure shows the zones grouped by fires, medical, and other incidents.

Figure 75: First Due Travel by Zone & Incident Type (2018–2022)



Time of day can have an enormous impact on travel times. For example, crew readiness, traffic patterns, and incident volume can impact travel times. In SCCFD's case, travel times fluctuate throughout the day. Apparatus sees a slightly lower travel time during the day than at night. However, medical units do not appear to follow any pattern. The following figure shows the first due travel times by the hour, grouped by the types of units arriving first, with the workload shown for reference.

Figure 76: 1st Due Travel Time by Staffing Type (2018–2022)



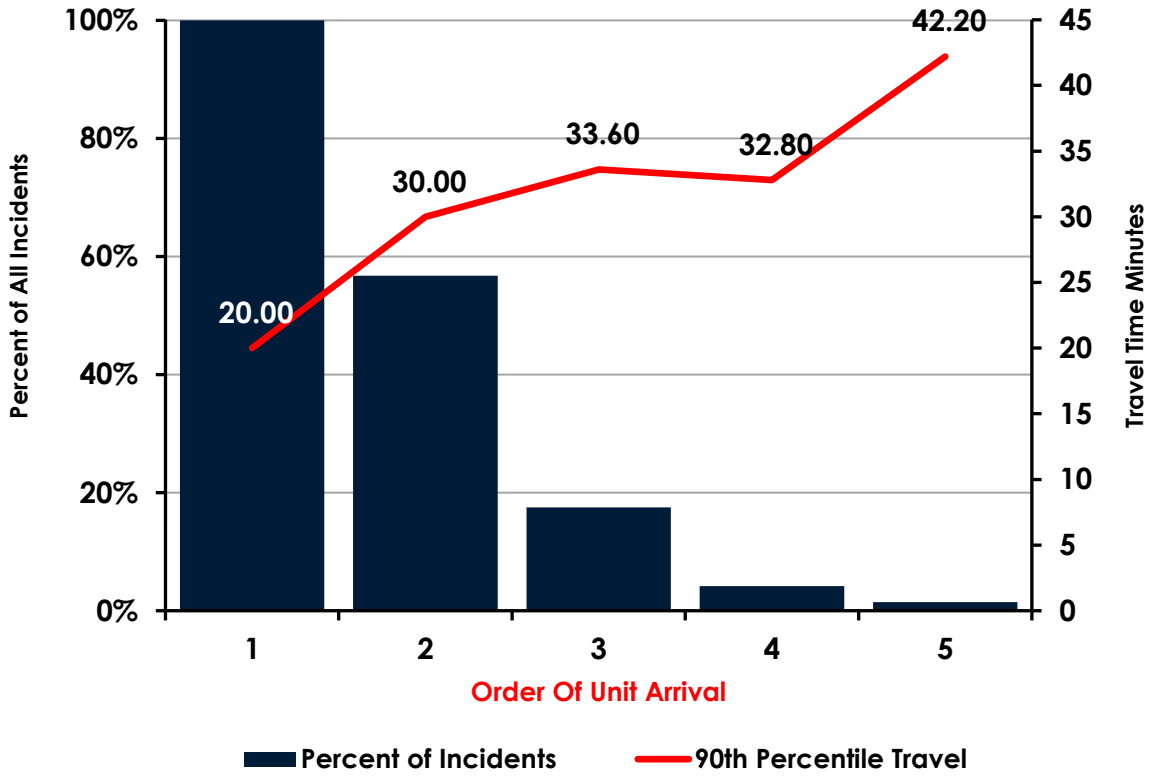
Again, the aid units and ambulances may be delayed through the communication notification process. However, this is not a conclusive statement based on the data used for analysis.

Effective Response Force

The second dimension of the travel time analysis is how well the effective response force (ERF) needed for a type of incident can be assembled. ERFs change with the complexity and resources required of any incident. In addition, they can range from one unit to multiple units with specialty equipment. Unfortunately, there were not enough data points to analyze the incidents by their type.

It is possible to evaluate the time it takes for a certain number of units to arrive on the scene. SCCFD can respond with many internal and aid resources to any given incident. However, gathering more crews takes much time due to the large distances needed for additional units to arrive. For most of the incidents, SCCFD can assemble the first three apparatus within 34 minutes of travel time of each other. However, travel time for additional units can extend significantly. While 57% of the incidents in the data needed two apparatus, only 23% received more than that. The following figure shows the travel time for emergent incidents of the first five units arriving.

Figure 77: First 5 Unit Travel Times (2018–2022)



Total Response Time Analysis

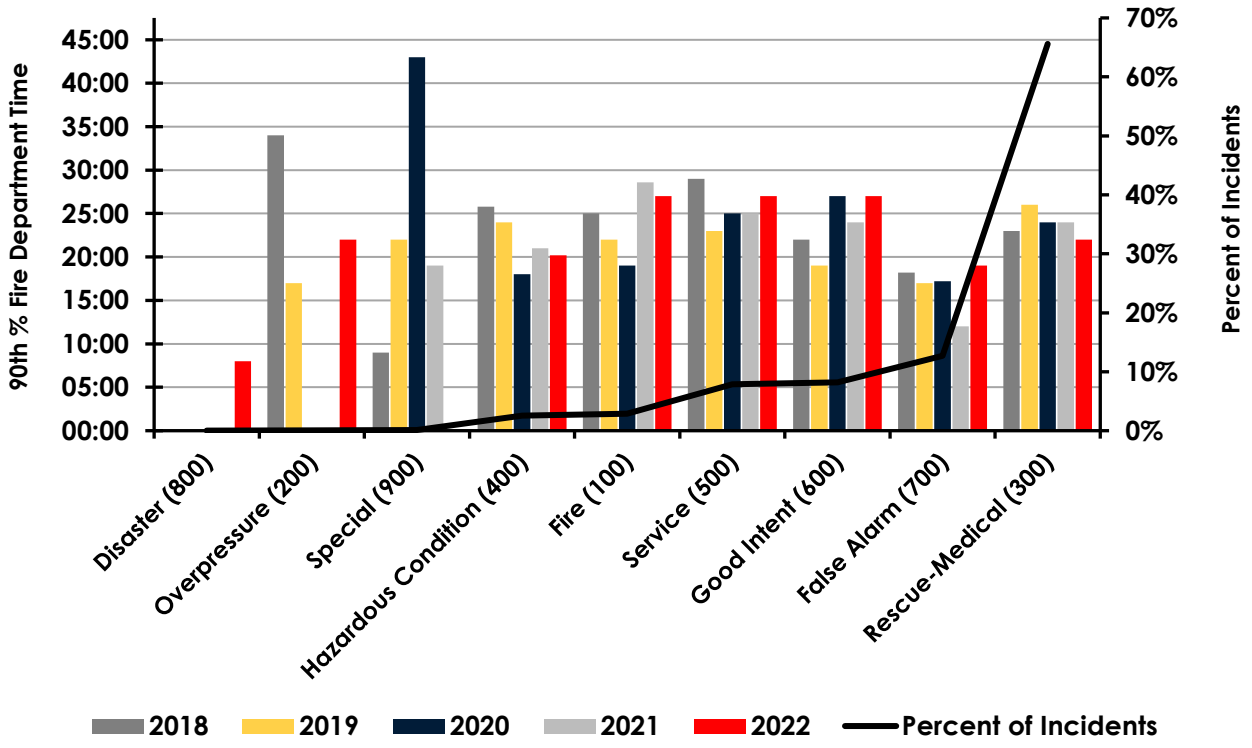
The reason each time segment is analyzed is to get an understanding of where performance can be measured and improved. However, the primary performance measurement is the total response time. The person in need sees this as SCCFD's performance.

Unfortunately, as discussed in the call processing section, the first critical step in response cannot be evaluated. Therefore, the fire department performance time will be used instead. This is the time from the first unit dispatched until the first unit arrived on the scene. However, leaders and managers will still find value in the specific fire department performance metric.

The results were only considered for those incidents within the county jurisdiction, emergent incidents, and the upper limit was set at one hour. In addition, zero times were not allowed. With the filters, 59% of the responses could be analyzed. In SCCFD's case, the first due fire department time overall was 23 minutes at the 90th percentile, plus or minus one minute due to the lack of seconds in the data.

The following figure shows incident types and their first-due fire department response times by year.

Figure 78: Total FD Time by Type (2018–2022)

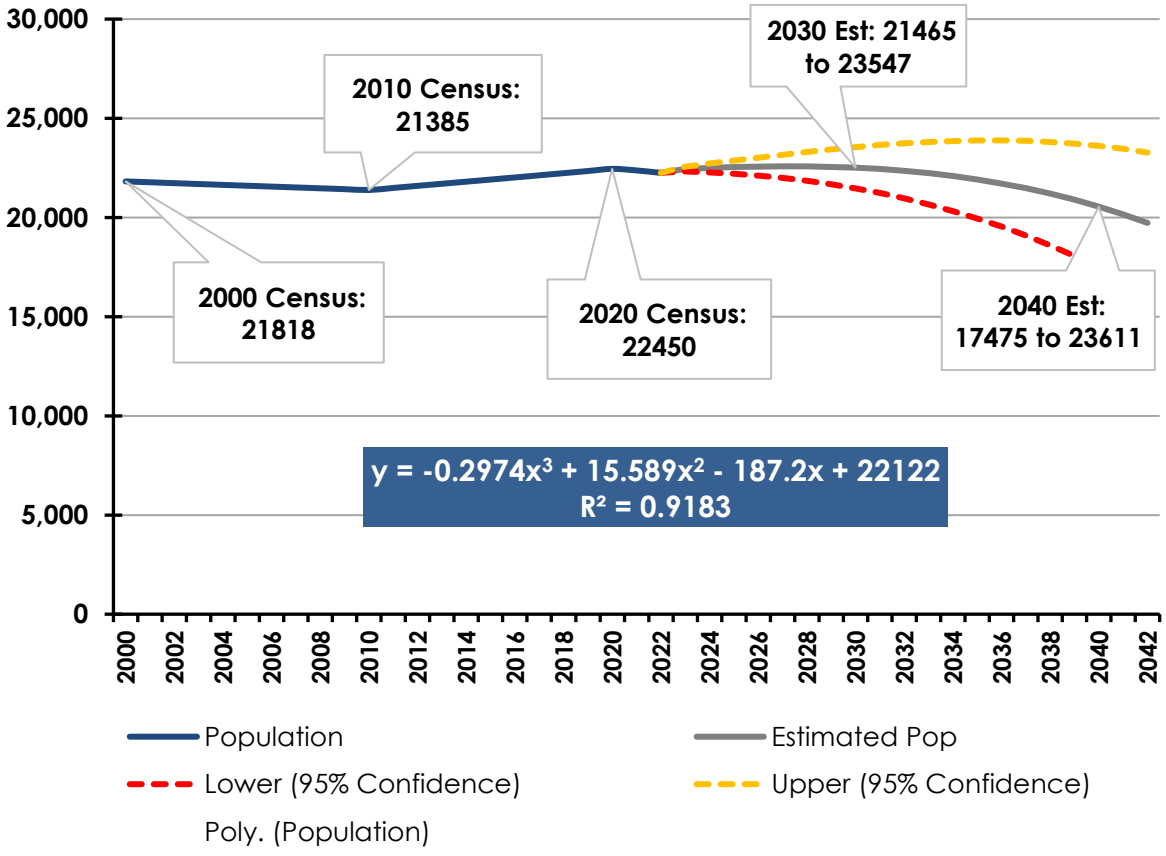


Population Growth & Service Demand Projections

The population in the SCCFD response area includes unincorporated portions of Santa Cruz County and the communities of Davenport, Bonny Doon, and Pajaro Dunes. Though there has been a population increase since the 2010 census, the U.S. Census American Community 5-Year Estimates project a future population reduction in the area. In 2020, the population was 22,450. By 2030, the population is estimated to be between 21,846 and 23,302.

The following figure shows the projected population in 2030 at 21,465 and 17,745 in 2040.

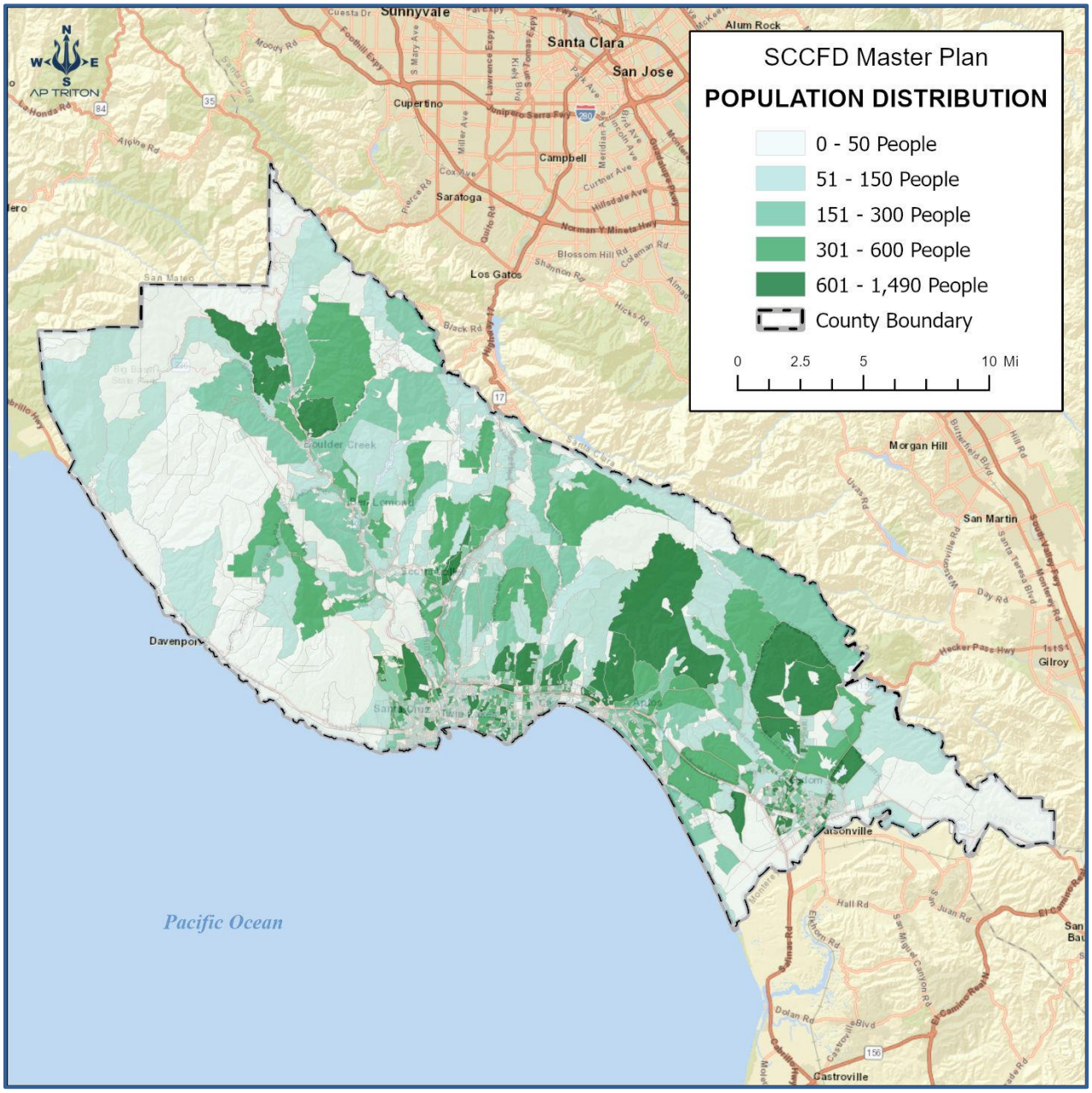
Figure 79: Populations Estimates



Population Distribution

The population of Santa Cruz County is predominantly centered around the cities of Santa Cruz, Watsonville, Scotts Valley, Capitola, Soquel, Aptos, and the communities of Live Oak and Rio Del Mar. Along the spine of the Santa Cruz Mountains in the northern portion of the county are the cities of Boulder Creek, Ben Lomond, and Felton. SCCFD provides fire protection to the unincorporated portions of Santa Cruz County. The following figure shows the population density for Santa Cruz County.

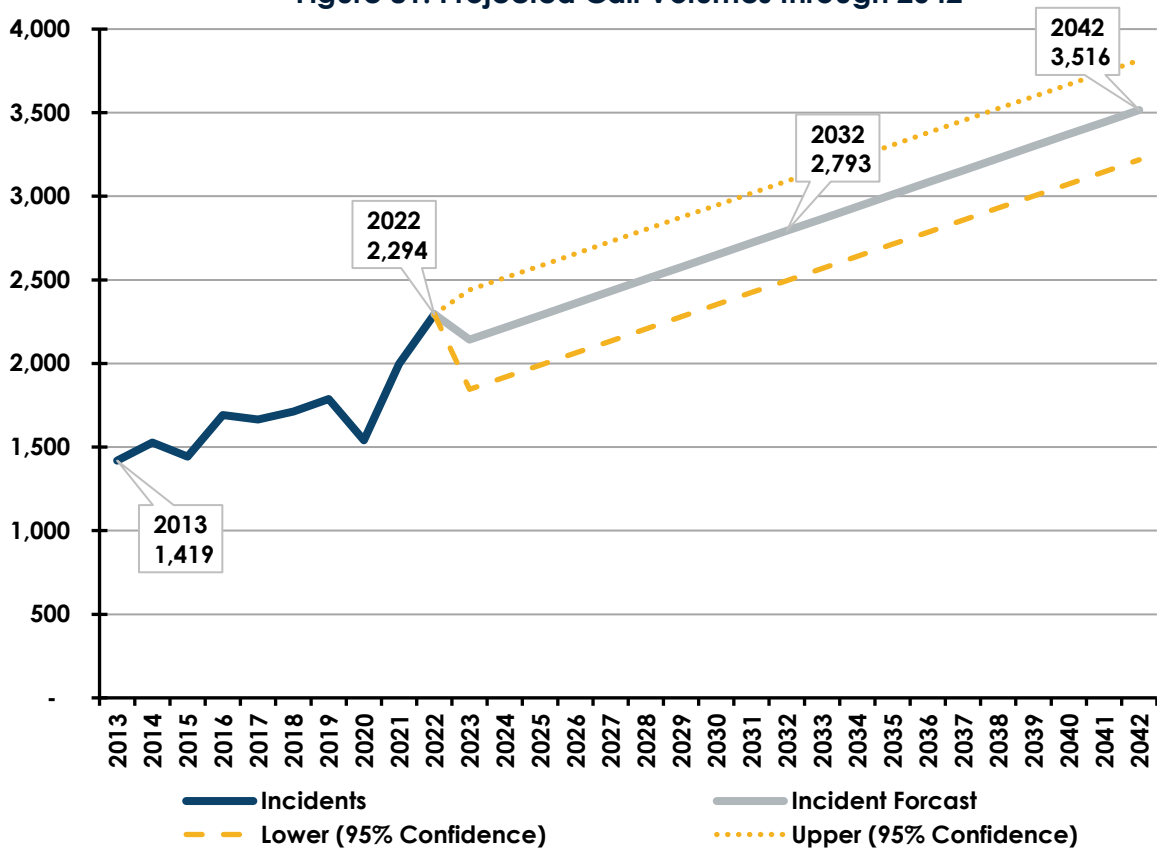
Figure 80: Population Distribution



Projecting demand for service requires reviewing historic incident rates to estimate the number of calls in future years. The following figure shows the incident responses in 2013 at 1,419, increasing to 2,294 in 2022. The increased utilization rate will potentially increase SCCFD's workload, as shown in the following figure. Response workload could reach over 3,500 incidents per year by 2040.

The following figure shows the projected incident volume in 2032 at 2,793 and 3,516 in 2040.

Figure 81: Projected Call Volumes through 2042



Establishment of Performance Objectives

SCCFD provides fire protection, first responder EMS, and other emergency services to a response area of approximately 264 square miles. This is accomplished with a mixture of staffed apparatus, volunteer companies, and mutual aid from neighboring jurisdictions. Critical tasks must be performed with each type of incident and corresponding risk, and particular numbers and types of apparatus should be dispatched.

Tasks that must be performed at a fire can be broken down into two key components: life safety and fire flow. Life safety tasks are based on the number of building occupants, their location, status, and their ability to take self-preservation action. Life safety-related tasks involve the search, rescue, and evacuation of victims. The fire-flow component involves delivering sufficient water to extinguish the fire and create an environment within the building that allows entry by firefighters.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat various types of fires. Without adequate personnel to perform concurrent action, the commanding officer must prioritize the tasks and complete some in chronological order rather than concurrently. These tasks include the following:

- Command
- Scene safety
- Search and rescue
- Fire attack
- Water supply
- Pump operation
- Ventilation
- Backup/rapid intervention

Critical task analyses also apply to non-fire-type emergencies, including medical, technical rescue, and hazardous materials. Numerous simultaneous tasks must be completed to control an emergency effectively. Santa Cruz County Fire Department's ability to quickly muster the needed numbers of trained personnel to make a difference is critical to successful incident outcomes.

Throughout this document, risk levels for each response type have been identified. Risks are categorized as low, moderate, high, and maximum risks. These apply across the six department programs of fire response, EMS, technical rescue, hazardous materials response, and aircraft rescue and firefighting efforts.

SCCFD completed a critical tasking overview as part of this study. Each hazard type was identified, and the number of personnel was determined based on critical tasking and operational procedures.

The following summarizes the total personnel required by incident type and risk category.

Figure 82: Staffing Recommendation Based on Risk

Incident Type	Low	Moderate	High	Maximum
Fire	3	16	22	28
Emergency Medical	3	9	13	25
Wildland/WUI	6	52	77	N/A
Technical Rescue	3	8	14	21
Hazardous Materials	3	10	16	26
Aircraft Rescue/Firefighting	4	8	22	32

Establishing resource levels needed for various emergencies is a uniquely local decision. Factors influencing local decisions for incident staffing include the type of equipment, training levels of responders, operating procedures, geography, traffic, and the nature of buildings and other protected risks.

Critical Tasking

SCCFD has developed the following Critical Task Analysis using risk matrices for various incident types. Critical tasks are those activities that must be conducted promptly by firefighters early in emergency incidents. This intervention is essential to control the situation, stop loss, and perform the necessary tasks required for a medical emergency. SCCFD is responsible for ensuring those responding companies can perform all described tasks promptly, efficiently, and safely.

The following figures are SCCFD's minimum number of personnel needed by incident type and risk severity by function.

Figure 83: Fire Response Critical Tasking

Function	Maximum	High	Moderate	Low
Command/Support	1	1	1	1
Safety	1	*	*	*
Size up (360°)	1	1	1	*
Driver/Engine or Pump Operator	1	1	1	1
Water Supply	1	1		
Standpipe/Sprinkler Control	*	*		
Fire Attack	4	2	2	1
Search & Rescue	4	6	2	
Ventilation/Utilities	4	3	2	
Backup Line	4	2	2	
Rapid Intervention Team	3	3	3	
EMS Unit - ALS	4	2	2	
Total Effective Response Force:	**28**	**22**	**16**	**3**

***Temporary Assignment**

Figure 84: Emergency Medical Services Critical Tasking

Function	Maximum	High	Moderate	Low
Command	1	1	1	*
Safety	1	*	*	*
Documentation			*	1
Family/Bystander Liaison			1	*
Operations	1			
Triage Group	1	1		
Basic Life Support Treatment	10	4	2	2
Advanced Life Support Treatment	6	6	2	*
Extrication/Hazard Mitigation			3	
Evacuation Group	3			
Transport Group	1	1		
Staging	1			
Total Effective Response Force:	**25**	**13**	**9**	**3**

***Temporary Assignment**

Figure 85: Wildland/WUI Fire Critical Tasking

Function	High	Moderate	Low
Command	1	1	1
Safety	*	*	*
Size up (360°)			*
Fire Attack			4
Recon Group	*	*	
Lookout	1		
Driver/Engine or Pump Operator	4	2	
Flank Divisions	12	10	
Water Supply	4	2	
Hand Crews	45	30	
Structure Protection	10	6	
Staging	*	1	
Total Effective Response Force:	**77**	**52**	**5**

* Temporary Assignment

Figure 86: Technical Rescue Critical Tasking

Function	Maximum	High	Moderate	Low
Command/Support	1	1	1	1
Safety	1	1	1	*
Size Up (360°)	1	1	*	
Extrication/Hazard Mitigation			4	2
Operations	1	1		
Rescue teams	5	4		
Rescue Support Group	4	4		
Basic Life Support Treatment	4	*	*	*
Advanced Life Support Treatment	4	2	2	
Staging	*			
Total Effective Response Force:	**21**	**14**	**8**	**3**

***Temporary Assignment

Figure 87: Hazmat Critical Tasking

Function	Maximum	High	Moderate	Low
Command/Support	1	1	1	1
Safety	1	1	1	*
Size Up (360°)	1	1	*	*
Pump Operation/Decon			2	
Hazmat Group Supervisor			*	
Hazard Mitigation			4	2
Operations	1	1		
Entry Team Officer and Team	5	2		
Backup Entry Team	4	2		
Hazmat Support Group	1	1		
Decon Group	2	2		
Medical Group/Patient Care	9	5	2	
Staging	1			
Total Effective Response Force:	**26**	**16**	**10**	**3**

***Temporary Assignment

Figure 88: Aircraft Fire & Rescue Critical Tasking

Function	Maximum	High	Moderate	Low
Command	1	1	1	1
Safety	1	*	*	*
Size Up (360°)	*	*	*	*
Operations Section	1	1		
Fire Attack Group	6	6	3	3
Rescue Group	10	8	4	
Medical Group		5		
Triage Group	1			
Basic Life Support	4			
Advanced Life Support	6			
Transport Group	1			
Staging	1	1		
Total Effective Response Force:	**32**	**22**	**8**	**4**

***Temporary Assignment

Alarm Assignments

SCCFD manages complexities built into the system as a combination department. For example, the variability of response from volunteer companies and the staffed engines do not necessarily meet the incident effective staffing requirements. However, the relationship between SCCFD and CAL FIRE allows for additional staffed apparatus when available. CAL FIRE CZU resources in the county often respond to assist and bolster the SCCFD response when available. In these instances, CAL FIRE is essentially providing automatic aid to SCCFD, absent any reciprocal agreement.

It must be said again, Schedule B stations, apparatus, and personnel are always obligated to their state wildland/watershed protection mission first and are available for immediate deployment to incidents anywhere in the State of California. Their availability to assist SCCFD in the performance of their all-hazard/local agency mission is always subject to the needs of the state and resource demands due to wildfires anywhere in the State of California.

The following figure shows the staffed apparatus and their unit levels.

Figure 89: SCCFD & CZU Staffed Apparatus (Peak Fire Season)

Apparatus	SCCFD	CZU
BC 1717	1	
BC 1716	1*	
Engine 4211	2	
Engine 1762		3
Engine 1769		3
Engine 1760		4
Engine 1776		4
Engine 1767		4
Engine 1764		4
Engine 1768		4
Engine 1766		3
Engine 1774		3
Totals:	**4**	**32**

*BC 1716 90/10 cost share between Pajaro Valley FPD (90%) and CSA 4 (10%).

Figure 90: SCCFD & Amador Staffed Apparatus (Non-Peak Fire Season)

Apparatus	SCCFD	Amador
BC 1717	1	
BC 1716	1*	
Engine 4211	2	
Engine 1762		3
Engine 1776		3
Engine 1767		3
Engine 1768		3
Engine 1774		3
Totals:	**4**	**15**

*BC 1716 90/10 cost share between Pajaro Valley FPD (90%) and CSA 4 (10%).

The preceding figure illustrates the difficulty of relying on specific apparatus to fill any alarm assignment. SCCFD-staffed units do not have sufficient full-time on-duty personnel to fulfill even low-risk alarm assignments. During peak wildfire season, CAL FIRE engines deployed in Santa Cruz County to meet the state mission are heavily relied upon to support SCCFD's response and are often the only fully staffed engine to arrive on scene.

During non-peak wildfire season, when the state reduces the number of staffed CAL FIRE engines due to the lower likelihood of vegetation fire, the County of Santa Cruz takes advantage of this available workforce to add five stations to Santa Cruz County Fire Department's operational staffing under CAL FIRE's Amador Program.

With the additional equipment and staffing, the SCCFD is better prepared to assemble an effective response force for some low and moderate-risk alarms without the heavy reliance on mutual aid from CAL FIRE, or other local fire agencies to provide the bulk of the response. However, the Santa Cruz Mountains and many of the coastal communities are remote.

Even with the addition of Amador resources, apparatus travel long distances over winding mountain roads, significantly increasing response times. Extended response times often make assembling a complete effective response force a long event. The SCCFD has six stations with volunteer firefighters and equipment who can, and do, respond.

To ensure the best chance for assembling an effective response force for all emergencies, the Felton ECC often dispatches a mixture of full-time on-duty apparatus augmented by volunteer equipment and personnel while requesting mutual aid resources from neighboring jurisdictions.

The intent is to build a dispatch model that most likely fulfills the tasking requirement for the various levels of risk. However, it is incumbent on the agency and dispatch center to attempt to fill the needed staffing with the initial dispatch.

The following figures list what the agency reports as their dispatch complement of units and personnel versus their identified staffing requirements for risk levels.

Figure 91: Emergency Medical Assignments by Risk

Dispatched Apparatus	SCCFD Units	SCCFD Staff	Aid Units	Aid Staff	Staffing
Low Risk (ERF staffing = 3)					
Fire/EMS Unit			1	3	3
Volunteers		1			1
Totals: Over/(Under) ERF	**0**	**1**	**1**	**3**	**4 (+1)**
Moderate Risk (ERF staffing = 9)					
EMS Units			1	2	2
Fire Units			3	7	7
Volunteers		1			1
Totals: Over/(Under) ERF	**0**	**1**	**4**	**9**	**10 (+1)**
High Risk (ERF staffing = 13)					
EMS Units			4	7	7
Fire Units			4	10	10
Volunteers		1			1
Totals: Over/(Under) ERF	**0**	**1**	**8**	**17**	**18 (+5)**
Maximum Risk (ERF staffing = 25)					
EMS Units			4	7	7
Fire Units			7	19	19
Volunteers		1			1
Totals: Over/(Under) ERF	**0**	**1**	**11**	**26**	**27 (+2)**

Figure 92: Fire Alarm Assignments by Risk

Dispatched Apparatus	SCCFD Units	SCCFD Staff	Aid Units	Aid Staff	Staffing
Low Risk (ERF staffing = 3)					
Engine			1	3	3
Water Tender	1	1			1
Battalion Chief					
Volunteers		1			1
Totals: Over/(Under) ERF	**1**	**2**	**1**	**3**	**5 (+2)**
Moderate Risk (ERF staffing = 16)					
Engine			4	12	12
Water Tender	1	1	1	1	2
Battalion Chief			1	1	1
Volunteers		2			2
EMS			1	2	2
Totals: Over/(Under) ERF	**1**	**3**	**7**	**16**	**19 (+3)**
High Risk (ERF staffing = 22)					
Engine			5	15	15
Water Tender	1	1	1	1	2
Battalion Chief			1	1	1
Volunteers		2			2
EMS			1	2	2
Totals: Over/(Under) ERF	**1**	**3**	**8**	**19**	**22**
Maximum Risk (ERF staffing = 28)					
Engine			7	21	21
Water Tender	1	1	1	1	2
Battalion Chief			2	2	2
Volunteers		2			2
EMS			1	2	2
Totals: Over/(Under) ERF	**1**	**3**	**11**	**26**	**29 (+1)**

Figure 93: Wildland/WUI Assignments by Risk

Dispatched Apparatus	SCCFD Units	SCCFD Staff	Aid Units	Aid Staff	Staffing
Low Risk (ERF staffing = 6)					
Fire Units	1	1	4	10	11
Volunteers		1			1
Totals: Over/(Under) ERF	**1**	**2**	**4**	**10**	**12 (+6)**
Moderate Risk (ERF staffing = 52)					
Fire Units	1	1	12	60	61
Volunteers		2			2
Totals: Over/(Under) ERF	**1**	**3**	**12**	**60**	**63 (+11)**
High Risk (ERF staffing = 77)					
Fire Units	1	1	17	79	80
Volunteers		2			2
Totals: Over/(Under) ERF	**1**	**3**	**17**	**79**	**82 (+5)**

Figure 94: Technical Rescue Assignments by Risk

Dispatched Apparatus	SCCFD Units	SCCFD Staff	Aid Units	Aid Staff	Staffing
Low Risk (ERF staffing = 3)					
Fire Units			1	3	3
Rescue Units	1	1			1
Totals: Over/(Under) ERF	**1**	**1**	**1**	**3**	**4 (+1)**
Moderate Risk (ERF staffing = 8)					
Fire Units			3	7	7
Rescue Units	1	1			1
EMS Units			1	2	2
Totals: Over/(Under) ERF	**1**	**1**	**4**	**9**	**10 (+2)**
High Risk (ERF staffing = 14)					
Fire Units			3	7	7
Rescue Units	1	1	1	3	4
EMS Units			3	5	5
Totals: Over/(Under) ERF	**1**	**1**	**7**	**15**	**16 (+2)**
Maximum Risk (ERF staffing = 21)					
Fire Units			5	13	13
Rescue Units	1	1	1	3	4
EMS Units			3	5	5
Totals: Over/(Under) ERF	**1**	**1**	**9**	**21**	**22 (+1)**

Figure 95: Hazardous Materials Assignments by Risk

Dispatched Apparatus	SCCFD Units	SCCFD Staff	Aid Units	Aid Staff	Staffing
Low Risk (ERF staffing = 3)					
Fire Units			1	3	3
Volunteers		1			1
Totals: Over/(Under) ERF	**0**	**1**	**1**	**3**	**4 (+1)**
Moderate Risk (ERF staffing = 10)					
Fire Units			3	7	7
Volunteers		1			1
EMS Units			2	3	3
Totals: Over/(Under) ERF	**0**	**1**	**5**	**10**	**11 (+1)**
High Risk (ERF staffing = 16)					
Fire Units			4	12	12
Volunteers		1			1
EMS Units			3	5	5
Totals: Over/(Under) ERF	**0**	**1**	**7**	**17**	**18 (+2)**
Maximum Risk (ERF staffing = 26)					
Fire Units			6	18	18
Volunteers		1			1
EMS Units			4	7	7
Totals: Over/(Under) ERF	**0**	**1**	**10**	**25**	**26**

Response Time Performance Objectives

There are two primary goals for establishing an effective response force based on critical tasking. The first is to couple the incident need with available resources, creating an efficient method for responding to incidents. As is evident in the previous section, this needs to be addressed if SCCFD is to improve deployment efficiency. The other goal is to know if your deployment methodology meets the needs of the incident type.

The deployment analysis based on an effective response force requires two components, an effective response force, and performance objectives. The most common methodology for a fire department is to evaluate itself using time analysis as a crucial performance metric.

At a minimum, the first due effective unit and the effective response force arrival time from the customer's perspective should be analyzed. Total time starts when the customer calls for service and meets the first due and ERF arrival benchmarks.

Two National Fire Protection Association (NFPA) standards can apply to SCCFD, NFPA 1710 and 1720. NFPA 1720, *Organization and Deployment of Fire Suppression Operations by Volunteer Fire Departments,* describes a combination of demographic definitions, time components, and minimum staff to respond in what this report would consider a moderate-risk structure fire. A summary figure can be found in the travel time analysis section of the historical performance portion of this report.

Unfortunately, there is not a single standard that applies to a system as dispersed, eclectic, and complex as SCCFD. Therefore, it will be incumbent on SCCFD to explore appropriate and attainable measures. However, whatever method is adopted, SCCFD should consider establishing specific response performance zones.

Fire agencies throughout the United States establish zones based on risk and population density. Risk or "demand" zones provide a more accurate picture of service delivery performance. This may be especially relevant for fire departments as extensive and diverse as SCCFD. Setting response standards and performance goals should be viewed as a strategic planning tool for community loss control. In the case of SCCFD, it should help establish whether the current contractor's performance is satisfactory and what it may take if that performance needs improvement. Therefore, SCCFD is encouraged to begin the process as soon as feasible to assist with future planning needs.

Section I-B:
SUPPORT PROGRAMS

Analysis of the SCCFD Volunteer Program

Program Overview

As stated in the Santa Cruz County Fire Department's Volunteer handbook, "Volunteers are individuals dedicated to helping their local communities in time of need. They spend many hours training to be qualified to respond professionally and safely during an emergency.

Five volunteer companies formed the County Fire Department from volunteer fire organizations, many of which were created more than 50 years ago. These companies provide protection within the County Fire Department jurisdiction, in conjunction with the stations staffed by CAL FIRE personnel. The talent and skills that volunteers bring to their communities and the County Fire Department from their daily professions are immeasurable.

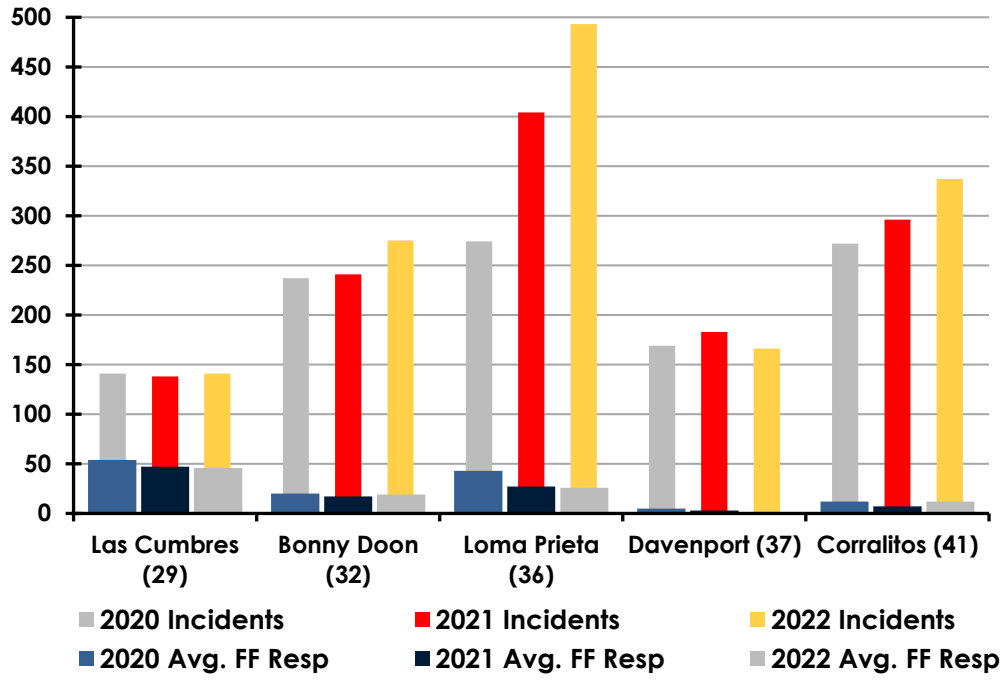
Volunteer Activity

Response

The Santa Cruz County Fire Department provides emergency response services from fourteen fire stations. These stations are staffed by CAL FIRE personnel, County Fire Volunteers, or a combination thereof. Volunteer Firefighters perform the full range of emergency response duties, responding to fires, emergency medical calls, rescue calls, vehicle accidents and an endless variety of other types of emergency situations.

The following figure shows the average number of responses by firefighters from 2020–2022 by company compared to the total number of responses within the response area.

Figure 96: Incident Volume with Average Volunteer Response by Company (2020–2022)

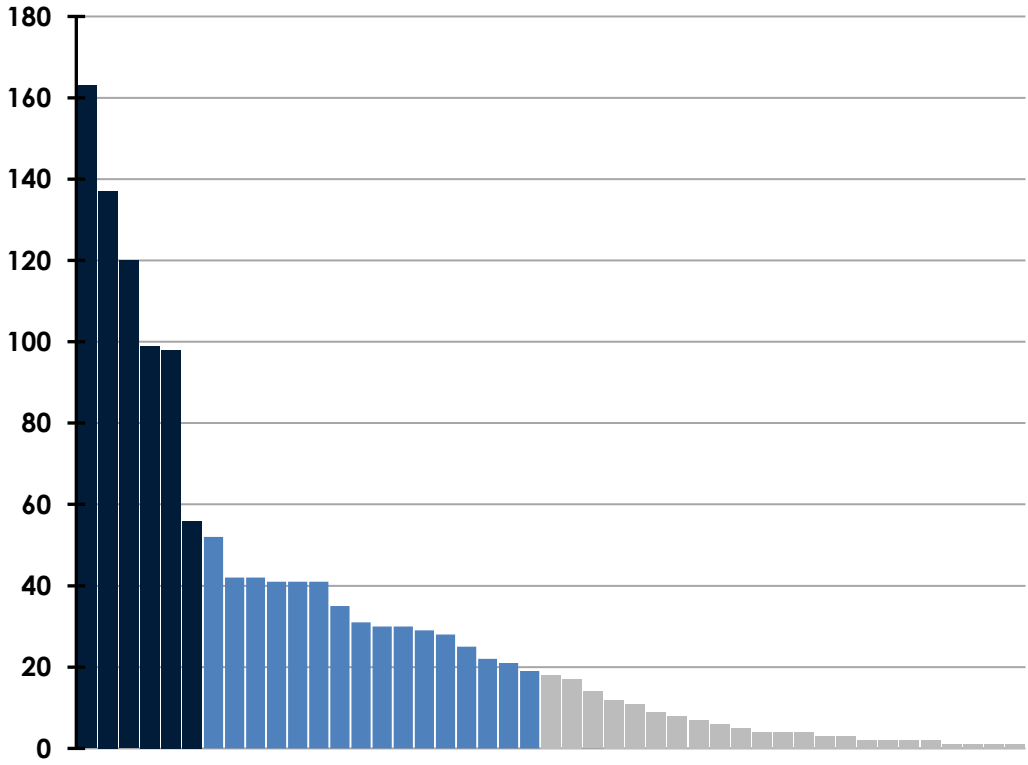


It was noted that of the 1,339 volunteer firefighter responses in the 2022 fiscal year, 673 responses (over 50%) were accomplished by six firefighters. With a total active roster of 62 volunteer firefighters in 2022, over 90% of the responses were accomplished by the top 22 responders. In other words, a third of the responders are responding to 90% of the incident's responding volunteers. Another third had no responses in 2022.

Each firefighter was given a random identification number to ensure anonymity. There is no rhyme or reason for the numbering, but all the names were standardized across all the response documentation.

The following figure shows each firefighter response for 2022. The blue segments are 90% of all calls, the dark blue is responsible for 50% of all incidents.

Figure 97: Individual Firefighter Responses (2022)



Training

Over the last several decades, the volunteer firefighter position has evolved into one that requires significantly more training and time commitment to meet national standards. Individuals desiring to become Volunteers with SCCFD are required to complete the following training courses totaling over 600 hours, including the Basic Firefighter Academy which is over 500 hours alone.

- Safety & Orientation which includes Equal Employment Opportunity (EEO)
- Completion of the Basic Fire Fighter Academy (BFFA):
  - Structure Fire Training
  - Wildland Fire Training
  - HAZ-MAT Training
  - Rescue Training
  - C-212 Classroom and Structure
  - CAL FIRE Water Rescue Awareness
  - S-190

- ICS 100 (Online)
- ICS 200 (Hybrid)
- NIMS-700 Online
- NIMS-800 Online
- Commanding the Initial Response (Classroom)
- PG&E Safety Orientation
- DGS Defensive Driver Training (Online)
- Public Safety-First Aid including CPR/AED (40 hours)
- Emergency Medical Technician is desired within 18 months of the date of hire.

Despite the breadth of training and number of hours listed above, this represents only a small portion of the amount of time volunteer firefighters spend training. Completion of the basic academy and other entry-level training requirements is only the beginning. Achieving true competency and remaining proficient requires ongoing training and a professional commitment.

To effectively evaluate volunteer fighters and the number of hours they recorded for training, the analysis was broken down into existing firefighters and new firefighters. The new firefighter's academy is 515 hours for the firefighting portion and 600 hours when the firefighter was put through the fire academy and first responder training. These were separate so the numbers were not skewed to include this academy.

The following figure shows the average number of annual training hours for each existing firefighter from 2020–2022. Those that departed or whose academy happened during the period were adjusted. The average annual training hours was 47, with a maximum of 208 and a minimum of 0. As with responses, 50% of the training hours were completed by 13 firefighters (17% of the staff), and 90% of the training hours were completed by 45 firefighters (56% of the staff).

The following figure shows the average number of hours per firefighter, arranged by company. It is broken into Loma Prieta, Las Cumbres, and Davenport and then Corralitos and Bonny Dune for page break and clarity.

Figure 98: Average Annual Training Hours by Firefighter (2020–2022)—Part 1

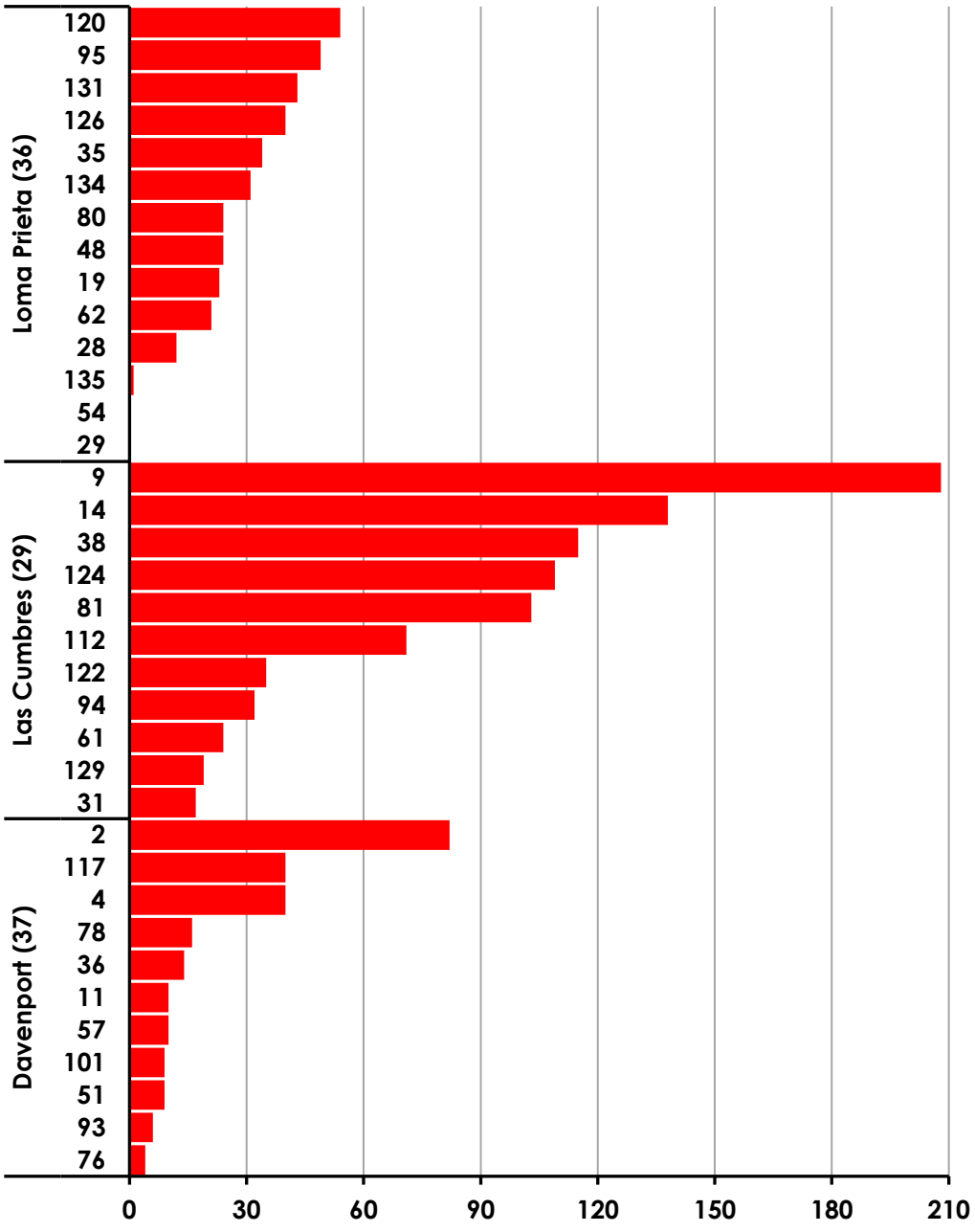
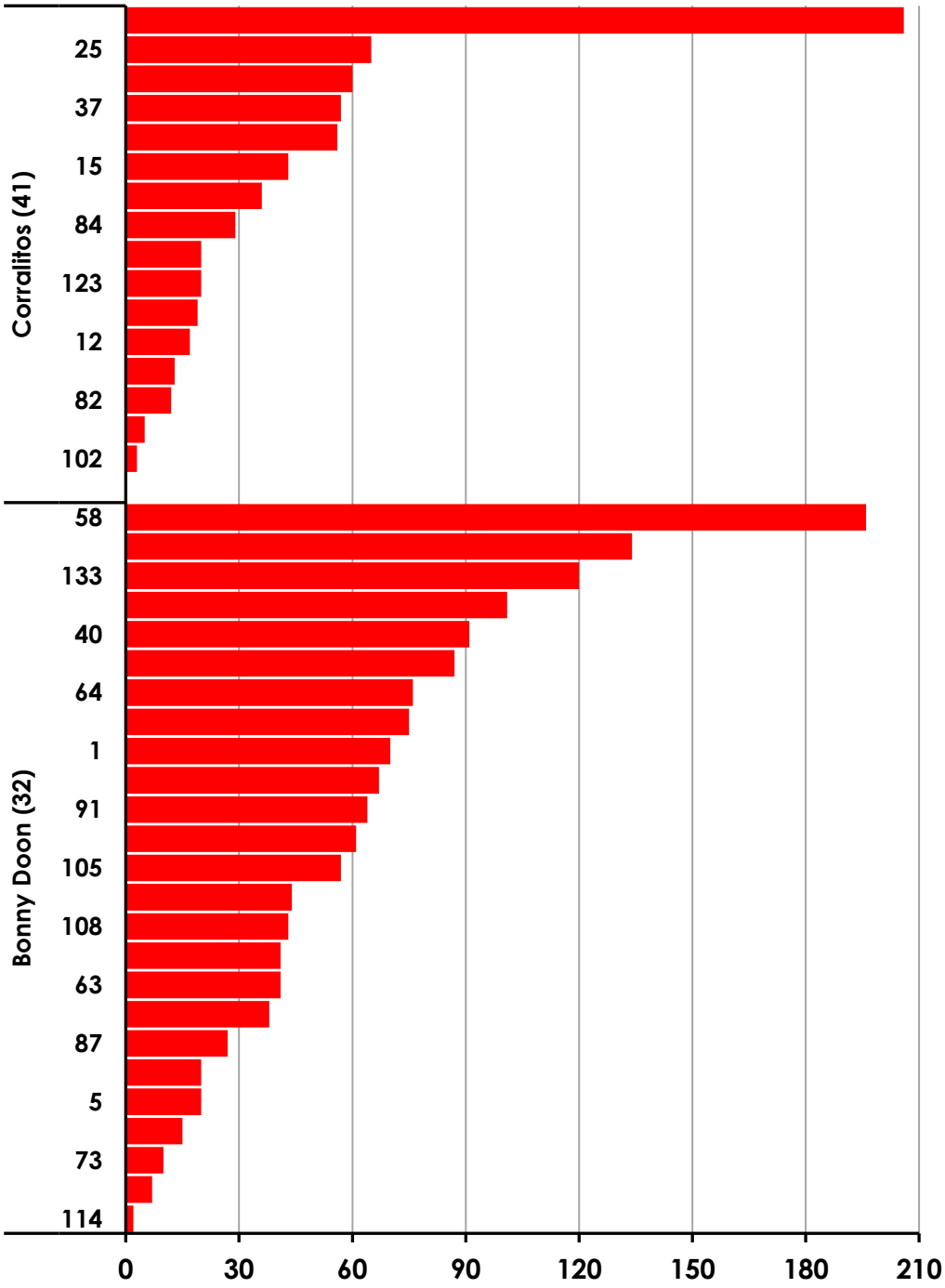
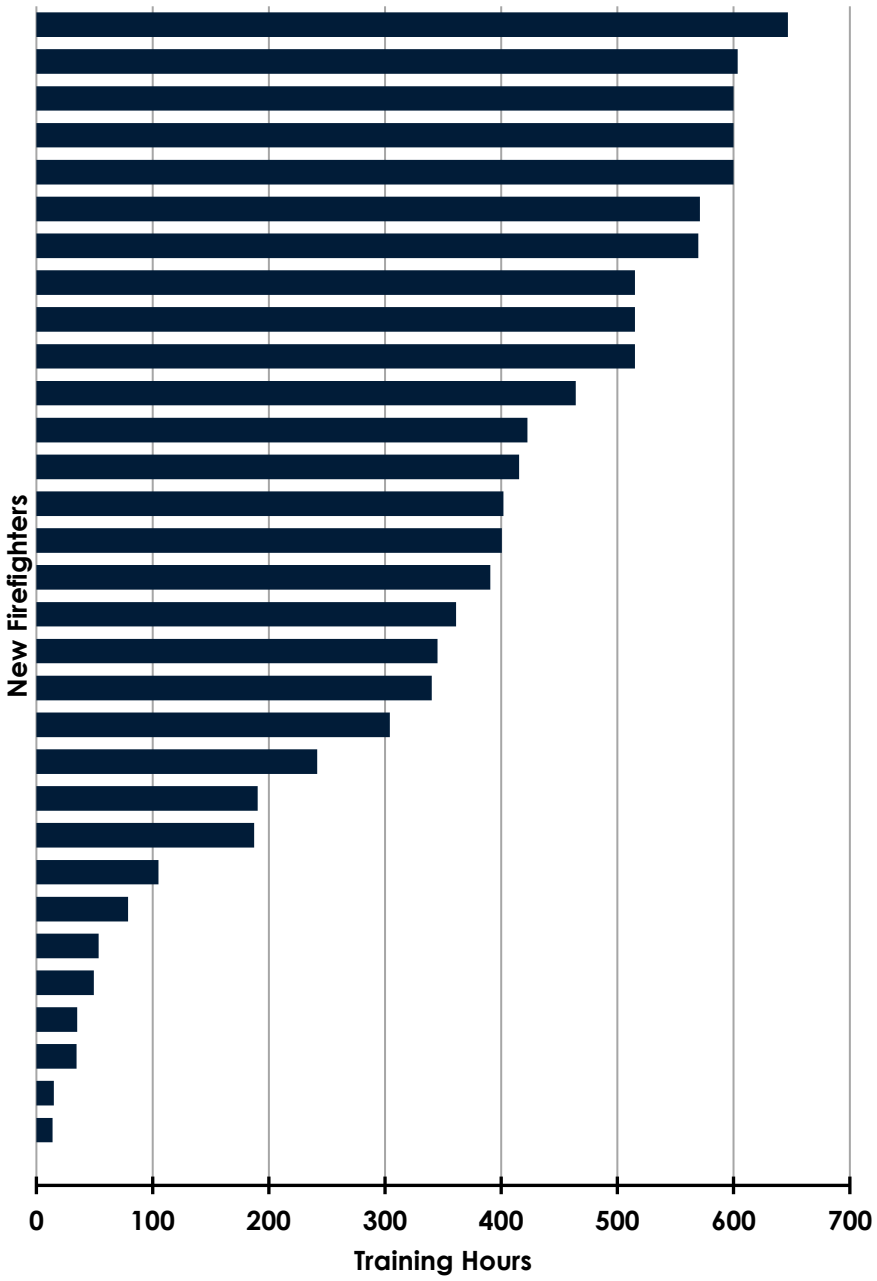


Figure 99: Average Annual Training Hours by Firefighter (2020–2022)—Part 2



The following figure shows the number of hours a new firefighter puts in. The average was 331, with only 10 completing 515 or greater hours. The low as 0 hours.

Figure 100: New Firefighter Total Training Hours (2020–2022)



Health & Safety

Risk of Injury

While it is essential for firefighters to be skilled and competent for the sake of effectiveness and efficiency, there is no better reason than for the safety of themselves, their coworkers, and the community. Though it seems obvious that the fire ground is an inherently dangerous place, firefighters do much more than fight fire. Firefighters respond to a wide variety of emergencies and are expected to apply those lifesaving and emergency rescue skills in every environment imaginable. Firefighters are regularly expected to perform these skills at night, and in inclement weather where visibility can be poor and the chance of injury even greater.

As it relates to the dangers associated with emergency response and the potential for serious injury, there is no distinction between volunteer firefighters and their full-time career counterparts. As clearly stated in the SCCFD Volunteer Handbook, "Volunteer Firefighters perform the full range of emergency response duties." Given that, the risks they face are no different.

The National Institute of Standards and Technology (NIST) Technical Note 2078 The Economics of Firefighter Injuries in the United States Geibe et al. (2008) found no statistical difference in risk factors between career and volunteer firefighters, although they did find that 34% of the fatalities of volunteers were under the age of 45 years, compared to only 15% of the career. (Kales et al. [2003] also found little statistical difference in risk factors between career and volunteer firefighters.)

A study by the National Fire Protection Association (NFPA) Survey of Fire Departments for U.S. Fire Experience estimated that in 2017, the greatest number of firefighter injuries occurred on the fire ground; the most prevalent type of injury was sprain, strain, and muscular pain; and the leading cause was overexertion or strain (Evarts & Molis, 2018).

Overview of firefighter injuries for 2017:

- 42% (24,495) occurred at the fireground.
- 21% (12,240) occurred at non-fire emergency incidents.
- 16% (9,165) occurred during other on-duty activities.
- 14% (8,380) occurred during training activities.
- 8% (4,555) occurred while responding to or returning from an incident.

Since the 1980s, there has been a substantial decrease in the number of annual fire ground injuries—almost 50%. However, the rate of injury per fire has not shown any consistent downward trend, as the number of fire incidents has also decreased by almost 50% since the 1980s. Successful measures have been taken to reduce fire prevalence over the years; however, firefighter injury rates remain significant.

Firefighters still face some obvious dangers during their work, including:

- Direct contact with fire.
- Direct contact with and handling of hazardous chemicals.
- Encountering excessive heat.
- Responding to and from incidents.
- Repetitive need to lift significant amounts of weight.
- Regular working conditions require unusual positions relative to their necks, backs, and joints.

Interestingly, the combined sum of all injuries that were the result of a burn (fire or chemical), smoke or gas inhalation, and thermal stress, on average between 2012 and 2017, was less than 10% compared to the total number of injuries sustained by firefighters. Significant improvements in personal protective equipment (PPE), technology, and training, in addition to an overall decrease in the number of fires nationally, have helped to play a role in limiting the quantity of these types of injuries. Firefighter injury rates remain significant, and firefighters face some real and obvious dangers during their work, including:

- Direct contact with and handling of hazardous chemicals.
- Encountering excessive heat.
- Responding to and from incidents.
- Repetitive need to lift significant amounts of weight.
- Regular working conditions require unusual positions relative to their necks, backs, and joints.

Benefits

Stipends

As with many other agencies, Santa Cruz County volunteer firefighters are offered a range of benefits, including stipends to compensate members for emergency incident response, in-service and out-service training hours, and as reimbursement for incidental and normal travel costs related to both. Stipends for emergency incident response are allocated based on rank. The following figure shows the breakdown of stipend by rank.

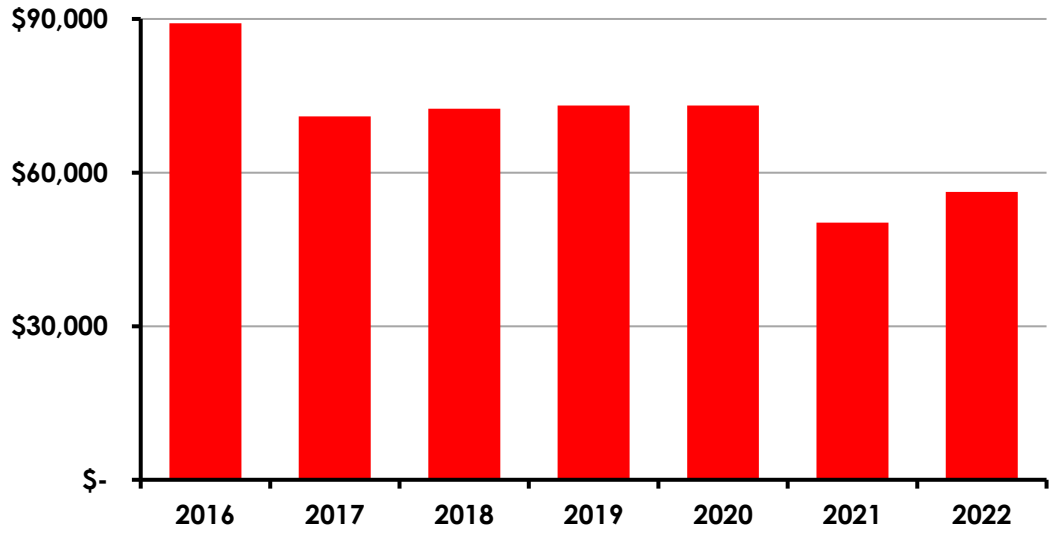
Figure 101: SCCFD Volunteer Stipend Rates

Volunteer Rank	Stipend
Volunteer Emergency Medical Responder	$15/Incident
Volunteer Firefighter	$20/Incident
Volunteer Driver/Engineer	$25/Incident
Volunteer Captain	$30/Incident

Stipends are also paid to members for each regularly assigned four (4) hours of formal training that is formally assigned through Vector Solutions, and one $15 stipend per each assigned monthly four-hour drill. Stipends are paid for a maximum of two drills per month or twenty-four drills per year. One additional $15 stipend may be allocated for each four hours of additional scheduled drill and/or pre-approved training.

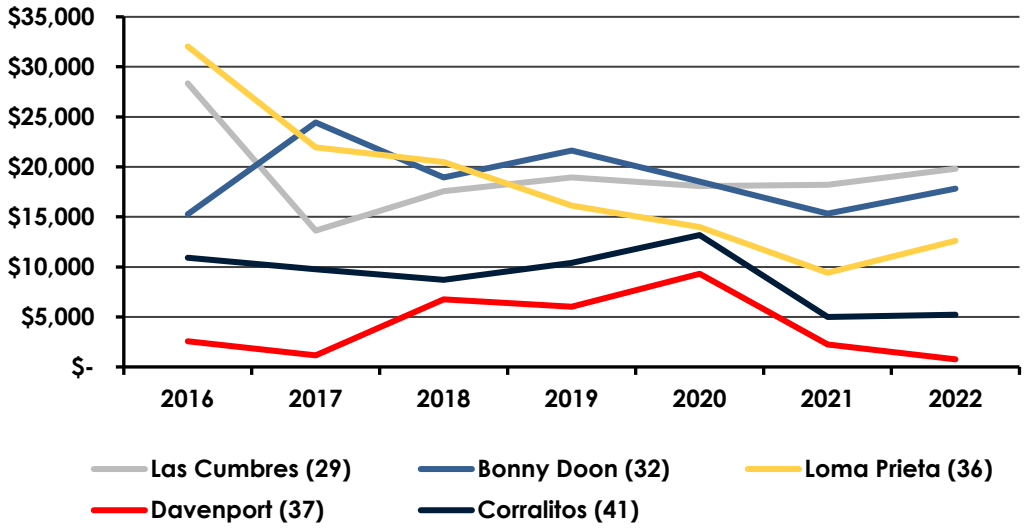
The final segment for analysis is the financial commitment for volunteers. This was taken from the reimbursement spreadsheets. The first figure shows the annual total reimbursements, including training and pay-per-call for the years in the data.

Figure 102: Annual Total Reimbursements



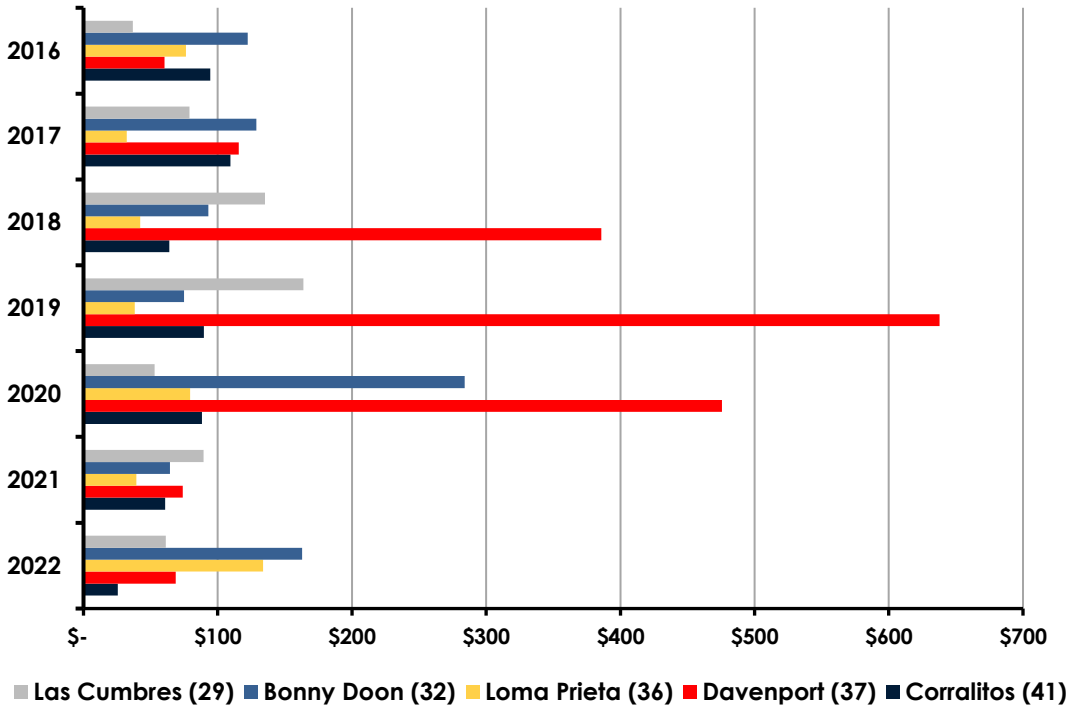
The following figure shows the total reimbursement by year and company.

Figure 103: Total Reimbursement by Year & Company



And finally, the cost per response was evaluated. This is the average firefighter reimbursement broken down by year and company. The average price per response was $114 overall.

Figure 104: Average Reimbursement Cost Per Response (2016–2022)



Benefits & Incentives

In addition to direct reimbursement for training and emergency response, the Santa Cruz County Fire Department provides other benefits and incentives to volunteer firefighters. Members are covered by Workers' Compensation coverage for any approved activities and official fire department business. The County also provides supplemental accident and health insurance in addition to that provided by Workers' Compensation. Coverage includes limited income replacement, dependent child benefits, mental stress management benefits, and many others.

County Fire provides membership in the California State Firefighters Association (CSFA) for all Volunteers. As CSFA members, SCCFD volunteers have access to several services for career advancement, industry-specific information and periodicals, political and policy representation on multiple state and national committees, as well as health and safety-related resources.

To assist personnel in dealing with incidents having the potential of causing unusual stress for responding personnel (e.g., major vehicle accidents, multi-casualty incidents, fire deaths, shootings, etc.), County Fire provides Critical Incident Stress Management (CISM) services through trained counselors. These services are available to individuals or groups of individuals and can be requested through the department's chain of command.

The Changing Face of Volunteerism

According to the U.S. Fire Administration, "*Volunteerism has been an integral part of American society since the founding of our nation. According to the NFPA data for 2020, there are an estimated 1,041,200 firefighters in the U.S., with 676,900 (65%) of those estimated to be volunteers.*"

They go on to say, "*The number of volunteers today is down significantly from 1984 when 897,750 volunteer firefighters were reported. This decline of over 220,850 volunteers took place while the United States population grew from nearly 236 million to over 331 million in the same time frame, indicating that volunteerism in the fire and emergency services has not kept pace with population growth.*"

"*Volunteerism in general has slipped and surged over the past several decades, peaking for a brief time after 9/11 and reaching a low around 2015. In 40 years of tracking volunteers, the U.S. Department of Labor's (DOL's) Bureau of Labor Statistics shows that volunteer rates tend to rise after the age of 20, peak between the ages of 35 and 44 when people tend to be more settled and have strong career and social networks, and then decline as individuals age. According to Nonprofit Quarterly, this decline is believed to be associated with retirement, diminished physical capabilities, and loss of connections with established social networks.*"

Factors influencing recruitment may include the available pool of potential volunteers to draw from in a community, distance to the department or calls (which may be especially relevant for rural areas in Santa Cruz County), training schedules, required training or shift hours, and physical training requirements.

Retention rates may include recruitment factors in addition to others: how volunteers interact with department leadership or members, changes in volunteers' work or home responsibilities, volunteers' health or physical fitness level, resources of the department, and changes to state or national requirements.

Research suggests there are often multiple factors, such as increased training requirements and increased personal responsibilities of two-income families, that may compound difficulties for volunteers wanting to serve as firefighters.

Volunteer Retention

A 2023 report by the U.S. Fire Administration states, *"Retaining volunteers requires a multi-pronged approach that showcases the department's support of and commitment to its volunteers and considers what the volunteers want. Conducting an internal retention assessment each year will help department leaders remain current on what is important to their volunteers, what changes should be considered, or benefits added, and if there are any issues that may be causing members to consider leaving."*

Though only a small amount of data was available, the numbers would suggest that the Santa Cruz County Fire Department loses between 7% and 35% of volunteers each year. The following figure illustrates the rate of volunteer turnover over the past 5 years.

Average years of service by company. Only those with start times after 2016 are considered (those active prior to 2016 were impossible to tell how long they were active volunteers).

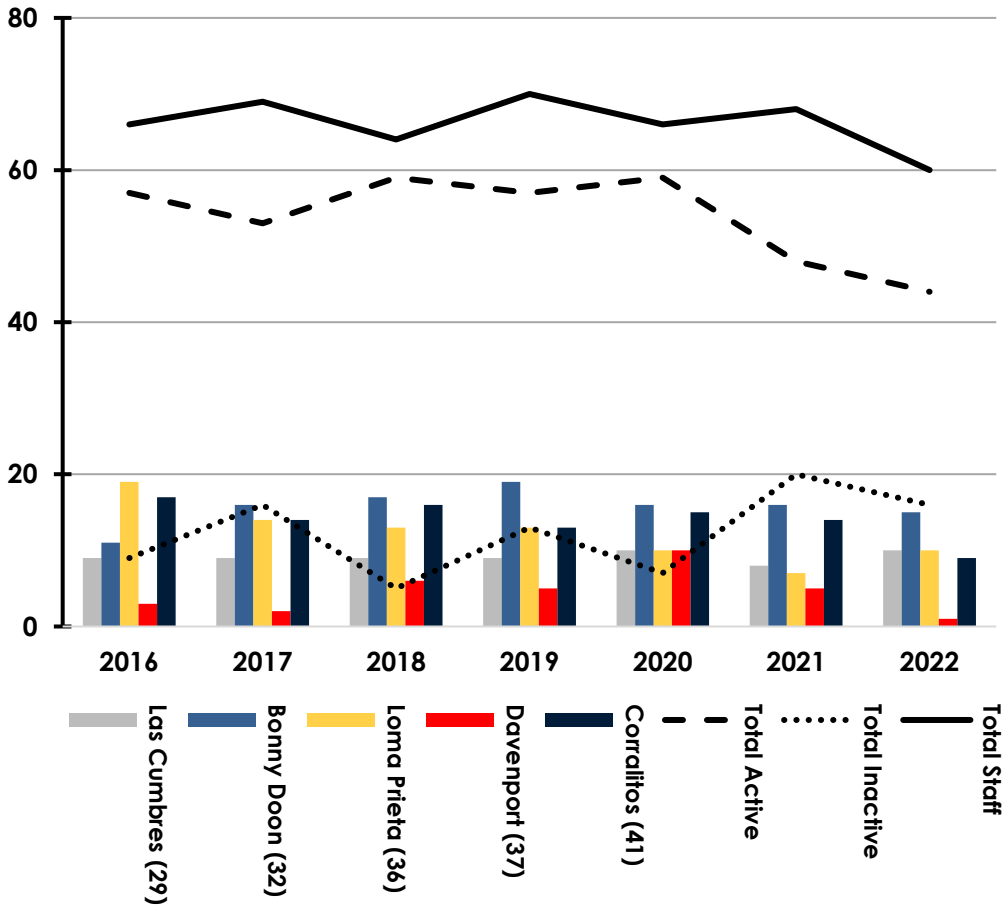
Figure 105: Years of Service & Net Staffing Level Changes (2016–2022)

Volunteer Company	Average Years of Service	Average Active Years	Net Staffing Levels
Santa Cruz County FD	3	2	-7
Las Cumbres	2.7	1.5	2
Bonny Doon	3.2	2.4	4
Loma Prieta	2.5	1.4	-9
Davenport	3.1	1.7	5
Corralitos	3.3	2.7	-9

Staffing Levels by Year. There were several volunteers for which there was no activity during the year, so those were removed to get the TOTAL ACTIVE number of firefighters. The TOTAL STAFF includes the TOTAL INACTIVE and TOTAL ACTIVE staffing levels.

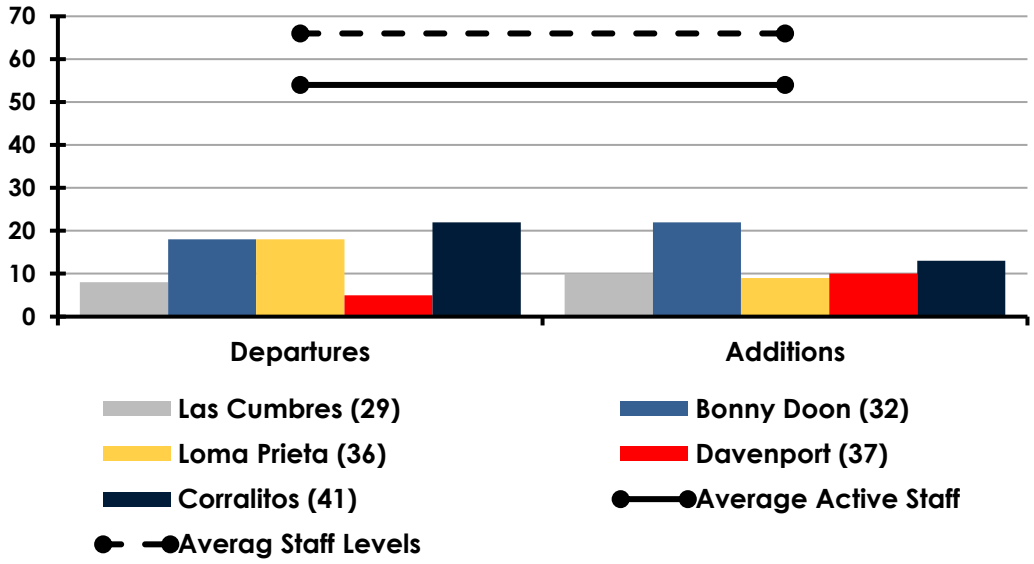
The following figure shows the average staffing levels of each volunteer company as compared to average years of service.

Figure 106: Staffing Levels by Year



The average turnover rate for 2017–2022 was 18%, with a high of 35% in 2022 and a low of 7% in 2017. The following figure shows the number of additions in staff and the total departures of staff by year.

Figure 107: Total Departures & New Recruits (2017–2022)



In 2020, the National Volunteer Firefighter Council (NVFC) published the Volunteer Retention Research Report with two specific goals. The first was to understand the institutional drivers of why volunteers leave the fire service. Second was to develop a stable, repeatable measure of retention rates across the volunteer fire service. The study consisted of three (3) distinct phases.

The first phase consisted of interviews with current and former volunteer firefighters as well as department leadership in the fire service. The purpose of the leadership interviews was to discuss perceptions of what is working and what is not, and how they measured retention. The purpose of volunteer interviews was to understand reasons for staying and leaving the service. The second focused on findings and implications from the interviews to develop content for the follow-up survey. The third and final phase consisted of a qualitative survey of 1,030 current and former volunteer firefighters.

The following figure illustrates a portion of the results of the study and highlights several positive factors impacting volunteer retention.

Figure 108: Positive Factors Impacting Retention

Which, if any, of these do you think could have (have had) a positive impact on retention at your department (most recent department)?				
	Current Volunteers			Former Volunteers
	All	Leadership	Non-Leadership	
SAMPLE SIZE	**922**	**445**	**477**	**108**
A mentorship program that pairs new volunteers with more experienced members	61%	60%	62%	42%
Giving out awards or honors when members reach service milestones (1 year, 5 years, 10 years, etc.) and/or superlatives at the end of the year	58%	61%	54%	44%
Conduct "stay" interviews with volunteers who have lapsed attendance and may be considering leaving the department	56%	54%	58%	53%
Conduct exit interviews when a volunteer leaves the department	50%	49%	51%	57%
Providing new volunteers with advice on how to fit volunteering into the rest of their life	52%	56%	47%	29%

This type of research can be especially useful to the Santa Cruz County Fire Department and County leadership as they look to better understand how to support and sustain a thriving volunteer firefighter program in Santa Cruz County. Rather than relying on anecdotal evidence or individual perceptions for guidance, they can look to organizations like the NVFC for impartial analysis that is both quantitative and qualitative.

The NVFC is the leading nonprofit membership association representing the interests of volunteer fire, EMS, and rescue services. Their research is academically rigorous, and their findings provide valuable insight into trends and topics that are timely and relevant.

The association also offers a variety of programs specifically designed to support fire departments like SCCFD. NVFC programs include:

- Make Me A Firefighter™ is a national volunteer firefighter and EMS recruitment campaign launched in 2015 by the NVFC to help departments reach new members.
- Serve Strong provides firefighters and EMTs with proven wellness programs and resources to help volunteer firefighters prevent cancer, reduce the risk of heart attack, cope with behavioral issues, and engage in safe practices on and off the fire ground.
- Fire Corps® is a national grassroots effort to help fire/EMS departments enhance their services by engaging with community members to assist with non-emergency tasks.
- The Wildland Fire Assessment Program (WFAP) is a joint effort by the U.S. Forest Service and the NVFC to provide volunteer firefighters and non-operational personnel, such as Fire Corps members, with training on how to properly conduct assessments for homes located in the wildland-urban interface (WUI).

As is often case, taking advantage of these type of programs can be challenging. To do so can be time consuming and even costly. Even when cost is not a factor, maximizing the benefits of these programs require a significant commitment by the organization and personnel assigned to implement them. Recognizing this as a barrier for many combination and all volunteer agencies, in 2004, Congress enacted the Staffing For Fire and Emergency Response (SAFER) Act as part of the National Defense Authorization Act. The program overseen by the Federal Emergency Management Agency (FEMA) was created to provide funding directly to fire departments and volunteer firefighter interest organizations to help them increase or maintain the number of trained, "front line" firefighters available in their communities.

The goal of SAFER is to enhance the local fire departments' abilities to comply with staffing, response, and operational standards established by the NFPA (NFPA 1710 and/or NFPA 1720). In FY 2022 Congress allocated $360,000,000 of grant funding for Staffing for Adequate Fire and Emergency Response Program.

The goal of this program is to create a net increase in the number of trained, certified, and competent firefighters capable of safely responding to emergencies likely to occur within the fire department's geographic response area. Additionally, the program supports recruitment and retention activities providing grants to support fire departments with the recruitment and retention of volunteer firefighters who are involved with or trained in the operations of firefighting and emergency response.

SAFER applications to support recruitment and retention-related activities stand a better chance and of being awarded if they contain some of the following components.

The SAFER application places a priority on programs that:

- Include a Recruiting and Retention Coordinator
- Indicate newly recruited firefighters will undergo an entry-level physical and receive immunizations, and who indicate they will provide annual medical exams.
- Train firefighters to Firefighter II and EMT or to just Firefighter II
- Are comprised of mostly volunteer members or have a significant number of volunteer firefighters.
- Have a high rate of turnover and have staffing levels significantly below the ideal staffing level required to comply with NFPA standards 1710 or 1720.
- Provide data based on a Needs Assessment

When considering the volunteer retention, it is important to note that monetary stipends and health and safety related benefits are important. But it is also important to acknowledge that they do not always translate to personal satisfaction, nor are they the only factors influencing employee and volunteer satisfaction and/or retention.

We look to the USFA and NVFC for creative and successful retention strategies. As mentioned previously, these two organizations are excellent sources of information and valuable resources for any agency. Each of them provides several ideas to incentivize volunteers and encouraging them to stay. While some are monetary and come with need for funding, many require little more than and attitudinal or cultural shift.

The County of Santa Cruz has rich history of volunteerism and much of the community is still protected by volunteer fire personnel serving as first responders. Should the County and the Santa Cruz County Fire Department want to ensure the program remains viable and continues to be an asset, they will need first develop a deeper understanding of the program and those who choose to volunteer. As the face of volunteerism continues to change, Fire Departments can no longer rely on community members to simply self-select to become volunteer firefighters. Rather, to ensure these programs remain vibrant will require concerted effort and ongoing maintenance

Communications & Dispatch

Overview

Dispatch services for the Santa Cruz County Fire Department are provided by CAL FIRE, under the terms of the Cooperative Fire Protection Agreement. In addition to the Santa Cruz County Fire Department, the CAL FIRE Felton Emergency Command Center provides dispatch services for the CAL FIRE San Mateo-Santa Cruz Administrative Unit (CZU), and the Pajaro Valley Fire Protection District.

Staffing

Unlike many other communications centers, CAL FIRE's Felton ECC is directly linked to field operations, with a Fire Captain (Floor Captain) serving as the initial Incident Commander (IC) until the arrival of the first engine and assumption of command by the officer on scene. To support added demand and dispatch needs of SCCFD, the County pays for one Communications Operator (Dispatcher).

Emergency Command Centers are integral parts of CAL FIRE's three-level command and control structure (Department, Region, and Unit), essential for the day-to-day operations of the department (CAL FIRE). Command centers receive reports of emergencies from a variety of sources, and are responsible for the allocation of resources, coordination of interagency incident activities, and support of incidents as necessary. This becomes important when considering the area comprising the CAL FIRE San Mateo-Santa Cruz Administrative Unit, which encompasses two counties and nearly 1,100 square miles. Dispatching resources for the Santa Cruz County Fire Department represents only a small portion of the total workload at the center.

911 Call Processing

When a 911 call is placed in Santa Cruz County, the call is immediately routed to the county's primary public safety answering point (PSAP), or the California Highway Patrol in Vallejo. Each of these centers is staffed 24 hours per day, 365 days a year.

Santa Cruz Regional 911—NetCom

NetCom is the primary PSAP for the City of Santa Cruz, Watsonville, Capitola, and the unincorporated areas of Santa Cruz County.

Scotts Valley

The Scotts Valley Police Department Communications Center is the primary PSAP for the City of Scotts Valley.

California Highway Patrol Golden Gate Division

The CHP Golden Gate Division serves the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

California Highway Patrol Coastal Division

The CHP Coastal Division serves the counties of Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, and Ventura.

Cell-based 911 calls originating on or within proximity to a state highway/freeway may go directly to CHP. These calls are then routed to the appropriate communications center and may result in considerable delays.

Calls for service requiring a fire response in Santa Cruz County Fire Department's jurisdiction are transferred from one of the primary PSAPs receiving the call to the Felton Emergency Command Center (a secondary PSAP).

NetCom uses a medical priority dispatch system, approved by the American Academy of Emergency Medical Dispatchers. Dispatchers query callers on priority symptoms, dispatch appropriate units at appropriate response codes, and provide pre-arrival and post-dispatch instructions to callers. Calls for service are given a determinant level based on the severity of the patient's condition ranging from minor, A (Alpha), to immediately life-threatening, E (Echo). Calls for service in the SCCFD response area are first received by NetCom and then transferred to Felton to dispatch the appropriate resource.

CAL FIRE's Felton ECC processes over 2,300 calls each year. The center utilizes the California Office of Emergency Services (CAL OES) standard for call answer time and the National Fire Protection Association (NFPA) standard for call processing/dispatch time for their performance objectives.

The following figure summarizes the ECC's call volume for each of the past three years.

Figure 109: Felton ECC Call Volume

Call Type	2019/20	2020/21	2021/22
911 Calls	1,376	3,366	1,992
10-digit Calls	2,749	3,247	1,721
Total Calls:	**4,125**	**6,613**	**3,713**

Emergency Medical Services

Emergency Medical Services (EMS) is an integrated emergency care system that has evolved steadily over the past several decades. When an individual needs medical help, most services start with the dispatch center. Next, this is handed off to the first responders who use prehospital medical techniques to stabilize and start treatment. Finally, the patient is delivered to the emergency room doctors to continue the stabilization and treatments that began in the field and then transfer them to definitive care. This sophisticated system started with the concept of first responders rendering limited medical aid to those in need.

SCCFD EMS Overview

SCCFD provides two different levels of emergency medical care. Full-time CAL FIRE personnel are trained and certified to provide care at the EMT-Expanded Scope level. Volunteer firefighters are trained and certified to provide care at the First Responder level at a minimum and many are trained to the EMT level.

County Fire provides Basic Life Support (BLS) Expanded Scope and defibrillator services throughout its jurisdiction. Paid and volunteer staff are trained to a minimum level of First Responder, and more than half of all personnel are certified Emergency Medical Technicians (Basic).

The private ambulance service responds to all medical emergencies in Santa Cruz County. SCCFD does not respond to low acuity medical emergencies given a determinant very minor, A (Alpha) by the primary PSAP.

Due to County Fire's reliance on volunteers, an Emergency Medical Responder (EMR) volunteer position was created in 2016. Given the physical demands and challenges of becoming a volunteer firefighter, the EMR position allows qualified individuals to complete a shorter training program which quickly qualifies them to serve this vital need for the community.

First Responder Scope of Practice

Firefighters certified at the First Responder level, are authorized to perform medical care while at the scene of an emergency including, but not limited to, CPR and AED, and may do any of the following:

- Evaluate the ill and injured.
- Provide treatment for shock.

- Use the following techniques to support airway and breathing:
  - Manual airway opening methods, including head-tilt chin-lift, and/ or jaw thrust.
  - Manual methods to remove an airway obstruction in adults, children, and infants.
  - Use the recovery position.
- Perform the following during emergency care:
  - Spinal immobilization.
  - Splinting of extremities.
  - Emergency eye irrigation using water or normal saline.
  - Assist with the administration of oral glucose.
  - Assist patients with the administration of physician-prescribed epinephrine devices and Naloxone.
  - Assist in emergency childbirth.
  - Hemorrhage control using direct pressure, pressure bandages, principles of pressure points, and tourniquets.
  - Hemostatic dressings may be used as approved by the EMS Authority
  - Chest seals and dressings.
  - Simple decontamination techniques and the use of decontamination equipment.
  - Care for amputated body parts.
  - Provide basic wound care.

EMT-Basic Scope of Practice

Firefighters certified at the EMT-Basic level, are authorized to perform medical care while at the scene of an emergency including, but not limited to, the following:

- Evaluate the ill and injured.
- Render basic life support, rescue, and emergency medical care to patients.
- Obtain diagnostic signs to include, but not be limited to, temperature, blood pressure, pulse and respiration rates, pulse oximetry, level of consciousness, and pupil status.
- Perform cardiopulmonary resuscitation (CPR), including the use of mechanical adjuncts to basic cardiopulmonary resuscitation.
- Administer oxygen.

- Use the following adjunctive airway and breathing aids.
  - Oropharyngeal airway.
  - Nasopharyngeal airway.
  - Suction devices.
  - Basic oxygen delivery devices for supplemental oxygen therapy including, but not limited to, humidifiers, partial rebreathers, and venturi masks.
- Manual and mechanical ventilating devices designed for prehospital use including continuous positive airway pressure.
- Use various types of stretchers and spinal motion restriction or immobilization devices.
- Provide initial prehospital emergency care to patients including, but not limited to:
  - Bleeding control through the application of tourniquets.
  - Use of hemostatic dressings approved by the Local EMS Authority.
  - Spinal motion restriction or immobilization.
  - Seated spinal motion restriction or immobilization.
  - Extremity splinting.
  - Traction splinting.
  - Administer oral glucose or sugar solutions.
  - Extricate entrapped persons.
  - Perform field triage.
  - Transport patients.
  - Apply mechanical patient restraint.
  - Set up for ALS procedures, under the direction of an Advanced EMT or Paramedic.
  - Perform automated external defibrillation.
  - Assist patients with the administration of physician-prescribed devices including, but not limited to, patient-operated medication pumps, sublingual nitroglycerin, and self-administered emergency medications, including epinephrine devices.

EMT-Expanded Scope of Practice

Firefighters certified at the EMT-Expanded Scope level of practice are authorized to provide a higher level of medical care. In addition to the skills authorized at the EMT-Basic level, those certified at the Expanded Scope level may perform the following:

- Monitor IV lines delivering glucose solutions or isotonic balanced salt solutions for volume replacement, and monitor, maintain, or adjust to maintain a preset rate of flow and to turn off the flow of IV fluid when indicated.
- Initiate and administer Continuous Positive Airway Pressure (CPAP).
- Administer Narcan by intranasal or intramuscular routes in suspected narcotics overdose cases.
- Perform finger stick blood glucose testing.
- Administer Epinephrine by auto-injector for suspected anaphylaxis or severe asthma.
- Administer over-the-counter medications, including Aspirin to patients presenting with chest pain of cardiac origin.

EMS Staffing & Certification Levels

Having the correct number and level of certified responders on scene with a critical patient has been shown to directly impact survival. Agencies have struggled with determining the right size and placement of EMS response apparatus and staffing. Models vary significantly between agencies. Some systems, like SCCFD, may only provide BLS responders. Others may use multiple ALS providers on a single resource, and some might use one ALS provider responding separately along with BLS resources.

Medical Care Necessity

Effective and immediate prehospital care in a medical emergency can make a significant difference in a patient's outcome and future quality of life. Lifesaving interventions, such as resuscitation, defibrillation, and medications, must be applied rapidly to be successful. In addition, understanding the most common incident types can help an agency determine where to place its limited resources.

The following figure lists the top five causes of death in California (CA) and the County of Santa Cruz in 2022.

Figure 110: Leading Causes of Death in California (2022)

Condition	CA Deaths	SCC Deaths	CA Rate*	SCC Rate*
Accidents (Unintentional Injuries)	125,333	3.2	1,027	4.0
Alzheimer's Disease	99,627	2.5	502	1.9
Assault (Homicide)	13,044	0.3	26	0.1
Cerebrovascular Diseases	108,450	2.8	708	2.7
Chronic Liver Disease & Cirrhosis	40,829	1.0	205	0.8
Chronic Lower Respiratory Diseases	67,483	1.7	385	1.5
Diabetes Mellitus	67,058	1.7	291	1.1
Diseases Of Heart	391,801	10.0	1,812	7.0
Hypertension & Renal Disease	37,348	1.0	186	0.7
Influenza & Pneumonia	26,282	0.7	90	0.3
Intentional Self-Harm (Suicide)	22,410	0.6	178	0.7
Malignant Neoplasms	356,484	9.1	2,492	9.6
Nephritis & Related Diseases	26,710	0.7	176	0.7
Parkinson's Disease	22,536	0.6	90	0.3

*Crude death rate calculation, not adjusted for age.

Medical Transportation

Medical transportation throughout Santa Cruz County is provided by a private ambulance service. The current contract, in place since 2019, is monitored for compliance by the County of Santa Cruz Health Services Agency (CSCHSA).

In addition to ground transportation via private ambulance, SCCFD has access to medical helicopter transport as needed. There are two helicopter transport providers available. CALSTAR is a private air transport service operating out of several air bases. The closest to SCCFD is in Watsonville. Life Flight is another flight and critical care transport program provided by Stanford Medical Center in Santa Clara County.

Patients are transported predominantly to Dominican Hospital in Santa Cruz, and Watsonville Community Hospital in Watsonville. Additional California hospitals are available to receive patients. These include the Santa Clara Valley Medical Center in San Jose and Stanford Hospital in Palo Alto, both level 1 trauma centers. Level 2 centers are available at Regional Medical Center in San Jose and the Natividad Medical Center in Salinas.

EMS Administration

Medical Control & Oversight

Because field medicine is performed by first responders and Emergency Medical Technicians (EMTs) without a medical doctor on-site, responders follow a protocol-based system. Protocols are a formalized set of diagnoses and treatments that require very little direct supervision from the Medical Program Director. Specific protocols allow first responders to act and provide emergency medical care within the scope of practice corresponding to their level of certification.

California's Emergency Medical Services Authority (CEMSA) regulates prehospital medical certifications and the scope of practices. The County of Santa Cruz Emergency Medical Services Agency (CSCEMSA) defines policies and procedures and is the primary operational governing body.

Quality Management

Quality management and improvement should be the goal of any agency providing emergency services. EMS response requires special attention and has more parameters to evaluate. For example, crew capability, treatment efficacy, patient outcomes, and legal compliance all need evaluation.

SCCFD operates under the Santa Cruz County EMS agency system policies and procedures. Policy 101, revised on May 22, 2020, defines the quality improvement program, and directs each response agency to develop its own quality improvement plan. In addition, it identifies the elements that must be included.

Logistical Support

Understanding the equipment and supply needs of the EMS responder is crucial to an effective program. EMS equipment can be expensive, and they have an effective life expectancy. Supplies need constant replacement due to use and expiration. Managing these replacements ensures EMS responders have the necessary supplies and can reduce operational costs.

Life Safety Services & Public Education

After the landmark 1973 report, *America Burning,* the American fire service made a concerted effort to reduce fires and fire loss. A focus on education, code development, and life safety code enforcement helped reduce the number of commercial structure fires by nearly 60% since 1980.[19] Arguably, this initial downward trend directly results from new, stricter life safety codes and focused public education. Enforcement and education came at a fraction of the cost of emergency response.

Unfortunately, the reduction in fire loss slowed significantly throughout the 1990s and has remained relatively steady since 2000. The total number of civilian fire deaths followed this trend. Deaths per million population decreased substantially from 1980 through 2000. Then the rate of decrease slowed through 2010, which has since remained constant. In addition, fire deaths in homes and residential structures, which make up only one-quarter of all fires, make up approximately three-quarters of all fire deaths and injuries. The National Fire Protection Association (NFPA), *Fire Loss in the United States During 2020,* reports, "There is still more work to do, particularly around home fires."

Fire agencies need to focus at least some of their resources on prevention. These life safety endeavors must be focused, consistent, strategic, and monitored for success.

Fire prevention is a priority for SCCFD. In 1995, the Office of the County Fire Marshal was consolidated into the County Fire Department, enhancing services to the public and coordination between County Fire, County departments, and state and local agencies.

The County Fire Department addresses fire prevention through several programs and activities:

- Inspections and plan checks as part of the building permit process.
- Response to fire hazard complaints.
- Public education programs and Fire Safe Councils.
- Mandatory fire safety inspection for required occupancies.

Public Education

There are many ways to accomplish public education on fire and life safety topics. The key to success lies in an agency's ability to correctly identify hazards and deliver a message or program that diminishes that risk. Any targeted educational curriculum, presentation, lecture topic, brochure, or mass media delivery can have the desired outcome.

The 2019 NFPA Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations identifies public education programs. Each program is based on the agency's community risk assessment, targets specific ages, and includes directions to provide information to each program's caregivers or adult supervisors.

The following figure lists the NFPA-recommended fire prevention programs provided by Santa Cruz County Fire Department.

Figure 111: NFPA Recommended Programs

Program	SCCFD Delivers
Daycare, Preschool, & Pre-K–12 School Education	On Request
Higher Education	On Request
Independent Senior Adult Education	On Request
Adult and Community-Wide Education	On Request
Workplace Education	On Request
Home Safety Education	On Request
Wildfire Safety Education	On Request

Code Enforcement Inspections

A trained, capable staff who applies specific codes is critical to the ongoing success of loss prevention. The 2019 NFPA 1730 *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations* defines inspection frequency based on hazard classification. How buildings and occupancies are classified is left to the authority having jurisdiction (AHJ).

The NFPA and USFA offer guidance in risk classification. Still, the agency should develop its risk classification to meet its needs. Once the hazard classification is determined, the agency should create a consistent process and timeline to complete these enforcement programs.

The following figure lists the NFPA recommended inspection frequency by risk classification.

Figure 112: NFPA Inspection Frequency[20]

Risk Classification	Inspection Frequency
High	Annual
Moderate	Every Other Year
Low	Every Three Years
Critical Infrastructure	To Be Determined by AHJ

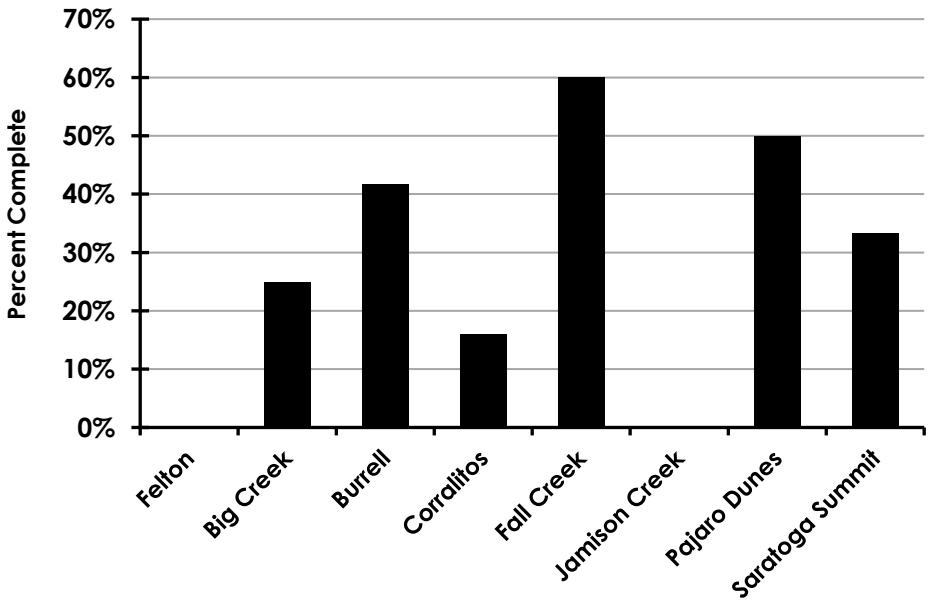
Since 2019, all California fire agencies have been required to inspect buildings and public spaces within their jurisdiction based on the adopted codes. They are required to report to the state fire marshal for compliance with these inspections. In addition, they are required to annually inspect hotels, motels, lodging houses, apartment houses, dwellings, buildings, and structures, except stand-alone homes.

SCCFD has an inspection program for all business occupancy types. Most businesses classified as a B occupancy are inspected by fire station personnel. The mandatory inspection program (Occupancy Class R-1, R-2, E, and I) is conducted by Fire Marshal Office staff. Both programs are captured in a computer-based software system. One Deputy Fire Marshal is performing these inspections.

SCCFD has adopted, by local ordinance, the 2021 edition of the International Fire Code (IFC) with California amendments. In addition, it has adopted local regulations relating to fire prevention.

The following figure lists the business inspection completion by percentage for the 2022/23 biennial Inspection cycle.

Figure 113: SCCFD Business Inspections (2022/23)



The Santa Cruz County Fire Marshals' Office and the Santa Cruz County Fire Department are in full compliance and reported 100% completion of all state-mandated inspections for the area served by SCCFD in 2022. State-mandated inspections include schools, hotels, jails, and residential occupancies such as apartments and boarding houses. In addition to the occupancy inspections required by the IFC, SCCFD performs defensible space inspections on homes in the state responsibility area. These inspections are governed by the California Fire Code, Chapter 49, and the California Public Resources Code 4291. These inspections are performed by CAL FIRE defensible space inspectors and engine company personnel.

Fire Cause Investigation

Establishing fire cause is crucial for agencies and the fire service. Understanding how fires start and progress is essential to help develop new codes, report problematic equipment, and develop fire prevention programs. In addition, catching and prosecuting those who intentionally set fires can reduce the number of future fires, saving life and property.

Therefore, personnel appropriately trained and equipped in investigative methods, evidence collection, and chain of custody are necessary. The 2019 NFPA 1730 *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations*, Chapter 8, outlines NFPA's recommended investigation program. In addition, the 2022 NFPA 1033 *Standard for Professional Qualifications for Fire Investigators* defines the specific job competencies required to investigate fires.

Under the terms of the Cooperative Fire Protection Agreement, SCCFD has full access to CAL FIRE's full-time law enforcement and fire investigation staff.

Engineering

The creation and application of newer life safety and fire prevention systems have one of the highest success rates in loss prevention. For example, building fire suppression and smoke detection systems have helped reduce life and property damage. These and other systems directly result from technological advances and mandating improvements and advocating for these systems can prevent loss.[21]

SCCFD advocates and mandates newer technical systems through its plan review process and current code adoptions. In addition, it consults with builders on new construction, occupancy changes, and tenant improvements during this process. The plan approval process further reinforces this.

Training & Continuing Medical Education

Training Methodology

Training refers to the specific programs, resources, and capabilities of the personnel within a fire department. A training program should be comprehensive, based on the needs of the department, and an integral part of day-to-day activities. Proper training is designed to provide for safe and effective delivery of emergency services to the community and is extremely important for all departments, no matter the size or make-up of the department's staffing levels.

Although the number of incidents varies from jurisdiction to jurisdiction, the types may be the same or similar in nature. Developing initial and maintaining ongoing fire, EMS, rescue, and hazardous materials training is critical for SCCFD to be effective and safe during an incident. A well-designed and comprehensive training program creates team dynamics, cohesiveness, improved incident outcomes, and can lower liabilities for the department.

NFPA has developed several standards relating to the training and certification of fire personnel. These standards are designed as minimum recommendations for Firefighters, Fire Officers, Prevention Staff, Fire Investigators, and various other position-specific personnel.

SCCFD meets these standards as well as requirements set forth by State Fire Training (SFT), a division of the California State Fire Marshal's Office, the California Occupational Health, and Safety Administration (Cal OSHA), the California Department of Motor Vehicles (DMV), and recognized standards outlined within the National Wildfire Coordinating Group (NWCG) curriculum for the Department's response to wildland and interface incidents.

Training Program Management & Scheduling

The Santa Cruz County Fire Department Training Division is staffed by two SCCFD Fire Captains who report to the state-funded Battalion Chief responsible for training all employees assigned to the CAL FIRE San Mateo – Santa Cruz Unit (CZU). Under the Battalion Chief's direction, the training captains are responsible for the delivery and documentation of training and safety for all career and volunteer personnel. The Battalion Chief and staff ensure all federal, state, and local training mandates, laws, and regulations are followed as they pertain to training.

CZU Training Plan

The CZU Training Plan serves as a policy guide for the Santa Cruz County Fire Department's training program. The CAL FIRE program operates within a traditional chain of command process, from the Department (CAL FIRE) to the Region (Northern Region), then to the Unit (CZU). The Department utilizes four basic levels of responsibility for its training program: Department, Program, Region, and Unit.

All Training is prioritized and allocated utilizing the following criteria:

1. Mandatory/Position Required Training (required by policy, law, or statute)
2. Incident Command System Training (based on the ERD needs)
3. Department's Mission
4. Career Enhancement and Employee Development

On an annual basis, the training division completes a comprehensive needs assessment. This assessment assists in the development and delivery of critical training as determined by safety and accident reviews, as well as by CAL FIRE and SCCFD management. The process allows for the development of individual and unit-level training goals and creates a foundation for the successful attainment of those goals.

The needs assessment begins with a review of each employee's Individual Development Plan (IDP). IDPs define the employee's development goals, specific objectives leading to those goals, and plans for meeting the objectives. The IDP provides a mechanism for employees and their supervisors to review work experience, special assignments, and any formal training that would assist the employee in achieving their goals. The IDP serves as a useful guide for the attainment of career goals and personal and professional growth. The IDP becomes a part of the employee's permanent training record and is used to support any future training requests.

Using the information gathered through the IDP process, CAL FIRE determines the amount and type of training needed. Once this is completed, each Administrative Unit is allocated slots based on the needs assessments presented by each respective Unit, Region, and Program.

The SCCFD Training Division adheres to the following timeline to facilitate the collection and dissemination of training needs information:

Figure 114: CAL FIRE & SCCFD Annual Training Needs Assessment Timeline

Month	Training Needs Information
November	Training Needs Assessments (TNA) go out to CAL FIRE Units from their respective Region.
December	Employees submit Individual Development Plans (IDP) to supervisor.
January	Unit Training Officer sends out TNA to the field.
February	TNA is consolidated and submitted to Region.
June	Region Training meets with Unit Training Officers to distribute training allocations for each Unit.
August	Training Battalion hosts a Unit allocations meeting (paid & volunteer).
September	Students receive a letter with allocated classes prior to vacation picks.

The following figure reflects mandatory training and continual professional training for SCCFD.

Figure 115: CAL FIRE & SCCFD Mandatory Training Competencies

Course Title	Federal, State, & Local Law
Safety & Orientation	
Fire Protection Duty Clause, Employee Safety & Training	29 USC 654 (a)1, CCR T8 3203 (IAPP), Cal Labor Code Section 6317, 6400, 6401, 6402, 6403
EEO Training	OSHA 3148
Blood Borne Pathogens, TB & Communicable Disease	CCR T8-5193 (e), 3203; OSHA Policy P&P C-47, 29CFR 1910.130
Sudden Infant Death Syndrome	CCR T8-3401, 3409, 5144, ANSI Z88.5 & 6, T8-5144, 29CFR 1910.134
Elder Abuse	22 CCR 100074 (EMT)
Child Abuse	PC 11166, 22CCR 100074 (EMT)
PPE & Clothing	29 CFR 1910.132, CCR T8-3401
ICS/SEMS	SB 1841, GC 8607, T19-2428, NWCG 310-1, NFPA 1561
Defensive Driver Training	DMV 15250.5, 6, CCR T8-3203, 49 CFR 383
Wildland Training	
Basic Firefighter Skills/Procedures	CCR T8-3203a4b,g.c, CCR T8 6773
Wildland Firefighter	CCR T8-3203 (a)7, 3401, 3410, 6773 NWCG 301-1
Wildland Fire Shelters	CCR T8-3203, 3401,3410
Wildland Fire Behavior	CCR T8, 3401, 3410, 3203
Structure Firefighting	
Structural Firefighting, Fire Control 3	CCR T8-3203 (a), T8-3401, OSHA
HazMat	
Haz Mat FRO Decon, Confined Space Awareness	29CFR 1910.120, CCR T8-3401, 5192, T19-2510, 29 CFR 1910.146, CCR T8-5156, 5157, 5158
EMS	
EMT-1 Including Defibrillator Emergency Medical Responder, EMS	CCR 10063(9), T22 CCR 100020,100021,100075
First Responder Defibrillator	CCR T22, Div 9, Ch1.5, (EMT-D), T-22-100021, 100064
CPR	T22 CCR 100025, H&S 1797, 182; CCR 22 100016, 100019
Additional Training	
Swift Water Rescue	CCR T8-3203
Terrorism: Emergency Response	National Fire Academy
Driver/Engineer Training	DMV 15250.5, 6, CCR T8-3203, 49 CFR 383

The SCCFD Training Captain has responsibility for developing an annual calendar and multi-year training plan. Topics of scheduled training vary but include manipulative, didactic, and computer-based subject matter using formal lesson plans, produced in-house or through commercial vendors.

The following figure reflects the annual training calendar for SCCFD.

Figure 116: Annual Training Calendar

Month	Subject/Skills Area	
January	Vector Solutions	Assignment/Certifications catch-up, EEO, Defensive Driver, Company Officer Expectations, Code of Conduct
February	EMS	Continuing Education, Skills, CPR/AED, Santa Cruz County Optional Skills
March	Vector Solutions	Mask Fit Testing
April	Wildland	I-100, AED Calibration, Dozer Safety, Fire Shelters, Wildland PPE
May	Wildland	RT-130, WUI Inspections, WUI Placards, LCES, Wildland Simulations, LCES
June	Wildland	Mobile attack, Air Ops (retardant drops), Firing Ops (Drip Torches), Hand tools, IRPG, Chainsaw maintenance
July	Structure Fire	PPE, SCBA, Ladders, Hose evolutions, Water Supply, Ventilation, Rapid Intervention, Structure Simulations
August	Structure Fire	Water Supply, Salvage & Overhaul, Forcible Entry, Search & Rescue, Attack Lines
September	Structure Fire/Auto Extrication	Company Performance Evaluations, Extrication Tools
October	Haz-Mat/MCI	Emergency Response Guidebook, Haz-Mat Awareness Recert, County MCI review
November	Ropes	Knots, Raising & Lowering Systems, Rope & Equipment Inspections, Rope Rescue Simulations
December	Company Officer Discretion	

Training Records

Training records and fire/EMS certifications are tracked and maintained electronically by the CAL FIRE Battalion Chief and SCCFD Training Captains using the Vector Solutions platform. The Training Division staff and career personnel have the authority to enter training records, and all SCCFD personnel have access to their respective training files.

SCCFD Volunteer Training

Volunteers must maintain the required certifications to stay proficient in basic skills. Volunteers are required to attend 50% of all drills per quarter and complete 100% of all assigned safety training. The SCCFD Training Division assigns volunteer training through Vector Solutions monthly as outlined below:

- Four (4) hours of formal instruction.
- One (1) hour of EMS training.
- Three (3) hours based on the quarterly training theme.
- Eight (8) hours of drill time.
- Two (2) four-hour hands-on drills based on the quarterly training theme.

Volunteer company officers are responsible for conducting and coordinating the primary drill with volunteer companies and are supported by the Training Division. In-service training for volunteers consists of 144 hours of training per year.

EMS Training & Skills Evaluation

SCCFD provides EMS continuing education online utilizing Vector Solutions. In-person Continuing Education (CE) and skills training are available through local hospital staff, sponsored training hosted by American Medical Response, in-house staff, and instructors from other fire agencies. SCCFD is a member and participant in the Santa Cruz County Emergency Medical Services Integration Authority (EMSIA), a joint powers authority. The EMSIA is recognized by California as a continuing education provider for Paramedics and emergency medical technicians (EMTs). Emergency Medical Technicians are required to complete 24 hours of Continuing Medical Education each year.

Hazardous Materials Support & Response

Hazardous materials are common in most, if not all, communities across the United States. Since the 1970s, it has become standard for fire departments and districts to respond to and mitigate hazardous materials events. However, each agency must try to match the level of service to the risk associated with their areas of responsibility, utilizing sound fiscal and risk management policies. Although no agency should ignore this risk, they can choose several approaches for a response. First, agencies may take a non-active role, just being aware of the hazard and contacting agencies to deal with the incident by training their responders to the awareness level.

They may take a response and defense stance, whereby responders are moderately equipped and trained at the operational level to defend people and property without entering the hazardous zones. Finally, some agencies may choose to equip and train their responders to directly enter the dangerous zones, utilizing specialized equipment and technician-level training. Agencies also have the option to take any combination of these three approaches.

HazMat Risk

SCCFD communities have a moderate level of hazardous materials risk. This is like most communities across the nation. The small quantities of hazardous materials they face are in small manufacturing processes, private dwellings, and mercantile businesses. Santa Cruz County faces the most significant amounts of HazMat through highway traffic and on major arterial streets.

HazMat Response

SCCFD trains and equips its responders with defensive tactics in mind. All responders receive HazMat training at the First Responder Operational level. The equipment on the apparatus includes limited absorbent materials and gas monitoring. Extended or specialized response requires outside assistance from the Santa Cruz Hazardous Materials Interagency Team (SCHMIT). The annual cost of $40,000 for maintaining the SCHMIT is split three ways and shared equally between CSA 48, OR3 (OES), and Santa Cruz County Environmental Health. The team response is dictated based on a memorandum of understanding signed between four cities, the County, state parks, and the University of California, Santa Cruz.

Special Operations

Technical Rescue

Another area of specialized response typically part of the fire service's responsibility is the ability to rescue people from dangerous situations. The fire service had historically been responsible for getting people out of harm's way during fires. These rescues eventually transformed into the need to remove victims from any number of hazardous situations, some of which required specialized equipment and training. Collectively, this specialty became known as technical rescue.

The Office of the State Fire Marshal of California does not list technical rescue among the standardized and recognized certifications. This leaves the level of hazard and certification up to the responding agency. The National Fire Protection Association (NFPA) Standard 1006: *Technical Rescue Personnel Professional Qualifications* does specify 20 rescue specialties. Each rescue specialty is broken into the awareness, operations, and technician levels.

The next figure lists the various hazards and technical rescue certification levels from NFPA.

Figure 117: NFPA Technical Rescue Certifications[22]

Rescue Type	Certifications
High & Low Angle	• NFPA Tower Rescue • NFPA Rope Rescue • NFPA Helicopter Rescue
Collapse, Confined Space, Trench, & Below Grade	• NFPA Structural Collapse Rescue • NFPA Confined Space Rescue • NFPA Trench Rescue • NFPA Cave Rescue • NFPA Mine and Tunnel Rescue
Vehicle & Machinery	• NFPA Common Passenger Vehicle Rescue • NFPA Heavy Vehicle Rescue • NFPA Machinery Rescue
Wilderness & Animal	• NFPA Animal Technical Rescue • NFPA Wilderness Search and Rescue
Moving & Standing Water	• NFPA Surface Water Rescue • NFPA Swiftwater Rescue • NFPA Dive Rescue • NFPA Ice Rescue • NFPA Surf Rescue • NFPA Watercraft Rescue • NFPA Floodwater Rescue

Technical Rescue Risk

SCCFD's technical rescue risk is like other urban coastal areas along the west coast of California. Roadways, including highways, pose a vehicle extrication risk. Areas inland from the ocean and hills may require a high or low-angle approach. Any built-up area may be subject to building collapse, confined space, or below-grade rescues.

High- & Low-Angle Rescue Services

Removing a victim from an elevated or below-grade situation may require a high or low-angle rescue approach. The high-angle rescue typically has the entire weight of the rescuer and/or victim suspended perpendicular to the ground. When rescuers use a low-angle rescue technique, the victim and responders are hoisted out of a situation with the assistance of ropes. In a low-angle case, the weight bearing is accomplished by direct or indirect ground contact.

SCCFD personnel are minimally trained at the operations, or incident support level for high- and low-angle rescues. Some personnel receive additional training and can assemble and descend or ascend on a high-angle rope system.

Collapse, Confined Space, Trench & Below Grade Response

Building collapses, extrication from limited mobility and potentially hazardous atmospheres, dealing with trench collapses, and rescues below grade all require additional equipment and training. Understanding the physics and balance of rubble or earth during the collapse of buildings or trenches requires special training. The collapse scenario hazards, equipment, and human limitations of confined and below-grade responses also need additional equipment. SCCFD personnel are minimally trained in incident support or operations level for building and trench collapse and confined space rescues.

Machine & Vehicle Response

Vehicle extrication and removal of trapped persons from machinery require specialized equipment. The equipment removes what is entrapping a victim and typically includes hydraulic, electric, or manual pushing, pulling, or cutting tools. SCCFD trains and equips its personnel for vehicle extrication. Some of the vehicle extrication skills transfer to other incidents. SCCFD carries a full complement of extrication and stabilizing equipment on all Type 1 apparatus, and combi-tools for cutting and spreading on all Type 3 apparatus.

Moving & Standing Water Response

Moving and standing water presents an exceptional hazard and unique rescue situation to responders. Shallow, rapid-moving water can and has been known to wash potential rescuers away, resulting in injury or death. SCCFD personnel are minimally trained in incident support or shore-based water rescue operations.

Section II:
COMMUNITY RISK ASSESSMENT

Description of Santa Cruz County

Santa Cruz County encompasses 607 square miles, with 445 square miles of land area, and the remaining is water. It is located at the northern end of Monterey Bay and continues north along the Pacific Ocean and the Santa Cruz Mountains to the east. It is the second smallest county by land area and is part of the central coast. Santa Cruz County was one of the original counties when California became a state in 1850. The county has four municipalities: the City of Santa Cruz, Watsonville, Scotts Valley, and Capitola.

The area includes the Monterey Bay National Marine Sanctuary, and the county has 29 miles of coastline. There are more than 42,000 acres of state parks in the county along the coastal and mountainous regions, and 1,593 acres maintained by the county. Many sporting and recreational activities are available, including sailing, fishing, golf, surfing, kayaking, hiking, and mountain biking. The local economy is supported by technology, agriculture, and tourism.

The estimated population in Santa Cruz County as of 2022 is 266,564, according to the California Department of Finance, compared to the 2020 U.S. Census at 270,861.

As previously stated, figures, graphs, and maps used to display information specific to the community risk assessment for the Santa Cruz County Fire Department refer to facilities (stations), apparatus and personnel as SCCFD and are labeled accordingly. When necessary, state funded CAL FIRE facilities and apparatus will be labeled specifically to assist the reader in differentiating between those under contract and serving as the Santa Cruz County Fire Department and state funded resources dedicated to the state's wildland fire protection mission.

All-Hazards Community Risk Assessment

Population & Demographics

The population and demographics can influence the type of services provided in a community. Social conditions such as poverty, the locations of high-risk areas, and housing types can impact the service delivery provided by SCCFD.

Population

The population can directly affect the service delivered by SCCFD. Data from the 2010 U.S. Census estimated a population of 21,385 which increased to 22,248 in 2020.

At-Risk Populations

An area's population has different residents at higher risk of fires and other unintentional injuries. When an incident occurs, it affects service delivery for the department. The SCCFD response area is considered rural but has other suburban areas, ranging from single-family homes and multi-family apartments. NFPA has identified groups with an increased risk of injury or death from a fire, as indicated in the following:[23]

- Children under five years of age
- Older adults over 65 years of age
- People with disabilities
- Language barriers
- People in low-income communities

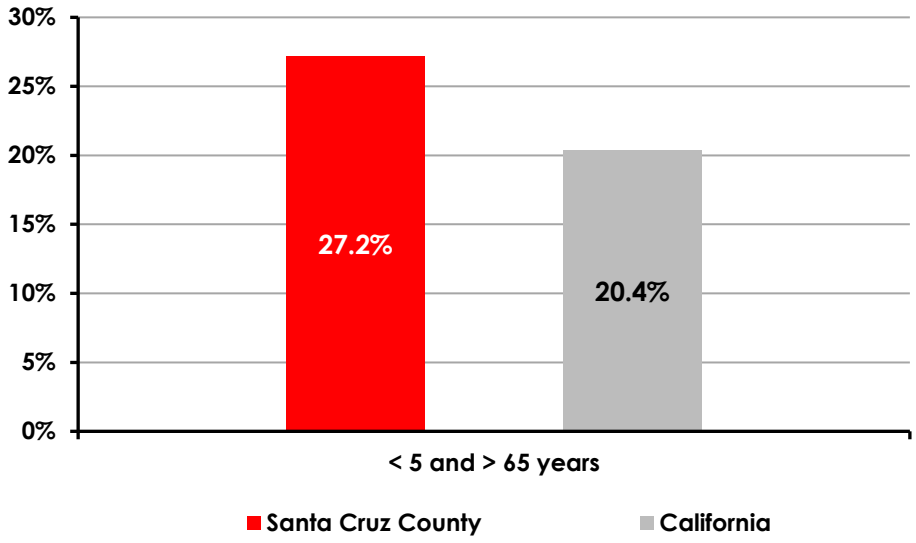
Data from the 2021 *U.S. Census American Community Survey Data* 5-year estimates identified several groups in these categories that are more likely to need emergency services, specifically EMS, than other populations.[24]

Age

A person's age in a high-risk population directly relates to an increase in unintentional injuries and death or injury from a fire. Older adults are 2.6 times more likely to die in a fire than the overall United States population. These age risks increase service demand, specifically for older adults needing additional medical care.[25]

Children under the age of five are at more risk because of their inability to care for themselves and need additional assistance during an emergency. Recent trend data (2018) from the U.S. Fire Administration indicates that this age group's relative risk of dying in a fire has dropped 30% in the last 10 years and is credited to increased fire prevention and education. The percentage of children under five and those older than 65 is 27.2%, which is higher than California. The following figure shows the percentage of children less than five years of age and those 65 years and older.

Figure 118: Children less than Five & Adults 65 & Older



Disabilities

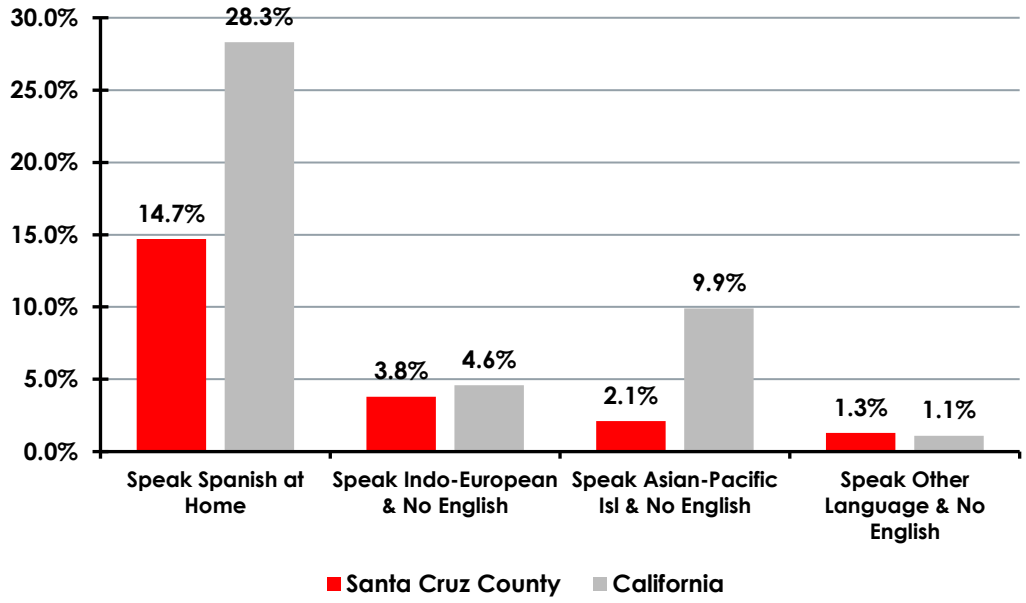
This population group may be unable to self-evacuate a building during an emergency or need additional medical services because of their disability. This may create additional demand for medical services, specifically as they age.

Language Barriers

SCCFD may encounter someone whose primary language is not English and will need additional help to communicate. The number of people over five speaking Spanish at home is 14.7%, less than the state at 28.3%. This population may not understand smoke alarm technology designed to provide early warning during a fire, increasing the risk of injuries or death in their home.

The following figure shows the percentage of people speaking languages other than English at home.

Figure 119: Languages Other Than English Spoken at Home

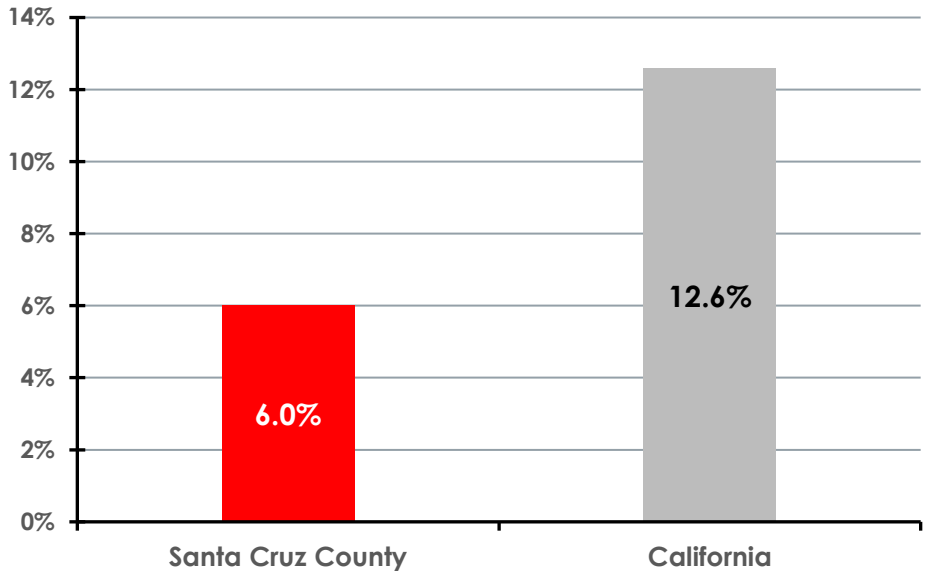


Income

Some populations may have lower incomes which can increase the risks of fires and medical illnesses. People living below the poverty level are considered at higher risk when combined with other factors such as education levels, disabilities, or unable to work. Lower incomes can lead to higher mental health impacts in the community. A report from the *World Economic Forum* states that depression and anxiety are nearly three times as likely in people with low incomes.[26]

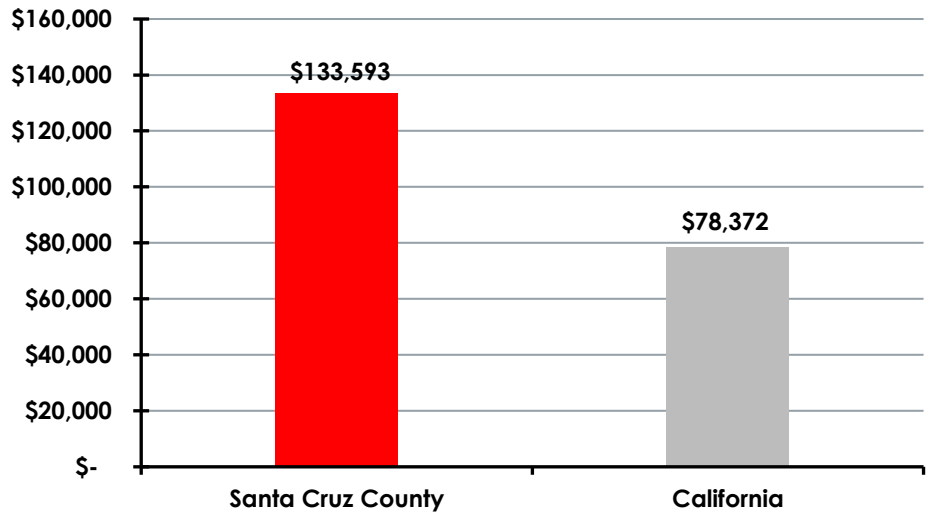
Only 6% of the population that reside in SCCFD jurisdiction are in poverty, less than the state at 12.6%. The following figure provides the percentage of people in poverty compared to the State of California.

Figure 120: Percentage of People in Poverty



The median household income is $133,593, much higher than the state's $78,372, as shown in the following figure.

Figure 121: Median Household Income

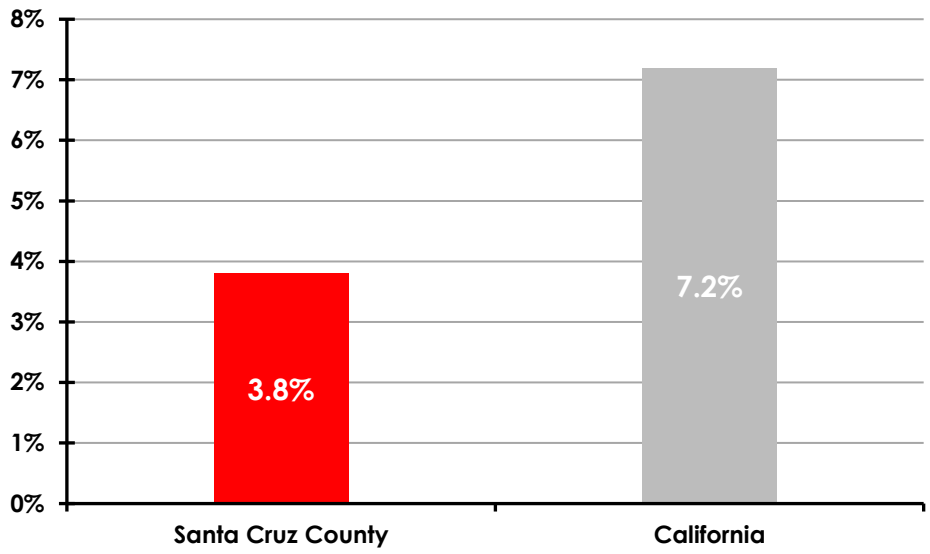


Additional Demographics

Persons without Health Insurance

Populations without adequate health care can challenge service delivery and increase the rate of medical incidents. Lack of health insurance may affect lower-income populations at a higher rate since they cannot pay for medical visits. An estimated 3.8% of the population is without health insurance in SCCFD, compared to 7.2% in the state. The following figure provides the percentage of people with no health insurance.

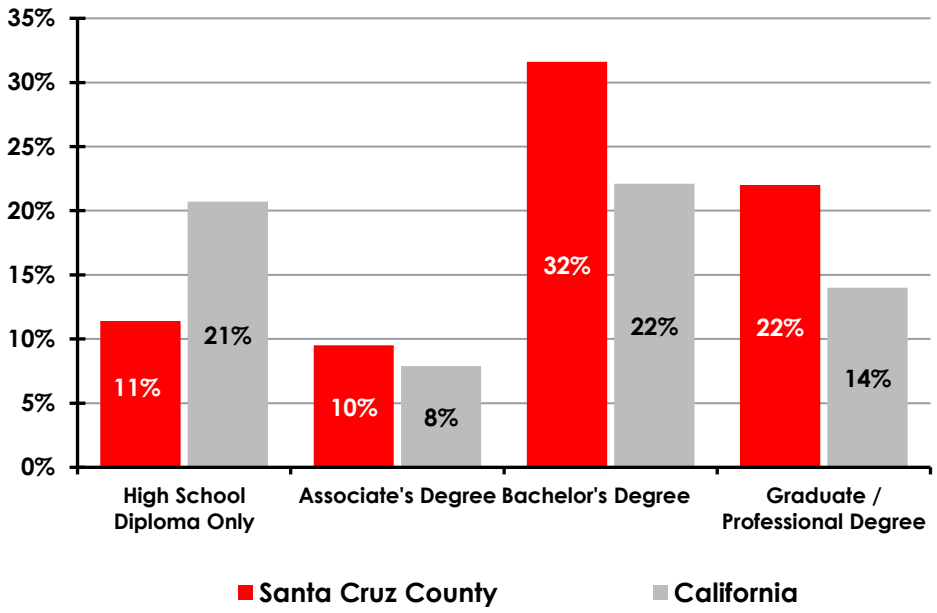
Figure 122: Population Without Health Insurance



Education Levels

Educational attainment is not considered one of the at-risk populations but is recognized as another risk group when developing fire and life safety education programs. Within the SCCFD district, 11.4% have a high school diploma only, compared to 20.7% of the state. Approximately 9.5% have an associate degree, 31.6% have a bachelor's degree, and 22% hold a graduate or professional degree in SCCFD. This group of people with lower education levels may fall into other categories, such as lower incomes and no health insurance. The following figure provides information on the education levels in SCCFD as compared to the State of California.

Figure 123: Education Levels



Race & Ethnicity

Race is considered a person's identification with a social group such as White, Black, African American, or Asian, while ethnicity identifies someone based on nationality, religion, language, or culture. The following figure shows how race and ethnicity are represented in Santa Cruz County compared to the state.

Figure 124: Race & Ethnicity

Race & Ethnicity	SCCFD District	California
White alone	72.2%	71.1%
Black or African American alone	19.7&	6.5%
American Indian & Alaskan alone	0.1%	1.6%
Asian alone	3.4%	15.5%
Native Hawaiian & Other Pacific Islander alone	0.4%	0.5%
Two or more races	3%	4.0%
Hispanic or Latino (of any race)	19.7%	39.4%

Housing Characteristics

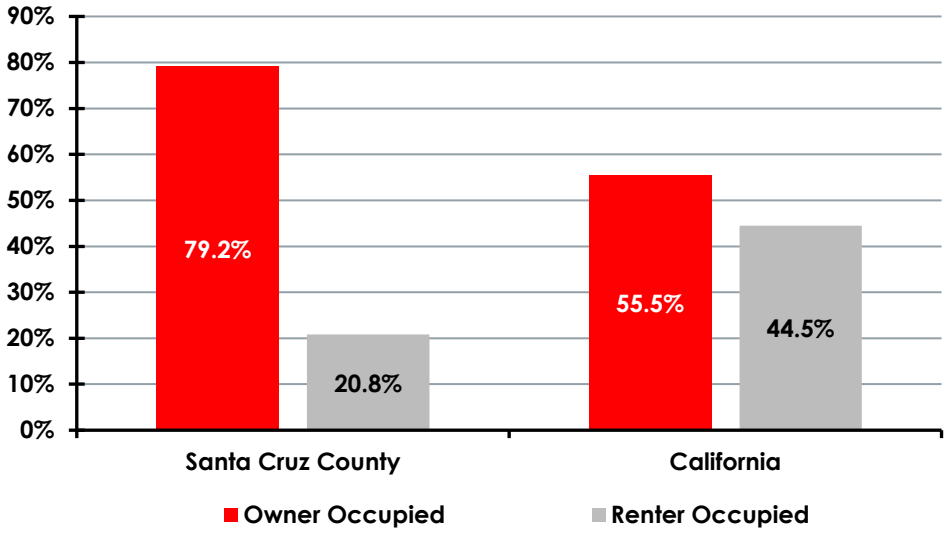
Housing types can vary in a community and provide insight into ownership, the age of the home, and the number of units in the building. Vacant structures can pose a risk for the fire department and community if the building is not secured to prevent entry. If the building is not maintained, the structural integrity can degrade and present problems during a fire. Vandalism may create additional problems for the fire department and law enforcement.

Data from the NFPA states that from 2015 to 2019, 75% of the fire deaths occurred in homes, and 57% of those were male.

Housing Ownership

Home-ownership in SCCFD district is 79.2% compared to the state at 55.5%. The next figure shows the percentage of owner and renter-occupied housing.

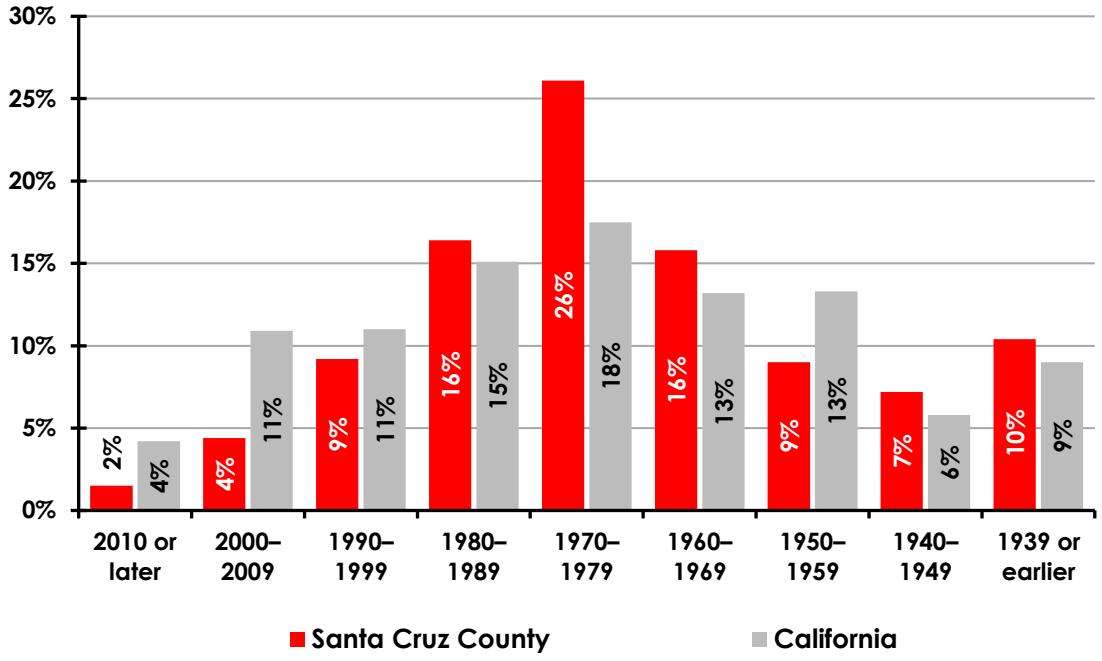
Figure 125: Owner or Rental Occupied Housing



Age of Housing

As buildings age, the cost of maintaining the structure increases over time. Homes built before smoke alarm installation requirements create a higher risk if none are present. Homes built before 1980 comprise 68% of the housing in Santa Cruz County, which is before most building code requirements for smoke alarm installations. Working smoke alarms have reduced fire death and provided an early warning during the event of a fire. New codes now require smoke alarms for new residential properties in each bedroom, hall, and floor. The following figure provides the age of housing units by decade.

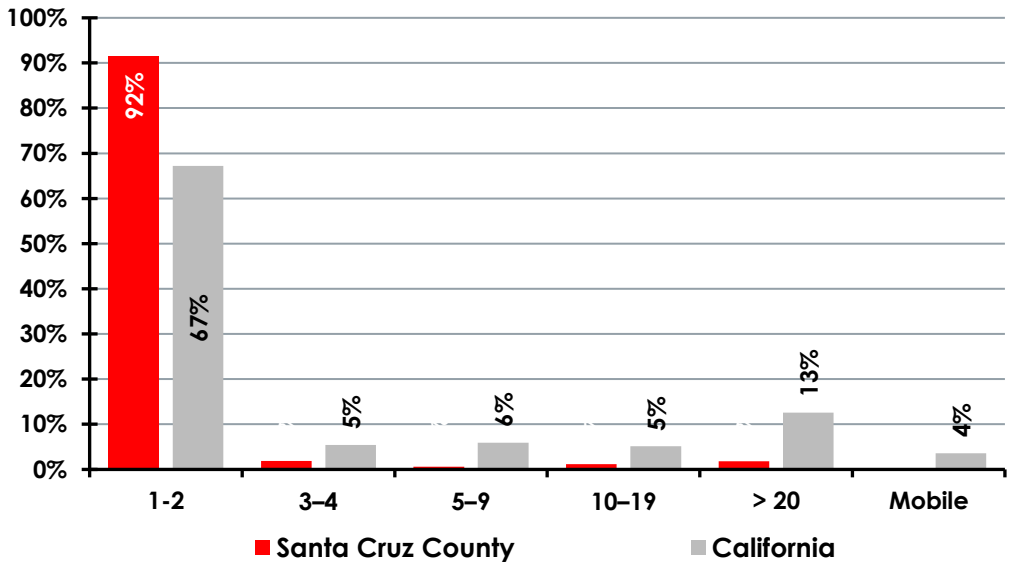
Figure 126: Age of Housing Units



Housing Units

The number of people living in one or two-family dwellings is 92% compared to the state at 67%. This high percentage is reflective of home ownership. The following figure lists the percentage of housing units per building.

Figure 127: Housing Units per Building



Risk Classification

Risk Assessment Methodology

Developing a risk score to determine risks in a community is necessary to provide an organization with a method for creating response protocols for an incident. The Three-Axis Heron model establishes a score by reviewing probability, consequence, and impact factors and assigning a score between 2–10 in each category.[27] A description of the incident types for each risk is in Appendix C.

Use of the Three-Axis Heron Formula includes the following equation.

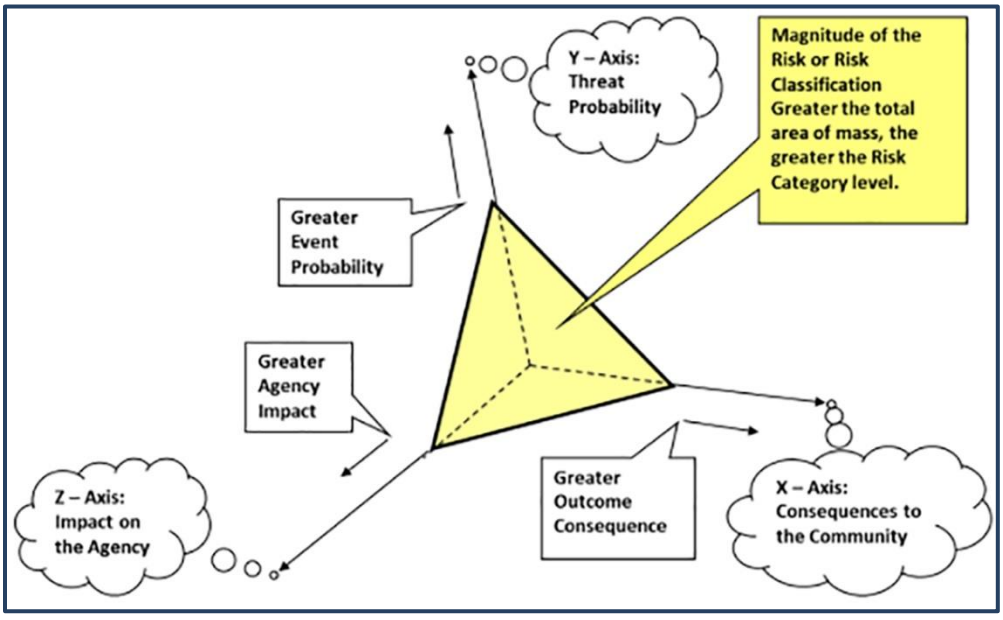
$$\text{Risk} = \sqrt{\frac{(P * C)^2}{2} + \frac{(C * I)^2}{2} + \frac{(I * P)^2}{2}}$$

The risk is graphically illustrated through a three-axis model as follows:

- **P** = Probability (Y-Axis)
- **C** = Consequences (X-Axis)
- **I** = Impact (Z-Axis)

The following figure summarizes the three-axis risk classification process and how a score is developed.

Figure 128: Three-Axis Risk Classification



When developing the score, each of the three scoring components is based on SCCFD incident data. For example, scoring a low-risk fire response is based on the probability of that type of incident occurring. Most low-risk incident types are frequent (occurring multiple times a day), but the consequence to the community and impact on the fire department is low. The probability of a low-risk incident in the county is 10 (high), while the consequence and impact are 2 (low). These numbers are placed into the above formula to create a score of 20.2. The score will increase dramatically for a maximum risk, although the probability is low (2), because the consequence to the community is a 10, and the impact on SCCFD is the highest at 10, which gives a score of 73.5.

These scores are designed to provide information to SCCFD to determine the level of service required for the community. The probability of an incident may affect response times if multiple events occur at the same time. Even if the risk is low, it will place an apparatus out of service for the response. The higher the score, the greater the risk to the community. Although the highest risk score available is 122.5, the probability of this type of event occurring is low. The following information provides additional details on probability, consequence, and impact.

Probability

Probability is the likelihood of an incident occurring in the community over time. This axis reflects the probability of a particular type of incident occurring (which contributes to the level of risk). Many factors are considered, including the time of day, location, hazard present, season of the year, building construction and maintenance, demographic factors, and more. It can range from a rare event to one that occurs often. The following figure defines probability categories.

Figure 129: Probability or Likelihood of Occurrence

Score	Category	Probability or Likelihood
2	Minor	Unlikely: < 0.02% of total call volume. Expected to occur very rarely.
4	Low	Possible: 0.02%–0.07% of total call volume. Expected to occur rarely.
6	Moderate	Probable: 0.07%–0.3% of total call volume. Expected to occur monthly.
8	High	Likely: 0.3%–2% of total call volume. Expected to occur multiple times per week.
10	Extreme	Frequent: > 2% of total call volume. Expected to occur one or more times per day.

Consequence

The consequence of an incident can vary from minor casualties to severe impacts that may destroy historical or major facilities in the community and create a large loss of employment or life. The following figure defines consequence categories.

Figure 130: Consequence to the Community

Score	Category	Consequence to the Community
2	Minor	1–2 people affected (injuries/deaths). < $10,000 loss.
4	Low	< 5 people affected (injuries/deaths). < $500,000 loss.
6	Moderate	5–50 people affected (injuries/deaths). $500,000–$1,000,000 loss
8	High	51–100 people affected (injuries/deaths). $1,000,000–$5,000,000 loss.
10	Extreme	>100 people affected (injuries/deaths). > $5,000,000 loss.

Impact

The third factor in determining the risk is the fire department's impact and the critical tasking needed to control or mitigate an incident. This includes the number of emergency responders and apparatus available, whether available internally or from external agencies. It measures the department's ability to respond to a given risk or incident while still providing service to the remaining parts of the jurisdiction. The following figure defines impact categories.

Figure 131: Impact on Operational Forces

Score	Category	Impact on Operational Forces
2	Minor	≥ 90% Remaining Apparatus/Crews
4	Low	≥ 75% Remaining Apparatus/Crews
6	Moderate	≥ 50% Remaining Apparatus/Crews
8	High	≥ 25% Remaining Apparatus/Crews
10	Extreme	< 25% Remaining Apparatus/Crews

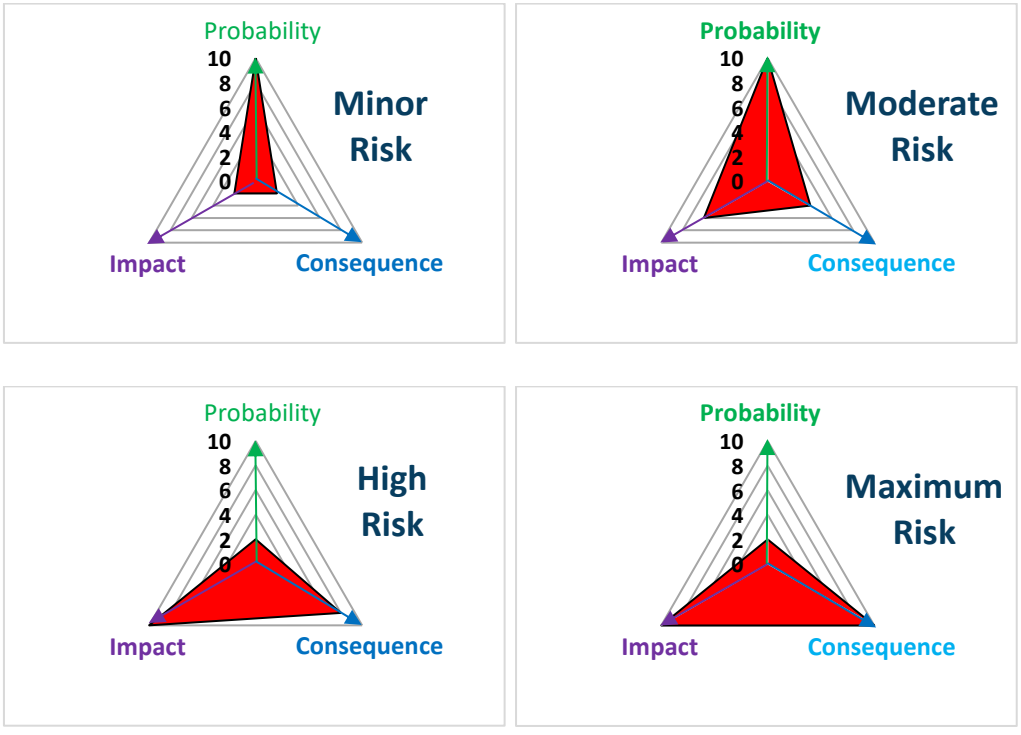
Fire Response

SCCFD is the primary provider for the mitigation of fire-related incidents. These range from low-risk incidents, such as a vehicle fire to a maximum risk incident for a fire involving a school. Fire risks for a vehicle fire are considered low compared to a maximum risk for a school that houses students. This scoring is applied to four different categories of fire incidents in SCCFD's response area to provide staffing needs to meet critical tasks on the fire ground. The following figures provide the fire response risk assessment scoring and the three-axis risk classifications.

Figure 132: Fire Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	10	2	2	10	4	6	2	8	10	2	10	10
Score Assigned	20.2			53.7			59.4			73.5		

Figure 133: Fire Three-Axis Risk Classifications



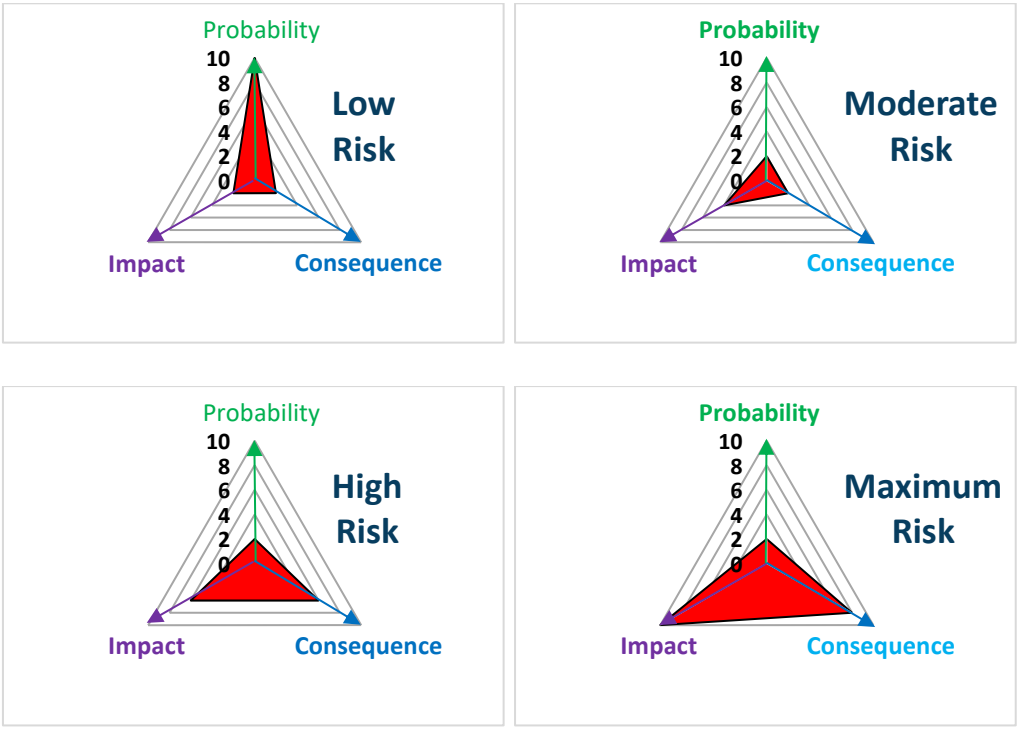
Emergency Medical Services Response

SCCFD provides basic life support emergency medical care, and AMR provides advanced life support and transport services. Incidents range from a low-risk medical assist to a maximum-risk multi-victim incident. The following figures provide the EMS response risk assessment scoring and the three-axis risk classifications.

Figure 134: EMS Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	10	2	2	2	2	4	2	6	6	2	8	10
Score Assigned	20.2			8.5			28.1			59.4		

Figure 135: EMS Three-Axis Risk Classifications



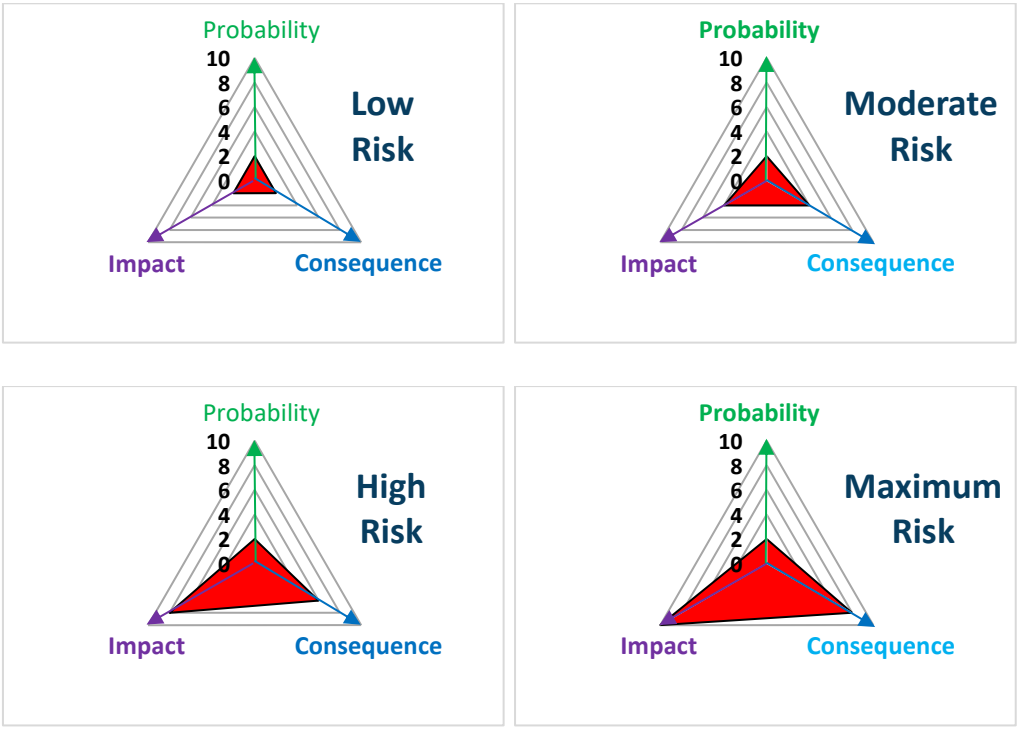
Technical Rescue Response

Rescue services can vary from a low-risk incident, such as accessing a locked vehicle with a child inside, to a confined space incident (maximum risk) that potentially requires many personnel to mitigate the incident. The following figures provide the technical rescue response risk assessment scoring and the three-axis risk classifications.

Figure 136: Technical Rescue Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	2	2	2	2	4	4	2	6	8	2	8	10
Score Assigned	4.9			13.9			36.8			59.4		

Figure 137: Technical Rescue Three-Axis Risk Classifications



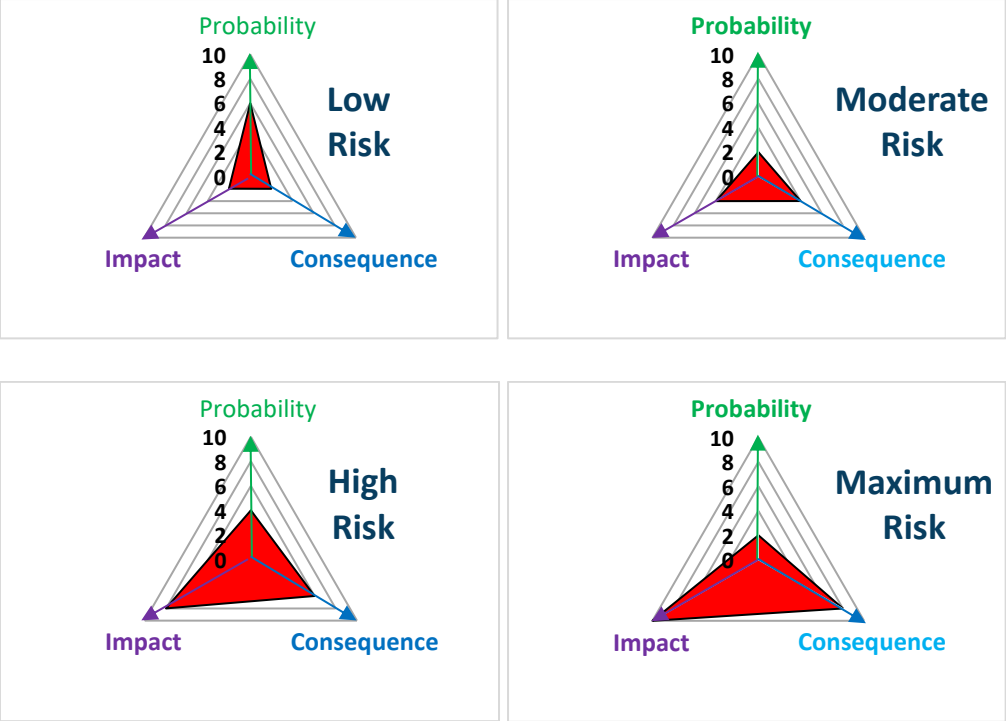
Hazardous Materials Response

Hazardous materials responses can vary from low-risk odor investigations to the maximum risk for a fuel tanker fire in higher populated areas. Most of these incidents can be managed by SCCFD, but higher risks may need assistance from outside resources. The following figures provide the scoring of the hazardous materials response risk assessment and the three-axis risk classifications.

Figure 138: Hazardous Materials Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	6	2	2	2	4	4	4	6	8	2	8	10
Score Assigned	12.3			13.9			44.2			59.4		

Figure 139: Hazardous Materials Three-Axis Risk Classifications



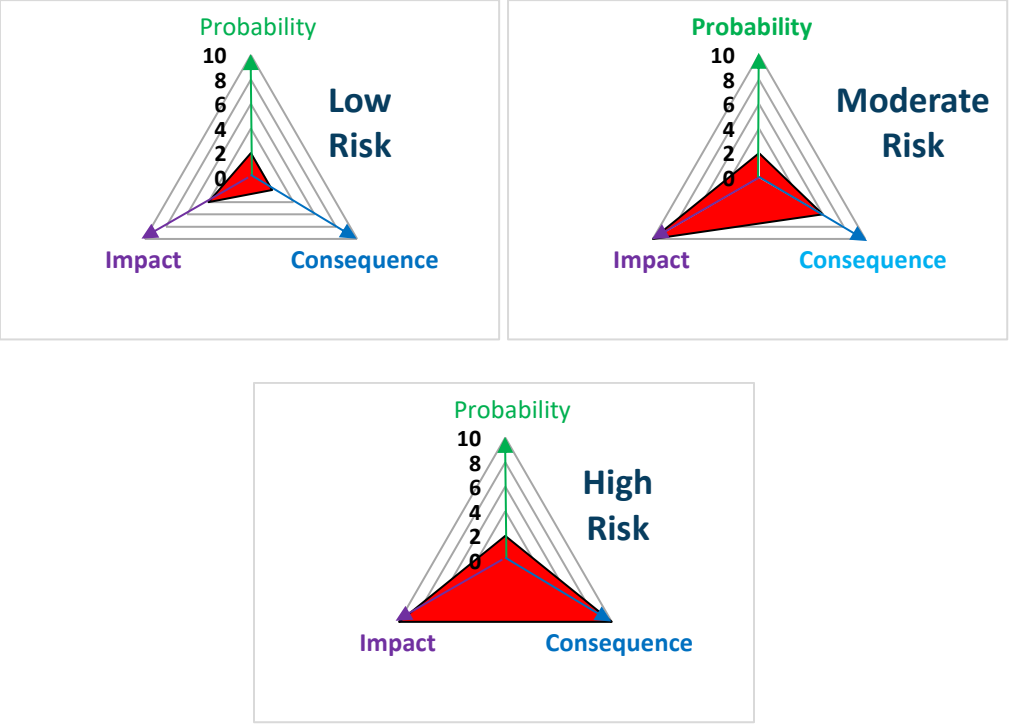
Wildland Fires Response

The types of wildland fire risk vary from small grass fires to large forest fires requiring many internal and external resources. The following figures provide the risk score and classifications assigned to each type of wildland fire risk in SCCFD's response area. The wildland fire risk only includes low, moderate, and high since a maximum risk would also be a state and federal response. The score assigned for a high risk (73.5) is significant because of the maximum scores of ten for the consequence to the community and impact on SCCFD. This incident type will strain the community and emergency services. The following figures provide the wildland fire response risk assessment and the 3-axis risk classification scoring.

Figure 140: Wildland Fires Response Risk Assessment

Description	Low			Moderate			High		
Risk Score	P	C	I	P	C	I	P	C	I
	2	2	4	2	6	10	2	10	10
Score Assigned	8.5			45.5			73.5		

Figure 141: Wildland Fires 3-Axis Risk Classifications



Land Use

The concept of land use regulation is to provide attractive social and environmental outcomes to assist in the efficient management of development. Land use for a community is designed to assign a classification for properties within a geographical area under governmental control. Zoning areas may vary from one portion of the service area to another, with a mixture of low, moderate, and high-risk properties.

- ***Low Risk:*** Areas zoned for agricultural purposes, open spaces, low-density residential, and other low-intensity uses.
- ***Moderate Risk:*** Areas zoned for medium-density single-family properties, small commercial and office use, low-intensity retail sales, and similarly sized business activities.
- ***High Risk:*** High-intensity business districts, mixed-use areas, high-density residential, industrial, storage facilities, and large mercantile centers.

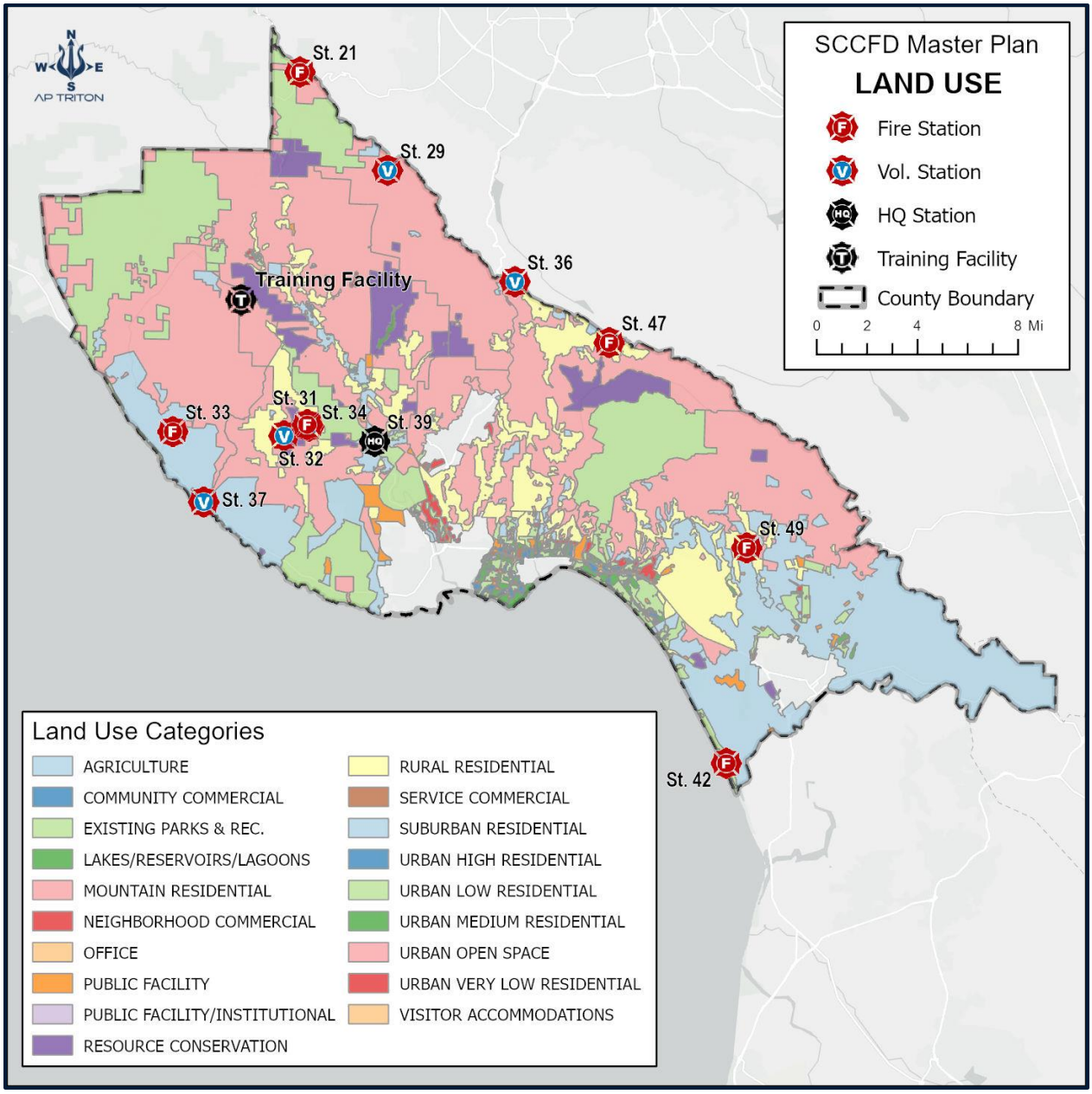
Santa Cruz County adopted its general plan in 1994. The Housing Element (5th Cycle) was approved in 2016 and the 6th Cycle Regional Housing Needs Allocation assigned for 2023 to 2031 is a 353% increase. The new Housing Element must be adopted by December 15, 2023.

Figure 142: Housing Element Allocation

Income Level	5th Cycle RHNA 2016–2022	6th Cycle RHNA 2023–2031	Percent Increase
Very Low	317	1,492	471%
Low	207	976	471%
Moderate	240	586	244%
Above Moderate	550	1,580	287%
Total RHNA:	**1,314**	**4,634**	**353%**

In 2022, the county adopted a growth goal that recommends a 0.5% rate for 2023, which limits the number of residential building permits to 256. These permits are divided between the county's rural (83) and urban (251) areas. If the unused allocations from 2022 are included, the total increases to 334.

Figure 143: Land Use Types



Most land use in the county is Mountain Residential, Agricultural, or Existing Parks and Recreation. Growth is primarily occurring around the existing cities and urban areas. The following figure provides the land use in Santa Cruz County.

Physical Assets Protected

Commercial occupancies or properties are considered target hazards in every community because of the special or unique risks to emergency responders and the occupants during an incident or event. Each of these occupancies should have up-to-date pre-incident surveys completed annually. The surveys allow responders to become familiar with the building, property, and special hazards.

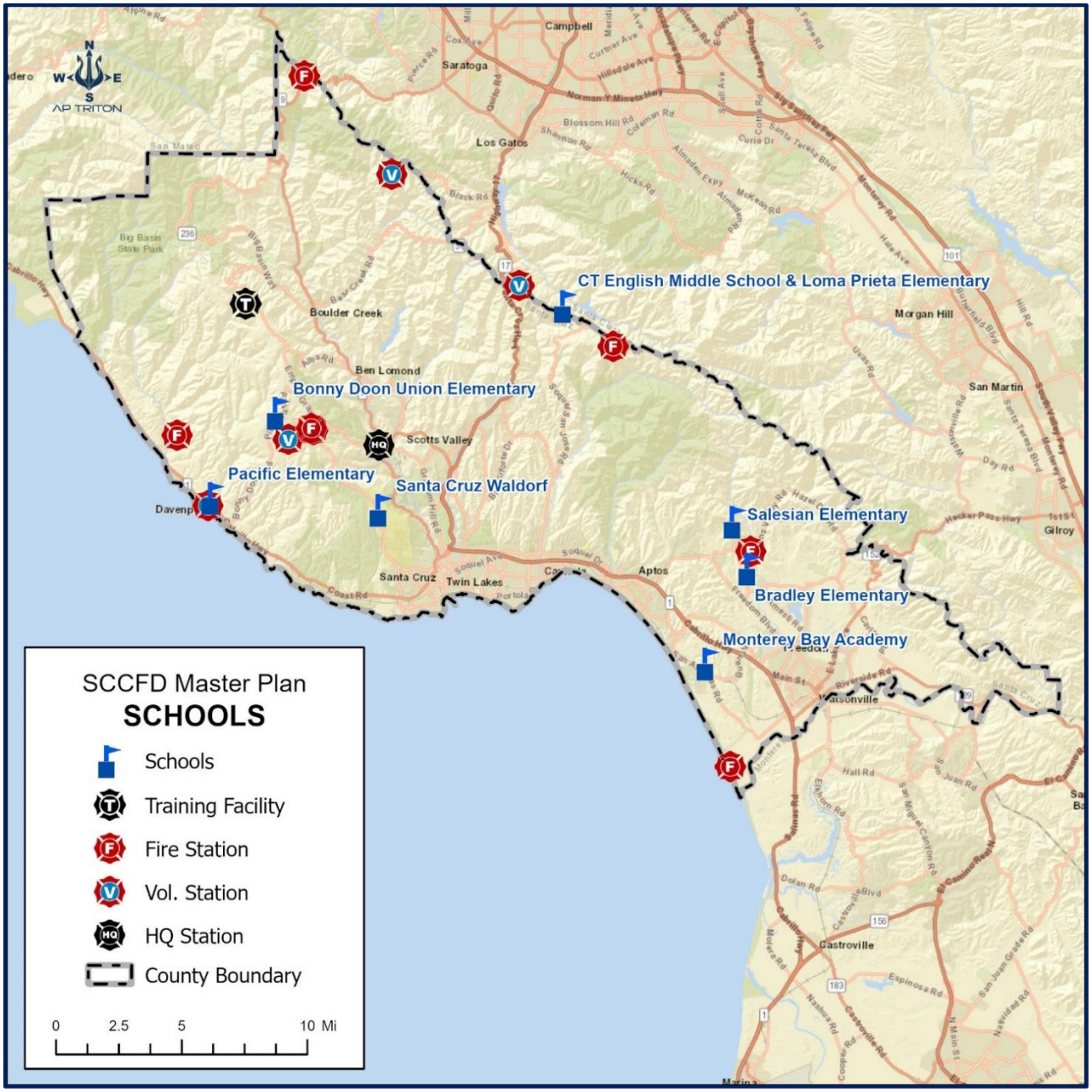
Structural Risks

The risks created by residential or commercial occupancies, for occupants of a building and emergency responders, increase based on the type and use of a building.

Educational & Childcare Facilities

Public and private schools and childcare facilities increase risks in any community and require substantial assistance during a significant event such as a mass casualty or fire response. In the county, numerous schools and childcare facilities require inspections and pre-incident plans to ensure the property is safe and that emergency responders are familiar with the location and site-specific hazards. The following figures provide the location of schools in Santa Cruz County Fire Department jurisdiction.

Figure 144: School Locations

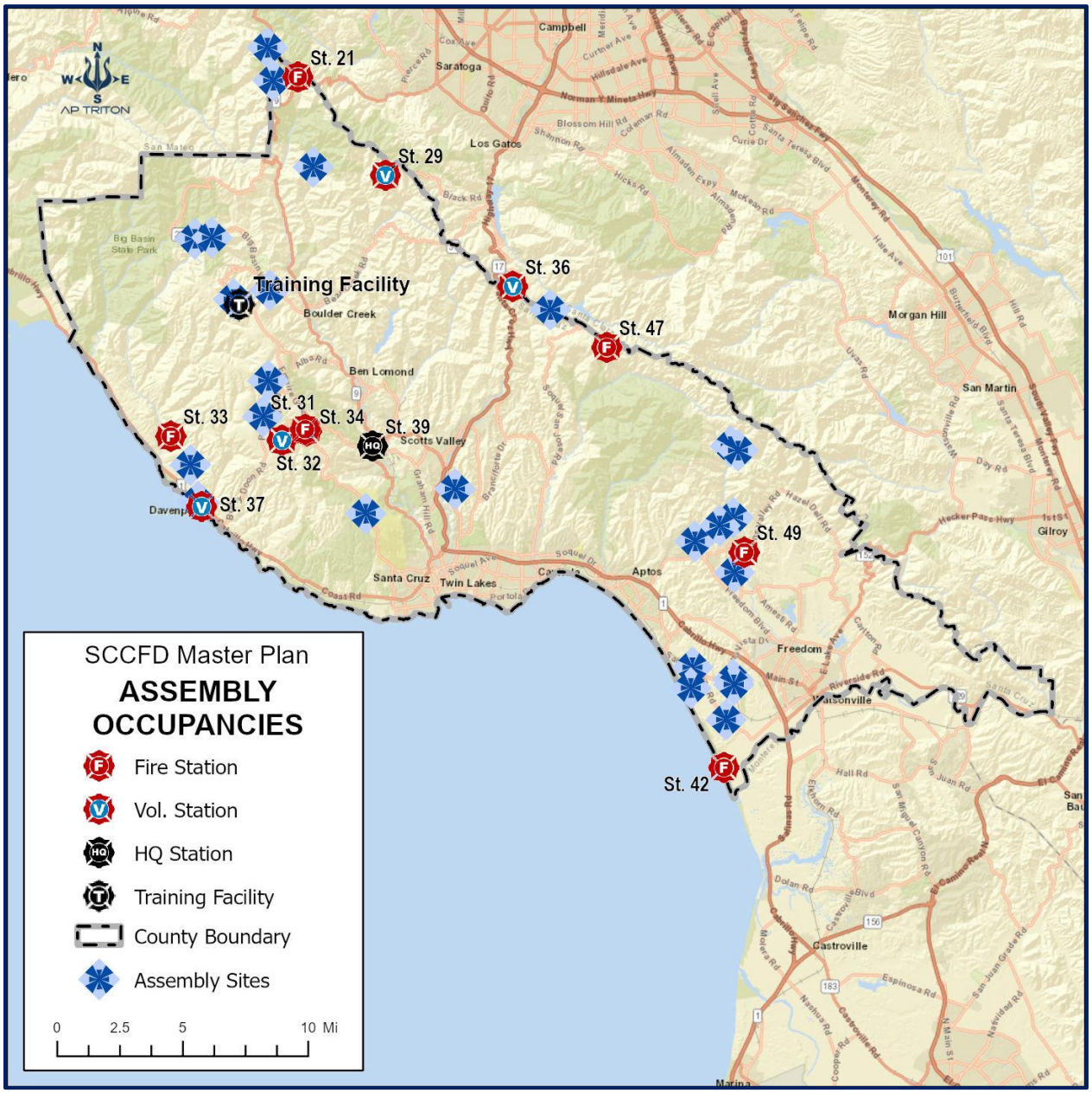


Assembly

Gathering large groups of people in a single location or building increases risks in locations such as a place of worship, entertainment venue, or eating establishment. Outdoor special events such as a street fair or other mass gatherings may require a public safety plan in accordance with the California Fire Code.

This plan should include emergency vehicle access and egress, fire protection, emergency medical services, public assembly areas, directing of vehicular traffic and attendees, vendor, and food concessions, need for law enforcement, fire or EMS personnel, and weather monitoring. The following figure provides the location of assembly occupancies in Santa Cruz County Fire Department jurisdiction.

Figure 145: Assembly Occupancies



Medical Facilities

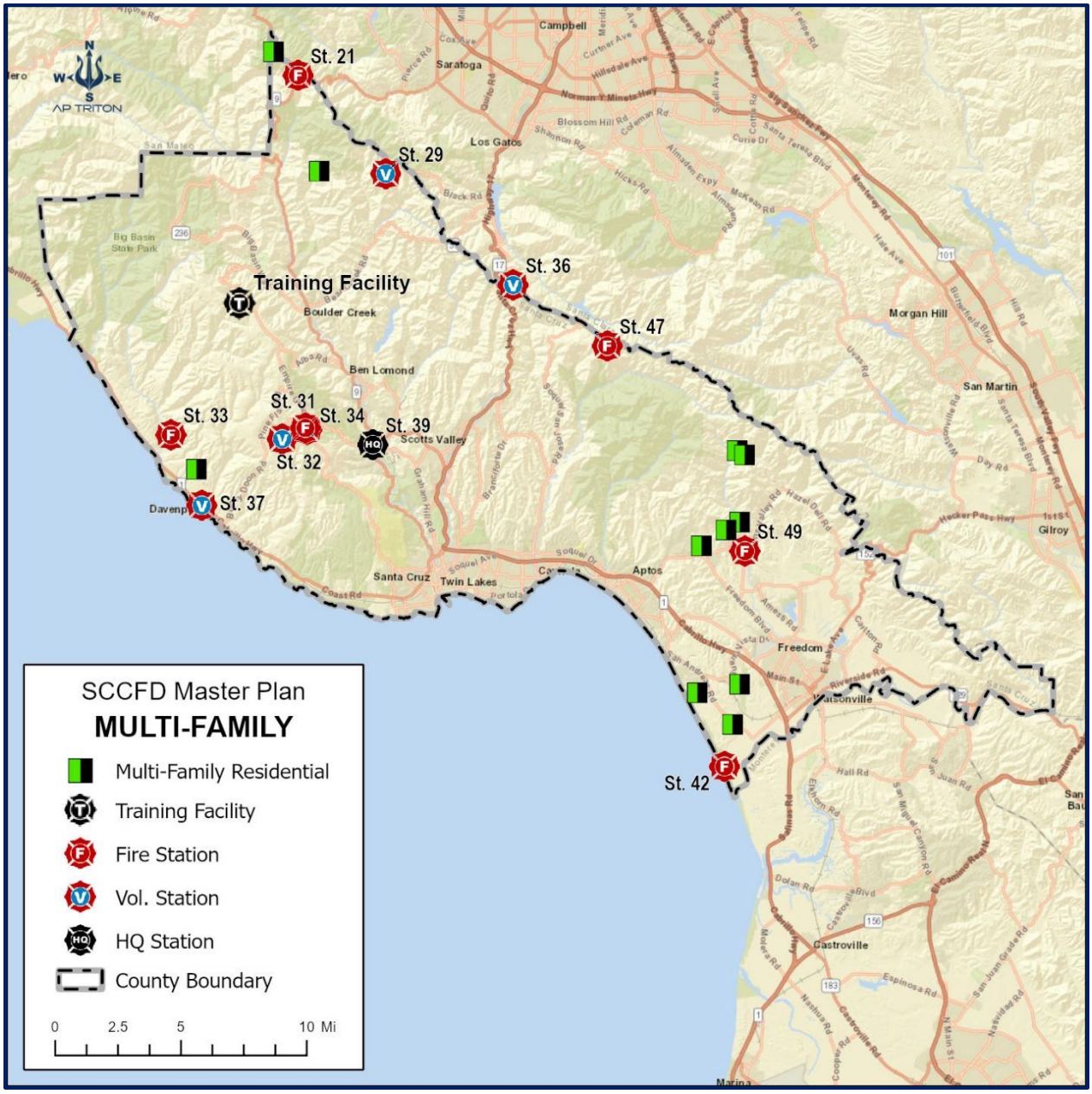
Although there are no major medical facilities in SCCFD's service area, there may be medical offices where occupants may be unable to leave without assistance from the staff. These locations may contain medical gases that can create additional risks for emergency responders during a fire, and completing up-to-date pre-incident plans is necessary.

Multi-family Occupancies

Although multi-family housing has fewer fires caused by electrical or heating malfunctions, the risk of cooking fires is twice the rate of other types of building fires.[28] Updated building and fire codes now require these buildings to have a residential fire sprinkler system installed and interconnected smoke alarms in all bedrooms, hallways, and floors for new construction and any redevelopment where city ordinances require these fire protection features.

These fire protection systems are designed to provide enough time for the occupants to evacuate the building. The following figure shows the locations of multi-family dwellings in Santa Cruz County Fire Department jurisdiction.

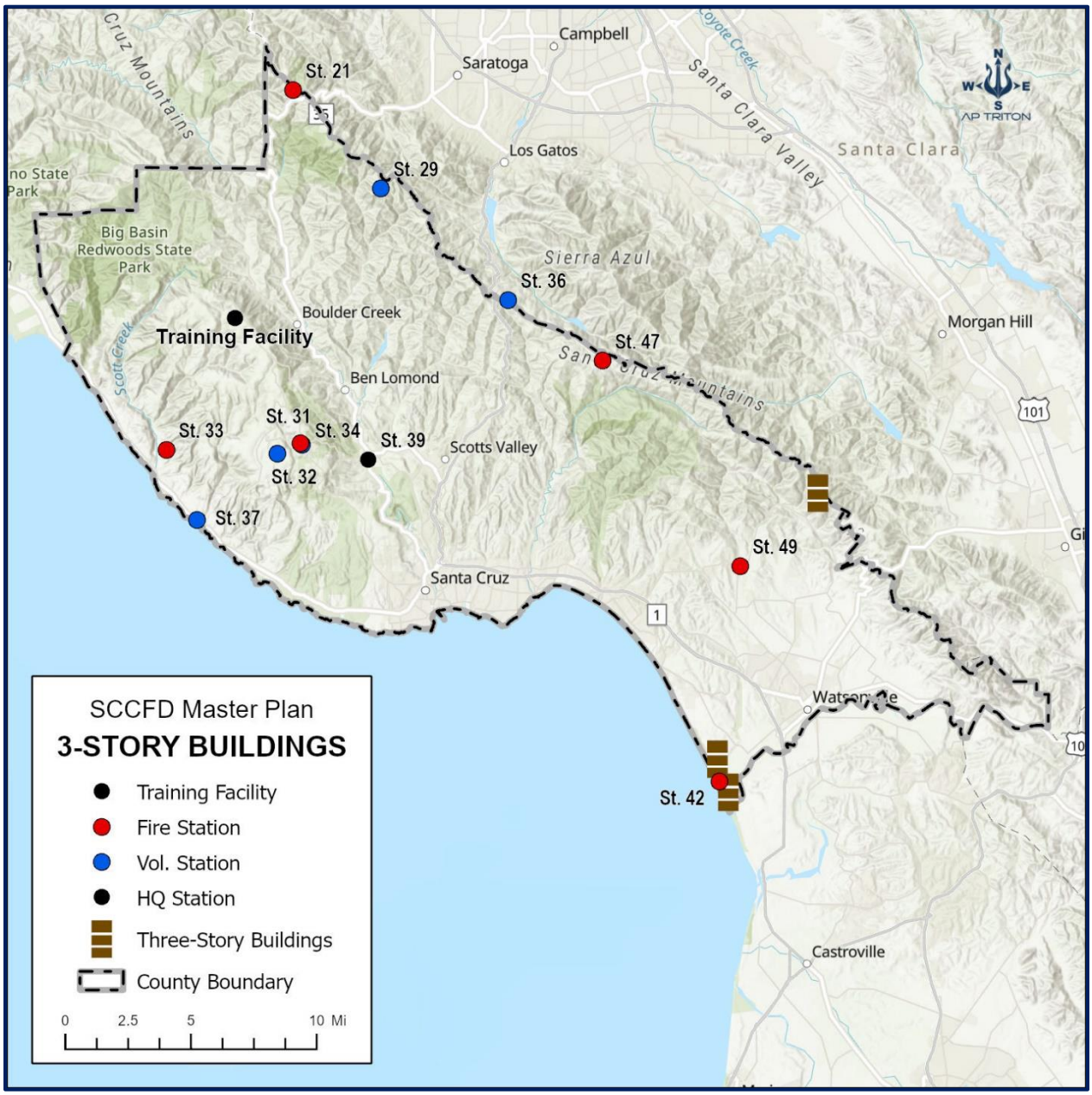
Figure 146: Multi-family Occupancies



Buildings Three or More Stories in Height

Currently, there are no structures three or more stories in height that require a response of an aerial apparatus with elevated master stream capabilities. The Insurance Services Office (ISO) reviews the coverage area for a ladder truck for all buildings within 2.5 miles. A ladder truck may be necessary to access these higher buildings' upper floors or roofs since most ground ladders cannot reach these heights. The next figure illustrates the locations.

Figure 147: Buildings Three of More Stories in Height

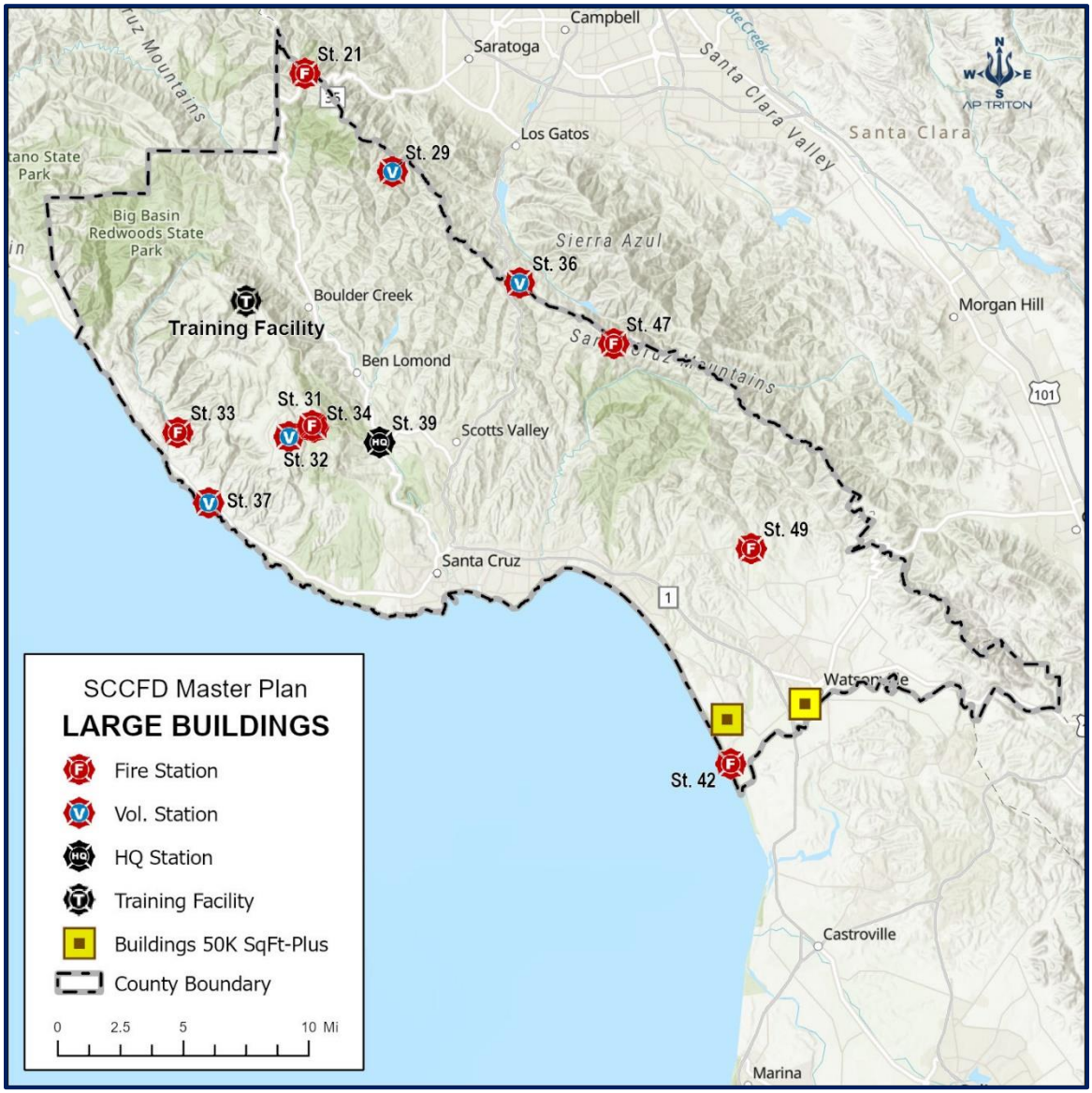


Large Square Footage Buildings

Large buildings, such as warehouses, strip malls, and large "box" stores, need greater volumes of water for firefighting and require more firefighters to advance hose lines long distances into the building. Although there is only one large square footage building, the fire flow may be greater for smaller buildings because of construction type, distance to exposures, and lack of built-in fire protection systems such as fire sprinklers.

The following figure is based on data from ISO and shows the locations for buildings 50,000 square feet and larger.

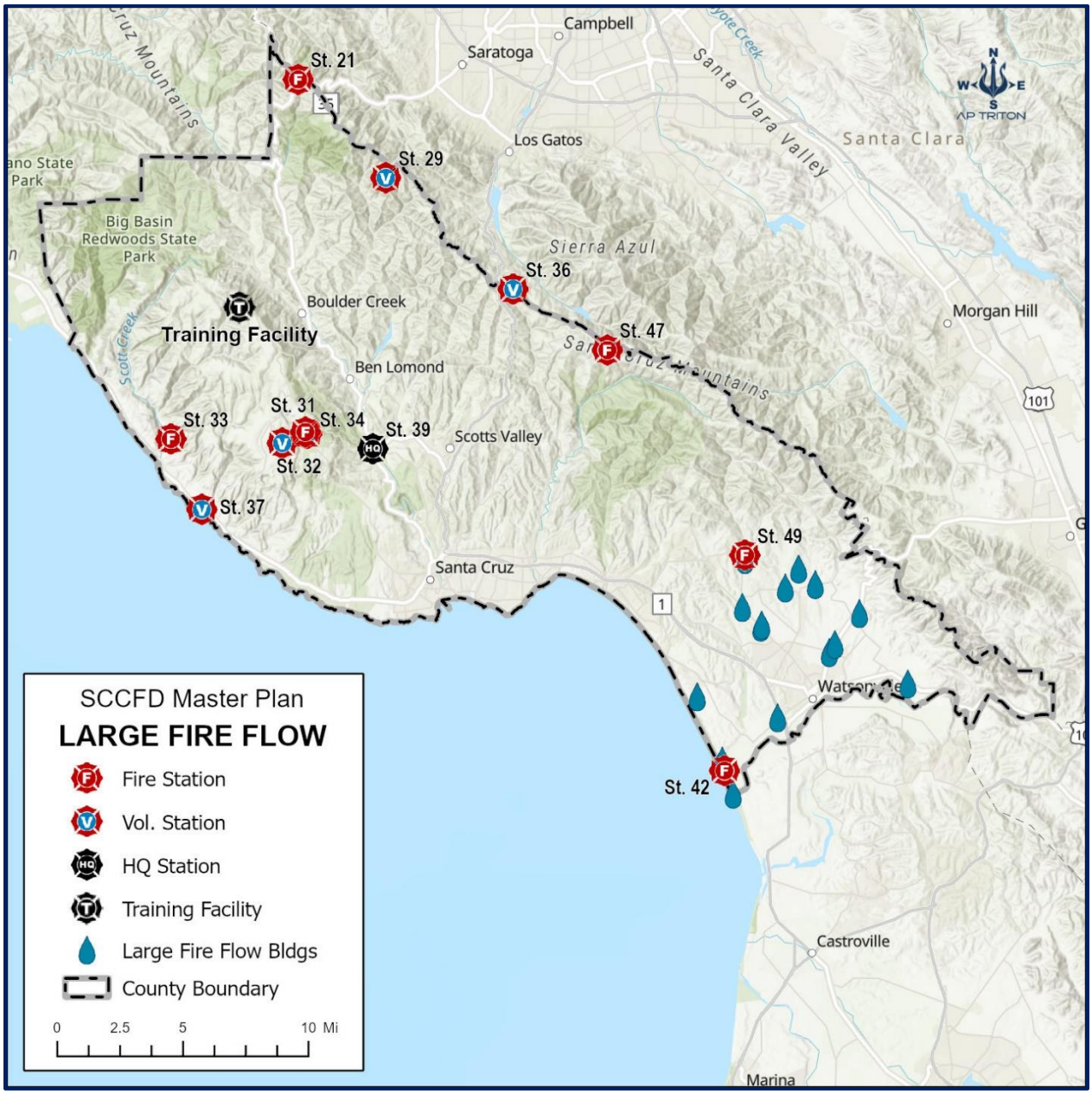
Figure 148: Buildings Greater Than 50,000 Square Feet



Large Fire-Flow Occupancies

Other buildings may require a higher amount of water to extinguish a fire. These occupancies can present a problem if the needed water is less than what is available from the water supply from hydrants or other water sources. The following figure shows the occupancies with a needed fire flow greater than 2,500 gallons per minute.

Figure 149: Buildings with Fire Flow 2,500 Gallon Par Minute or Greater



Spatial Visualization of Data & Information

Environmental Hazards

All communities are continually threatened by physical hazards. Hazards can range from wildfires, earthquakes, tsunamis, flooding from heavy rains, or droughts. Mitigation plans provide public and emergency responders with information to understand the risks and prepare for an event.

Weather Conditions

The climate can affect SCCFD year-round and may impact emergency response. Whether it is a thunderstorm or other weather event, SCCFD must respond when requested. Because of the size of the county, weather conditions can vary based on topography and location.

Temperature

The weather conditions in an area can impact the fire department and the entire community during the year.[29] When temperatures are high, they affect firefighters during extended incident operations and require rehabilitation to prevent heat exhaustion. The average high temperature is the highest during September (76.4°F) in the southern end, while it is higher in the Ben Lomond area at 82°F. In September 2022, a high temperature of 107°F was recorded at Ben Lomond and 110°F at Corralitos. The following figures provide the average monthly high temperature in Watsonville and Ben Lomond.

Figure 150: Average High Temperatures in Watsonville

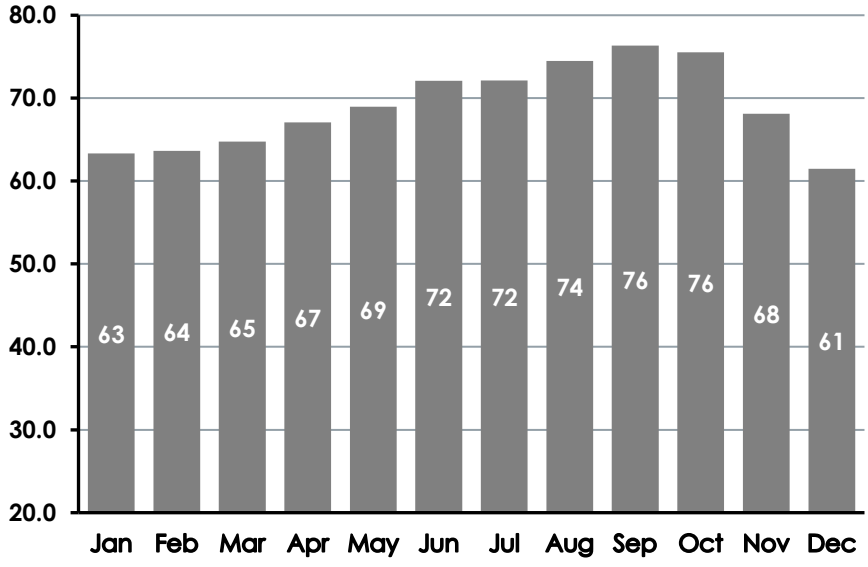
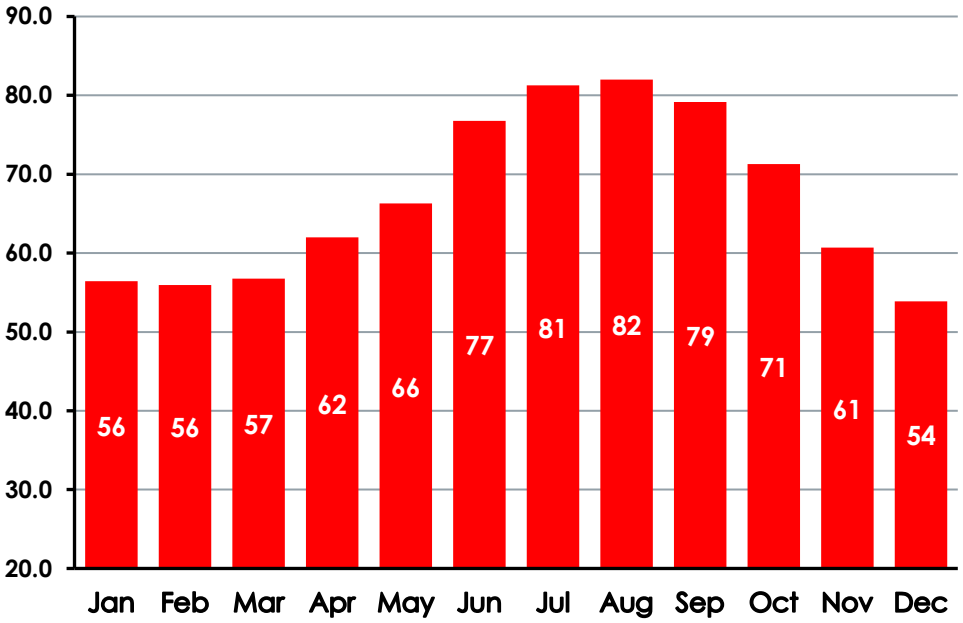


Figure 151: Average High Temperatures in Ben Lomond



The lowest average daily low temperature occurs in December at 41°F, and the warmest is during July and August at 59°F. The following figure shows the average monthly low temperatures in Watsonville and Ben Lomond.

Figure 152: Average Low Temperatures in Watsonville

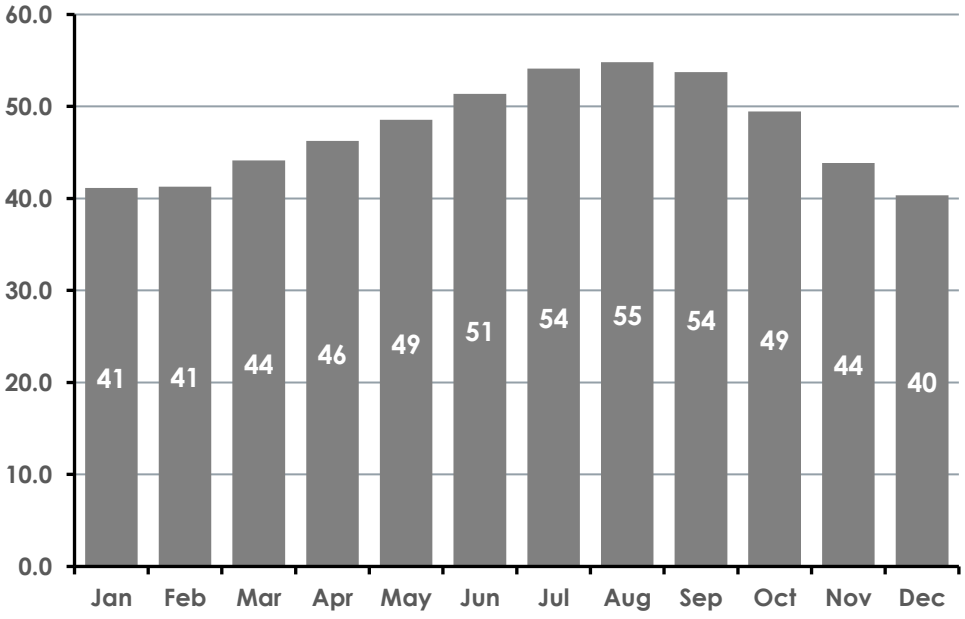
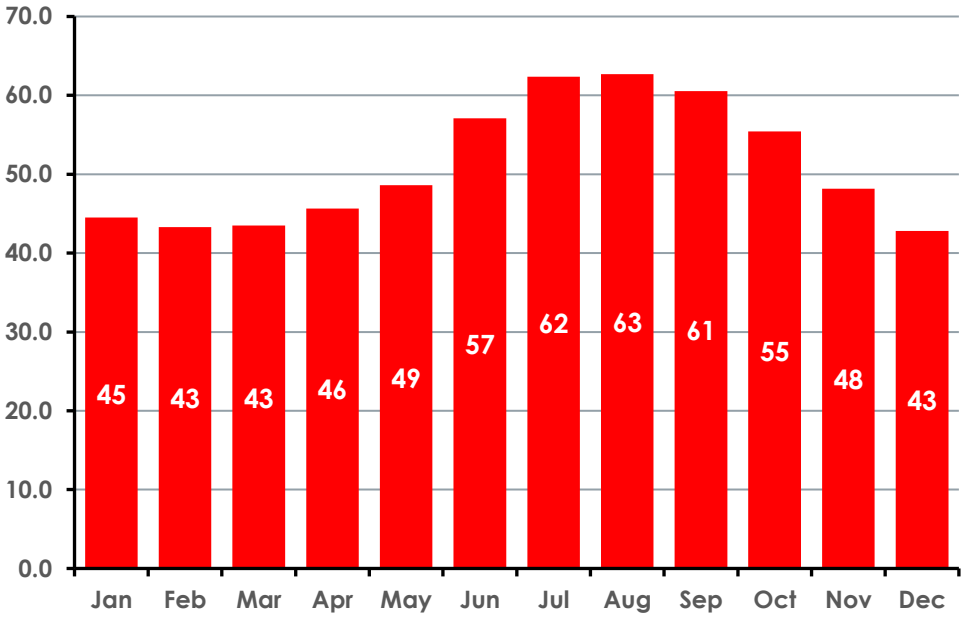


Figure 153: Average Low Temperatures in Ben Lomond



Winds

Wind speed and direction influence how SCCFD manages events such as a wildfire or hazardous materials incident. The highest average wind speeds occur between April and July of each year in Watsonville, while in Ben Lomond, the highest occurs between December and March.[30] The following figures show the average monthly wind speeds.

Figure 154: Average Monthly Wind Speeds in Watsonville

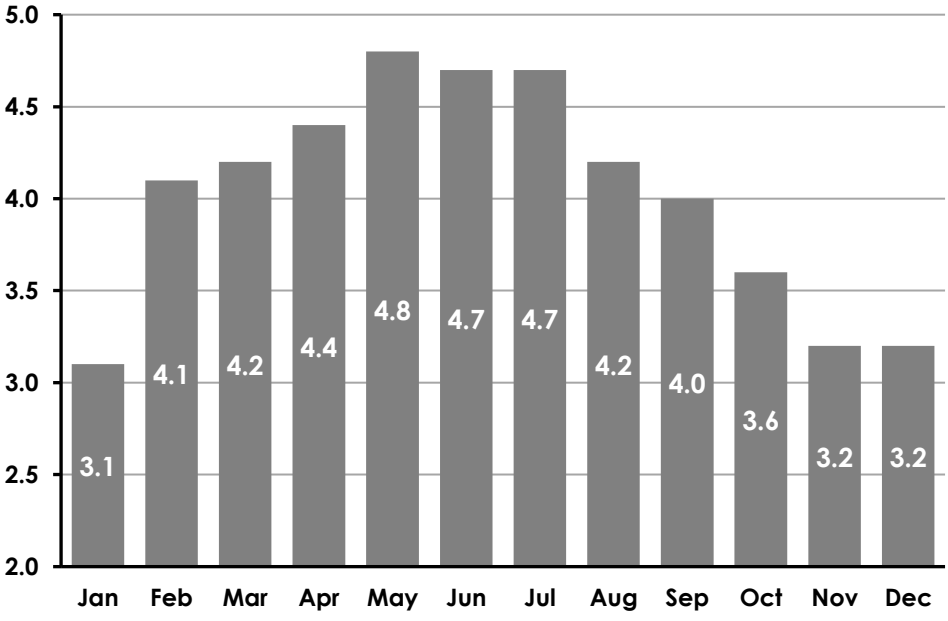
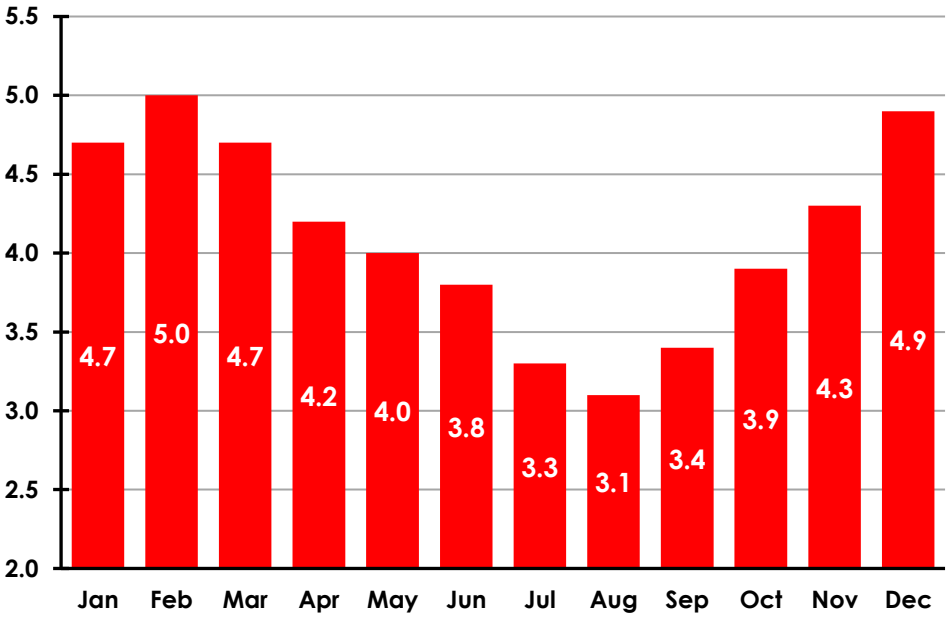
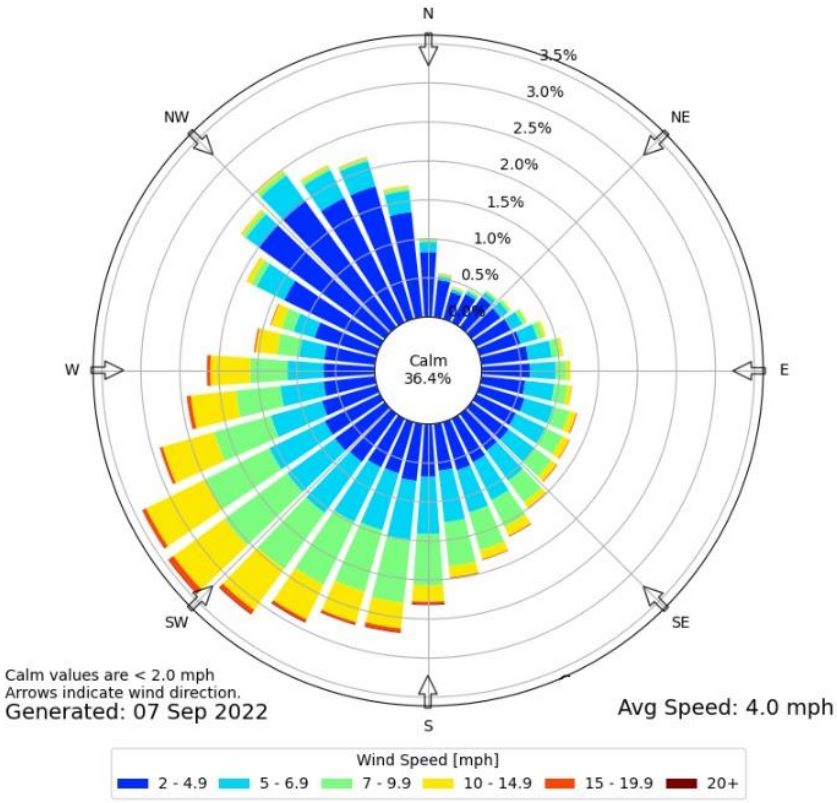


Figure 155: Average Monthly Wind Speeds in Ben Lomond



The prevailing winds are from the southwest and northwest, as shown in the following figure, a wind rose from the National Weather Service (NWS) Watsonville Airport reporting station.

Figure 156: Watsonville Wind Rose



The prevailing winds from Ben Lomond are primarily from the northwest (8%) and north northwest (12%) but can fluctuate to the north northeast (8%) and south-southwest (8%).

Precipitation

The lack of precipitation for an extended period creates problems in a community. Drought increases the hazards of wildland fires as the vegetative moisture content decreases and generates higher combustible fuels. Insufficient rainfall affects the ability to grow crops and maintain landscaping. The months with the highest precipitation occur between December and March, but the Ben Lomond area receives significantly more precipitation than the Watsonville area, as shown in the following figures.

Figure 157: Average Precipitation in Watsonville

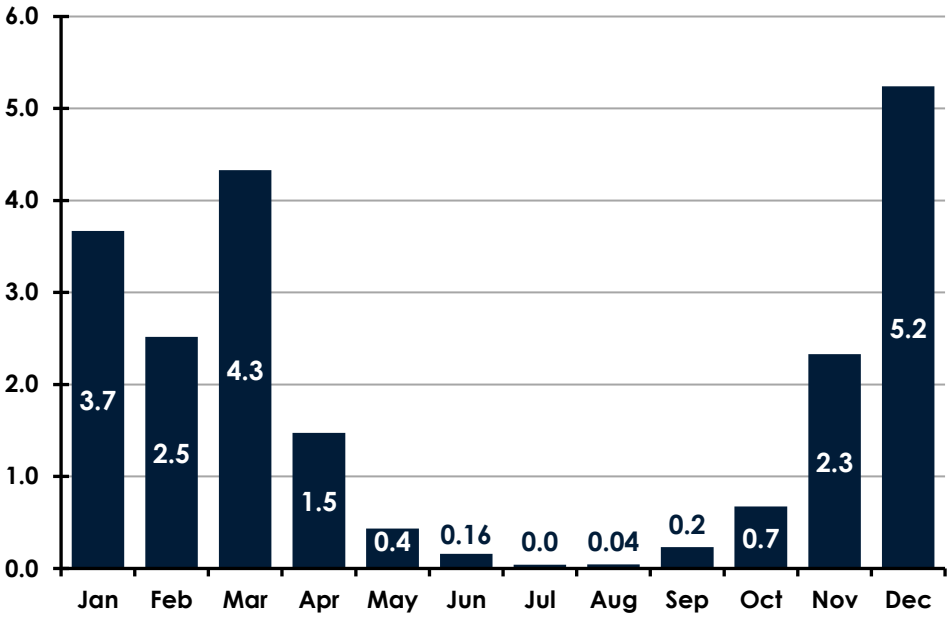
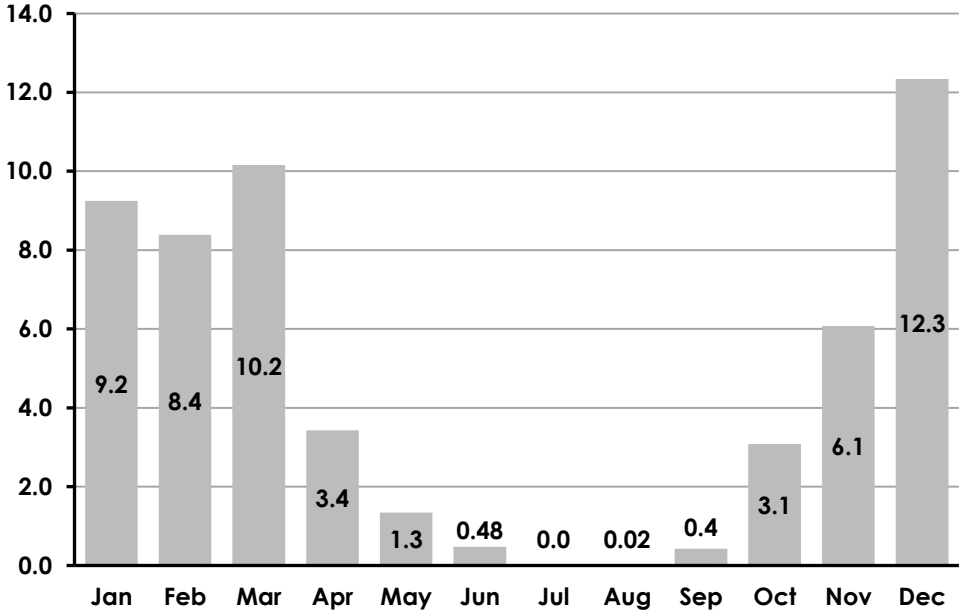
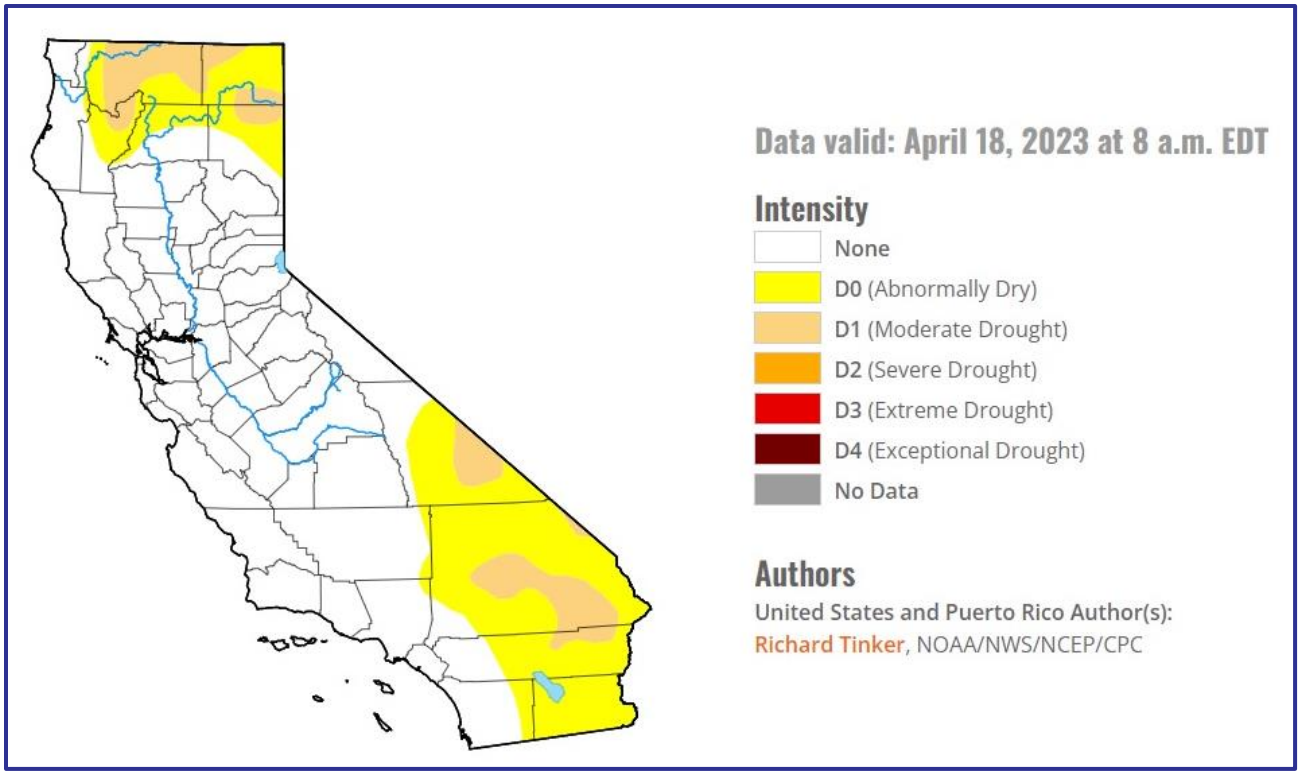


Figure 158: Average Precipitation in Ben Lomond



The next figure shows that there are no drought conditions in Santa Cruz County, although as recently as January 2023, there was a severe drought in the county. Since December 2022, more than 78 inches of rain have been recorded at the Ben Lomond NWS reporting station.

Figure 159: Drought Conditions



Physical Hazards

A physical hazard is described as a natural disaster or weather event that affects the community. The event may last a few hours or extend for a lengthy period, such as a heatwave or drought. The NWS issues advisories, watches, and warnings for these hazards when conditions exist or are in the immediate forecast.

Earthquakes

The risk of an earthquake in Santa Cruz County is high because of the San Andreas and the San Gregorio faults. These faults create a significant hazard for the county. Other fault zones include Butano, Sargent, Zayante, and Corralitos. These faults can cause surface deformations during an earthquake where it reaches the surface and can cause damage to roads, utilities, and other critical infrastructure in the county. The 2021–2026 Local Hazard Mitigation Plan lists the probability and consequence as high and the loss of life as a medium risk.

Recorded historic earthquakes date back to the 1800s in Santa Cruz County. The most destructive earthquakes in recent history were the 1906 San Francisco and 1989 Loma Prieta, and these two events created visible ground cracks.

The 1906 earthquake caused a partial collapse of the courthouse and damaged many chimneys in the county. The 1989 Loma Prieta earthquake was centered about ten miles east-northeast of the city of Santa Cruz and damaged 674 dwellings, 32 mobile homes, and 310 businesses in the county.

The following figure shows earthquake magnitudes, the average repeat time in years, and the 30-year likelihood of one or more events in the San Francisco region.

Figure 160: Magnitude & Likelihood of an Earthquake[31]

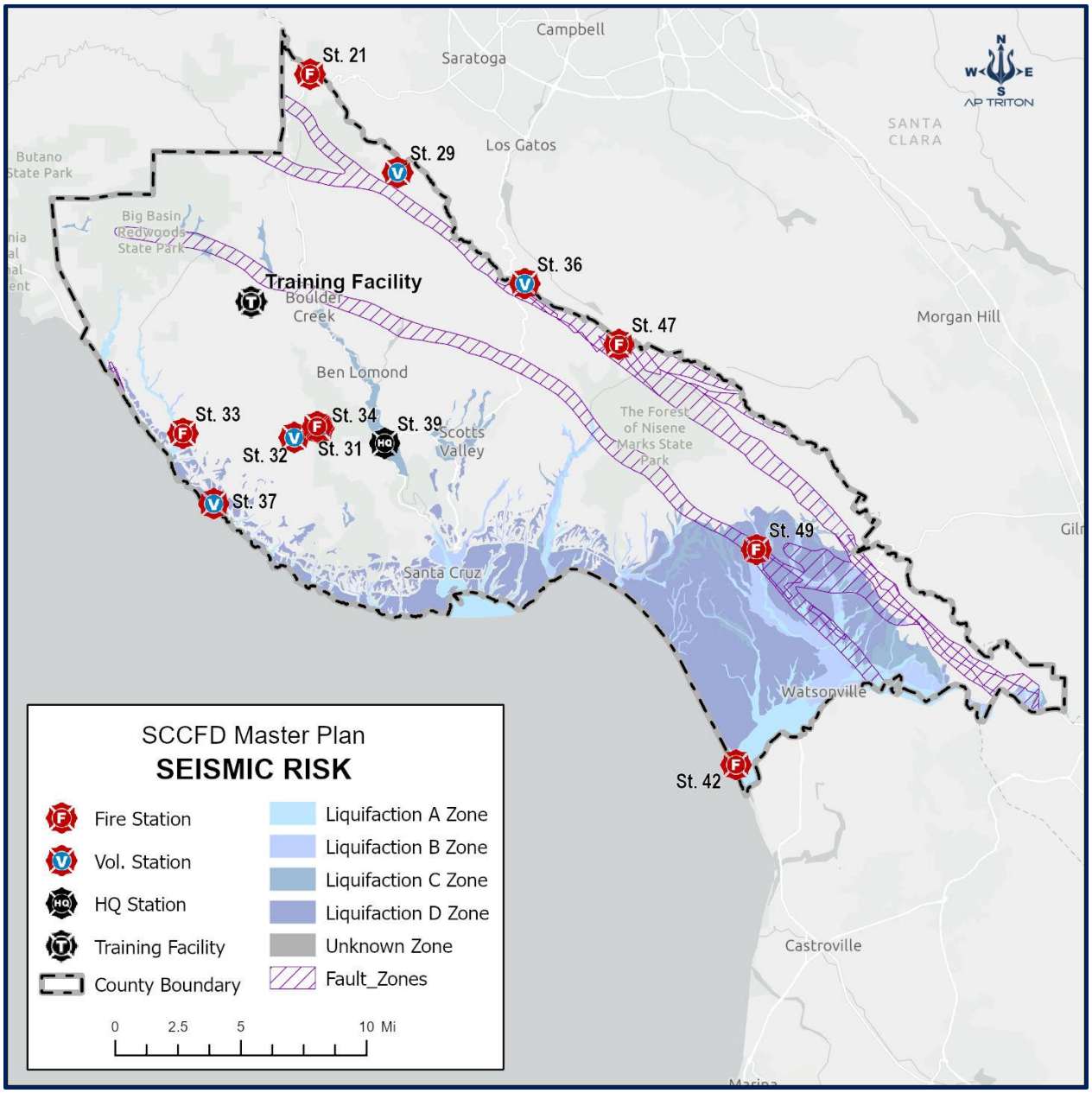
San Francisco Region

Magnitude	Average Repeat Time (years)	30-year likelihood of one or more events
5	1.3	100%
6	8.9	98%
6.7	29	72%
7	48	51%
7.5	124	20%
8	825	4%

Liquefaction of soils is a hazard in many of the valley bottoms in the southern areas of the county. Shaking from an earthquake causes the soil to lose its stability and can damage building foundations and cause a structure to collapse. The Hazard Mitigation Plan (HMP) states 7,099 structures, ten schools, and six fire stations are at risk in Santa Cruz County.

The next figure shows the earthquake fault and liquefaction zones in Santa Cruz County.

Figure 161: Seismic Risks



Wildland Fires

Most of Santa Cruz County is in fire hazard severity zones and in a state responsibility area for fire protection. The Community Wildfire Protection Plan for Santa Cruz County is combined with San Mateo County and was most recently completed in 2022. All new development projects and construction are required to meet fire safety standards that meet California law and Santa Cruz County Code Chapter 7.92.

The county code *establishes requirements for fuel modification and emergency water supply, as well as minimum fire-safe driveway and road standards*. New building code regulations require homes in high-risk areas to harden the structure with ignition-resistant building products. If improvements to a structure are more than 50% of the value, they are required to meet the new construction standards.

To reduce the threat of wildfire, Fire Safe Santa Cruz County was formed in 2016. Its primary *purpose is to educate and mobilize the people of Santa Cruz County to protect their lives, homes, community, and environment from wildfire.*[32] The Fire Safe Council provides the following information.

- Help the public learn how to live with the fire threat.
- Assist homeowners in hardening their homes.
- How to reduce fuels around their homes and businesses.
- Assist homeowners in forming a Firewise Community.
- Conduct educational presentations on wildfire resilience strategies.
- Provide homeowners with assistance, such as chipping programs.

Santa Cruz County has two associate fire safe councils, Bonny Doon and South-Skyline (includes a portion of San Mateo and Santa Clara Counties). These Fire Safe Councils provide education to specific areas of the county. The county has more than 30 Firewise USA® Communities that may target a smaller area or a specific street to reduce the wildfire risk.

The United States Department of Agriculture's Wildfire Risk to Communities website states most of Santa Cruz County (53%) are indirectly exposed to a wildfire from ember cast or home-to-home ignition. Thirty-three percent are directly exposed and 15% have no exposure. The populated areas in the county have, on average, a greater risk of a wildfire than 46% of the counties in California, while the risk to homes is 44%.[33]

Although Santa Cruz County does not fund wildfire protection projects, CAL FIRE has many projects throughout the region. These projects include hazardous fuel reductions, ignition prevention, and reforestation.[34] CAL FIRE has hand crews at the Ben Lomond Camp and two engine companies in the non-peak fire season to assist with fuel reduction and vegetation management projects. CAL FIRE has assigned one forester to Santa Cruz County. CAL FIRE performs defensible space inspections year-round, with staff hired specifically for this function. During the non-fire season, Santa Cruz County provides funding for staff to continue these inspections. CAL FIRE has created a plan to inspect all residential properties in the SRA on a rotating basis, every three years. During 2022, 938 inspections were completed, and 885 were compliant.

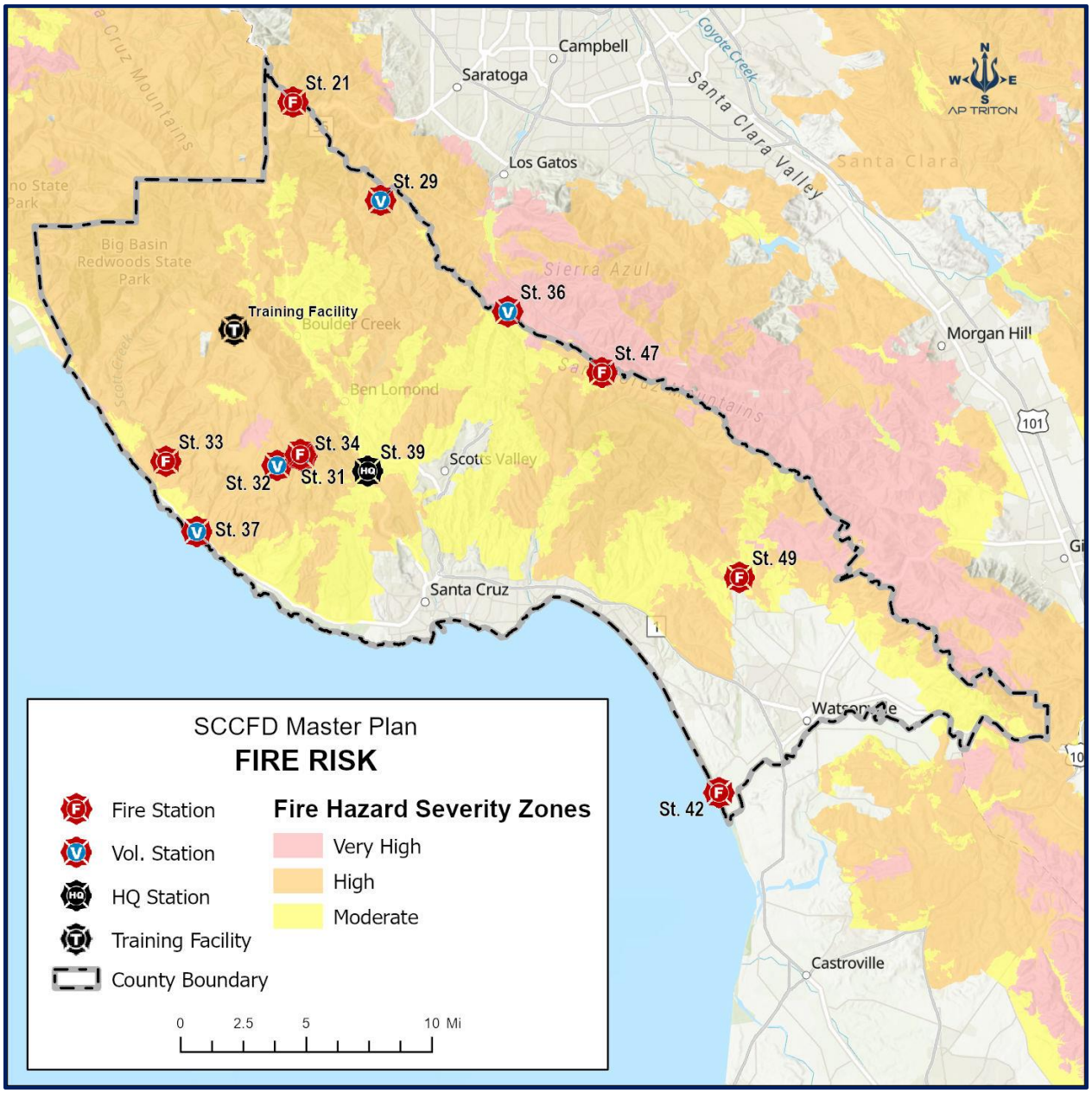
Santa Cruz County provides the Genasys Protect-EVAC (formerly Zonehaven) evacuation management platform for residents. The Know Your Zone educational campaign ensures residents know their respective evacuation zones and when they may be required to evacuate. The following figure shows the year and acreage of significant wildfires in Santa Cruz County history.

Figure 162: Significant Wildfire History

Year	Name	Acres
1948	Pine Mountain	19,000
1980	Big Basin #7	378
1984	Rocha VMP Escape	1,240
2008	Summit	4,174
2008	Martin	482
2008	Trabing	594
2009	Lockheed	7,783
2009	Loma	669
2017	Bear	317
2020	CZU Lightning Complex	86,509

The following figure shows the wildfire risk in Santa Cruz County.

Figure 163: Wildfire Risks



Analysis of State Responsibility Area (SRA), Local Responsibility Area (LRA) & Federal Responsibility Area (FRA)

Overview

To fully explain how fire protection is provided by the Santa Cruz County Fire Department, it is important to provide a brief explanation of the complex patchwork of public and private lands in Santa Cruz County. This becomes important when differentiating between the legal responsibility CAL FIRE has for protecting California's watershed and their contractual obligation to also provide service as the Santa Cruz County Fire Department.

Santa Cruz County is like any other in that the area within its geographical boundaries are a mixture of public and private lands owned and managed by a variety of agencies. For simplicity, and to maintain a focus on fire protection, Triton will discuss three categories of statutory responsibility as defined by the state of California's Public Resources Code. (Section 4125(a).

State Responsibility Area

State Responsibility Area (SRA) is defined as: "areas of the state in which the financial responsibility of preventing and suppressing fires has been determined by State Board of Forestry and Fire Protection to be primarily the responsibility of the state."

In accordance with P.R.C 4125(b), every fifth year, CAL FIRE is responsible for identifying the boundaries of lands classified as state responsibility. This classification was last completed on April 15th, 2021, and 357.2 square miles of the SCCFD service area has been designated as SRA, which amounts to 80.2% of their total service area.

By statute, the California Department of Forestry and Fire Protection (CAL FIRE) is responsible for the prevention and suppression of wildland fires in all areas that are classified as "State Responsibility Area (SRA)."

SRA is further defined as:

(a) Lands covered wholly or in part by forests or by trees producing or capable of producing forest products.

(b) Lands covered wholly or in part by timber, brush, undergrowth, or grass, whether of commercial value or not, which protect the soil from excessive erosion, retard runoff of water or accelerate water percolation, if such lands are sources of water which is available for irrigation or for domestic or industrial use.

(c) Lands in areas which are principally used or useful for range or forage purposes, which are contiguous to the lands described in subdivisions (a) and (b).

Improvements to the land such as residential structures, commercial buildings for production, or sale of agricultural products including croplands like vineyards are not considered the state's responsibility. They are the responsibility of the local agency.

Local Responsibility Area

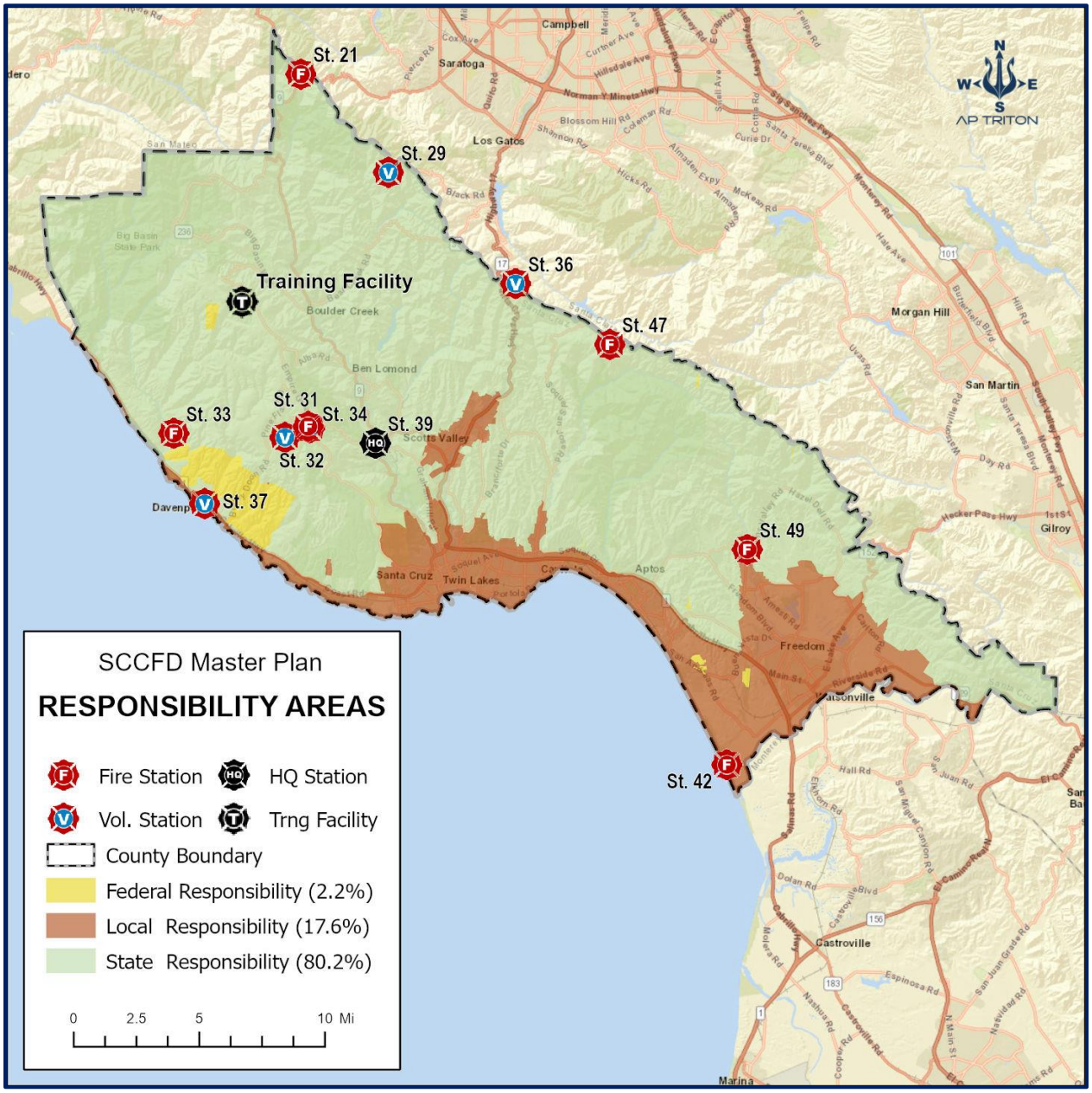
A Local Responsibility Area (LRA) is that portion of the county, either incorporated, or unincorporated, not classified by the State Board of Forestry as a state responsibility area, where the financial responsibility of preventing and suppressing fires belongs to the county, city, or fire district. Of the SCCFD service area, 78.4 sq. mi. has been designated as LRA, which amounts to 17.6% of its total service area. Encompassed in this area are the Cities of Santa Cruz, Capitola, Scotts Valley, and Watsonville, as well as the communities of Soquel, and Pajaro Dunes.

Federal Responsibility Area

A Federal Responsibility Area (FRA) is that portion of the county not classified by the state as a state responsibility area, where the financial responsibility of preventing and suppressing fires belongs to the Federal Government. Of the SCCFD service area, 10.0 sq. mi. has been designated as FRA, which amounts to 2.2% of their total service area. All FRA lands in Santa Cruz County are protected by CAL FIRE.

The following figure provides a breakdown by percentage of the area of the statutory financial responsibility for preventing and suppressing fires in Santa Cruz County.

Figure 164: Responsibility Areas



Overlapping Responsibility

To better understand the roles and responsibilities of CAL FIRE versus the Santa Cruz County Fire Department, it is helpful to think of them as two different departments, with two different missions, yet both serving much of the same geographic area.

CAL FIRE (CZU)

As was previously stated, the geographical boundaries of the Santa Cruz County Fire Department fall entirely within the CAL FIRE San Mateo-Santa Cruz Administrative Unit (CZU). Given this, the County of Santa Cruz benefits from the proximity to CAL FIRE facilities and resources essential for the management and day-to-day operations of CZU.

That said, one must keep in mind that CAL FIRE CZU serves two counties covering just under 1350 square miles. Thus, CAL FIRE resources located within Santa Cruz County are deployed in a manner to best meet the fire protection needs of the SRA in Santa Cruz County as well as the remainder of CZU.

Unless otherwise required under the terms of the Cooperative Fire Protection Agreement, CAL FIRE resources located within Santa Cruz County are not obligated to provide a response for emergency medical service, technical rescue, hazardous materials, or public service assistance. When available, CAL FIRE resources may respond to incidents other than wildfires, but their response is to assist the local government agency having jurisdiction. This includes assisting the Santa Cruz County Fire Department.

Santa Cruz County Fire Department

The role of the Santa Cruz County Fire Department serving the community as a local agency is different from that of CAL FIRE in that its mission is focused on a broader range of hazards and risks within Santa Cruz County. It is the Santa Cruz County Fire Department that has responsibility for providing commercial and residential fire protection, fire prevention, vehicle extrication, emergency medical service, hazardous materials response, technical rescue, and response to other hazardous conditions such as flooding, earthquakes, downed power lines, and requests for public service assistance.

This overlapping but complementary relationship is codified in the California Health & Safety Code. “Territory which has been classified as a state responsibility area may be included in a district, except for commercial forest lands which are timbered lands declared to be in a state responsibility area. Upon inclusion of a state responsibility area in a district, whether by formation or annexation, the state shall retain its responsibility for fire suppression and prevention on timbered, brush, and grass-covered lands.

“The district shall be responsible for fire suppression and prevention for structures in the area and may provide the same services in the state responsibility area as it provides in other areas of the district.”

Resource Demands

To serve the fire protection and emergency response needs of any community, the local agency must first determine the level of service that is required. Determining the level of service is based upon several factors, including the governing bodies' fiscal parameters, as well as an assessment of the risks and hazards. Santa Cruz County Fire Department's personnel and equipment must be properly distributed to address the identified risks and hazards efficiently and effectively.

Flooding

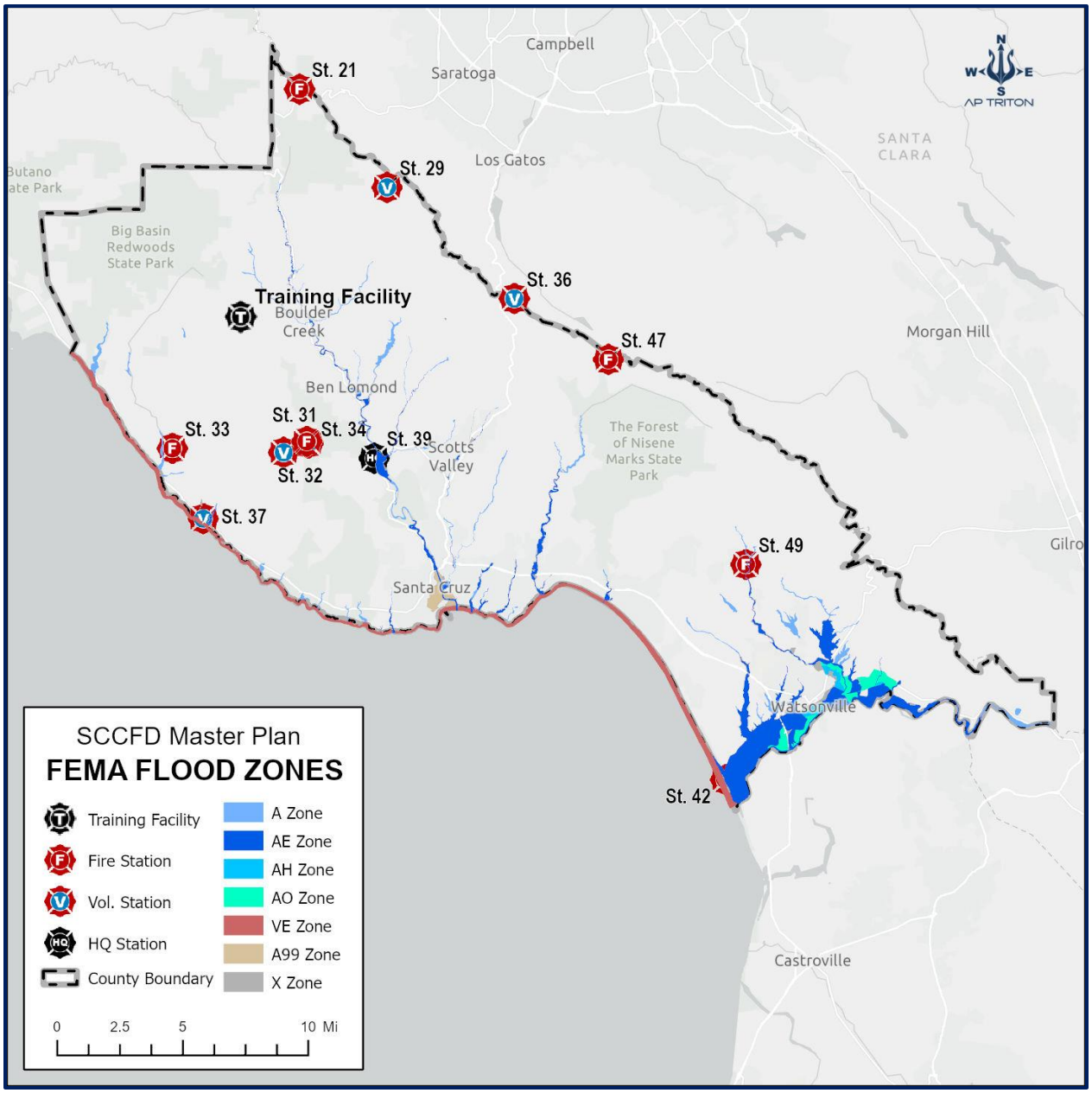
Climate change and its potential impact will affect flooding in the future based on how quickly the sea rises. Flooding can occur because of varying factors that can impact the response by emergency services. The terrain, impervious surfaces, rainfall amounts, a breached dam or levee, or insufficient infrastructure to contain runoff can increase the chance of a flood event. Streams that empty into the Pacific Ocean may carry higher amounts of vegetative materials growing during dry years. This increases sedimentation when excessive rainfall occurs, such as the heavy rain events during January 2023. Heavy rainfall after an extensive wildfire event can cause debris flows or a landslide when the fire destroys all the vegetative shrubs or plants. An example occurred after the Thomas Fire in Montecito, CA in January 2018, killing 23 people.

Portions of Santa Cruz County fall within the FEMA-classified flood zones. According to FEMA's website, "AE," regulatory floodways areas are along the creeks and streams that terminate at the Pacific Ocean. This includes the San Lorenzo River, Carbonera Creek, Soquel Creek, and numerous other creeks and their tributaries. Zone "VE" is located along the beaches.

- "AE" designation is considered "Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods." and is further defined as a 26% chance of a flood occurring in 30 years. Base flood elevations (BFE) are created from a detailed hydraulic analysis.
- "A" designation is a flood zone within the 100-year floodplain, but a detailed hydraulic analysis has not been performed.
- "VE" designation is in the 100-year floodplain and includes storm waves and are measured from BFEs.

The following figure shows the location of FEMA flood zones.

Figure 165: FEMA Flood Zones

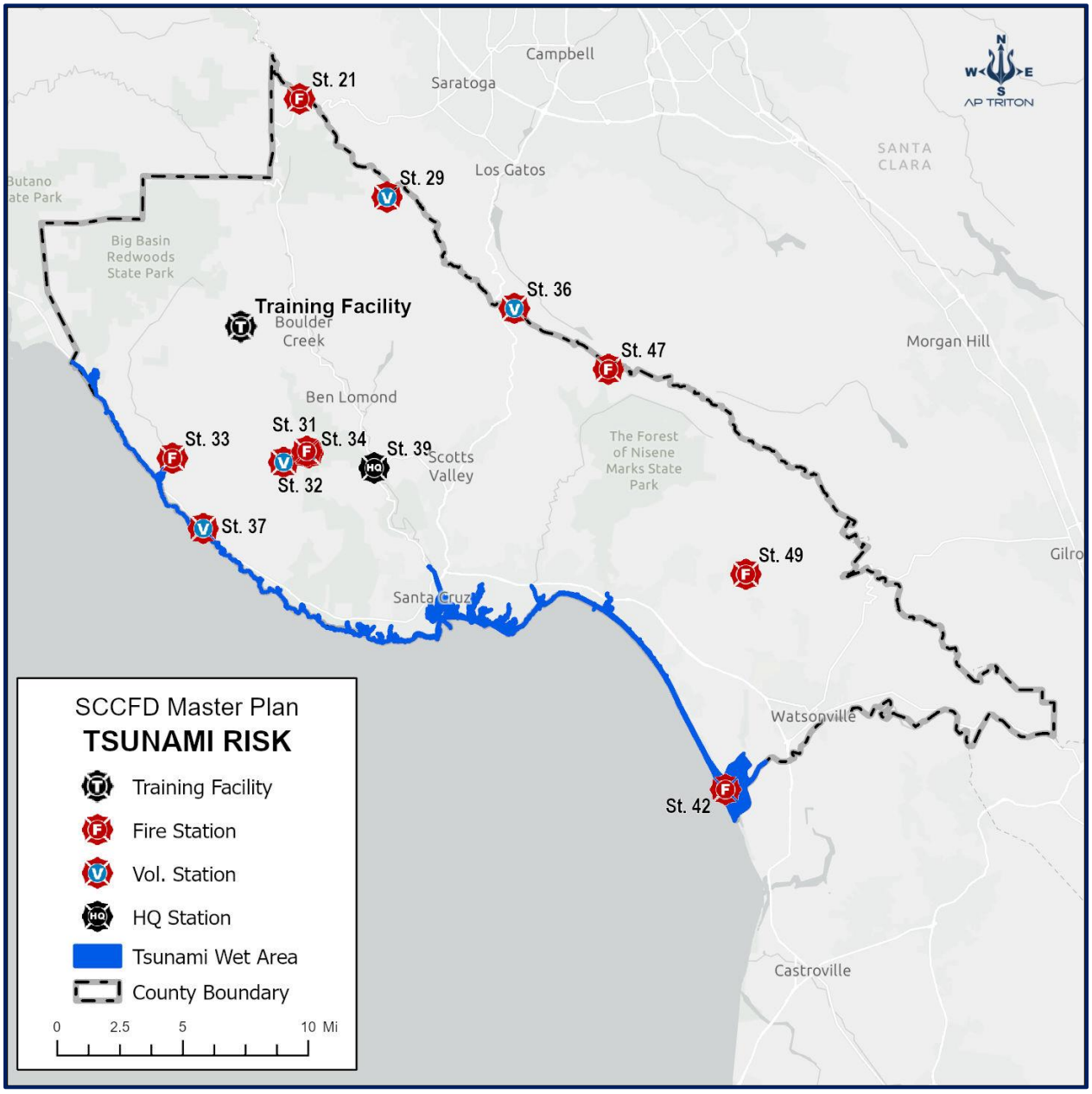


Tsunami

Two types of tsunamis that may impact SCCFD are a teletsunami, which occurs from an earthquake in the Pacific Ocean, or a local source tsunami generated by an earthquake along any of the numerous faults in the region. These events may occur in the Pacific Ocean or the Pacific basin and create tsunami waves that reach the coast of Santa Cruz County.

The highest risk of a tsunami is from the numerous faults in this region, which would impact the area quickly after an earthquake occurs. The warning time is considerably less than a teletsunami. The most recent event with significant damage occurred in 2011 after a 9.0 magnitude earthquake struck Japan. The waves associated with the tsunami caused approximately $20 million in damage in Santa Cruz Harbor. The following figure shows the tsunami inundation areas.

Figure 166: Tsunami Risk



Critical Infrastructure

Critical infrastructure and key resources (CIKR) explain what is crucial for a community to function in a modern economy. Critical infrastructure is defined as a sector "whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof." There are sixteen defined Critical Infrastructure Sectors (CIS):[35]

- Chemical Sector
- Commercial Facilities Sector
- Communications Sector
- Critical Manufacturing Sector
- Dams Sector
- Defense Industrial Base Sector
- Emergency Services Sector
- Financial Services Sector
- Food and Agriculture Sector
- Government Facilities Sector
- Healthcare and Public Health Sector
- Information Technology Sector
- Nuclear Reactors, Materials, & Waste Sector
- Transportation Systems Sector
- Water and Wastewater Systems Sector
- Energy Sector

All these sectors may not be in Santa Cruz County; each community must determine critical infrastructure locations and develop pre-incident plans for responding personnel.

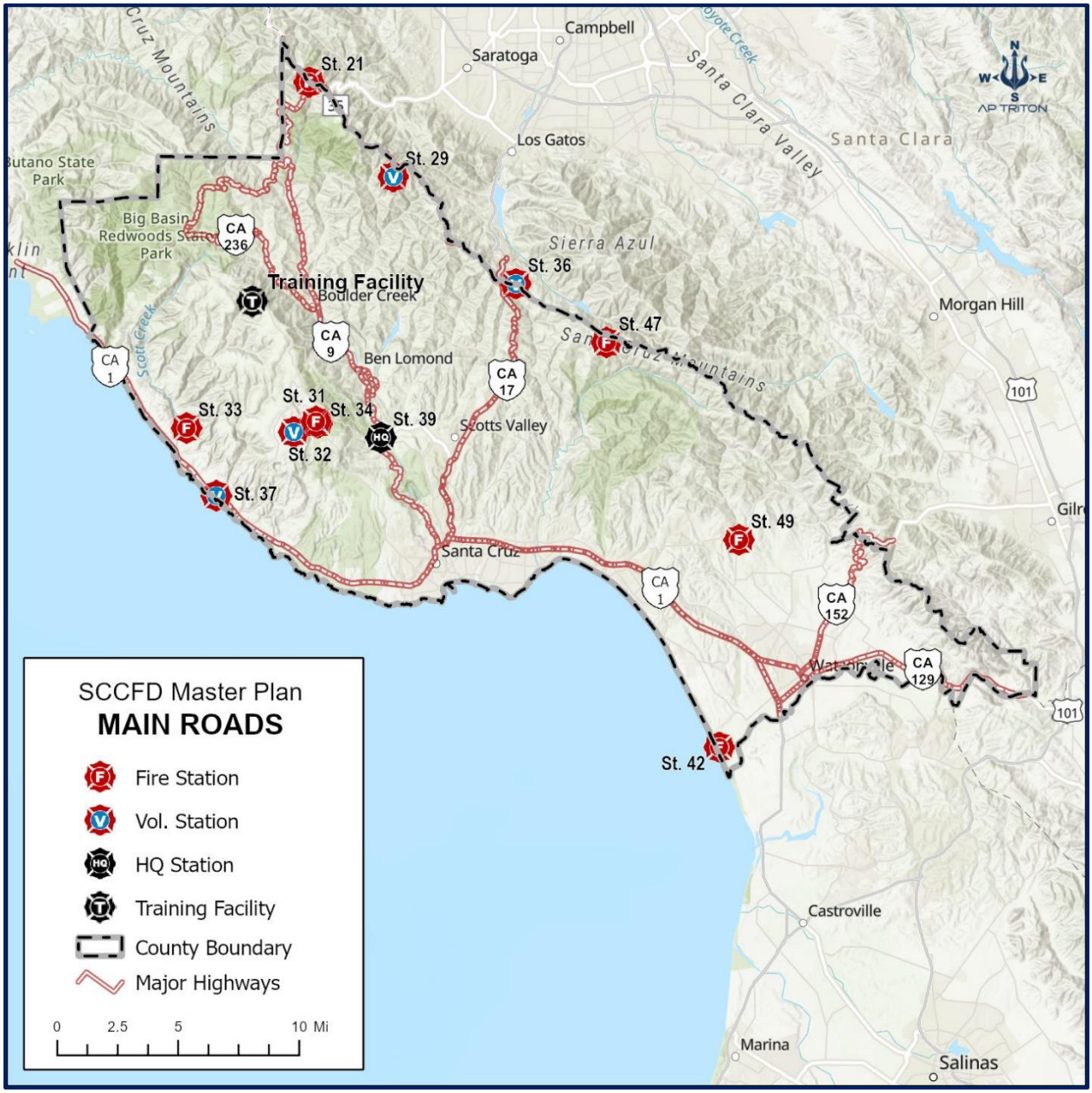
Other buildings to consider as target hazards could include occupancies with a potential for a significant loss of life, such as places of public assembly, schools, childcare centers, medical and residential care facilities, and multi-family dwellings. Other considerations include buildings with substantial value to the community—economic loss, replacement cost, or historical significance—that, if damaged or destroyed, would have a significant negative impact.

Highways & Roads

Emergency personnel need a transportation network to respond efficiently to an incident. A delayed response can occur without a system of interconnected roads and streets. Interconnectivity provides multiple access points to a location if another approach is unavailable. There are some streets in the county on a grid system, but most are winding roads, with many in mountainous areas with a cul-de-sac.

The primary thoroughfare in the county is California Highway 1, which provides controlled access from the southern border to Santa Cruz City. It then follows the coast to the San Mateo County line. California Highways 9 and 17 provide north-south access to Santa Clara County to the north. The following figure shows the main roads in Santa Cruz County.

Figure 167: Main Roads

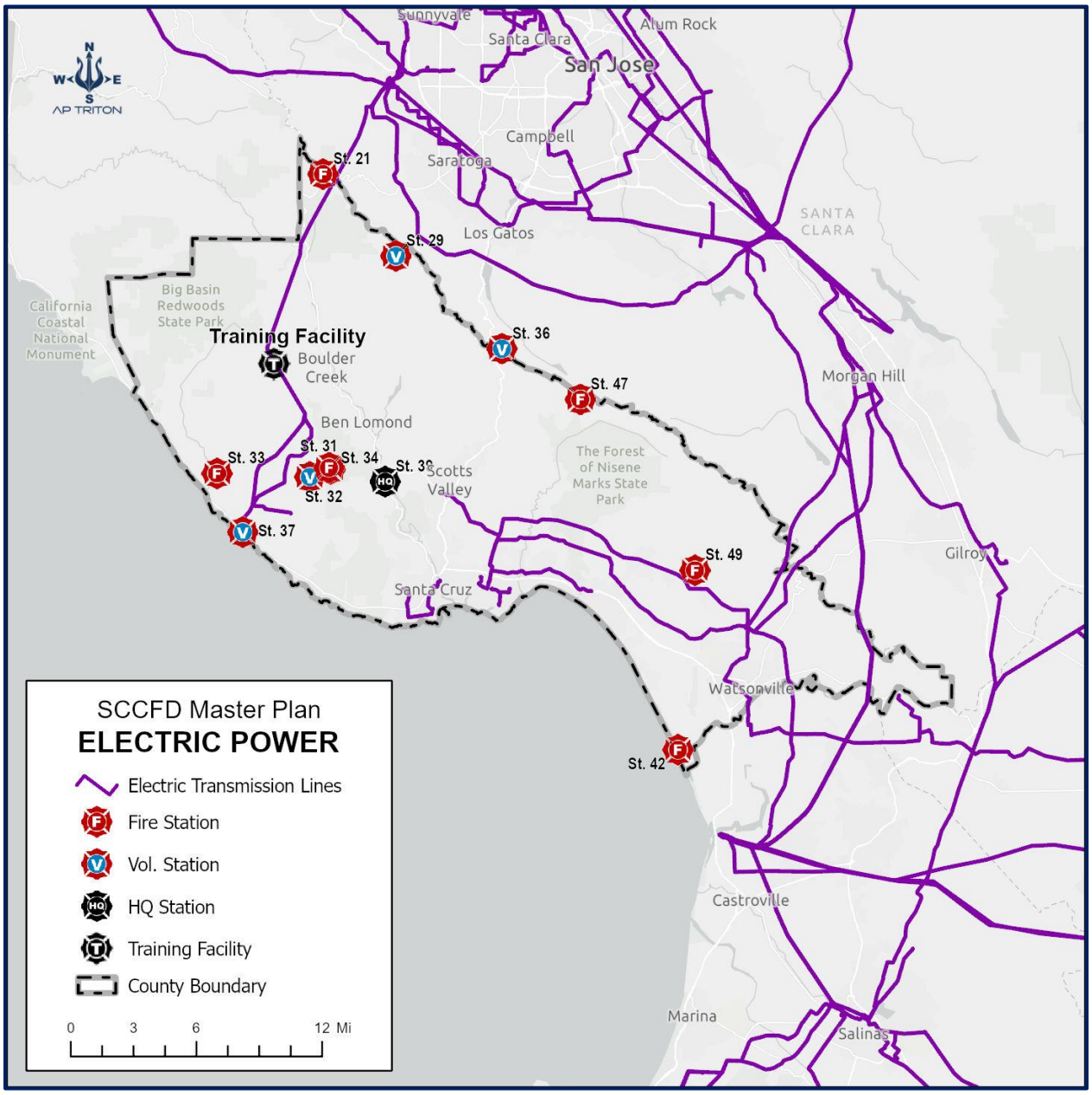


Electricity

Pacific Gas and Electric (PG&E) provides electrical service for Santa Cruz County. Sixty-six kilovolt electrical transmission lines travel through the city for distribution and to other parts of the region. An electrical substation steps down the voltage in the distribution system for residential and commercial users. Emergency responders must exercise extreme caution if an incident occurs at one of these locations. Entry by SCCFD personnel to a sub-station should not happen until representatives of PG&E arrive on the scene and give clearance.

PG&E may implement Public Safety Power Shutoffs during red flag warnings. These warnings occur when there are high winds (> 25 mph or gusts above 45 mph), low humidity, or when PG&E observes an issue that may cause a fire from powerlines causing a spark, even in locations that are not considered at risk. These shutoffs are usually temporary. PG&E alerts customers before the power is shut off, but the customer must sign up for text, phone messages, or email notifications.[36]

Figure 168: Electrical Transmission Lines

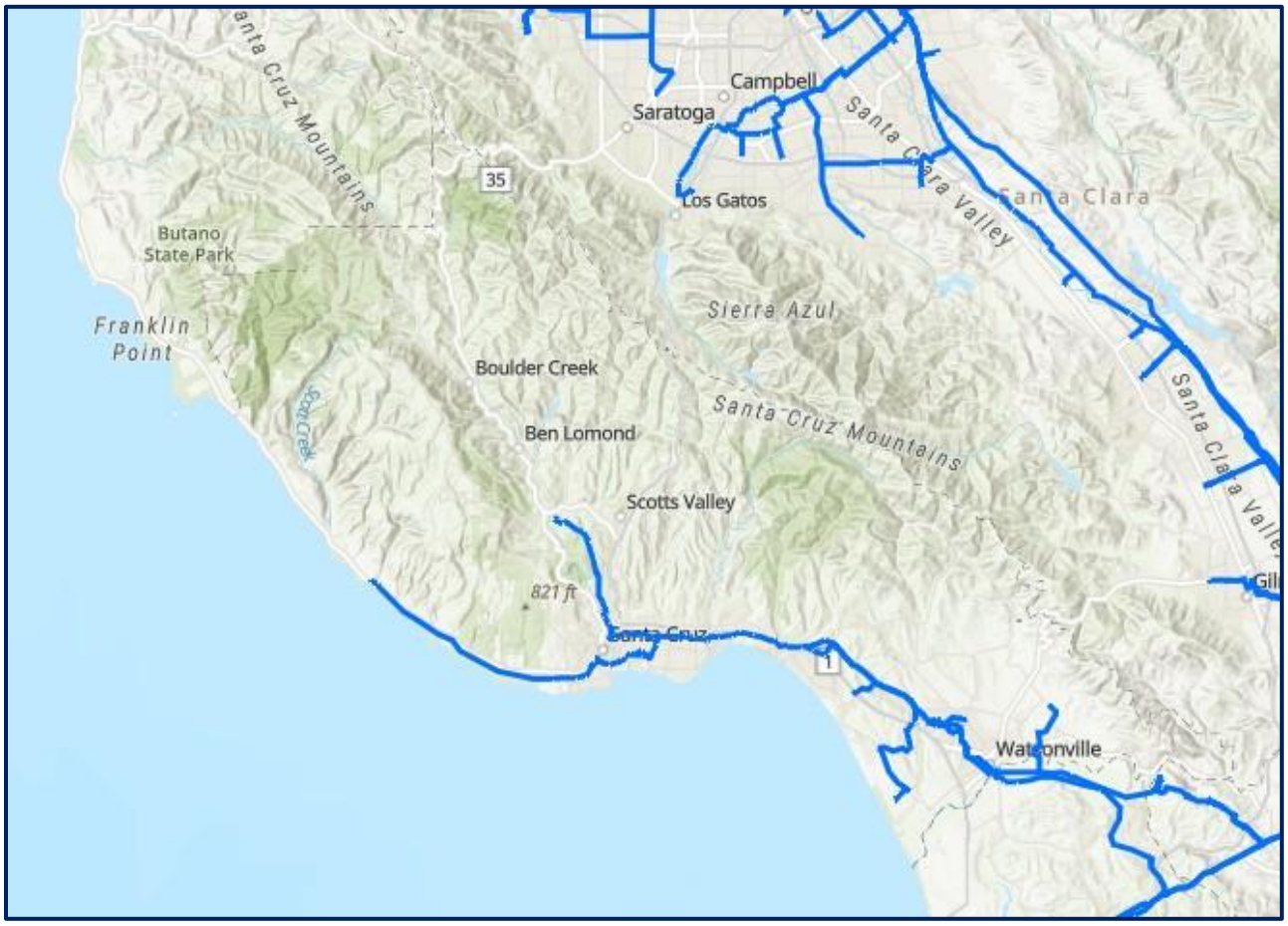


Natural Gas

PG&E provides natural gas in Santa Cruz County through transmission and high-pressure distribution lines that supply service lines for commercial and residential use. PG&E's natural gas transmission pipeline travels north-south along Graham Hill Road to Roaring Camp Road and closely follows the Cabrillo Highway west of Santa Cruz to Davenport. Incidents involving natural gas are often caused by contractors who cut or damage lines when excavating during construction.

The following figure from PG&E shows the natural gas transmission and high-pressure pipeline location.[37]

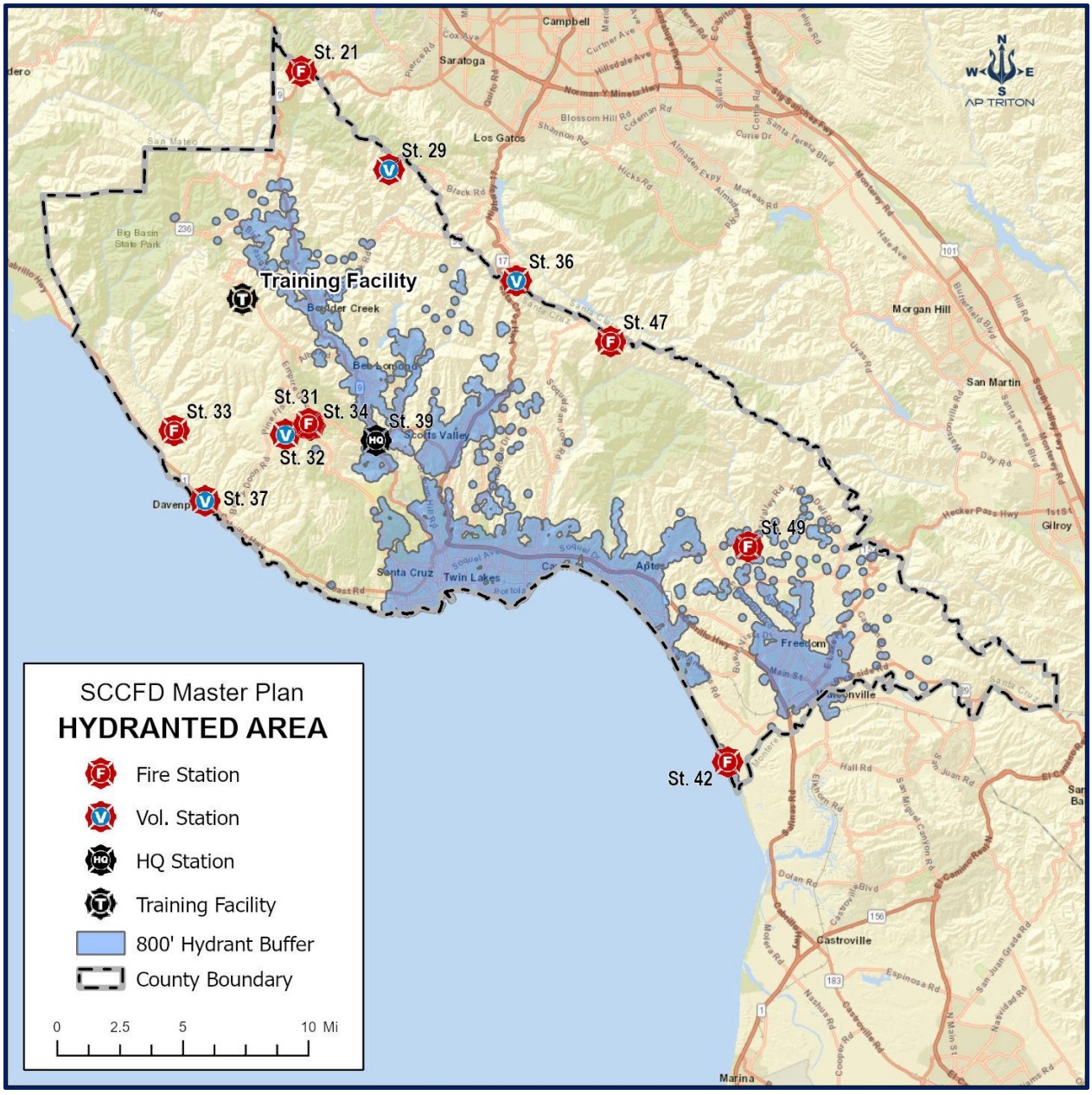
Figure 169: PG&E Natural Gas Transmission Lines



Water

Controlling a fire becomes challenging without an adequate water supply and distribution system consisting of water storage, mains, and a fire hydrant system. A system of well-distributed hydrants and appropriately sized water mains are necessary to provide the required water for fireground use. The following figure provides the area where fire hydrants are available.

Figure 170: Hydranted Areas



Communication

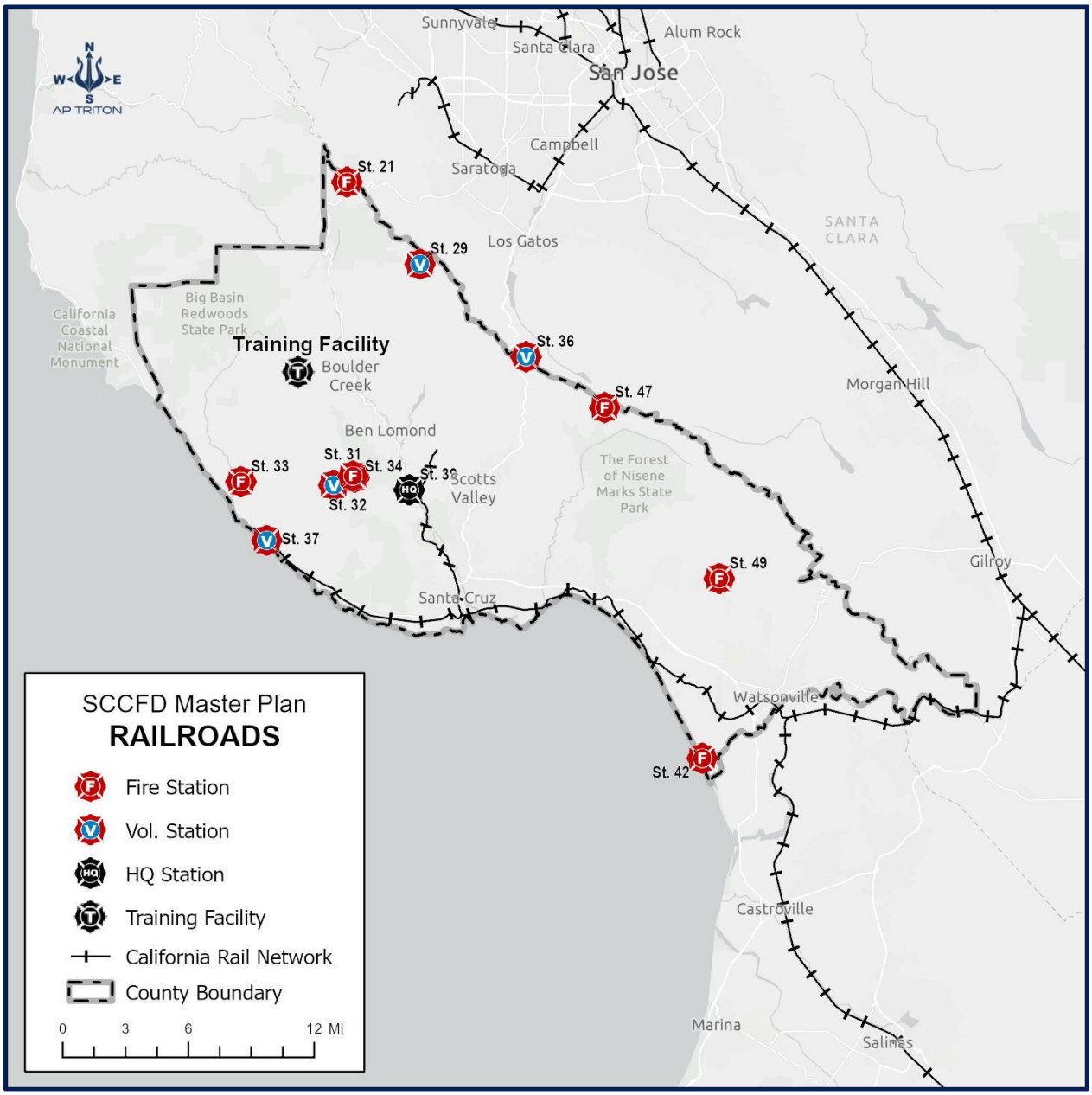
When an incident occurs, essential facilities to receive and transmit alarm information require a communication center to communicate with emergency responders properly. Other communications are critical to the community, such as cellular phones, Voice over Internet Protocol (VoIP) telephone systems, or transmission lines from the local telephone company. These systems allow the public to notify emergency services of an incident. Internet services are essential for the public, commercial establishments and emergency services to conduct daily business. Whether the Internet services are through cellular access or an Internet service provider, the failure of these communication systems can significantly impact emergency services and the public.

CAL FIRE CZU, located in Felton, provides dispatch services for SCCFD and utilizes a VHF radio system. The center provides dispatching services for CAL FIRE, Santa Cruz County FD, Pajaro Valley, and Pajaro Dunes.

Rail Network

Union Pacific previously operated the rail line that passes through Santa Cruz County, but it was purchased by the Regional Transportation Commission in 2012. The following figure shows the location of the rail line in Santa Cruz County.

Figure 171: Rail Network



Comparison of Fire Risk in Other Communities

Fire Loss

In 2021, fire departments responded to more than 1.35 million incidents in the United States that caused 3,655 civilian fire fatalities and over 15,200 civilian fire injuries. The property damage was estimated at more than $15.9 billion. The NFPA reported that 64% of the fire deaths occurred in one or two-family dwellings. The report stated that $648 billion worth of property losses were from wildland urban interface incidents.[38]

Fire loss can vary yearly based on the number of fires occurring or the amount of property exposed during an incident. Population estimates for SCCFD's district were limited to 2020 only, and further analysis is unavailable. Based on information from the 2023 Growth Goal adopted by the county, the population is presumed to be similar to 2020 or slightly increasing. Reviewing incident data between 2018–2022, the fire loss ranged from a high of approximately $158 in 2019 to a low of $31.00 in 2018. In 2020, the year of the population estimate, the fire loss was $104.52. Based on the most current NFPA statistics, the below figure compares the number of fires per 1,000 population and the property loss per capita for 2020.

Figure 172: Property Loss per Capita 2020

Year	SFD Property Loss per Capita	U.S. Property Loss per Capita[39]
2018	$31.00[1]	$79.28
2019	$158.00[1]	$45.58
2020	$104.52	$66.07
2021	$61.00[1]	$66.07
2022	$59.00[1]	N/A[2]

[1]Estimate.

[2]Data for the U.S. property loss has not been released for 2022.

The number of fires per 1,000 population in the SCCFD response area is lower than the national average, as shown in the following figure.

Figure 173: Fires per 1,000 Population

Year	SFD Fires per 1,000 Population	U.S. Fires per 1,000 Population[40]
2018	2.2[1]	4.1
2019	2.3[1]	4.0
2020	3.1	4.3
2021	3.0[1]	4.1
2022	4.5[1]	N/A[2]

[1]Estimate.

[2]Data for the U.S. property loss has not been released for 2022.

Intentionally Set Fires

Intentionally set fires, in many cases considered arson, is defined as "any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle aircraft, or personal property of another.[41] The following figure compares the number of intentionally set fires during the study period.

Figure 174: Intentionally Set Fires 2018–2021

Year	Intentionally Set Fires
2018	11
2019	15
2020	10
2021	6
2022*	12

*Data through June 2022.

Insurance Service Office

The Insurance Services Office, Inc. (ISO©) is an independent organization that collects and analyzes data from fire departments in communities throughout the United States to determine rates for fire insurance. According to their report, the ISO's Public Protection Classification Program, or PPC, "is a proven and reliable predictor of future fire losses." Commercial property insurance rates are expected to be lower in areas with better (lower) ISO PPC Class ratings.

In California, the Office of State Fire Marshal, Rating, and Inspections Division provides this service for jurisdictions with less than 100,000 in population.

The ISO Fire Suppression Rating Schedule (FSRS) measures four primary elements of a community's fire protection system: *Emergency Communications* (max 10 points); *Fire Department* (max 50 points); *Water Supply* (max 40 points), and *Community Risk Reduction* (max 5.5 points) for a maximum possible total of 105.5 points. ISO then assigns a grade using a scale of 1 to 10. Class 1 represents the highest degree of fire protection, and Class 10 designates a fire suppression program that does not meet ISO minimum criteria.

A review of the most recent evaluation by ISO, effective November 1, 2018, assigned 60.62 credits and provided the Santa Cruz County Fire Department with a classification of 4/4Y. The first rating number applies to any property within five miles of a fire station and a fire hydrant within 1,000 feet or an alternate water source. The second number is for any property within a five-mile distance from a fire station, but the property is more than 1,000 feet from a fire hydrant.

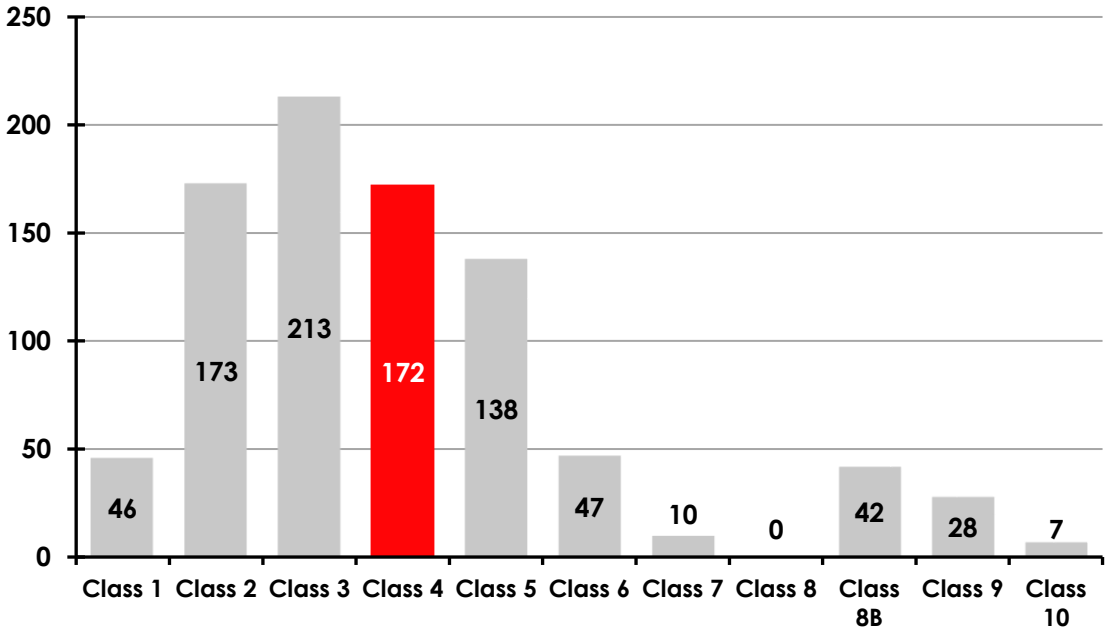
Opportunities for improvement include the following. Telecommunicators received 3.16 credits out of four available. Credit for Company Personnel earned 4.13 out of 15 available and Water Supply System received 18.15 out of 30. Credits earned for Inspection and Flow Testing of fire hydrants was 2.64 out of 7 available. The below figure shows the ISO credits earned and available for the SCCFD.

Figure 175: ISO Earned & Available Credits for SCCFD

ISO Feature	Earned Credit	Available Credit
Emergency Communications	8.86	10
Fire Department	25.47	50
Water Supply	23.74	40
Divergence	-1.68	0
Community Risk Reduction	4.23	5.5
Totals:	**60.62**	**105.5**

The following figure shows all the fire departments in California and the number of ratings for each classification. There were 171 departments with a Class 4 rating in the state.

Figure 176: California ISO Classifications



Section III:
FINDINGS & RECOMMENDATIONS

Findings & Observations

General Findings & Observations

- Property values continue to escalate in the county.
- Current valuations, limited housing stock, and the cost of living in the county limit the ability of the fire department employees to reside within the county, requiring a commute to work.
- The service contract with CAL FIRE was renewed in July 2023 and will expire in June of 2024.

Management Components

- The Santa Cruz County Fire Department (SCCFD) does not have a strategic plan.
- Management goals and objectives have not been documented and are not clearly expressed.
- With its close relationship to CAL FIRE, SCCFD does not appear to have an independent identity.
- The role of the Fire Department Advisory Commission needs to be reviewed, updated, and clarified.
- The reporting relationship between the Santa Cruz County Fire Department to the Santa Cruz County Board of Supervisors is through the County's General Services Department.

Staffing & Personnel

- During peak fire season, the total number of on-duty personnel dedicated to Santa Cruz County as part of the Santa Cruz County Fire Department is less than during non-peak fire season.
- SCCFD Firefighter career staffing per 1,000 population is 0.5 during peak fire season and 0.9 during non-peak fire season compared to the national average of 1.72.
- SCCFD Firefighter volunteer staffing per 1,000 population is 3.6 compared to the national average of 5.66.
- One-third of Santa Cruz County Fire Department Volunteers are not responding to emergency calls.
- The Santa Cruz County Fire Department turnover rate for volunteer firefighters averages between 7% and 35% each year.

Service Delivery & Performance

- There were significant challenges with the data for statistical and performance analysis.
- The complex relationship between CAL FIRE and SCCFD makes determining the service provided under county funds challenging.
- The time-stamped data presented for evaluation did not include seconds. It was unclear whether this was because they were not collected, dropped, or rounded up or down. This introduced an error of plus or minus one minute on all the time evaluations.
- Volunteer activity is not well documented.
- There were 9,311 incidents for SCCFD from January 1, 2018, through December 31, 2022.
- The SCCFD response area relies heavily on mutual and automatic aid from all the surrounding agencies and state-funded units from CAL FIRE.
- Incident densities are highest along the coast, near Watsonville, and the county line along Highway 17.
- Service demand and system analysis for 2020 and 2021 may be driven by the COVID pandemic and associated societal measures taken to prevent its spread. The research indicated a significant change in the utilization of emergency services. Many people were reluctant to call for medical aid, leave their homes, or travel during the pandemic. Incident volumes for these years may not be what agencies might expect in less restrictive times. For this reason, further evaluation is warranted as non-pandemic data becomes available.
- The incident volume indicated a significant dip during 2020, with a rebound in 2021 to levels more like pre-COVID years. However, the number of responses may change significantly as the community recovers.
- 70% of all incidents occur between 8:00 AM and 8:00 PM.
- The travel distance between each station is excessive, leaving large portions of the service area without adequate coverage.
- None of the individual fire units are overutilized. The one full-time engine, Engine 4211, has the most responses. However, the five Amador-funded engines have similar incident volumes when considering their state-funded activities on the county's behalf.

- The data provided did not allow for a call-processing review.
- The turnout performance for the volunteer apparatus was 14 minutes, and the career company performance exceeded NFPA 1710 standards, exceeding 6 minutes at the 90th percentile.
- Enroute time is captured at the ECC after all units have declared they were responding which may artificially inflate the turnout time.
- The County of Santa Cruz or the SCCFD has not adopted any service delivery performance goals or standards.
- First-due travel time is 20 minutes at the 90th percentile throughout the system.

Financial Overview

- Revenue from the special assessments within CSA 4 is insufficient to fund the costs of CAL FIRE within the area.
- Fire protection services to the county are provided through a service contract between the County and CAL FIRE.
- Revenues generated from assessment of special assessments in one District, such as CSA 4 or CSA 48, may not be expended outside of the respective District (no co-mingling of funds).
- Revenues collected from the assessment of the special fire tax within CSA 48 are used to pay for services provided by CAL FIRE.
- CAL FIRE provides apparatus staffed with three personnel. Under the terms of the existing agreement Pajaro Dunes is staffed with two personnel; this staffing pattern is typically insufficient to safely provide delivery of suppression services.

Life Safety Services & Public Education

- Public education and community outreach are lacking and only provided upon request.
- Firesafe Santa Cruz County is making a significant and positive impact on the wildfire problem in Santa Cruz County, enhancing wildfire prevention and safety measures.

Introduction to the Recommendations

Based on a comprehensive analysis and taking into consideration the unique expectations and needs of the community, AP Triton has crafted a set of tailored recommendations to assist the Santa Cruz County Fire Department in long-range planning, as well as in enhancing the delivery of fire and emergency services to the community. We recognize that implementing all these recommendations may not be feasible in the short term due to various constraints, such as economic conditions. However, each recommendation has been carefully designed to chart a progressive course towards improving the department's overall capability and service. We believe that these recommendations reflect innovative and forward-thinking strategies that can lead to long-term success and responsiveness to the community's evolving needs. By prioritizing these areas, SCCFD will be strategically positioned to build a safer and more resilient community.

Short-Term Recommended Strategies

The following strategies offer a concise collection of the short-term recommendations aimed at enhancing the existing conditions and levels of protection for the upcoming one to two years.

Recommendation A-1: Emphasize Quality Assurance for Time Data Inputs

Description: Quality documentation is essential for the fire department, especially for stakeholders like attorneys, insurance companies, and property owners. A thorough process must be established to ensure accuracy and quality control in reporting.

The first step is to establish a written policy and publish it. For quality reports, the best practice is for the officers in charge to review and verify that the information is complete and correct. If not, correct it or return it to the author for revision. Once the report is done, it must be evaluated for quality control, typically by another officer or chief officer.

Outcomes: Regular, accurate, and defensible performance analysis.

Estimated Cost: Staff time for review and correction.

Recommendation A-2: Contract with CAL FIRE for one (1) Schedule A Deputy Chief

Description: The Santa Cruz County Fire Department does not have a dedicated administrative Deputy Chief. Administrative Chief Officers play a critical leadership role, ensure effective management of the organization, and ensure supervision of emergency response personnel is carried out. At present, the Santa Cruz County Fire Department relies on a CAL FIRE Unit Chief and Deputy Chief assigned to CZU to provide all administrative duties. The CZU Unit Chief and Deputy Chief are already responsible for day-to-day operations and supervision of CAL FIRE personnel protecting 607 sq. mi of Santa Cruz and San Mateo County designated as State Responsibility Area. Given their existing workload and requirement to pull double duty, the current management team lacks the bandwidth to effectively implement, or manage additional personnel, projects, programs, or service delivery enhancements.

Outcomes: A Schedule A Deputy Chief would provide the Santa Cruz County Fire Department with leadership dedicated solely to Santa Cruz County and executive level leadership for the organization unincumbered by the additional responsibility of managing day to day operation of the CAL FIRE San Mateo-Santa Cruz County Administrative Unit.

Estimated cost: The estimated cost for one (1) Deputy Chief is approximately $309,274 annually.

Recommendation A-3: Contract with CAL FIRE for one (1) Schedule A Division Chief

Description: The Santa Cruz County Fire Department does not have a dedicated administrative Division Chief. Should the County of Santa Cruz choose to implement Recommendation A-7: Improve Service Delivery by Staffing Three Stations 24/7/365, there will be a significant increase in total number of personnel for the Santa Cruz County Fire Department. An additional Administrative Chief Officer will play a critical leadership role, and help ensure effective management of the organization, and supervision of emergency response personnel. At present, the Santa Cruz County Fire Department relies on a CAL FIRE Unit Chief and Deputy Chief assigned to CZU to provide all administrative duties. The CZU Unit Chief and Deputy Chief are already responsible day-to-day operations and supervision of CAL FIRE personnel protecting 607 sq. mi of Santa Cruz and San Mateo County designated as State Responsibility Area. Given their existing workload and requirement to pull double duty, the current management team lacks the bandwidth to effectively implement, or manage additional personnel, projects, programs, or service delivery enhancements.

Outcomes: A Schedule A Division Chief would provide the expanded Santa Cruz County Fire Department with leadership dedicated solely to Santa Cruz County and executive level management for a larger organization unincumbered by the additional responsibility of managing day to day operation of the CAL FIRE San Mateo-Santa Cruz County Administrative Unit.

Estimated cost: The estimated cost for one (1) Division Chief is approximately $304,346 annually.

Recommendation A-4: Review Incident Data Annually

Description: Understand the pandemic's full effect on service delivery, which requires annual evaluation until fully comprehended.

Due to potentially distorted data during the COVID-19 pandemic years, trends and predicted demand may be flawed. It is essential to understand the full effect of the pandemic on service delivery, and that will only be possible with continued analysis. Evaluating demand, service types, and other information annually until the pandemic-specific effects are fully accounted for and understood is critical. That effect must be fully understood before the analytics created using the pandemic-era data have the potential to be misleading.

Outcomes: Creating an understanding of the pandemic era effect on, and creating appropriate adjustments to, service delivery and performance analytics.

Estimated Cost: Costs will vary depending on the approach adopted. At a minimum, staff time will be required. Additional expenses may include training, increased staff levels, compensation, equipment, or fees paid to outside vendors.

Recommendation A-5: Complete a 3–5-Year Strategic Plan

Description: SCCFD needs to establish a Strategic Plan to address challenges and maintain continuous improvement.

The SCCFD does not appear to have a 3–5-year strategic plan. This guiding document will help identify immediate and longer-term strategies to address any challenges faced by the department. This document can also help maintain the consistency of improvement during staffing changes. Properly conducted, this can address potential organizational self-image issues and keep the mission, vision, and values current.

Outcomes: An adopted, published, and managed strategic plan.

Estimated Cost: Costs will vary depending on the approach adopted. At a minimum, staff time will be required. Additional expenses may include training, increased staff levels, compensation, equipment, or fees paid to outside vendors.

Recommendation A-6: Improve Volunteer Company Activity Data Collection

Description: Accurate documentation of volunteer participation and performance is vital for safety and efficiency.

Within volunteer fire departments, it is crucial to understand the participation and performance of the different companies. Documenting volunteer participation is critical for their safety and well-being, especially during exposure events. This is also crucial when understanding participation and effective response force deployment. Therefore, adopting and enforcing documentation and policies is essential. Additionally, the records management system used to collect the information must fit into the fire department operations.

Outcomes: Accurate documentation of volunteer participation and performance.

Estimated Cost: Staff time to review individual documentation for errors and omissions. Additional funds may be required if the current records management system does not adequately support operations. Newer, more volunteer-oriented systems are available, and the costs of these systems vary.

Recommendation A-7: Improve Service Delivery by Staffing Three Stations 24/7/365

Description: Santa Cruz County currently relies on Amador staffing, one Schedule A staffed station at Pajaro Dunes, volunteers, and a small level of contractual response. While this model is fiscally appealing, the service level is not very robust, timely, or consistent. Staffing three stations in the urban corridor would improve this service level. This does not include the Pajaro Dunes station, which could either be moved or staffed as a fourth station. There are a multitude of staffing models, including volunteer shifts, CAL FIRE Schedule A service, County-provided fire professionals, or a combination. For this recommendation, a continuation of the CAL FIRE service model and volunteer shift models are explored below.

Outcomes: Improved service delivery with full-time staffed stations strategically located in the heaviest call volume areas.

Estimated Cost: Cost estimates depend on deployment dates and the chosen service model. While every attempt is made here to capture current rules and regulations, a full legal review is required before action is taken. A complete review is outside the scope of this report.

Example Option 1: Fully staffed utilizing CAL FIRE Schedule A services. The fully burdened rate of staffing three fire stations, each with a captain, engineer, and firefighter, would be an additional $5,845,401. If the Pajaro Dunes station is moved into a more central location and staffing is added to the three-station model, the additional funding requirement would be approximately $4,951,023. This model requires continued association with CAL FIRE as the administrative and leadership support for the fire department and continued Amador funding.

Example Option 2: Fully staffed utilizing 100% volunteer services. Volunteers cannot receive more than 20% of what a similar paid position would receive and cannot receive more than minimum wage by hours worked.[42] This program may cost as little as $1,173,359 in 2023 dollars for volunteer stipends and reimbursements. It should be noted that a reasonable number of shifts per volunteer needs to be set. For example, a reasonable number of hours to be expected in either 8-, 12-, or 24-hour shiftwork may be 48 hours per volunteer per month. This requires approximately 15–16 volunteers per position per month, or 137 active and fully trained volunteers on the books at any given time. This will require a recruitment drive and the addition of approximately 75 volunteers to the roles.

Example Option 3: Staff each of the three stations with a Schedule A Captain and Engineer and fill out the rest of the staffing with shift volunteers as the firefighters. At a minimum, this will require 46 active volunteers assuming a maximum of 48 hours a month per volunteer in shifts. This would not require any additional volunteer staffing, providing all the current volunteers actively participate. The cost for this system would add approximately $4,124,360 annually in volunteer stipends and additional Schedule A staffing.

These three options appeared the most feasible within the current organization and association with CAL FIRE. However, other options exist and could be explored, assuming the fully staffed solution for Santa Cruz County Fire Department will cost between $6,808,752 for volunteer staff and $11,480,794 for a career-staffed system.

Recommendation A-8: Set and Adopt Performance Goals

Description: SCCFD does not have performance goals for each program or level of risk. These performance goals should reflect the community's expectations and be developed with an approved methodology.

Outcomes: Adopted specific performance objectives for each program and level of risk.

Estimated Cost: Staff time.

Recommendation A-9: Consider Proposing a Special Assessment to Generate Revenue from CSA 4

Description: Current revenue from the special assessments within CSA 4 needs to be increased to fund the costs of CAL FIRE within the area to provide for the cost escalations in the provision of fire-based services. Additional revenue equivalent to a 20% increase in the special assessment is required from CSA 4 (Pajaro Dunes).

Outcomes: Service delivery remains consistent with that being delivered today.

Estimated Cost: The special assessment will increase by approximately 20% for each parcel to fund the cost escalation.

Recommendation A-10: Conduct a Volunteer Satisfaction Survey

Description: The Santa Cruz County Fire Department should conduct a comprehensive volunteer satisfaction survey. The survey should be based on research conducted by the National Volunteer Firefighter Council. It will provide the County with a better understanding of why Santa Cruz County volunteer firefighters leave and why they stay. Additionally, the study should focus on how those insights can increase participation and extend the length of service.

Outcomes: Reliable qualitative information regarding the current satisfaction level of volunteer firefighters.

Estimated Cost: Staff time to prepare, administer, compile, and analyze information gathered from the survey.

Recommendation A-11: Develop a Public Information Campaign

Description: A Public Information Campaign will educate officials, key stakeholders, and community members about the distinct roles of SCCFD and CAL FIRE. Throughout the information gathering and analysis phase of the Master Plan project, it became evident that the difference between CAL FIRE and the Santa Cruz County Fire Department is unclear to elected officials, key stakeholders, and community members leading many to believe the roles and responsibilities of SCCFD and CAL FIRE is the same. This lack of understanding leads many to believe that Santa Cruz County has a greater capacity for all-hazard emergency response than it actually does. Moreover, this lack of understanding leads to false or unmet expectations of CAL FIRE and impairs the negotiation process when considering the future service delivery needs of Santa Cruz County.

Outcomes: A well-developed public information campaign to educate elected officials, key stakeholders, and community members on the role of the Santa Cruz County Fire Department versus the role of CAL FIRE will create a more accurate understanding of the two agencies and their overlapping but complementary roles in protecting Santa Cruz County. Elected officials, key stakeholders, and community members better equipped with a working knowledge of how this mutually beneficial relationship works will be able to engage in a more meaningful dialogue about the all-hazard fire protection needs of Santa Cruz County and make truly informed decisions when evaluating the effectiveness of the current deployment model and considering the future service delivery needs of Santa Cruz County.

Estimated Cost: Staff time.

Recommendation A-12: Review and Revise Santa Cruz County Code, Chapter 2.120, Fire Department Advisory Commission

Description: The Fire Department Advisory Commission's stated purpose is to monitor, study, and advise the County Fire Chief and the Board of Supervisors. To ensure authority, membership, organization, procedures, powers, and duties of this layer of oversight and governance are efficient and effectively meeting the needs of the County Board of Supervisors and serving the interests of the citizens residing in Santa Cruz County Fire Department's Jurisdiction. During the development of this Master Plan, it became clear that the role of the commission was not fully utilized and or its role understood. AP Triton recommends a comprehensive review and revision (if necessary) of Santa Cruz County Code, Chapter 2.120.

Outcomes: Greater transparency and accountability of the Commission and oversight of the County's fire protection, rescue, and emergency medical services program. Reduced liability through adherence to open meeting laws as required under the Government Code §54950 relating to meetings of legislative bodies of local agencies.

Estimated Cost: Costs will vary. At a minimum, staff time will be required. Additional expenses may include legal fees, or fees paid to outside vendors for training.

Mid-Term Recommended Strategies

The mid-term strategies signify progressive enhancements to the current conditions that will likely necessitate a three-to-five-year timeline for realization.

Recommendation B-1: Establish a Program for Staffing Stations During Peak Demand Hours

Description: Recognizing that 70% of incidents occur between 8:00 AM and 8:00 PM, a staffing program during these peak hours would enhance response times and public service. It is crucial to consider that most volunteers work during the day and may not be available, potentially affecting emergency response reliability.

Outcomes: Reliable and enhanced staffed stations during peak response loads.

Estimated Cost: The cost is contingent on the staffing model. If full-time staff are employed, their costs must be accounted for, whereas compensation for volunteers must be calculated if they are chosen to staff the station. Additional funds will be required for station and equipment maintenance.

Recommendation B-2: Develop Risk-Based Public Education Programs for Department-Wide Delivery

Description: Public education plays a vital role in fire prevention services. By crafting programs based on actual risks, and targeting them geographically and demographically, it is possible to significantly reduce fires, injuries, and loss of life. These programs should utilize incident data to identify and prioritize risks, building upon existing wildfire mitigation educational efforts.

Outcome: An informed community actively participating in risk reduction, leading to behavior changes that enhance overall community safety.

Estimated Cost: Staff time is needed to develop and deliver programs. Collaboration with community groups, like Fire Safe Councils, CERT, and Red Cross, can also aid in program development and delivery.

Recommendation B-3: Apply for a SAFER Grant to Hire a Volunteer Recruitment and Retention Coordinator

Description: The Santa Cruz County Fire Department should explore applying for a Staffing for Fire and Emergency Response (SAFER) Grant from the Federal Emergency Management Agency. This grant would fund a part-time employee (Recruitment and Retention Coordinator) focused on overseeing volunteer recruitment and retention.

Outcomes: Concentrated focus on maintaining engaged volunteer firefighters. The Recruitment and Retention Coordinator would act as a liaison to volunteers, ensuring their issues, perspectives, and experiences are understood and considered. This insight would guide both recruitment of new volunteers and retention of current ones.

Estimated Cost: Staff time is needed to prepare and submit the grant application.

Long-Term Recommended Strategies

The following long-term strategies provide a broader and more profound perspective on future initiatives, focusing on community growth and its effect on the deployment of fire stations and personnel. These long-term approaches go beyond the short and mid-term recommendations to create a sustainable vision for the organization.

Recommendation C-1: Re-Evaluate Station Locations and Effectiveness Following Staffing Improvements and New Response Data

Description: Timely response to emergencies within the urban corridor may be hindered by the current station locations. Following improvements in staffing and the establishment of a new response data model, a thorough study on performance data should be conducted. This includes assessing the placement, availability, and suitability of stations to create a strategic plan that incorporates capital needs and funding requirements for improved location efficiency.

Outcomes: A strategic plan for station locations or relocations, potentially enhancing response times throughout the urban corridor.

Estimated Cost: The costs will vary depending on whether internal staff or external specialists and consultants are utilized.

Recommendation C-2: Create a Comprehensive Capital Improvement Plan

Description: Recognizing the need for continuous facility maintenance, upgrades, and replacements, a comprehensive Capital Improvement Plan (CIP) is vital. A CIP will encompass all physical locations, facility infrastructure, capital equipment, and apparatus, including aspects such as heating and cooling systems, roofing, landscaping, and other identifiable improvements. By understanding the projected capital replacement costs and planning a funding mechanism accordingly, a long-term, sustainable improvement plan can be implemented.

Outcomes: A well-structured guide that directs upcoming capital expenditures for both the department and County. This guide will prioritize and detail costs for long-term capital planning.

Estimated Cost: Creation of the plan can be handled through staff time, potentially including collaboration with other County departments. Additional costs might involve capital monitoring systems or software, as well as specialized assistance for costing and planning.

These long-term strategies lay a foundation for the continuous growth and adaptability of SCCFD in response to community needs and changes. By focusing on the big picture, including station effectiveness and comprehensive capital planning, the organization positions itself to maintain high levels of service and efficiency. These recommendations not only enhance current operations but also establish a roadmap for sustainable future initiatives, reflecting the department's commitment to innovation and community-centered planning.

Section IV: APPENDICES

Appendix A: Strategic Partners—Stakeholder Interviews

Introduction to the Stakeholder Interviews

Triton interviewed a wide variety of the Santa Cruz County Fire Department internal and external stakeholders. The purpose of these interviews was to gain a better understanding of issues, concerns, and options regarding the emergency service delivery system, opportunities for shared services, and expectations from community members.

It is important to note that the information solicited and provided during this process was in the form of "people inputs" (stakeholders individually responding to our questions), some of which are perceptions reported by stakeholders. All information was accepted at face value without an in-depth investigation of its origination or reliability. The project team reviewed the information for consistency and frequency of comment to identify specific patterns and/or trends. Multiple sources confirmed the observations, and the information provided was significant enough to be included within this report. Based on the information reviewed, the team identified a series of observations, recommendations, and felt they were significant enough to be included in this report

Stakeholders were identified within the following groups: Community Leaders, Citizens, Chief Officers, Labor Leaders, Volunteer Firefighters. Rank & File, and Administrative Staff.

Chief Officers, Labor Leaders, Rank & File & Volunteer Firefighter Representatives

What strengths contribute to the success of the Santa Cruz County Fire Department? What do you do well?

- The depth that CAL FIRE brings to the table.
- CAL FIRE provides a large economy of scale.
- SCCFD does not need to provide its own Human Resources, or Finance division.
- Strong partnerships with neighboring agencies and good Mutual Aid and Auto Aid
- Central Santa Cruz Fleet Maintenance
- Santa Cruz County Fire gets a lot of resources for very little money.
- We have excellent community support.
- Volunteers are motivated and dedicated to making their community better.
- SCCFD has an excellent training program.
- We have modern fire apparatus that is well-maintained.

- The identity of the Santa Cruz County Fire Department is starting to emerge under new county leadership.
- We have strong Policies, Procedures, and Bylaws,
- The SCCFD administration team is strong.
- The organization ensures accountability.
- SCCFD has an excellent relationship with CAL FIRE

What are some areas in which you think the Santa Cruz County Fire Department could make improvements?

- Administration of FDAC. This is a layer of local government that creates vulnerability (subject to the Brown Act/Open Meeting law).
- Santa Cruz County FD needs more overhead and administrative support.
- The County Fire Chief reporting structure.
- Overreliance on CAL FIRE during the non-peak season/lack of coverage
- Lack of revenue.
- There needs to be a greater separation between the state and the county.
- Santa Cruz County FD lacks its own identity.
- Greater fiscal responsibility.
- Equipment replacement schedule
- Lack of staff and funding for volunteer training.
- Volunteers lack engagement with the organization.
- Volunteer participation is waning and many leave for paid careers.
- CAL FIRE employees leave for better-paying paying positions with local government departments.
- More training with other fire agencies.
- We need a succession plan for the County Fire Marshals' Office
- There is unnecessary duplication of fire service in Santa Cruz County.
- We need to look for opportunities for consolidation & boundary drops.
- There are too many communications centers.

What do you see as the top critical issues facing the Santa Cruz County Fire Department today?

- The county needs to contract for full-time staffing.
- There is no Santa Cruz County Fire identity.
- Recruitment and retention of volunteers (this same statement was made by several respondents).
- Over-reliance on volunteer staffing.
- The contract is nearing its end and needs to be renegotiated.
- Staffing. The County is lucky to have CAL FIRE
- Volunteers are treated as subservient, or 2nd class citizens.
- The ability to backfill with volunteers when necessary is becoming more difficult.
- A lot of time is wasted by communications.
- High cost of living in the area.

What opportunities, in your view, are available to improve the service and capabilities to the region/Santa Cruz County Fire Department?

- Consolidation into a single fire district (this same statement was made by several respondents).
- Greater inter-agency training (this same statement was made by several respondents).
- Expand the Schedule A contract to cover the entire county (this same statement was made by several respondents).
- Explore the opportunity to become a CAL FIRE Contract County
- SCCFD needs to do more community outreach.

What challenges do you see to enacting those opportunities?

- There are numerous existing response issues (long response times, lack of coverage).
- Volunteer retention issues.
- Potential loss of Pajaro Valley (unknown gain/loss)
- Egos of individual agencies and willingness to change.
- Bureaucracy and lack of direction (this same statement was made by several respondents).

- Lack of continuity among area service providers.
- Lack of understanding of policies
- Need to interface better with CAL FIRE resources from out of the area.
- Politics of the individual Fire Boards (this same statement was made by several respondents).
- The agencies and electorate would need to be convinced/assured that service would be better.
- Volunteers aren't paid for training and must choose between family and fire.
- "The state"
- Impact of the economically stressed areas.
- Need staff to make it happen (currently being borrowed from CAL FIRE). (This same statement was made by several respondents).
- Amador staffing/program is just a band-aid.

If you could change, or improve one thing about the Santa Cruz County Fire Department, what would it be?

- Change the reporting structure for the County Fire Chief to the Board of Supervisors.
- Increase (dedicated) admin staffing/Make all 5 County Fire stations Schedule A (this same statement was made by several respondents).
- Clarity of the chain of command and Leader's Intent.
- County Fire is subservient to CAL FIRE.
- Educate the community about County Fire vs CAL FIRE (local branding).
- Politics
- Need to come to terms with the drop in the number of people wanting to be volunteers.
- Make SCCFD autonomous of CAL FIRE

How would you rate the level of service provided by the Santa Cruz County Fire Department?

- Sufficient
- Satisfactory
- On a scale from 1-10, we're an 8, but improving.

- Average to above average for volunteers.
- On a scale from 1-10, we're a 9.
- On a scale from 1-10, we're a 7 (due to good volunteer support)
- On a scale from 1-10, we're a 5 (when not staffed)
- On a scale from 1-10, we're a 10 (due to CAL FIRE) (this same statement was made by several respondents).

Business & Community Leaders, Strategic Partners & Community Volunteers

Describe your expectations of the Santa Cruz County Fire Department.

- Close collaboration with the community and partner agencies.
- Work to rebuild relationships (there was a breach of trust during the CZU Lightning Complex.
- Provide adequate staffing to ensure safety of the community (this same statement was made by several respondents).
- Show up when called (this same statement was made by several respondents).
- Full after action of the CZU Lightning Complex/Follow-up with community (this same statement was made by several respondents).
- Better communication across the board.
- Provide efficient and effective service to the County.
- Be more inclusive and less we vs them.
- Provide a medical response (this same statement was made by several respondents).
- Be proactive and forward-thinking regarding service delivery.
- Be proactive with wildfire hazard mitigation.
- Better management of volunteers (this same statement was made by several respondents).
    - If they are to be relied upon, then use them. if not, then drop the program.
- Have a more effective Plan B for when CZU resources are out of the area (this same statement was made by several respondents).
- Sort out the bureaucracy.
- Provide leadership and coordination of emergency/disaster response.

Which of these expectations is not being met to your satisfaction?

- Support of volunteers (this same statement was made by several respondents).
- Staffing levels are not sufficient.
- Collaboration with FireSafe Council and Firewise communities.
- Funding for FireSafe Council leadership.
- OES was defunded right before the CZU Lightning Complex.
- CAL FIRE's communication with the community (this same statement was made by several respondents).
- Issues with Davenport have not been addressed.
- No after-action of the CZU Lightning Complex or follow-up with the community (this same statement was made by several respondents).
- During CZU, local knowledge was not acknowledged regarding evacuations.
- The published budget is unreliable and lacks transparency.
- CAL FIRE reports identify issues, but there's never any action.
- The plan to leave the forest alone does not work (climate change).
- CAL FIRE is not proactive (risk assessment & hazard mitigation)
- Have a more effective Plan B for when CZU resources are out of the area (this same statement was made by several respondents).

What do you think the Santa Cruz County Fire Department is doing particularly well?

- The County Marshal is excellent.
- Emergency response (fire response) (this same statement was made by several respondents).
- Volunteers work very well with other agencies.
- Volunteers do good public outreach.
- SCCFD does a good job of maintaining accountability for training requirements.
- Good use of social media.

Are there services that you think the Santa Cruz County Fire Department should be providing that they are not providing now?

- Identify communities at risk (this same statement was made by several respondents).
  - Risk mapping
  - Fuels mitigation
  - Evac route maintenance
- Providing volunteers with a voice.
- Automatic External Defibrillators on all apparatus.
- More trained community members
- Greater accountability for CAL FIRE
- Work better with volunteers (this same statement was made by several respondents).
- Work more closely with the FDAC.
- State-mandated WUI inspections (LE 100) are not being completed (this same statement was made by several respondents).
- Public outreach (this same statement was made by several respondents).
- Identified and dedicated County Fire Chief
- Performance audits as described in the 2012 Master Plan & 2020 Grand Jury finding.
- Better organization/communication at the community level (this same statement was made by several respondents).
- Assist with grant requests FireSafe Council (this same statement was made by several respondents).
- Leadership for FireSafe Council
- Roads
  - Narrow
  - Rigs are too large.
  - Equipment needs to match the area.
- Better use of technology like remote cameras (this same statement was made by several respondents).

Are there services the Santa Cruz County Fire Department is providing that you think should be discontinued or done differently?

- The response force is too small for the risk.
- CAL FIRE should not be relying on County Fire to support the state mission during fire season.
- Advanced Life Support.
- Greater engagement with the volunteers.
- Grant administration should be a function of the state.
- Ambulance dispatching and hospital destination.

When you dial 911 to report an emergency, how long should it take for help to arrive?

- As quickly as possible
- Newer mountain residents don't understand the service level differences between urban and rural areas (travel time).
- Volunteers are the ones responding to the calls.
- 15 minutes
- Responding withing 2-3 minutes. On scene within 10.
- 5-7 minutes
- 10-15 minutes

Does that expectation change depending on where in the community you are located?

- Yes. Living in a rural community means you need to have more realistic expectations (this same statement was made by every respondent).

Appendix B: Risk Classifications

The following are the risk classifications determined by incident type.

Fire

Low Risk

These incidents are considered low in risk and are minor in scope and intensity. It requires a single fire apparatus and crew to manage fires involving passenger vehicles, fences, trash or dumpsters, downed power lines, residential or commercial alarm investigations, or an odor investigation.

Moderate Risk

These incidents are the first alarm response needed to manage a moderate fire risk incident. These incidents include smoke in a building, small outside building fires, commercial vehicle fires, a single-family residence, lightning strikes to a building, automatic fire alarm at a high-risk occupancy, or a hazardous materials pipeline fire.

High Risk

These incidents are a second alarm response needed to manage a high-fire risk incident. These incidents include smoke in a high-life hazard property (school, skilled nursing, etc.), single-family residences with injured or trapped victims, multi-family residential buildings, or a moderate-sized commercial/industrial occupancy.

Maximum Risk

A third alarm response is needed to manage a maximum fire risk incident. These incidents include a hospital, assisted living facility, fire in an apartment building, high-rise building fire, a large commercial or industrial occupancy, hazardous materials railcar, or storage occupancy. Incident assignments will include additional command staff, recalling off-duty personnel, and mutual aid assistance for other critical tasking needs.

EMS Risks

Low Risk

A single EMS unit can manage a low-risk EMS incident involving an assessment of a single patient with a critical injury or illness, no-life threatening medical call, lift assist, or standby.

Moderate Risk

A two-unit response is required to control or mitigate a moderate-risk EMS incident. It involves assessing and treating one or two patients with critical injuries or illnesses or a motor vehicle crash with 1-2 patients.

High Risk

A multiple-unit response is required to control or mitigate a high-risk EMS incident. It involves 3-8 patients with injuries ranging from minor to critical. Patient care will involve triage, BLS, ALS treatment, and a coordinated transport of patients.

Maximum Risk

A multiple-unit response is required to control or mitigate a maximum-risk EMS incident. It involves more than nine patients with injuries ranging from minor to critical. Patient care will involve triage, BLS, ALS treatment, and a coordinated transport of patients. If this is an active shooter incident, the response may require a casualty collection area unit to treat patients, not in the hot zone.

Technical Rescue

Low Risk

A single fire unit can manage a low-risk technical rescue incident involving rescues that are minor in nature, such as a child locked in a vehicle, elevator entrapment, or minor mechanical entrapment.

Moderate Risk

A two-unit response is required to control or mitigate a moderate technical rescue risk incident. Support is not usually required from a technical rescue team. This type of incident involves a motor vehicle crash that requires patient extrication, removal of a patient entangled in machinery or other equipment, or a person trapped by downed power lines.

High Risk

A multiple-unit response is required to control or mitigate a high-risk technical rescue incident. This type of incident may involve full-scale technical rescue operations ranging from structural collapse to swift water rescues. It may involve multiple motor vehicles that require extrication, commercial passenger carriers, or a vehicle impacting a building. Support is usually required from a technical rescue team. This incident may require multiple alarms.

Maximum Risk

A multiple-unit response is required to control or mitigate a maximum risk technical rescue incident. Support is required from a specialized technical rescue team and may have multiple operations locations. This type of incident will involve full-scale technical rescue operations such as victims endangered or trapped by structural collapse, swift water, or earth cave-ins. This incident will require multiple alarms and may expand beyond the identified critical tasking. Recall of off-duty personnel or assistance from auto or mutual aid may occur during a disaster or when additional alarms and command staff are needed.

Hazardous Materials

Low Risk

A single fire unit can manage a low-risk hazardous materials incident involving carbon monoxide alarms and other unknown hazmat investigations without symptomatic victims, less than 20 gallons of fuel, natural gas meter incident, downed power lines, equipment, or electrical problems, or attempted burning. Automatic alarms that may originate from a hazardous material.

Moderate Risk

A two-unit response is required to control or mitigate a moderate risk hazardous materials incident. Direct support is not usually required from a hazardous materials team. This type of incident involves a carbon monoxide alarm with symptomatic patients, a fuel spill of 20–55 gallons, or a gas or petroleum products pipeline break not threatening any exposures.

High Risk

A multiple-unit response with a hazmat team is required to control or mitigate a high-risk hazardous materials incident. Support is needed for a Level 2 hazmat incident that involves establishing operational zones (hot/warm/cold) and assigning multiple support divisions and groups. This response includes a release with 3-8 victims, gas leaks in a structure, hazmat alarm releases with victims, flammable gas or liquid pipeline breaks with exposures, fuel spills greater than 55 gallons, fuel spills in underground drainage or sewer systems, transportation or industrial chemical releases, or radiological incidents. Additional assistance may be required to expand operations past the identified critical tasks.

Maximum Risk

A multiple-unit response is required to control or mitigate a maximum-risk hazardous materials incident. Support is required from an on-duty hazmat team and their specialized equipment. This type of incident involves establishing operational zones (hot/warm/cold) and assigning multiple support divisions and groups. Examples include nine or more contaminated or exposed victims, a large storage tank failure, a hazmat railcar failure, or a weapon of mass destruction incident. This incident will require multiple alarms and may expand beyond the identified critical tasking. Recall of off-duty personnel or assistance from auto or mutual aid may occur during a disaster or when additional alarms and command staff are needed.

Wildland Urban Interface

Low Risk

A single fire unit can manage a low-risk wildland firefighting incident involving a fire minor in scope, structures not threatened, and Red Flag conditions do not exist. These include low-risk wildland or grass fires including an outside smoke investigation, illegal or controlled burns, or small vegetation fires.

Moderate Risk

Multiple units are needed to manage a moderate-risk wildland firefighting incident involving a significant fire in the brush or brush pile at a chipping site, grass, or cultivated vegetation. Red Flag conditions do not exist, and structures may or may not be threatened.

High Risk

Multiple units or alarms are needed to manage a high-risk wildland firefighting incident. The level is associated with Red Flag warnings with structures that may or may not be threatened. This fire involves a significant wildfire in brush, grasses, and cultivated vegetation. And woodland areas. Additional alarm assignment, command staff, recall of off-duty personnel, and mutual aid assistance may require the operations to extend beyond the identified critical tasks.

Appendix C: Table of Figures

Appendix D: References

[1] Wallace, M. (2006). *Fire Department Strategic Planning, Creating Future Excellence. (2nd Ed)*. Pennwell, pp 112-115.

[2] Santa Cruz Fire Department. (3/16/2022). *Volunteer Firefighter Handbook. Policies and Procedures.* (p. 3)

[3] Bryson, J. (2018). *Strategic Planning for Public and Nonprofit Organizations (5th Ed.)*. John Wiley & Sons, Inc, pp 269-270.

[4] Santa Cruz Fire Department. (p. 3)

[5] Wallace (2006), pp 73-78.

[6] Santa Cruz Fire Department. (p. 3)

[7] Santa Cruz County Fire Protection Services Proposed Budget, FY 2021–2022.

[8] FY 2023 Requested Budget.

[9] Historical Financial Information provided by Santa Cruz County staff.

[10] FY 2023 Requested Budget.

[11] Draft SCCO Mobile Equipment Replacement Schedule.

[12] Historical Financial Information provided by Santa Cruz County staff.

[13] FY 2023 Requested Budget.

[14] This Photo by Unknown Author is licensed under CC BY-SA-NC, creativecommons.org/licenses/by-nc-sa/3.0/s.

[15] www.isomitigation.com/ppc/technical/criteria-for-deployment-analysis-of-companies.

[16] santacruzcountyfire.com/stations/county-fire-response-area/

[17] National Fire Protection Association. Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.2020) [Appendix D].

[18] National Fire Protection Association. Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.2020) [Table 4.3.2 Staffing Response Times].

[19] www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Fire-loss-in-the-United-States.

[20] NFPA 1730, Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations. (Chapter 6 Section 7). 2019.

[21] Stouffer, J. (2016). Community Risk Reduction Planning. A guide for developing a community risk reduction plan. Version 4. Vision 20/20, pg. 10.

[22] National Fire Protection Association. (2020). 1006: Standard for Technical Rescue Personnel Professional Qualifications, 2021.

[23] *National Fire Protection Association, 2007; Urban Fire Safety Project, Emmitsburg, MD.*

[24] U.S Census Bureau.

[25] U.S. Fire Administration website.

[26] World Economic Forum website, www.weforum.org/agenda/2021/01/poverty-mental-health-covid-intervention/.

[27] Quality Improvement for the Fire and Emergency Services.

[28] Topical Fire Report Series, Multifamily Residential Building Fires (2013–2015), June 2017.

[29] Iowa Environmental Menoset website.

[30] Ibid.

[31] County of Santa Cruz Local Hazard Mitigation Plan 2021–2026.

[32] Fire Safe Council of Santa Cruz County website.

[33] USDA Wildfire Risk to Communities website.

[34] CalMAPPER Forest and Fuels Management Projects, ArcGIS Online.

[35] Infrastructure Security, Department of Homeland Security.

[36] PG&E website.

[37] SoCalGas Natural Gas Pipeline Map.

[38] Fire Loss in the United States During 2021, NFPA, September 2022.

[39] Fire Loss in the United States, NFPA, 2018, 2019, 2020.

[40] Ibid.

[41] Crime Data Explorer, Federal Bureau of Investigation.

[42] Wage and Hour Opinion Letter FLSA2005-51; FLSA 29 C.F.R. §§ 553.100-.106; AB 1299 Volunteer Firefighter Reimbursement; IAFC *Managing Volunteer Firefighters for FLSA Compliance: A Guide for Fire Chiefs and Community Leaders* (2006).