North Tahoe Fire Protection District
and
Meeks Bay Fire Protection District

California

STANDARDS OF COVERAGE AND DEPLOYMENT PLAN

2018

ESCI Emergency Services Consulting International
Providing Expertise and Guidance that Enhances Community Safety

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INTRODUCTION

The following report serves as the North Tahoe Fire Protection District and Meeks Bay Fire Protection District Standards of Coverage and Deployment Plan. It follows closely the Center for Fire Public Safety Excellence (CPSE) Standards of Coverage model that develops written procedures to determine the distribution and concentration of a fire and emergency service agency's fixed and mobile resources. The purpose for completing such a document is to assist the agency in ensuring a safe and effective response force for fire suppression, emergency medical services, and specialty response situations.

This report focuses on the area within the boundaries of the two fire districts. Although the districts serve a larger area, those areas are served by contract with other entities.

It is important to understand that there are no mandatory federal or state regulations directing level of service, fire service response times, or outcomes. The body of regulations for the fire service provides that if fire services are provided, it must be done with the safety of the firefighters and citizens in mind.

Creating a Standards of Coverage and Deployment Plan document requires that a number of areas be researched, studied, and evaluated. This report will begin with an overview of both the community and the agency. Following this overview, the plan will discuss topics such as community risk assessment, critical task analysis, agency service level objectives, and distribution and concentration measures. The report will provide analysis of historical performance and will conclude with policy and operational recommendations.

ESCI extends its appreciation to the elected and appointed officials of the North Tahoe Fire Protection District and Meeks Bay Fire Protection District and all others who contributed to this plan.

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EXECUTIVE SUMMARY

This document describes the North Tahoe Fire Protection District (NTFPD) and Meeks Bay Fire Protection District (MBFPD) Standards of Coverage (SOC) and Deployment Plan. It includes MBFPD and the service demand associated with the contracted service area of Alpine Springs County Water District (ASCWD). These areas operate as a single entity for incident response. Community risks, response resources, deployment strategies, and service levels have been evaluated in this study. This report establishes response time goals and standards for measuring the effectiveness of fire district services and the deployment of its resources. The document is divided into components generally based on the format recommended by the Center for Public Safety Excellence.

The North Tahoe Fire Protection District and Meeks Bay Fire Protection District are established and organized under California law. Together they provide fire protection, emergency medical, and rescue services to the community. They also provide service to adjacent agencies in accordance with mutual and automatic aid agreements.

NTFPD/MBFPD serves a combined resident population of approximately 15,000 people and protects an area that totals of approximately 27.5 square miles, not including ASCWD. NTFPD/MBFPD operates from eight fire stations, five of which are constantly staffed. A sixth station is staffed during wildfire season. It utilizes 27 response apparatus including reserve apparatus. Emergency (911) calls are answered by several agencies in the region and calls are dispatched by the California Department of Forestry and Fire Grass Valley Emergency Communications Center (GVECC).

The analysis completed during this study revealed a number of important findings. These include:

- Total response workload has increased 54 percent over the past 10 years.
- 60.8 percent of all responses are requests for emergency medical service.
- Response workload is greatest around Fire Stations 51 and 52.
- Medic 51 exceeds 10 percent unit hour utilization.
- NTFPD/MBFPD has adopted response performance goals matching nationally recommended standards.
- Call transfer time from the Primary Public Safety Answer Points to Grass Valley Emergency Communications Center (GVECC) exceeds NTFPD/MBFPD's performance goal.
- The amount of time GVECC takes to dispatch fire district response units exceeds NTFPD/MBFPD's performance goal.
- The amount of time required for response personnel to initiate travel to incidents exceeds NTFPD/MBFPD's performance goal.
- The amount of time response units spend traveling to an incident exceeds NTFPD/MBFPD's performance goal.
- None of the NTFPD/MBFPD service area can be provided an effective response force for a low-rise building fire because of limited staffing and the distance between staffed stations.

In the SOC process, potential service area classifications are broken down into five categories:

- **Metropolitan**—Geography with a population of over 200,000 people in total and a population density predominately over 3,000 people per square mile. These areas are distinguished by inner city neighborhoods and numerous mid-rise and high-rise buildings often interspersed with smaller structures.
- **Urban**—Geography with a population of over 30,000 people and/or a population density predominately over 2,000 people per square mile. These areas are characterized by significant commercial and industrial development, dense neighborhoods, and some mid-rise or high-rise buildings.
- **Suburban**—Geography with a population of 10,000 to 29,999 and/or a population density predominately between 1,000 and 2,000 people per square mile. These areas are characterized by single and multifamily neighborhoods and smaller commercial developments.
- **Rural**—Geography with a total population of less than 10,000 people or with a population density of less than 1,000 people per square mile. These areas are characterized by low density residential, little commercial development, and significant farm or open space uses.
- **Wilderness/Frontier/Undeveloped**—Geography that is both rural and not readily accessible by a publicly or privately maintained road.

NTFPD/MBFPD's service area, based on population density, is primarily rural within areas of suburban and urban intermixed. The community's risk classification should influence how response resources are distributed now and in the future.

A Performance Statement as well as goals for the services provided by NTFPD/MBFPD have been developed. These further define the quality and quantity of service expected by the community and consistently pursued by the department.

Overall Performance Statement and Response Performance Goals

The North Tahoe Fire Protection District provides the highest possible level of fire and life safety, rescue and emergency medical service, fire prevention and public education to the citizens and visitors of the communities we serve.

NTFPD/MBFPD has adopted the following service delivery goals for measuring response performance:

Dispatch Call Processing Time

- 911 calls will be answered at the primary PSAP within 15 seconds, 95 percent of the time.
- Calls will be transferred from the primary PSAP to GVECC within 30 seconds from the time answered, 95 percent of the time.
- Response resources shall be notified of a priority incident within 64 seconds from receipt of the call at the dispatch center, 90 percent of the time.

Turnout Time

- Response personnel shall initiate response to a priority non-wildland fire and special operations incidents within 80 seconds from notification, 90 percent of the time.
- Response personnel shall initiate response to a priority wildland fire incident within three minutes from notification, 90 percent of the time.
- Response personnel shall initiate response to all other priority incidents within 60 seconds from notification, 90 percent of the time.

Response time for arrival of the first response unit at a priority incident

- The first response unit capable of initiating effective incident intervention shall arrive at a priority non-wildland fire and special operations incident within 5 minutes, 20 seconds from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at a priority wildland fire incident within 8 minutes from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at all other priority incidents within 5 minutes, from notification of response personnel, 90 percent of the time.

Response time for arrival of the effective response force at a moderate risk structure fire

- The full effective response force shall arrive at a moderate risk structure fire within 9 minutes, 20 seconds, of notification of response personnel, 90 percent of the time.
- The full effective response force shall arrive at a wildland fire within 11 minutes of notification of response personnel, 90 percent of the time.

The analysis conducted during the evaluation phase of this process identified a number of opportunities to improve service (improvement goals). The following improvement goals are offered for consideration. These goals and specific recommendations for each are described in more detail at the end of this report (Component H).

Recommendations

Improvement Goal A: *Adopt response performance goals that are achievable within budget constraints.*
Current goals are not achievable without a significant increase in response resources. Goals are offered that, with some resource addition and operational changes, should be achievable.

Improvement Goal B: *Reduce the dispatch call process time interval.*
Both call transfer time and call processing time well exceed national standards. Recommendations are offered to reduce both times.

Improvement Goal C: *Reduce the turnout time interval.*
Turnout time exceeds national standards. Reviewing station configuration and reinforcing expectations will shorten this interval.

Improvement Goal D: *Improve data collection and analysis for ongoing performance assessment.*
Although much data is collected, it is not being fully utilized for performance analysis. Improvements will provide the district's a much clearer picture of the level of services provided.

Improvement Goal E: *Begin using MDCs for unit status changes to provide more accurate data.*
Relying on the dispatcher to enter status change times based on voice transmissions leads to some inaccuracy in data collection. Using MDCs for status change recording will improve data accuracy.

Improvement Goal F: *Use Pro QA (EMD) to differentiate response to EMS incidents.*
GVECC is questioning callers to determine the type and severity of emergencies. However, particularly for emergency medical incidents, NTFPD/MBFPD does not alter the number and type of units sent. Sending only what is needed based on the severity of the emergency will improve response unit reliability.

Improvement Goal G: *Staff M51 at least 10–12 hours per day, seven days per week.*
Medic 51 currently exceeds 10 percent unit hour utilization. In addition, each time Medic 51 responds to an incident, Engine 51 is unstaffed. Medic 51 should be staffed during daytime hours with its own response crew.

Improvement Goal H: *Use data to identify community risk reduction opportunities.*
Analysis of incident data can provide valuable information to identify frequently occurring incident types, geographic trends, and the like. Education and other mitigation efforts can be initiated helping to manage a growing response workload.

COMPONENT A | DESCRIPTION OF THE ORGANIZATION

Organization Overview

Created in 1993, the North Tahoe Fire Protection District was formed as the result of the consolidation of the Tahoe City Fire Protection District (Tahoe City, CA) established in 1941 and North Tahoe Fire District (Kings Beach, CA) established in 1952. In addition to the District's formal service area, the District via contract provides fire-based services to the Alpine Springs County Water District's citizens and visitors. The District currently serves 27.5 square miles on the north and west shore of Lake Tahoe within its boundaries.

The community is a mix of residential and commercial properties with an assessed valuation of $6.5 billion. The full-time resident population is approximately 15,000, with an influx of part-time residents and visitors during the summer and winter seasons. NTFPD serves approximately 16,000 households and 1,000 businesses.

Meeks Bay Fire Protection District was officially formed in 1973. Prior to formation of a fire protection district, fire protection was provided as part of an El Dorado County Service Area. MBFPD encompasses 14 square miles on the west shore of Lake Tahoe. The community is a mix of residential, recreational, and commercial properties with an assessed valuation of over $1 billion. The full-time resident population is approximately 1,000, with an influx of part-time residents and visitors during the summer and winter seasons. MBFPD serves approximately 2,000 parcels. The District's service area includes extensive state park lands (841 acres) and federal lands (1,244 acres). The proximity to Desolation Wilderness creates challenges for the District with respect to wildland fire danger and specialized rescue services.

NTFPD and MBFPD are joined together via an intergovernmental agreement entered into in April 2014. The two agencies work as one with a single Fire Chief directing the organization. The NTFPD and MBFPD Boards of Directors provide policy oversight.

Together, NTFPD/MBFPD respond to over 1,900 calls for service annually including fire (structural and wildland), rescue, advanced life support emergency medical services, ambulance transportation, hazardous materials response, and others. Residents and visitors participate in a wide variety of outdoor activities including, hiking, skiing, and water sports. Emergencies involving these activities require specialized training and equipment for emergency personnel such as back country rescue, water rescue, avalanche extrication, rope rescues, hillside rescues, and searches.

Governance and Lines of Authority

Each district operates under the authority of California Health and Safety Code Section 13800 et. Seq. (Fire Protection District Law of 1987). Both districts have a five-member Board of Directors. The NTFPD Fire Chief serves both agencies. Per the terms of the Agreement for Fire Services Management and Related Services, the NTFPD Chief has designated a member of his executive staff to serve as Chief of MBFPD for daily operations and liaison to the MBFPD Board.

Organizational Finance

Establishment of financial policy for the NTFPD/MBFPD is the responsibility of each Board with the Fire Chief responsible for fiscal administration. Together, North Tahoe Fire Protection District and Meeks Bay Fire Protection District have an assessed valuation of $7.5 billion.

The districts use a one-year cycle to prepare the operating budget and the capital improvement plan based on a July through June fiscal year. Operating funds are generated primarily from property taxes and ambulance service revenue, and in NTFPD's case several contract services agreements.

The following figure lists the projected budgeted revenue for NTFPD/MBFPD by source for fiscal year 2018–19.

Figure 1: Budgeted Revenue, FY 2018–19

Revenue Type	NTFPD	MBFPD
Property and other taxes	10,018,427	1,483,304
Ambulance service	1,450,000	0
Grants and donations	924,079	15,000
Contract services	1,948,123	0
Miscellaneous	1,559,888	61,828
Total	**15,900,517**	**1,560,132**

The next figure shows each district's budgeted expenditures for fiscal year 2018–19.

Figure 2: Budgeted Expenditures, FY 2018–19

Expenditure Type	NTFPD	MBFPD
Personnel services	11,709,338	260,227
Services and supplies	3,137,505	1,369,202
Debt service	943,674	0
Capital outlays	0	0
Transfers	110,000	0
Total	**15,900,517**	**1,629,429**

A comprehensive capital improvement and replacement program is important to the long-term financial and operational stability of any fire and emergency medical service organization. Such programs provide systematic development and renewal of the physical assets and rolling stock of the agency. A capital program must link with the planning process to anticipate and time capital expenditures in a manner that does not adversely influence the operation of the agency or otherwise place the agency in a negative financial position. Items usually included in capital improvement and replacement programs are facilities, apparatus, land acquisition, and other major capital projects. The North Tahoe Fire Protection District has a long-range capital improvement plan.

COMPONENT B | REVIEW OF SERVICES PROVIDED

Services Provided

NTFPD/MBFPD's service area includes the North Tahoe Fire Protection District and Meeks Bay Fire Protection District. NTFPD also serves the Alpine Springs County Water District by contract. NTFPD/MBFPD also provides automatic and mutual aid to other agencies within the region. NTFPD/MBFPD provides a variety of response services, including structural and wildland fire suppression, advanced life support level emergency medical care, ambulance transportation, rescue, and other services.

NTFPD/MBFPD also provides non-response services including staff training, new construction building plan review and inspection, existing occupancy fire safety inspections, public safety education, forestry services, fuels management, and fire investigation.

Most emergency 911 calls are answered by the Placer County Sheriff's Office, El Dorado County Sheriff's Office, and the California Highway Patrol, as the primary public safety answering points. Requests for fire department services are dispatched by Grass Valley Emergency Communications Center.

There are 63 full-time and 5 part-time personnel are involved in delivering services to the community. Staffing coverage for emergency response uses career firefighters on 24-hour shifts. For immediate response, no less than 13 personnel are on duty at all times.

The following figure provides basic information on each of the core services, its general resource capability, and information regarding staff resources for that service.

Figure 3: Core Services Summary

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Fire Suppression	5 staffed engines/cross-staffed with ambulances 0 staffed ladder trucks 2 command response units 0 two-person rescue 0 Safety Officer Additional automatic and mutual aid engines, aerials, and support units available.	13–16 suppression-trained personnel Additional automatic and mutual aid firefighters available.
Emergency Medical Services	5 ALS Ambulances cross-staffed with Engines 1 Engine—ALS equipped	4 certified emergency medical technicians 12 paramedics
Vehicle Extrication	4 engines equipped with hydraulic rescue tools, hand tools, air bags 1 service company with cutting torch, stabilization cribbing 3 ambulances with combination cutter-spreader hydraulic rescue tool	16 firefighters trained in vehicle rescue
Low-Angle Rescue	9 District personnel participate as part of regional technical rescue team with mutual aid partners. Rescue-rated rope and all associated hardware shared between all agencies.	15 personnel trained to the low angle rope rescue standards. Associated rescue rated hardware available at 3 District stations.
Trench and Collapse Rescue	2 personnel trained in trench rescue. Rescue rated equipment associated with confined space and other rescue gear. Additional personnel, material and equipment available through mutual aid partners.	
Swift-Water Rescue	Minimal swift water threat within District boundaries, but throw-bags, PFPDs, helmets, and one rescue raft available to be deployed when needed. Shore Zone and ice rescue equipment available to be deployed as needed.	6 personnel trained in swift water rescue operations. 16 personnel trained in shore zone water rescue techniques. 16 personnel trained in ice rescue techniques.

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Confined Space Rescue	Two sets of all required equipment with tripod, cribbing, shores, air monitoring equipment, basket stretchers, rescue-rated rope available at Station 51 and 52. Additional equipment and personnel available through mutual aid.	6 personnel trained to the technician level in confined space rescue.
Hazardous Materials Response	Minimal direct hazardous materials threat within District boundaries, but 4 personnel trained to Haz Mat Specialist level and participate as part of regional Type II Haz Mat Response team. Regional Type II Haz Mat response vehicle equipped with personal protective equipment, gas and radiation monitoring equipment, containment supplies, and non-sparking tools located at Truckee Fire Protection District Station 96.	16 personnel trained to the operations level.

Assets and Resources

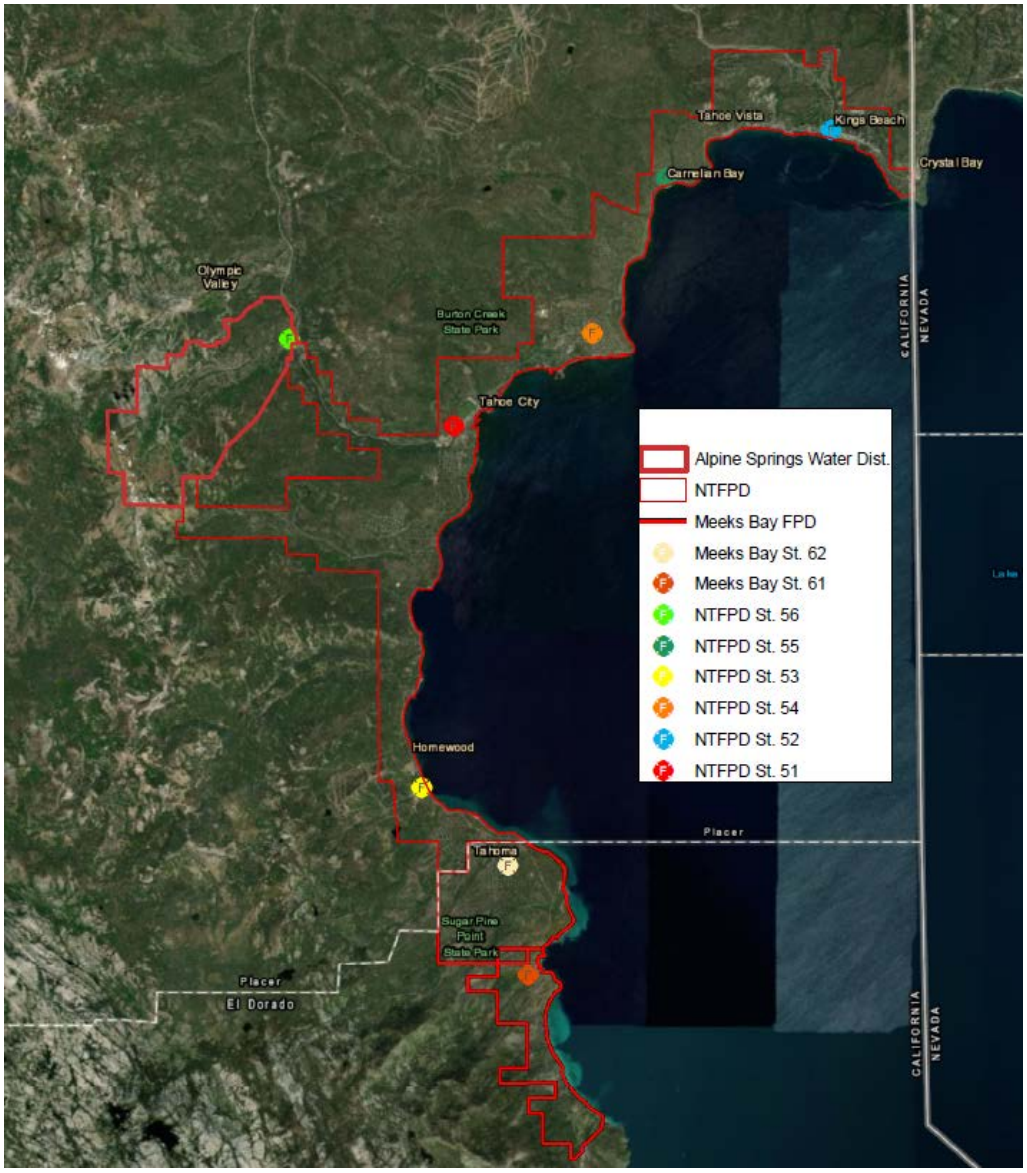
Fire Stations

Fire stations play an integral role in the delivery of emergency services for several reasons. A station's location will dictate, to a large degree, response times to emergencies. Fire stations also need to be designed to adequately house equipment and apparatus, as well as the firefighters and other personnel assigned to the station.

Station Location and Deployment

NTFPD/MBFPD delivers fire, emergency medical services (EMS), and other emergency response from eight fire stations, five of which are constantly staffed. The following map shows district boundaries, Alpine Springs contract area, and the locations of NTFPD/MBFPD stations.

Figure 4: Current Facility Deployment



A detailed assessment of the condition and serviceability of each station was completed for the recent consolidation study and is found in that document.

Apparatus

Response vehicles are an important resource of the emergency response system. If emergency personnel cannot arrive quickly due to unreliable transport, or if the equipment does not function properly, then the delivery of emergency service is likely compromised. Fire apparatus are unique and expensive pieces of equipment, customized to operate efficiently for a specifically defined mission. The following figure lists apparatus assigned to the eight NTFPD/MBFPD fire stations.

Figure 5: NTFPD/MBFPD Fire Stations and Apparatus

North Tahoe Fire Protection District Apparatus

Apparatus Designation	Type	Year	Make and Model	Condition	Pump Capacity	Tank Capacity
M-15	1	1922	Seagrave Pumper	Parade		
M-45	3	1992	Int'l Mini Pumper	Good	500	500
M-52		1971	John Deere Loader			
M-60		1999	Ford F-250 Utility (STL)			
M-65	3	2007	Int'l 7400 Chassis	Very Good	500	650
M-71	1	2003	Spartan Pumper	Good	1500	1000
M-75		2004	Kenworth Water Tender	Very Good	750	2500
M-76		2004	Ford Braun Ambulance	Surplus Ambulance	CERT Rehab	
M-77	2	1997	Int'l Pumper	Good	750	500
M-78		2008	Ford F-250 (501)	Good		
M-80		2008	Ford F-150 Utility	Very Good		
M-81		2008	Ford F-150 Utility	Very Good		
M-83		2006	Bauer Air Trailer	Very Good		
M-84 (Sta. #55)		2005	DCA70 CAT Generator	Very Good		
M-85		2008	Ford Expedition	Good		
M-86		2009	Ford Expedition	Good		
M-88		2012	Ford F-550 (Mech Vehicle)	Very Good		
M-89		2011	Ford F350 Braun Ambulance	Very Good		
M-90		2012	Ford F350 Braun Ambulance	Very Good		
M-91		2014	Ford F350 Braun Ambulance	Very Good		
M-92	1	2016	KME Severe 4x4 Pumper	Excellent	1500	750
M-93	1	2016	KME Severe 4x4 Pumper	Excellent	1500	750
M-94		2014	Dodge 3500 Braun Ambulance	Excellent		
M-95		2015	Dodge 3500 Braun Ambulance	Excellent		
M-96		2015	Ford Explorer Utility	Excellent		
M-97		2016	Ford F250 Utility	Excellent		
M-98		2016	Ford F250 Utility	Excellent		
M-99	1	2017	KME Severe 4x4 Pumper	Excellent	1500	750
M-100		2018	Ford Interceptor Utility	Pending Delivery		

Apparatus Designation	Type	Year	Make and Model	Condition	Pump Capacity	Tank Capacity
M-101		2018	Ford F-250 Utility	Pending Delivery		
M-102		2017	Dodge 3500 Braun Ambulance	Excellent	Excellent	
M-103	3	2018	HME 4x4 Brush Engine	Pending Delivery	500	500
M-104		2018	Pending delivery			
M-105		2018	Pending delivery			

Meeks Bay Fire Protection District Apparatus

Apparatus Designation	Type	Year	Make & Model	Condition	Pump Capacity	Tank Capacity
M-215		2011	Chevy Tahoe	Good		
M-1501	1	1999	HME	Good Reserve	1250	1000
M-1503	1	2003	International Water Tender	Very Good	1250	2000
M-1504		2000	Ford Expedition	Fair		
M-1505		2002	Dodge Pickup	Good		
M-1507		2007	Freightliner Dump Truck	Good		
M-1508		2005	250 Brush Bandit Chipper	Good		
M-1509		2007	255XP Track Bandit Chipper	Good		
M-1510		1999	Ford Plow Truck	Fair		
M-1512	1	2017	KME Severe 4x4 Pumper	Excellent	1500	750
M-1513			Track Chipper Trailer	Good		

NTFPD/MBFPD use several types of apparatus as shown in the previous figure. Each type is further described as follows:

- Engine—Primary response unit from each station for most types of service requests. Each is equipped with a pump and carries water.
- Medic—Primary response vehicle for medical emergencies. These units carry medical equipment and provide patient transportation to medical facilities.
- Brush—Smaller vehicle used primarily to combat wildland fires.

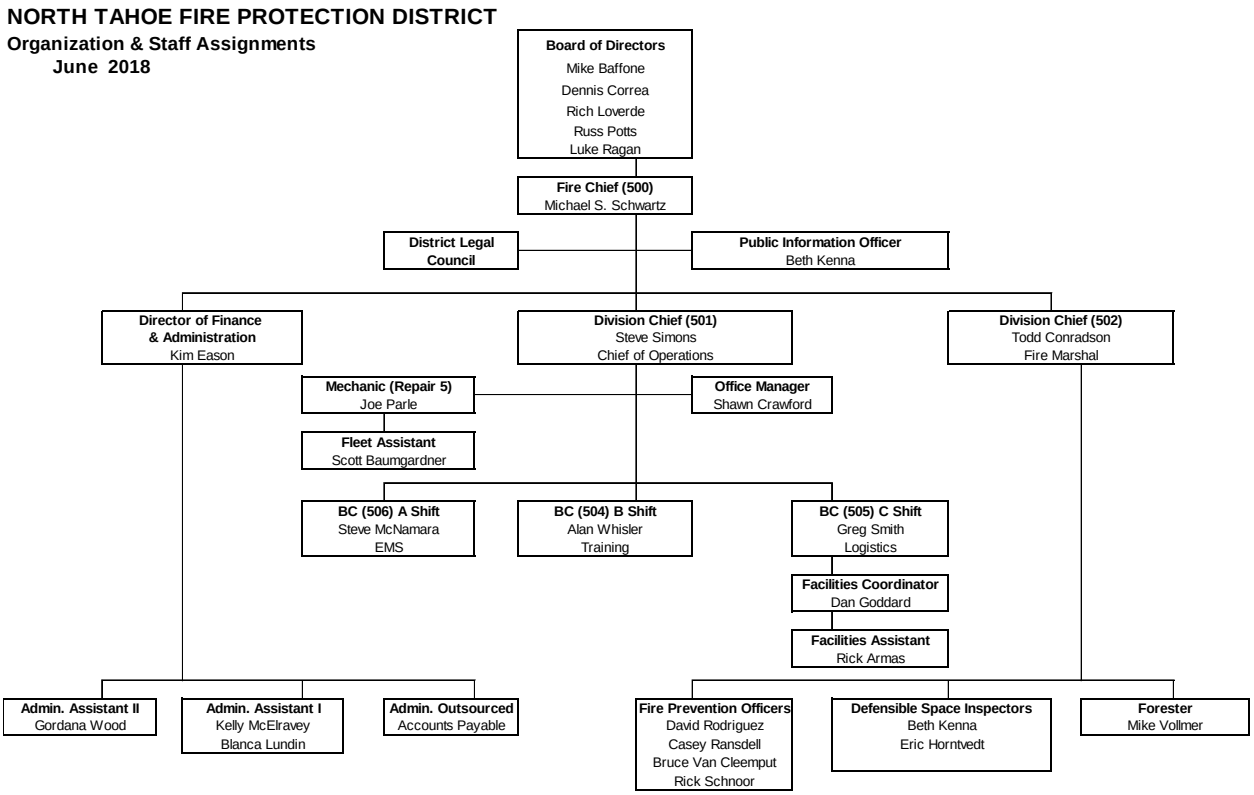
Staffing Information

NTFPD/MBFPD provides staffing in three key areas: administration, operations, and fire prevention services.

Organizational Structure

NTFPD/MBFPD is organized in the typical top-down hierarchy. The chain of command is identified with common roles for a fire department of this size. NTFPD/MBFPD oversees eight fire stations that house emergency response resources. The operation's multiple facilities and its three-shift, 24-hours-per-day, seven-days-per-week operational schedule create numerous internal communications and management challenges. NTFPD/MBFPD's organizational chart is functional and primary roles are well identified.

Figure 6: NTFPD & MBFPD Organizational Chart



Administration and Support Staff

One of the primary responsibilities of a fire department's administration and support staff is to ensure that the operational entities of the organization can accomplish service delivery responsibilities to the public. Without sufficient oversight, planning, documentation, training, and maintenance, operational staff will struggle to perform their duties well. Administration and support services require appropriate resources to function properly.

There are 63 full-time and 5 part-time personnel involved in delivering services to the jurisdiction. NTFPD/MBFPD's primary management team includes the Fire Chief, Division Chief of Operations, Division Chief Fire Marshal, and Director of Finance supported by administrative assistants. In total, NTFPD/MBFPD has twelve and one half full-time equivalent management, administration, and support staff.

Figure 7: Management, Administration, and Support Personnel by Position

Position	Number
Fire Chief	1
Division Chief – Operations	1
Division Chief – Fire Marshal	1
Director of Finance/Administration	1
Office Manager (MBFPD employee)	1
Administrative Assistant	3
Facilities Coordinator	1
Fleet/Facilities Assistant	2 (PT)
Fleet mechanic	1
Defensible Space Inspector	.5
Fire Inspector	2 (PT)

Emergency Services Staff

It takes an adequate and well-trained staff of emergency responders to put the community's emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an emergency decreases the effectiveness of the response and potentially increases damage and injury.

NTFPD/MBFPD uses 51.5 career and one volunteer personnel to carry out emergency response functions. The following figure shows the distribution of emergency personnel by rank. The two Division Chiefs are listed both in the following figure and the administrative personnel figure above since they regularly perform both functions.

Figure 8: Emergency Response Personnel by Rank

Position	Number
Fire Chief	1
Division Chief (Operations & Fire Marshal)	2
Battalion Chief	3
Fire Captain	12
Fire Apparatus Operator	15
Firefighter – Career	18
Firefighter – Volunteer	1

Methodology for Incident Staffing

This document will provide an analysis of how well NTFPD/MBFPD is providing personnel and other resources for incidents within its primary service area. This data is important and can be an indicator of the effectiveness of its staffing efforts.

For larger incidents, NTFPD/MBFPD commonly acts together with one or more neighboring fire departments in providing fire and life protection through a coordinated regional response system of mutual and automatic aid agreements. This is particularly true for large structure fires, other high-risk incidents where staffing needs are great, and during periods of significant incident activity. This document will provide an overall view of aggregate staffing provided by NTFPD/MBFPD and neighboring agencies.

The prompt arrival of at least four personnel is critical for structure fires. Federal regulations (CFR 1910.120) require that personnel entering a building involved in fire must be in groups of two. Further, before personnel can enter a building to extinguish a fire, at least two personnel must be on scene and assigned to conduct search and rescue in case the fire attack crew becomes trapped. This is referred to as the two-in, two-out rule. However, if it is *known* that victims are trapped inside the building, a rescue attempt can be performed without additional personnel ready to intervene outside the structure. Further, there is no requirement that all four arrive on the same response vehicle. Many fire departments rely on more than one unit arriving to initiate interior fire attack.

Some incidents (such as structure fires) require more than one response unit. The ability of NTFPD/MBFPD and its automatic aid neighbors to assemble an effective response force for a multiple unit incident within the specific period of time, also known as *resource concentration*, will be analyzed in a later section of this document.

The following figure lists each station, staffed unit, and the staffing assigned to each at minimum staffing. Cross staffed means personnel from the station's primary unit staff the other units as needed based on the type of incident.

Figure 9: Staffing Complement

Station	Apparatus	Minimum On-Duty Staffing
Station 51 (Headquarters)	Engine 51	3
	Medic 51	Cross staffed
	Medic 251	Cross staffed
	Brush 51	Cross staffed
	Ranger 51 (4 seat EMS ATV)	Cross staffed
	Water Tender 51	Cross staffed
	Battalion Chief 5	1
	Utility 51	Cross staffed
Station 52	Engine 52	3
	Medic 52	Cross staffed
	Brush 52	Cross staffed
	Air 52	Cross staffed
	Utility 52	Cross staffed
Station 53	Engine 53	2
	Medic 53	Cross staffed
	Brush 53	Cross staffed
	Utility 53	Cross staffed
Station 54 (Shop)	Mechanic Shop	0
Station 55 (CAL FIRE – Seasonal)	CAL FIRE Lease Fire Season	0
	Engine 55	0
Station 56	Engine 56	2
	Medic 56	Cross staffed
Station 56 Annex	Reserve Engine	Reserve
Station 61	Engine 61 (ALS)	2
	Medic 61	Cross staffed
	Utility 61	Cross staffed
Station 62 (Storage)	Water Tender 62	0
	Reserve Engine	Reserve
TOTAL		**13**

The region's fire agencies have developed a very comprehensive system for sharing resources. Regional fire agencies rely on mutual and automatic aid agreements for major structure fires, other higher risk incidents, and during periods of high incident activity. Though this system is not a substitute for locally delivered services, it provides significant depth of coverage for unusual circumstances. The following figure illustrates resources available from other fire departments near NTFPD/MBFPD.

Figure 10: Mutual Aid Resources from Area Fire Departments

Department	Engines	Ladders Trucks	Other	Total Available Staffing
North Lake Tahoe Fire District (NV)	3	1	4 Ambulances 3 Brush	12
Truckee Fire District	4	1	4 Ambulances 3 Brush	10
Squaw Valley Fire	1	0	2 Brush Engines	4
Northstar Fire	2	1	2 Brush Engines	4
Lake Valley Fire District	2	0	2 Ambulances 1 Brush Engine	6
TOTALS	**12**	**3**		**36**

Insurance Services Office Public Protection Classification

The Insurance Services Office (ISO) reviews the fire protection resources within communities and provides a Community Fire Protection Rating system from which insurance rates are often based. The rating system evaluates four primary areas: the emergency communication and dispatch system, the fire department, the community's pressurized hydrant or tanker-based water supply, and the fire department's community risk reduction efforts. The overall rating is then expressed as a number between 1 and 10, with 1 the highest level of protection and 10 unprotected or nearly so.

As of the latest survey (2017), ISO gave NTFPD/MBFPD inclusive of ASCWD's response area a rating of Class 3/3Y. The class 3 rating applies to property within five road miles of a fire station and within 1,000 feet of a credible water supply. Class 3Y applies to properties within five road miles of a fire station but beyond 1,000 feet of a credible water supply.

The emergency communications function includes the capabilities of the call receipt and dispatch system along with the quality and redundancy of communications systems between dispatchers and response units. ISO gave 8.45 points out of a possible 10 points to this element. Deficiencies were noted in the lack of emergency dispatch protocols intended to ensure correct call categorization.

The fire department is evaluated on its ability to provide needed apparatus within specified distances of developed property, the pump capacity and equipment carried on those apparatus, and the number of personnel staffing each. In addition, the fire department is evaluated on its training programs and facilities. NTFPD/MBFPD received 29.99 points out of a possible 50 points for this element. Deficiencies primarily related to insufficient on-duty personnel and lack of ladder truck capability.

The water system is evaluated on the amount of storage, size of water mains, distribution and condition of fire hydrants, and the ability of the system to deliver needed quantities of water based on specific risks within the service area. Where an underground water main and hydrant system is not available, the fire department is evaluated on its ability to deliver sufficient water using water carrying apparatus or via stationary water sources. The water system received 34.05 points out of a possible 40 points. Minor deficiencies were noted in the water supply system (when needed water flow from fire hydrants is compared to available water flow) and in the fire hydrant inspection program.

Community risk reduction evaluates the fire department's fire inspection, public education, and fire investigation programs. NTFPD/MBFPD received 5.1 out of a possible 5.5 points for this component. Minor deficiencies were noted in personnel certification and the scope of public education programs delivered.

Current Service Delivery Goals

A Performance Statement as well as goals for the services provided by NTFPD/MBFPD have been developed. These further define the quality and quantity of service expected by the community and consistently pursued by the department.

Overall Performance Statement and Response Performance Goals

The North Tahoe Fire Protection District provides the highest possible level of fire and life safety, rescue and emergency medical service, fire prevention and public education to the citizens and visitors of the communities we serve.

NTFPD/MBFPD has adopted the following service delivery goals for measuring response performance:

Dispatch Call Processing Time

- 911 calls will be answered at the primary PSAP within 15 seconds, 95 percent of the time.
- Calls will be transferred from the primary PSAP to GVECC within 30 seconds from the time answered, 95 percent of the time.
- Response resources shall be notified of a priority incident within 64 seconds from receipt of the call at the dispatch center, 90 percent of the time.

Turnout Time

- Response personnel shall initiate response to a priority non-wildland fire and special operations incidents within 80 seconds from notification, 90 percent of the time.
- Response personnel shall initiate response to a priority wildland fire incident within three minutes from notification, 90 percent of the time.
- Response personnel shall initiate response to all other priority incidents within 60 seconds from notification, 90 percent of the time.

Response time for arrival of the first response unit at a priority incident

- The first response unit capable of initiating effective incident intervention shall arrive at a priority non-wildland fire and special operations incident within 5 minutes, 20 seconds from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at a priority wildland fire incident within 8 minutes from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at all other priority incidents within 5 minutes, from notification of response personnel, 90 percent of the time.

Response time for arrival of the effective response force at a moderate risk structure fire

- The full effective response force shall arrive at a moderate risk structure fire within 9 minutes, 20 seconds, of notification of response personnel, 90 percent of the time.
- The full effective response force shall arrive at a wildland fire within 11 minutes of notification of response personnel, 90 percent of the time.

NTFPD/MBFPD is not currently achieving these goals as will be demonstrated in a later section of this report.

COMPONENT C | COMMUNITY EXPECTATIONS FOR TYPE AND LEVEL OF SERVICE

The goal of any emergency service delivery system is to provide sufficient resources—personnel, apparatus, and equipment—to the scene of an emergency in time to take effective action to minimize the impacts of the emergency. This need applies to fires, medical emergencies, and any other emergency situations to which the fire department responds. Obtaining and understanding the desires and expectations of community stakeholders is an important first step. The North Tahoe and Meeks Bay Fire Protection Districts are committed to incorporating the needs and expectations of residents and policy makers in the service delivery planning process.

It is important to note that the information solicited and provided during this process was provided in the form of "people inputs," some of which are perceptions as 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. The observations included in this report were confirmed by multiple sources or the information provided was significant enough to be included. Based on the information review, the team was able to identify a series of observations, recommendations, and needs which are included in this report.

The responses are summarized below.

Please describe your expectations of the fire district.

- Responses had a common thread in that continuing the services the two districts currently provide and being capable to provide the community the best services that they possibly can, is important. Additional comments included that the two districts should be combined, attention should be paid to response time, as well as public education regarding fire danger.

What of these expectations are not being met to your satisfaction?

- The two districts have not come together yet.

Are there services that you think the fire district should be providing that they are not now?

- The majority of those interviewed stated that there is nothing the district should be providing that they are not. A comment was made that working with Placer County Building Department to take over as the enforcement agency in lieu of North Tahoe Fire Protection District. I.e., enforcement of the problem with BBQs on the deck, open burning, etc.

Are there services the fire district is providing that you think should be discontinued or done differently?

- Responses were consistent "No."

When you dial 911 to report an emergency, how long should it take for help to arrive?

- The majority of responses "5 minutes." An additional response was "20 minutes or less."

Does that expectation change depending on where in the system service area you are located?

- Response times often depend on road conditions, influx of tourism, road construction, speed bumps, and proximity of the emergency location.

There are two deployment strategies for fire service resources. The first suggests that all residents of the District should receive generally the same level of service; fire stations are spaced uniformly to equalize response time throughout the community. The other deployment strategy suggests resources should be deployed to serve the next most-likely emergency to occur, i.e., the more populated an area, the more likely an emergency will occur. One choice tries to create as much equity in the delivery of service to all residents. The other concentrates resources in areas with higher incident activity, leaving other areas with slower service. Which strategy do you think makes the most sense for the community?

- Comments varied from staffing in the more concentrated/populated areas to taking into consideration that all residents pay equal taxes; therefore, should receive equal service delivery.

Please share any other thoughts or comments you may have.

- Biggest concern is the threat of a forest fire. The threat increases when non-residents come to enjoy the beautiful area and don't think twice about starting a fire under a tree.

What other information would you like to add?

- Would like to see more public participation at the meetings rather than communicating via electronic messages; they need to be more involved. Pleased that ESCI is working on the Standards of Cover and interviewing stakeholders.

COMPONENT D | COMMUNITY RISK ASSESSMENT

This section analyzes certain categorical risks present within the NTFPD/MBFPD service area that potentially threaten the people and property within the community and that can create response workload for the NTFPD/MBFPD. These risks are identified to assist in identifying where to locate response resources in the types and numbers needed to effectively respond to likely emergencies.

Geographic and Weather-Related Risks

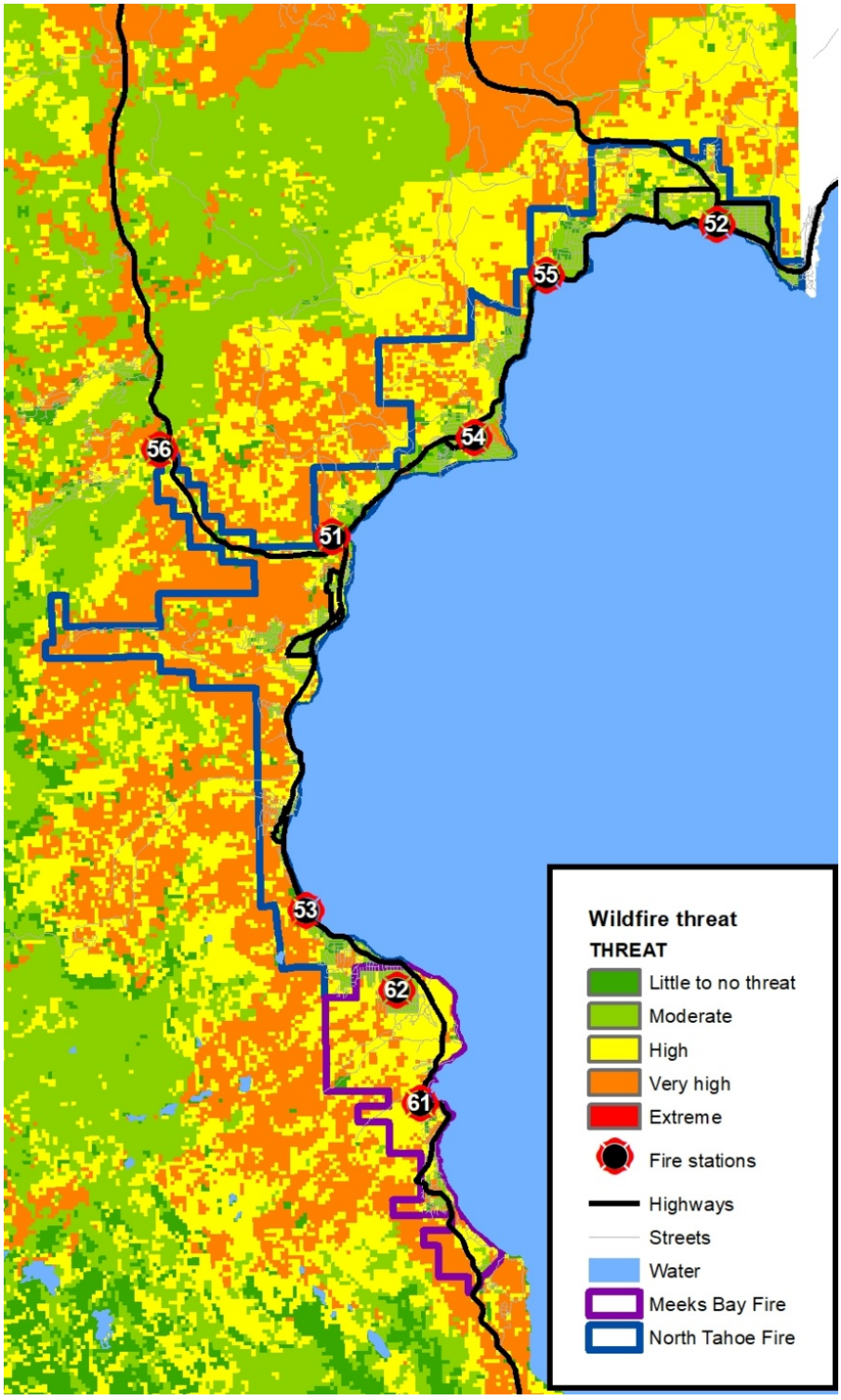
Weather Risk

The Lake Tahoe area climate is best described as a snowy, highland climate, characterized by warm to hot dry summers and cold, snowy winters. Snowfall averages 140 inches each year. The lowest temperature recorded was minus 29 degrees Fahrenheit and the highest temperature recorded was 99 degrees Fahrenheit. The region receives an average of 16 inches of rainfall each year occurring mostly in the winter months. Average temperatures range from 29 degrees Fahrenheit in December and January to highs of 75 degrees in July and August.

Wildfire Risk

Because of the region's climate, the risk of wildland fires exists. The following map illustrates wildland fire threat as defined by the California Department of Forestry and Fire (CAL FIRE).

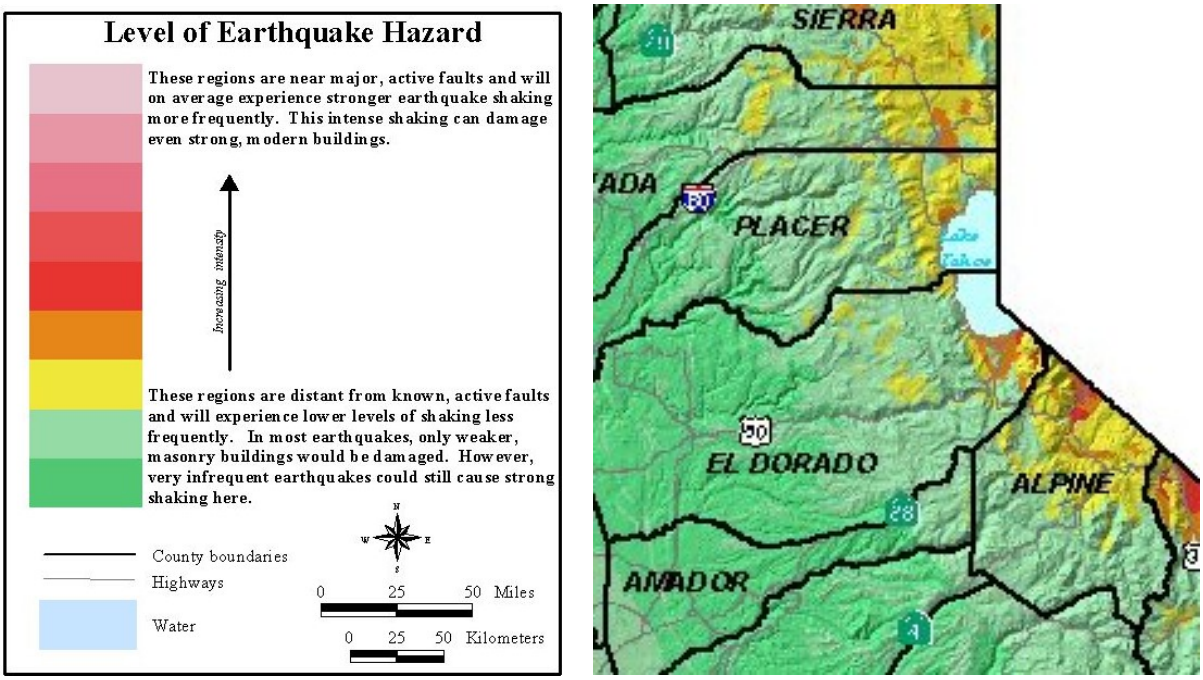
Figure 11: Wildfire Threat



Earthquake Risk

The Lake Tahoe region is a high risk for earthquakes. Recent study reveals that faults within the area could produce a magnitude 7.3 earthquake that would produce tsunami waves or seiche waves as much as 30 feet high on Lake Tahoe. Quakes of this magnitude have occurred in the past, as recently as 500 years ago.

Figure 12: Lake Tahoe Region Earthquake Hazards



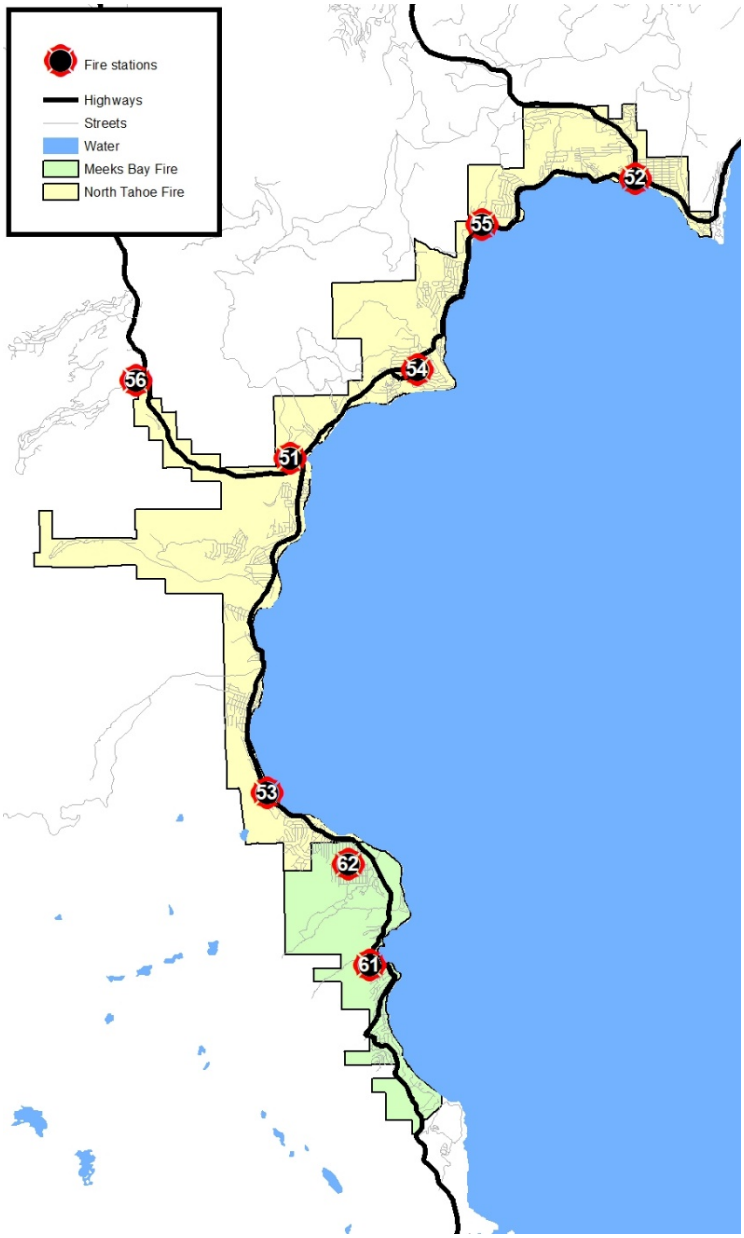
Transportation Risks

Transportation corridors provide necessary access and egress for the department. The configuration of transportation systems can also affect the response capability of emergency services. Limited access resulting from weather incidents, peak tourism travel, and special events can interrupt street connectivity, forcing apparatus to negotiate a circuitous route to reach an emergency scene.

Roads

Surface streets dominate the service area and Highway 89 provides collector and arterial level traffic circulation. The balance of the department's service has a limited mix of interconnected and numerous disconnected street networks.

Figure 13: Street System



Railroads

There are no railroad lines within the service area.

Airport

There are no airports within the service area. There are several airports in the region though none provide scheduled service airline flights. Numerous aircraft transit the sky above the service area daily.

Physical Assets Protected

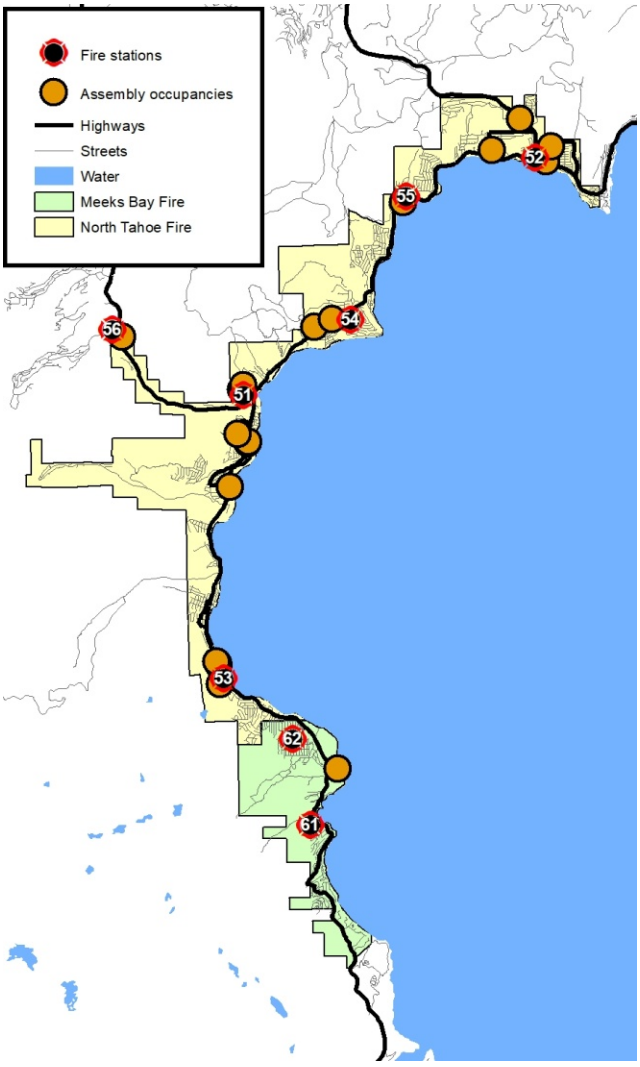
Many buildings in the service area are used for purposes that create more significant risk than others. High occupancy buildings, facilities providing care to vulnerable populations, and others may require greater numbers of emergency response resources during an emergency. This section draws on information from NTFPD/MBFPD records and other sources.

Public Assembly

Numerous buildings lie within the cities in which large numbers of people gather for entertainment, worship, and such. A variety of nightclubs, theaters, and other entertainment venues exist.

These facilities present additional risk, primarily for mass casualty incidents. Fire, criminal mischief, and potentially terrorism could cause a major medical emergency requiring significant emergency service resources. The following figure shows the locations of buildings identified as public assembly facilities within the service area.

Figure 14: Public Assembly Facilities

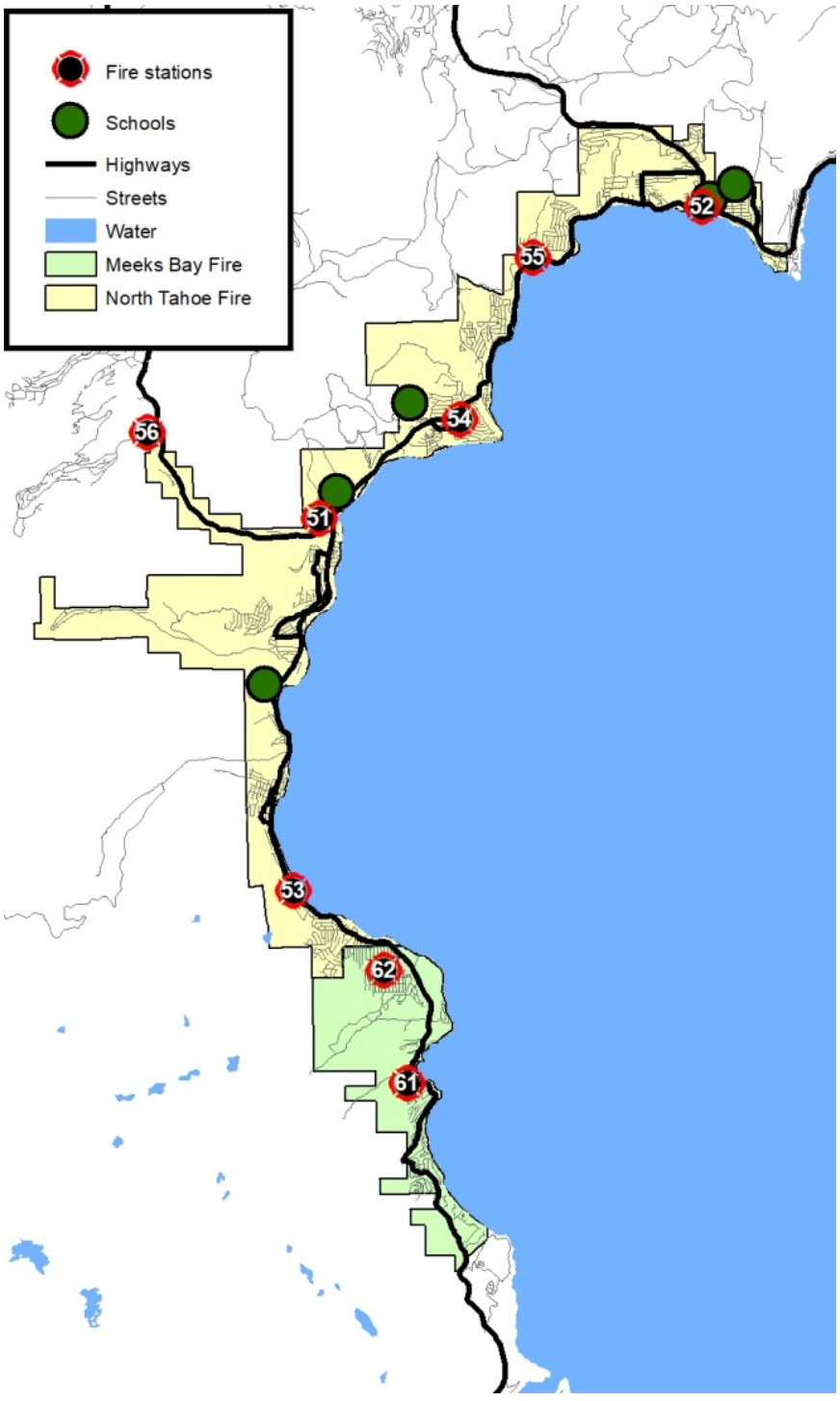


Schools

The Tahoe Truckee Unified School District serves the area's children. The district operates 12 schools in and out of the NTFPD/MBFPD service area with a total enrollment of just over 4,000 students.

The following figure shows the locations of public and private school facilities.

Figure 15: Public and Private School Facilities



Medical Facilities

There are no medical facilities within the NTFPD/MBFPD service area

Other Critical Infrastructure

In this section, other types of infrastructure critical to a community are discussed in general terms. It is important the fire department plan for emergencies at any of these facilities.

WATER DISTRIBUTION

The most obvious concern to the fire department is the water reservoir, water main, and fire hydrant system. Providing sufficient storage, distribution, and access to this valuable firefighting resource through well-distributed fire hydrants is very important.

COMMUNICATIONS

Emergency communication centers and the associated transmitting and receiving equipment are essential facilities for emergency response. A number of agencies provide emergency 911 call receipt. GVECC provides dispatch service to several regional fire agencies. This center provides for the interrogation of 911 calls for help, dispatching of fire and other emergency responders, and important support to the incident management function.

There are other communication facilities and equipment that are equally important to the community and government operations. These are the telephone company central offices and the transmission lines of local telephone service providers. Internet service providers, along with wireless cellular communication providers, provide essential communication capabilities for the community as well as emergency personnel through their facilities and equipment.

ENERGY

Previously discussed community services, from communications to traffic signals to normal operations, require the use of energy. Whether it is electricity generation and transmission systems, fuel distribution and storage tanks, or natural gas pipelines and regulator stations, the community is dependent upon energy sources.

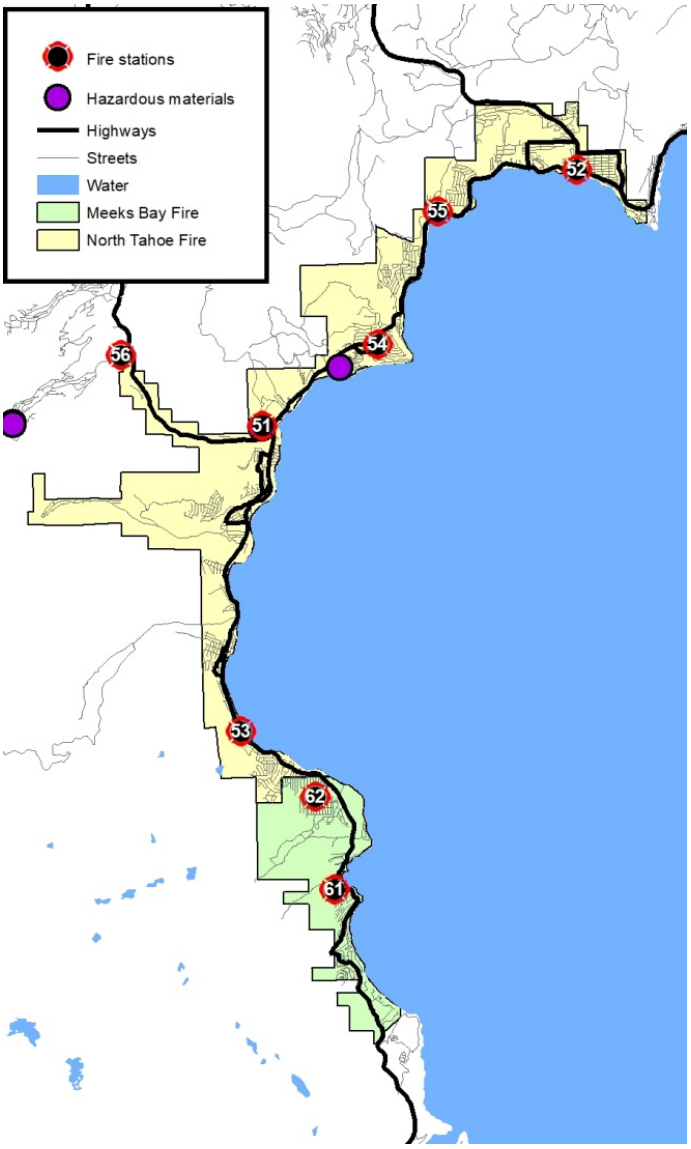
Structural Risks

Certain buildings, their contents, functions, and size present a greater firefighting challenge and require special equipment, operations, and training. Information for this section has been drawn from NTFPD/MBFPD records and the Insurance Services Office (ISO) database.

HAZARDOUS MATERIALS

Buildings that have been identified as containing hazardous materials can create a dangerous environment to the community as well as the firefighters during a spill or fire. Special equipment such as protective clothing and sensors, along with specialized training, is necessary to successfully mitigate a hazardous materials incident. The following figure shows the locations of the two facilities classified as using more than small quantities of hazardous materials. Only one is located within the NTFPD/MBFPD service area.

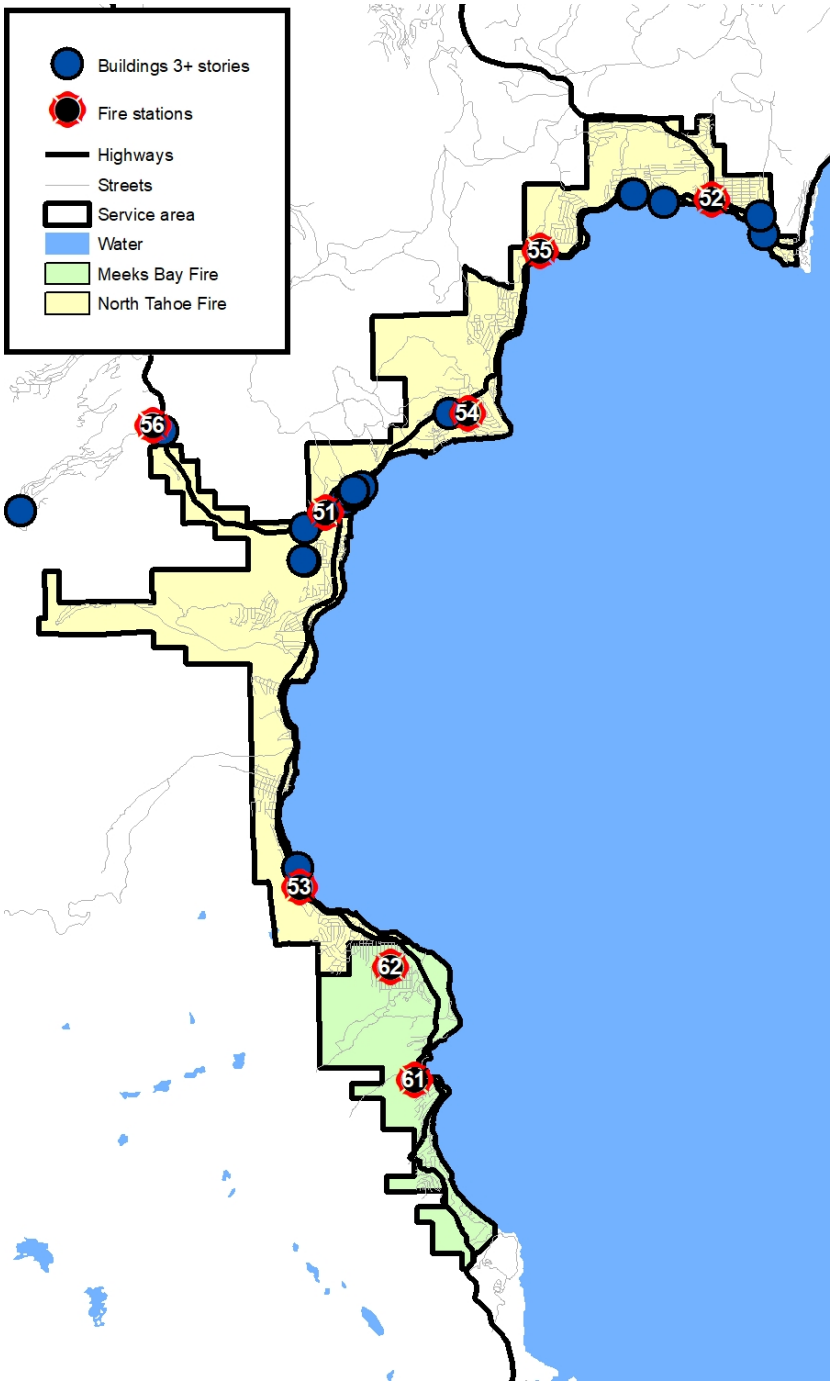
Figure 16: Hazardous Material Use Locations



BUILDINGS THREE OR MORE STORIES IN HEIGHT

The Insurance Services Office calls for a ladder truck within 2.5 miles of developed areas containing buildings three or more stories in height. Accessing the upper floors and roof of buildings this tall typically requires ladder truck capability as ground ladders may not provide access. The following figure shows the locations of buildings that are three stories in height. There are two buildings taller than three stories, both of which are seven stories tall.

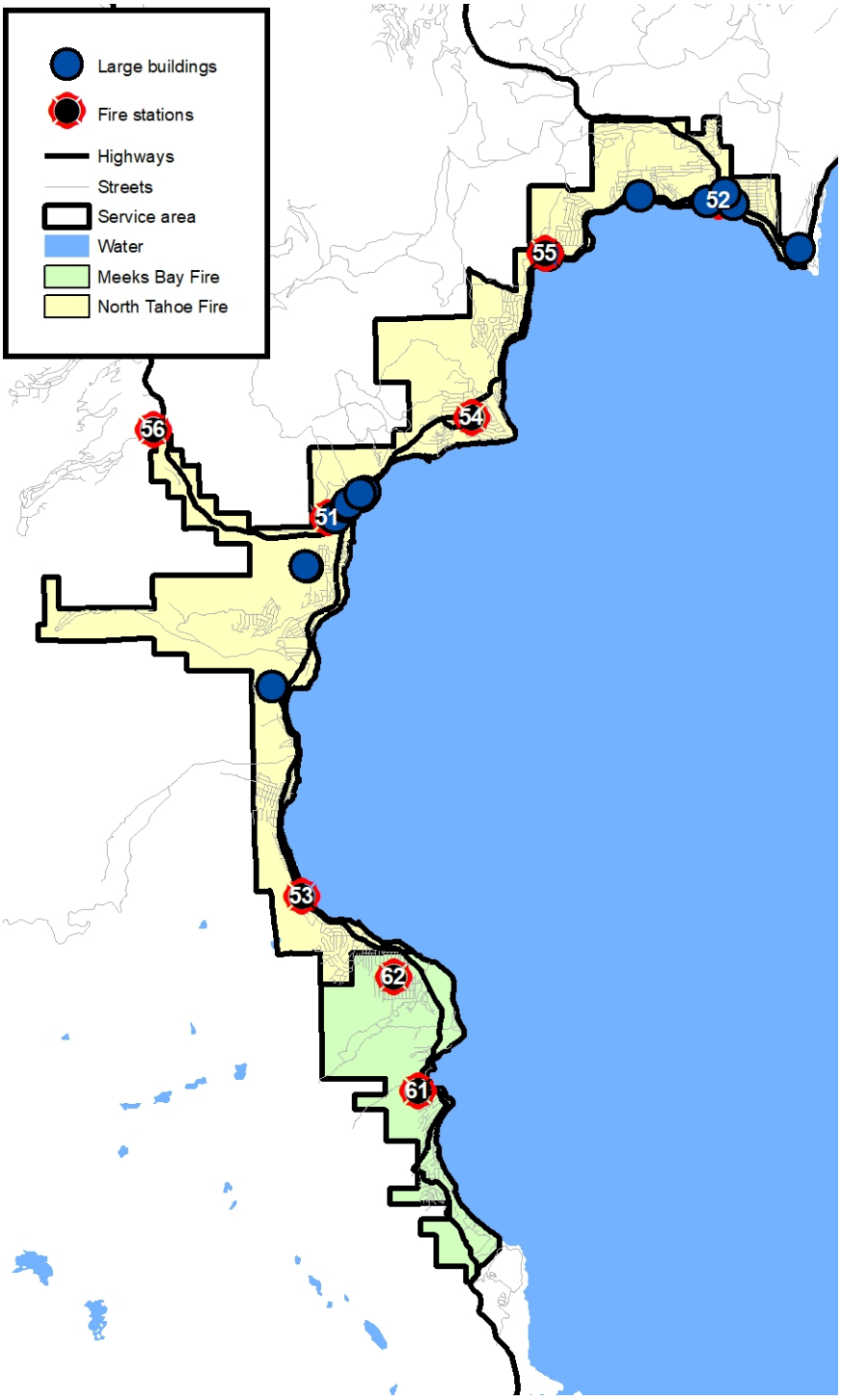
Figure 17: Buildings Three or More Stories in Height



LARGE SQUARE FOOTAGE BUILDINGS

Large buildings require more firefighters to advance hose lines long distances into the building. The following figure shows the locations for buildings 25,000 square feet and larger, the largest being just over 71,000 square feet.

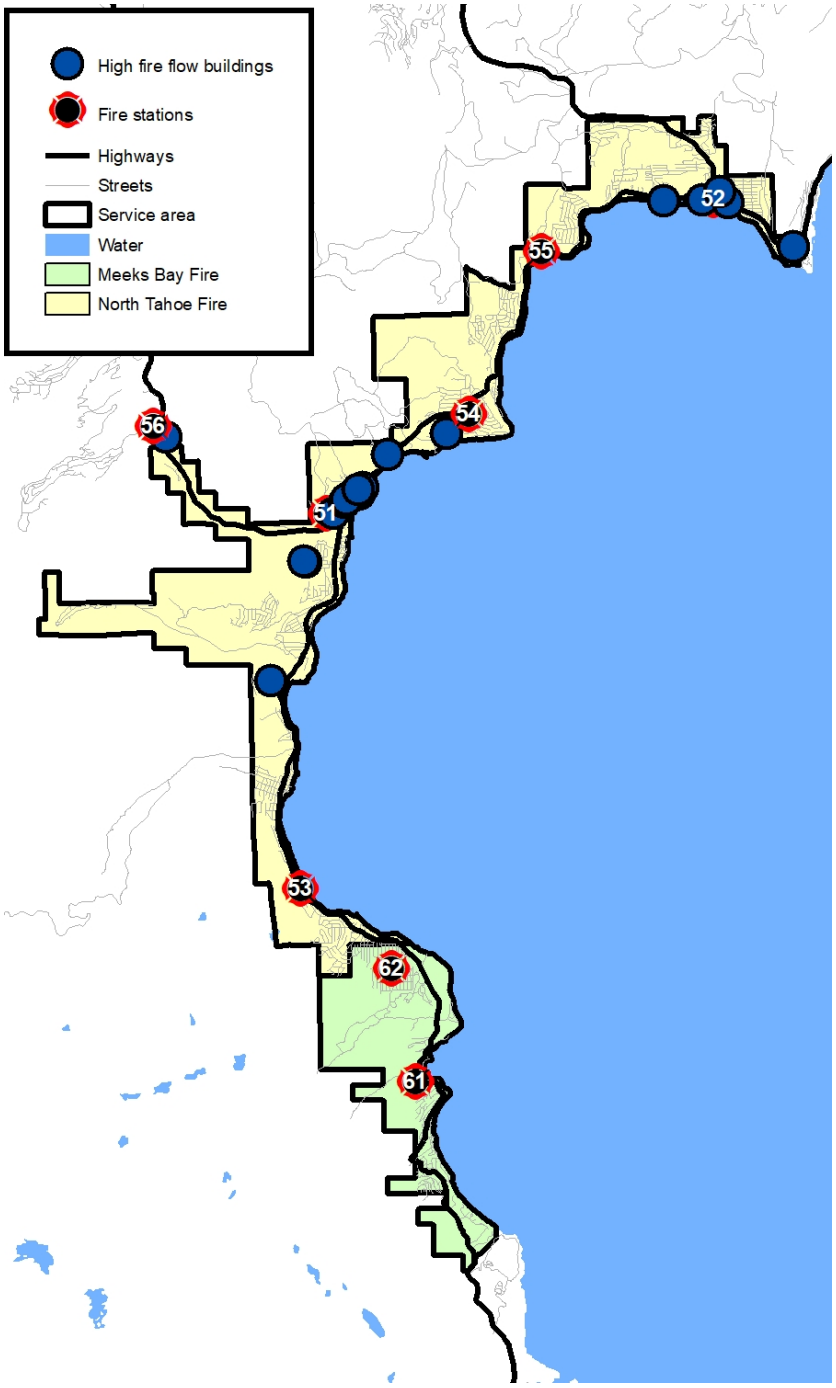
Figure 18: Buildings—25,000 Square Feet and Larger



HIGH FIRE FLOW BUILDINGS

Fire departments must deliver sufficient resources to a fire to apply an adequate amount of water to extinguish a fire. Larger buildings and buildings constructed of combustible construction require more water (in gallons per minute) that smaller, fire resistive buildings with automatic extinguishing systems. The following figure shows the locations of buildings with a needed fire flow of 2,500 gallons per minute or more.

Figure 19: High Fire Flow Buildings



Terrorism

All communities are potential targets for terrorism. Most of the previously categorized risks in the community are targets for such activity. In addition, the area hosts numerous large public gathering events during the year.

Ski Resorts

There are several ski resorts in or near NTFPD/MBFPD's service area. These generate an influx of population and have unique risks associated with them.

Homewood Mountain Resort covers 1,260 acres and can accommodate approximately 4,500 skiers per day. It has a lodge with food services, rentals, and retail shops. The lodge has an occupancy of about 350 and is approximately 7,500 square feet in size. There are proposals to expand the facility to include lodging, parking, residential, fractional ownership, retail, dining, and village like redevelopment of the whole resort. This would substantially increase the occupancy load, square footage, assessed valuation, and change the use from limited seasonal occupancy to year-round multipurpose use. This resort generated about 125 calls this last season alone in spite of its late opening due to lack of snow.

Alpine Meadows Resort covers 2,400 acres and can handle 7,000 skiers per day. It has a lodge with food services, rentals, and retail. The lodge has an occupancy of about 700 people and is approximately 35,000 square feet in size. It also has several other large operational facilities. This ski area has limited, one way in one way out, access and has a significant avalanche threat during heavy storms.

Squaw Valley Ski Resort is within the NTFPD EMS service area and within the districts automatic aid area. It covers an area of about 6,000 acres and can handle 17,000 skiers per day.

Base Lodge, High Camp, Gold Coast, and Village facilities comprised of several midrise, multi-level, multi-use structures were built between the 1950s and present. The Village has been developed over the last 15 years. These facilities cover several hundred thousand square feet and can be occupied by several thousand people during peak events. This area also has a significant avalanche threat during heavy storms.

All of these resorts are very high occupancy target hazards during the ski season, and during other special events that are hosted year-round. Many of the facilities are large wood frame structures well over 30 years in age.

Development and Population Growth

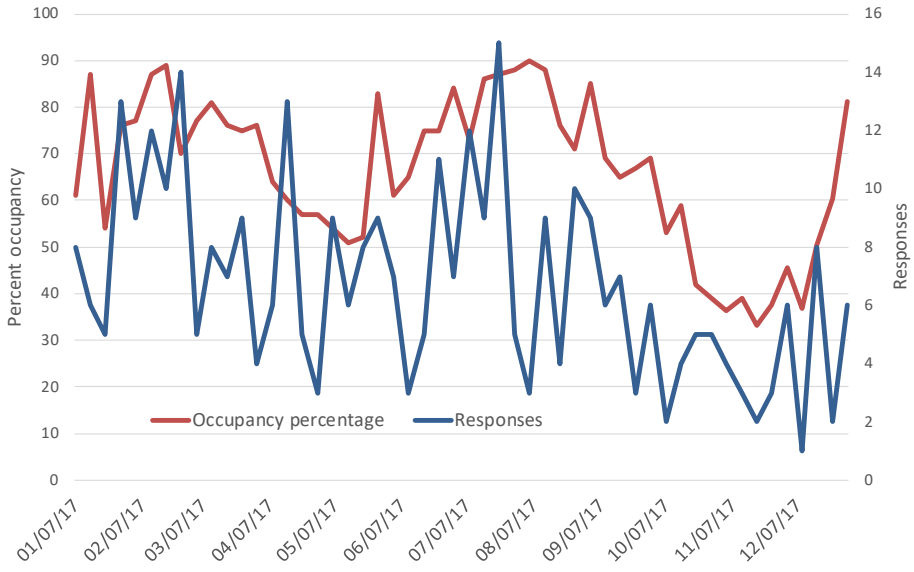
Current Population Information

The districts serve a resident population of approximately 15,000 people. An unknown number of additional part-time residents reside in the districts seasonally. In addition, the number of visitors who travel to the area can only be estimated. Little is known about how population has changed over the past years.

An analysis performed by Stantec using cell phone data purchased from Air Sage for three months in 2014—February, July, and August—arrived at a statistic of visitors entering the Tahoe Basin 24.4 million times. This number is at an 80 percent confidence level, meaning it can range from 19.5–29 million in any given year. The data also showed that winter and summer day use accounted for 42 to 43 percent of that figure, the balance of those entering staying at least one night. A traffic engineer correlated the analysis with historic traffic counts collected by NDOT and Caltrans. Since this effort was for transportation planning the visits were translated into vehicles, which when rounded up amounts to 10 million visitor vehicles entering the Lake Tahoe region.

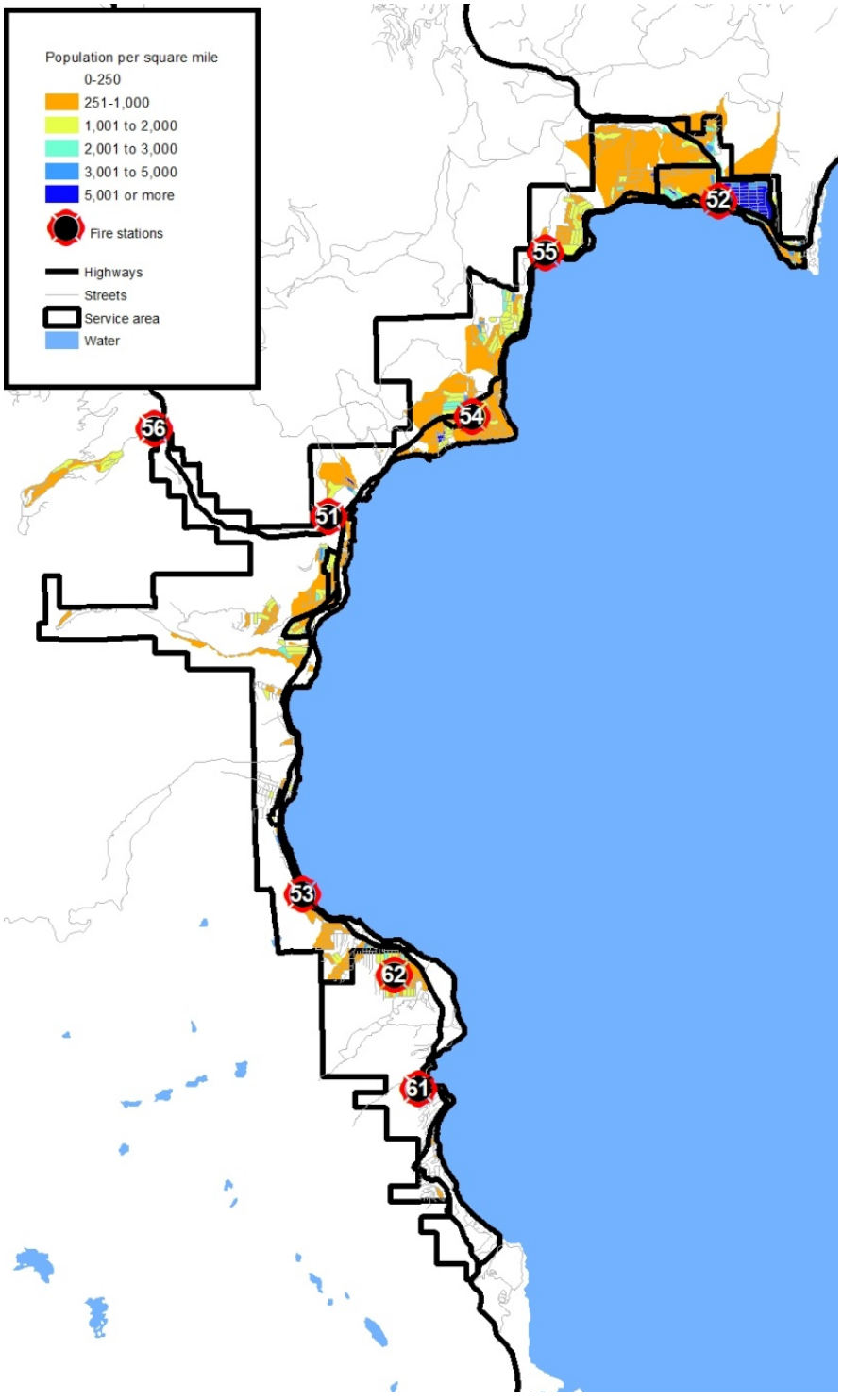
A comparison of hotel occupancy rate and responses was also made. The following figure illustrates the percentage of hotel occupancy on each Saturday in 2017 and the number of responses made by NTFPD/MBFPD on that same Saturday. While there is some indication that higher occupancy increases response activity the correlation between the two factors is only 0.47.

Figure 20: Comparison of Hotel Occupancy to Response Activity



There is a direct correlation between resident population density and service demand. The following figure displays the population density of the service area based on 2010 Census data. Census data only includes people who live full-time in the community. It does not include people who visit or reside temporarily in a community.

Figure 21: Population Density, 2010



Risk Classification

Areas of higher fire and life risk require greater numbers of personnel and apparatus to effectively mitigate emergencies. Areas with a higher incident activity require additional response units to ensure reliable response. Staffing and deployment decisions for different regions of the districts should be made in consideration of the level of risk in each.

Most communities contain areas with different population densities and property risk allowing the community's policy makers to specify different response performance objectives by geographic area. The classifications are identified as:[1]

- **Metropolitan**—Geography with a population of over 200,000 people in total and a population density predominately over 3,000 people per square mile. These areas are distinguished by inner city neighborhoods, numerous mid-rise and high-rise buildings, often interspersed with smaller structures.
- **Urban**—Geography with a population of over 30,000 people and/or a population density predominately over 2,000 people per square mile. These areas are characterized by significant commercial and industrial development, dense neighborhoods, and some mid-rise or high-rise buildings.
- **Suburban**—Geography with a population of 10,000 to 29,999 and/or a population density predominately between 1,000 and 2,000 people per square mile. These areas are characterized by single and multifamily neighborhoods, and smaller commercial developments.
- **Rural**—Geography with a total population of less than 10,000 people or with a population density of less than 1,000 people per square mile. These areas are characterized by low density residential, little commercial development, and significant farm or open space uses.
- **Wilderness/Frontier/Undeveloped**—Geography that is both rural and not readily accessible by a publicly or privately maintained road.

The NTFPD/MBFPD service area, based on population density, is primarily rural with small pockets of suburban and urban classifications. The community's risk classification should influence how response resources are distributed now and in the future.

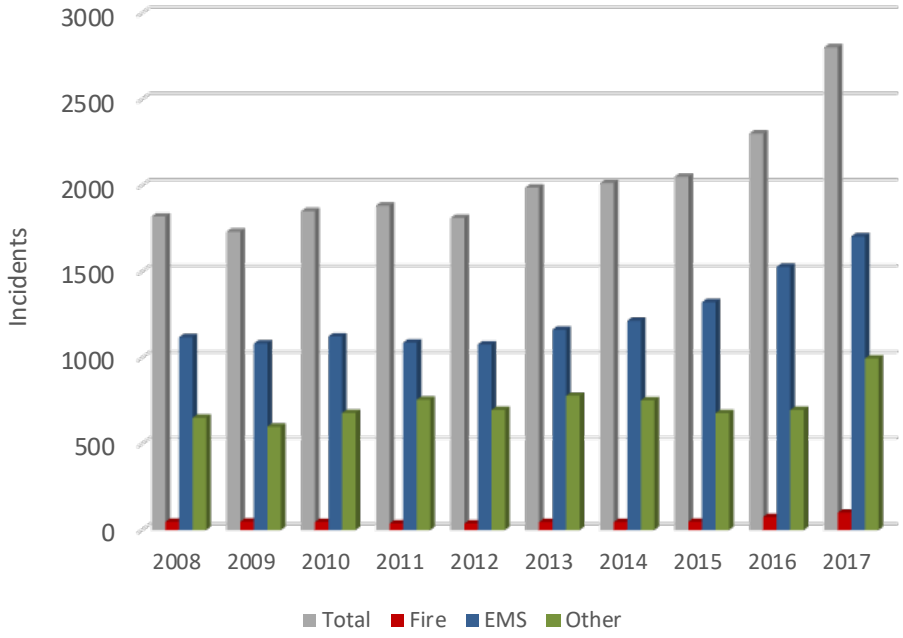
[1] CFAI *Standards of Cover, 5th edition.*

Historic System Response Workload

Before a full response time analysis is conducted, it is important to first examine the level of workload (service demand) that the fire district experiences. Higher service demands can strain the resources of a department and may result in a negative effect on response time performance.

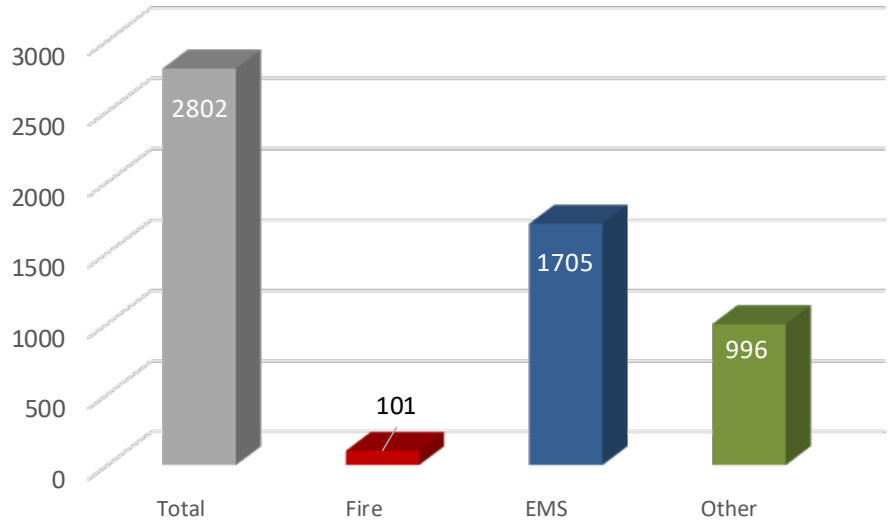
The following figure shows response workload for the past ten years. Total response workload has increased 54 percent, primarily driven by the increase in emergency medical responses.

Figure 22: Response Workload History, 2008–2017



Incident data used for the evaluation of current performance was also used to determine incident activity within the districts. During 2017, NTFPD/MFPD responded to 2,802 incidents within and outside its service area. Emergency medical type responses (EMS and motor vehicle accidents) are the most common at 60.8 percent of total responses.

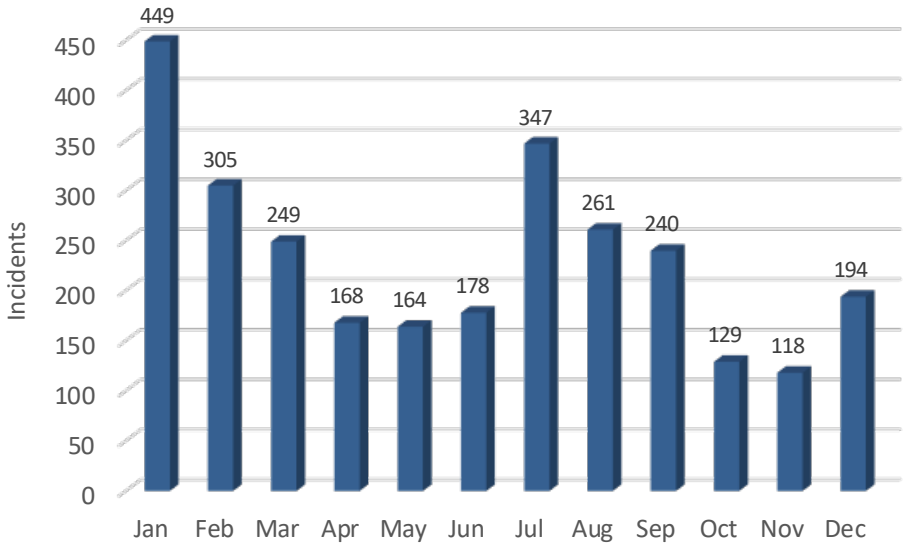
Figure 23: Incidents by Type, 2017



Temporal Analysis

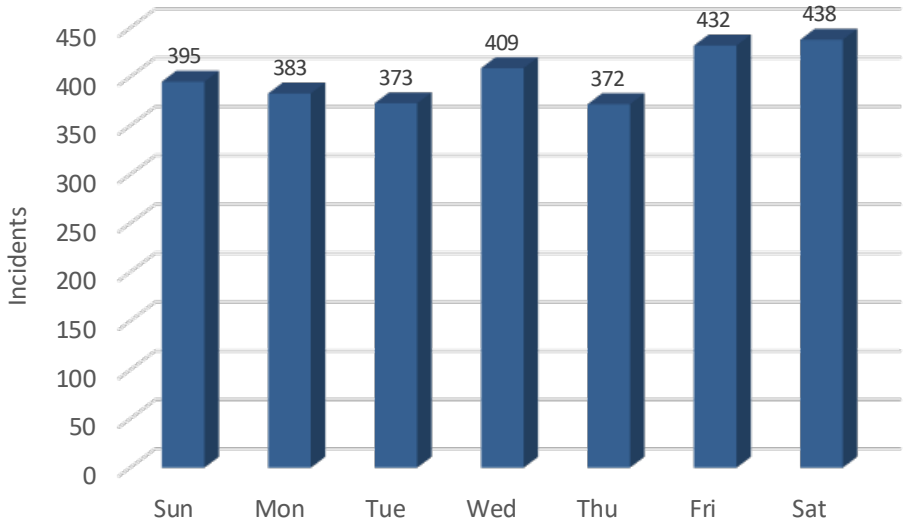
A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following figures show how activity and demand changes for NTFPD/MFPD based on various measures of time. The following figure shows response activity during the study period by month. There is significant variation by month.

Figure 24: Monthly Response Workload, 2017



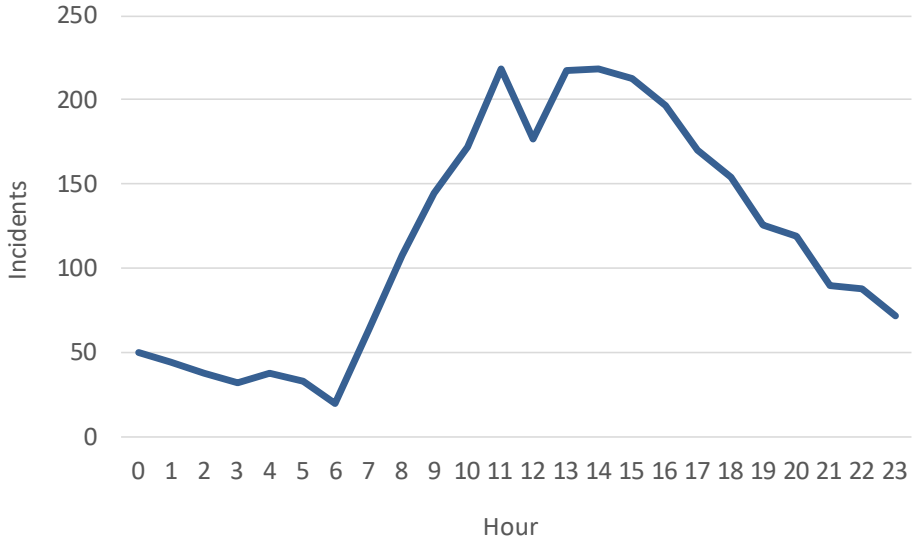
Next, response workload is compared by day of week. There is some variation in response workload by weekday with Wednesday, Friday, and Saturday the busiest.

Figure 25: Daily Response Workload, 2017



The time analysis that always shows significant variation is response activity by hour of day. Response workload directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours as shown in the following figure. Incident activity is at its highest between 8:00 AM and 8:00 PM.

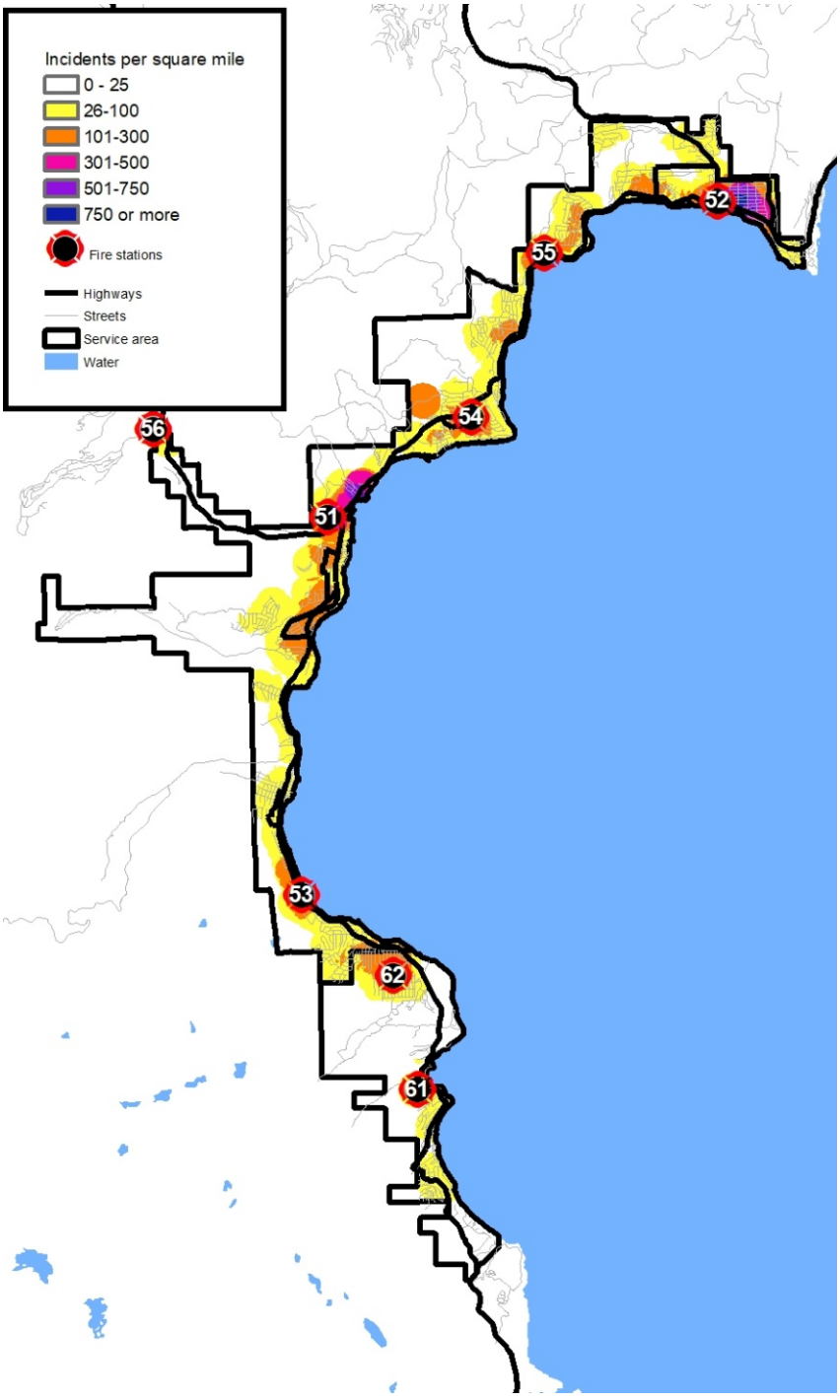
Figure 26: Hourly Response Workload, 2017



Spatial Analysis

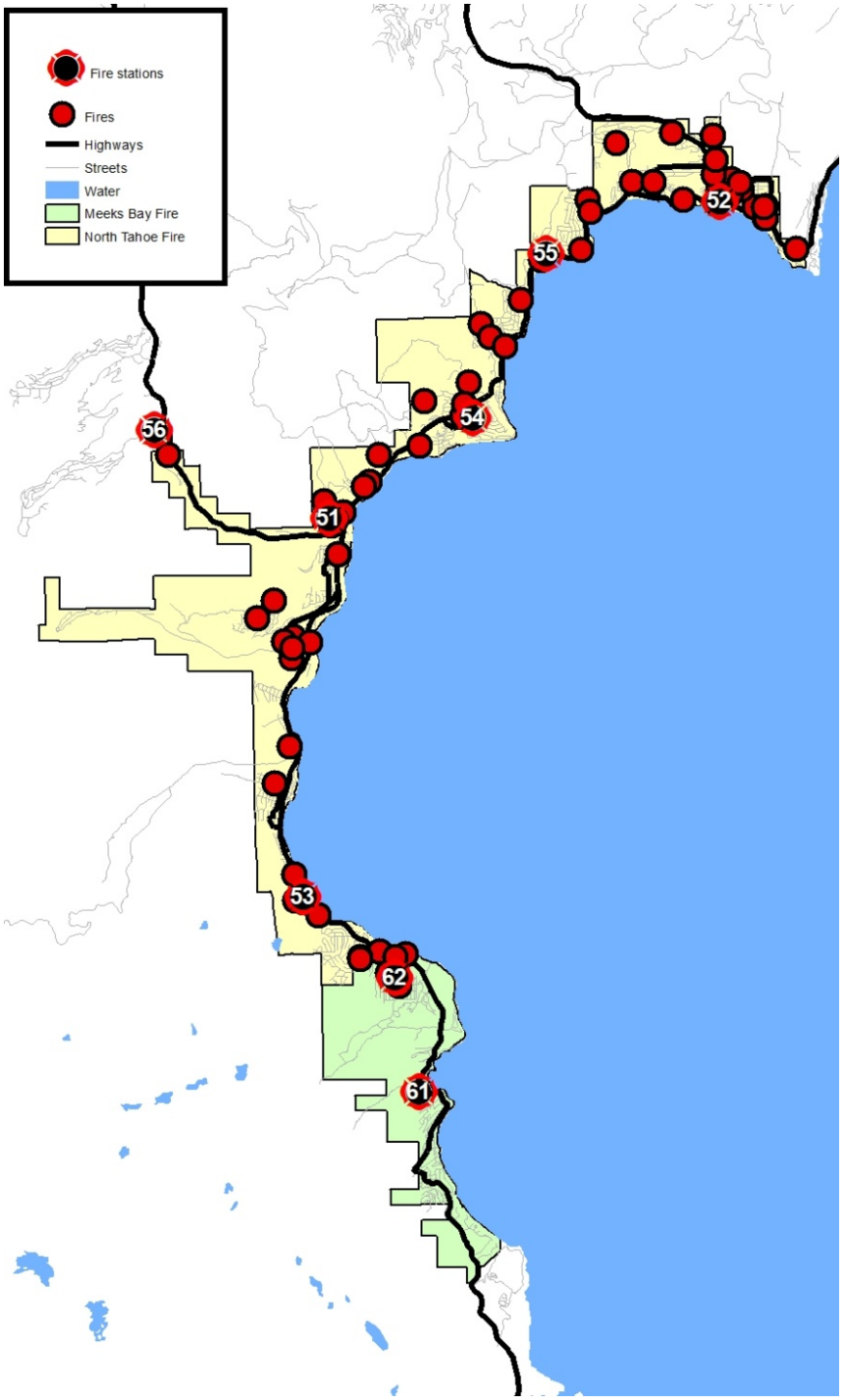
In addition to the temporal analysis of the current service demand, it is useful to examine geographic distribution of service demand. The following figures indicate the distribution of emergency incidents in the service area during 2017. The first figure displays the number of incidents per square mile within various parts of the service area. The area of greatest service demand is the vicinity of Station 51 and 52.

Figure 27: Service Demand Density, 2017



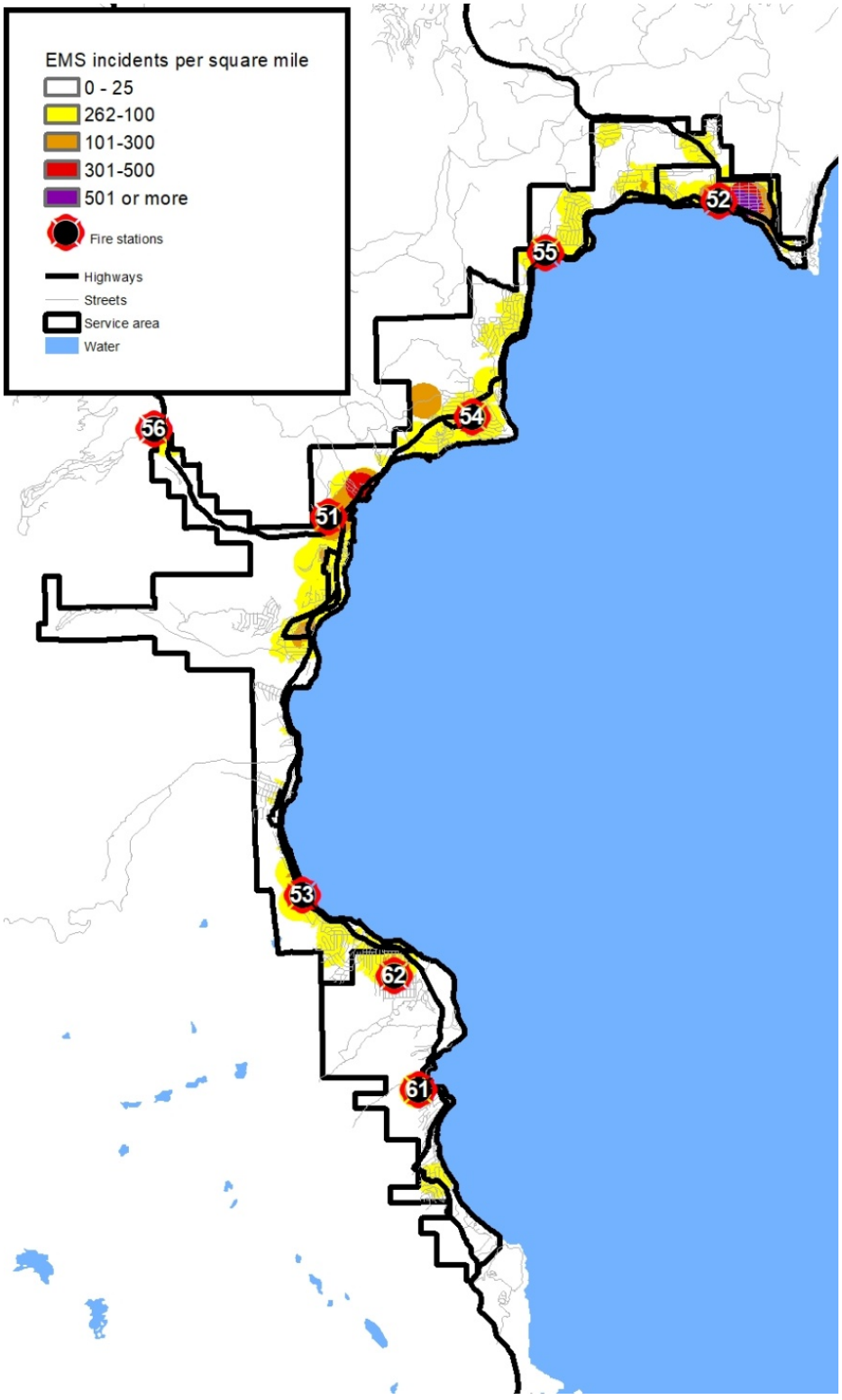
The preceding figure reflects all calls within the service area. Service demand can vary by area based on incident type. The following figure displays the location of fires occurring within the service area during 2017.

Figure 28: Fires, 2017



Similarly, emergency medical incidents also occur in greater concentration in areas of higher population density. The following figure displays emergency medical incidents per square mile during 2017.

Figure 29: Emergency Medical Incidents per Square Mile, 2017



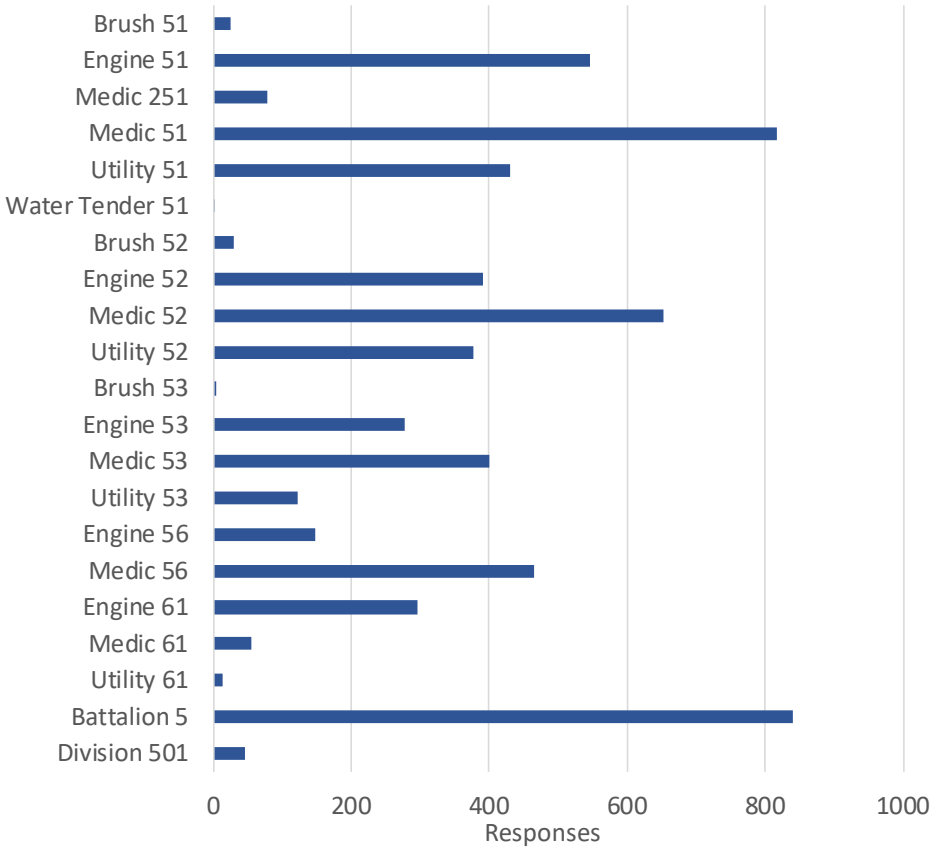
Unit Workload Analysis

A review of workload by response unit can reveal much about response time performance. Although fire stations and response units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area. If a response unit is already on an incident and a concurrent request for service is received, a more distant response unit will need to be dispatched. This will increase response times.

Response Unit Workload

The workload on individual response units during the 2017 is shown in the following figure. Individual response unit workload can be greater than the workload in its home station area. Many incidents, such as structure fires, require more than one response unit.

Figure 30: Response Unit Workload, 2017



The amount of time a given unit is committed to an incident is also an important workload factor. The following figure illustrates the average time each unit was committed to an incident, from initial dispatch until it was available for another incident

Figure 31: Average Time Committed to an Incident by Unit, 2017

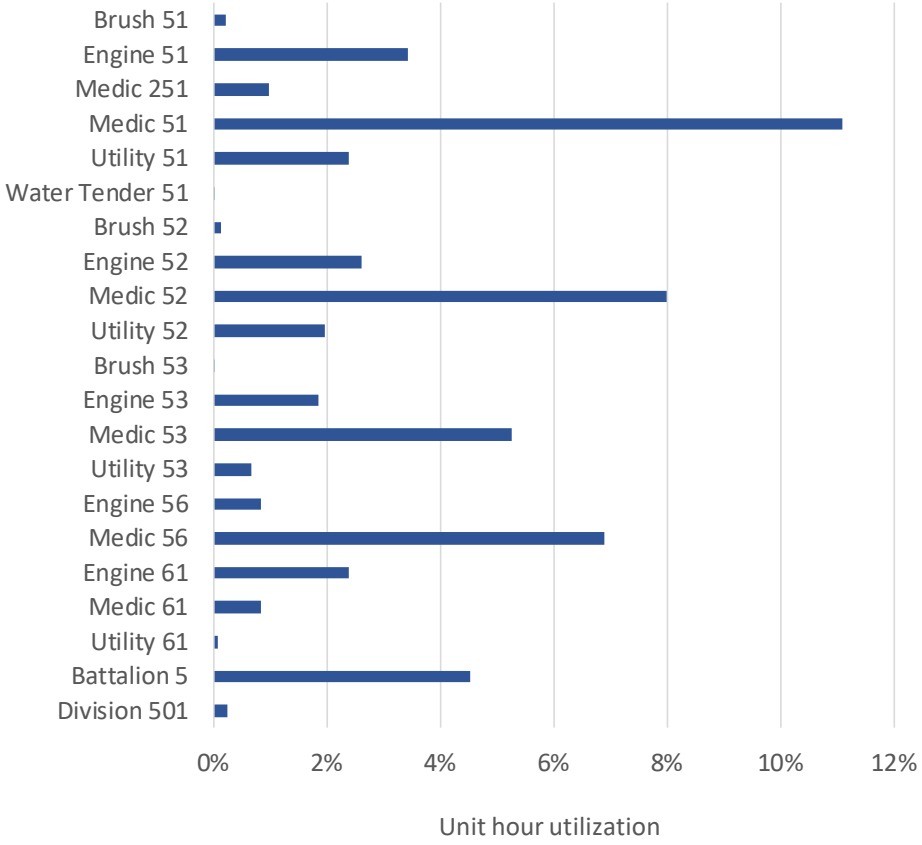
Unit	Responses	Average Minutes per Response
Brush 51	26	42.5
Engine 51	545	33.2
Medic 251	78	66.5
Medic 51	816	71.4
Utility 51	430	29.3
Water Tender 51	2	33.6
Brush 52	30	21.4
Engine 52	390	35.2
Medic 52	653	64.4
Utility 52	377	27.5
Brush 53	3	17.4
Engine 53	277	35.0
Medic 53	399	69.2
Utility 53	122	29.1
Engine 56	148	30.2
Medic 56	464	78.1
Engine 61	295	42.3
Medic 61	56	78.5
Utility 61	14	25.5
Battalion 5	840	28.3
Division 501	45	27.8

Unit hour utilization is an important workload indicator. It is calculated by dividing the total time a unit is committed to all incidents during a year by the total time in a year. Expressed as a percentage, it describes the amount of time a unit is not available for response since it is already committed to an incident. The larger the percentage, the greater a unit's utilization and the less available it is for assignment to an incident.

Unit hour utilization is an important statistic to monitor for fire agencies using percentile-based performance standards, as does NTFPD/MBFPD. In this case, where performance is measured at the 90th percentile, unit hour utilization greater than 10 percent means that the response unit will not be able to provide on-time response to its 90 percent target even if response is its only activity.

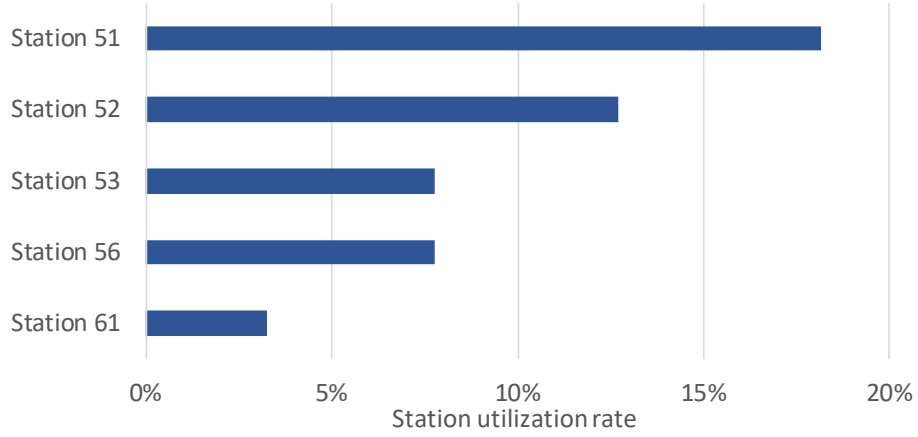
Medic 51 is the only unit that exceeds 10 percent unit hour utilization.

Figure 32: Unit Hour Utilization, 2017



NTFPD/MFPD station crews operate multiple units and select the one most appropriate to the type of incident. This means that the crews in each station are utilized more than would appear by evaluating individual response units. The following figure illustrates crew utilization by station. The crews at Stations 51 and 52 are utilized more than the target 10 percent.

Figure 33: Station Utilization Rate, 2017



Population Forecast

A population forecast was not available for this study. Annual historic population growth is also not quantified sufficiently to draw conclusions about fire district utilization rates. Tourism has been increasing since the recession of 2008. Some new housing is expected but development is controlled. There are proposals in the planning stages for an additional 460 homes and an additional 100 units of lodging. NTFPD/MBFPD should work with its community partners to try to quantify future development and population growth and expected visitor counts.

Incident Workload Projection

The most significant predictor of future incident workload is population; 100 percent of requests for emergency medical service are people-driven. The National Fire Protection Association reports that approximately 70 percent of all fires are the result of people either doing something they should not have (i.e., misuse of ignition source) or not doing something they should have (i.e., failure to maintain equipment). It is reasonable to use forecast population growth to predict future fire department response workload.

Current utilization rates cannot be determined because actual visitor numbers cannot be accurately determined thus a response workload forecast cannot be reliably developed. Intuitively, NTFPD/MBFPD should expect response workload to increase over time and should be prepared to serve that growing demand.

COMPONENT E | CRITICAL TASKING AND ALARM ASSIGNMENTS

The NTFPD/MBFPD service area is primarily rural with pockets of suburban and urban environments. As such, contains an elevated number, density, and distribution of risk. The fire districts should have the resources needed to effectively mitigate the incidents that have the highest potential to negatively impact the community. As the actual or potential risk increases, the need for higher numbers of personnel and apparatus also increases. With each type of incident and corresponding risk, specific critical tasks need to be accomplished and certain numbers and types of apparatus should be dispatched. This section considers the community's identified risks and illustrates the number of personnel that are necessary to accomplish the critical tasks at an emergency.

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 and their location, status, and 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 different types of fires. In the absence of adequate personnel to perform concurrent action, the command officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include:

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

Critical task analysis also applies to non-fire type emergencies including medical, technical rescue, and hazardous materials emergencies. Numerous simultaneous tasks must be completed to effectively control an emergency. The districts' ability to muster needed numbers of trained personnel quickly enough to make a difference is critical to successful incident outcomes.

The following figure illustrates the minimum emergency incident staffing recommendations of the Commission on Fire Accreditation, International. The following definitions apply to the figure:

Low Risk—Minor incidents involving small fires (fire flow less than 250 gallons per minute), single patient non-life threatening medical incidents, minor rescues, small fuel spills, and small wildland fires without unusual weather or fire behavior.

Moderate Risk—Moderate risk incidents involving fires in single-family dwellings and equivalently sized commercial office properties (fire flow between 250 gallons per minute to 1,000 gallons per minute), life threatening medical emergencies, hazardous materials emergencies requiring specialized skills and equipment, rescues involving specialized skills and equipment, and larger wildland fires.

High Risk—High risk incidents involving fires in larger commercial properties with sustained attack (fire flows more than 1,000 gallons per minute), multiple patient medical incidents, major releases of hazardous materials, high risk rescues, and wildland fires with extreme weather or fire behavior.

Figure 34: Staffing Recommendations Based on Risk

Incident Type	High Risk	Moderate Risk	Low Risk
Structure Fire	29	15	6
Emergency Medical Service	12	4	2
Rescue	15	8	3
Hazardous Materials	39	20	3
Wildland Fire	41 (Red Flag level)	20	7

The NTFPD/MBFPD has developed the following critical task analysis using the risk matrices included in the Critical Task section for various incident types. Further, it has defined, based on current unit staffing levels, the number and type of apparatus needed to deliver sufficient numbers of personnel to meet the critical tasking identified. ESCI's review of the critical task analysis concludes that all are generally in keeping with industry standards and provide the minimum number of personnel needed for effective incident operations.

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

Critical Tasking

Critical tasks are those activities that must be conducted early on and in a timely manner by firefighters at emergency incidents to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. NTFPD/MBFPD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. These are the minimum number of personnel needed by incident type for each agency. More personnel will be needed for incidents of increased complexity or size.

LOW RISE STRUCTURE FIRE

Task	Number of Personnel
Command/Safety	1
Pump Operations	1
Attack Line	2
Search/Rescue/Ventilation	2
RIC	2
Other (Hydrant, backup line)	2
TOTAL	**10**

HIGH RISE STRUCTURE FIRE (55+ FEET IN HEIGHT)

Task	Number of Personnel
Command/Safety	3
Pump Operations	2
Attack Line	4
Search and Rescue	4
Ventilation	4
RIC	4
Other (Hydrant, backup line)	4
TOTAL	**25**

MODERATE RISK COMMERCIAL STRUCTURE FIRE

Task	Number of Personnel
Command/Safety	3
Pump Operations	2
Attack Line	4
Search and Rescue	4
Ventilation	4
RIC	2
Other (hydrant, backup line)	4
TOTAL	**23**

HIGH RISK COMMERCIAL STRUCTURE FIRE

Task	Number of Personnel
Command/Safety	3
Pump Operations	2
Attack Line	4
Search and Rescue	4
Ventilation	4
RIC	4
Other (hydrant, backup line)	4
TOTAL	**25**

WILDLAND FIRE – LOW RISK

Task	Number of Personnel
Command/Safety	2
Attack Line	2
TOTAL	**4**

WILDLAND FIRE – HIGH RISK

Task	Number of Personnel
Command/Safety	3
Pump Operations/Lookout	5
Attack Line	12
Structure Protection	3
Water Supply	2
TOTAL	**25**

AIRCRAFT EMERGENCY

Task	Number of Personnel
Command/Safety	1
Aircraft Fire Suppression	2
Pump Operations	2
Attack Line	2
Back-up Line	2
Rescue	2
Emergency Medical Care	2
Water Supply	1
TOTAL	**14**

HAZARDOUS MATERIALS – LOW RISK

Task	Number of Personnel
Command	2
Liaison	1
Decontamination	4
Research/Support	2
Entry team, and Backup Team	6
TOTAL	**15**

HAZARDOUS MATERIALS – HIGH RISK

Task	Number of Personnel
Command	2
Liaison	1
Decontamination	4
Research Support	2
Team Leader, Safety, Entry Team, and Backup Team	6
Total	**15**

EMERGENCY MEDICAL AID (LIFE THREATENING)

Task	Number of Personnel
Patient Management	1
Patient Care	2
Documentation	1
TOTAL	**4**

MAJOR MEDICAL RESPONSE (10+ PATIENTS)

Task	Number of Personnel
Incident Command/Safety	1
Triage	1
Treatment Manager	1
Patient Care	8
Transportation Manager	1
TOTAL	**12**

MOTOR VEHICLE ACCIDENT (NON-TRAPPED)

Task	Number of Personnel
Scene Management/ Documentation	2
Patient Care/Extrication	2
TOTAL	**4**

MOTOR VEHICLE ACCIDENT (TRAPPED)

Task	Number of Personnel
Command/Safety	1
Scene Management	1
Patient Care	2
Extrication	3
Pump Operator/ Suppression Line	2
Extrication/Vehicle Stabilization	2
TOTAL	**11**

TECHNICAL RESCUE – WATER

Task	Number of Personnel
Command/Safety	1
Rescue Team	3
Backup Team	2
Patient Care	2
Rope Tender	2
Upstream Spotter	2
Downstream Safety	2
TOTAL	**14**

TECHNICAL RESCUE – ROPE

Task	Number of Personnel
Command/Safety	1
Rescue Team	2
Backup/Support Team	2
Patient Care	2
Rigger	1
Attendant	1
Ground Support	4
Edge Person	1
TOTAL	**14**

TECHNICAL RESCUE – CONFINED SPACE

Task	Number of Personnel
Command/Safety	2
Rescue Team	2
Backup/Support Team	2
Patient Care	2
Attendant	1
Rigger	1
Ground Support	4
TOTAL	**14**

TECHNICAL RESCUE – TRENCH

Task	Number of Personnel
Command/Safety	2
Rescue Team	2
Backup/Support Team	2
Patient Care	3
Shoring	5
TOTAL	**14**

Alarm Assignments

In order to ensure sufficient personnel and apparatus are dispatched to an emergency event, the following first alarm response assignments have been established. "Total Staffing Needed" is the number identified in the Critical Tasking Analysis in the previous section. The number of personnel and apparatus required to mitigate an active and complex working incident will require additional resources greater than the numbers listed in the following tables.

The following tables illustrate the type and number of apparatus initially dispatched to various incident types. Not all incidents receive the needed number of personnel as defined by the critical tasking assessment.

LOW RISE STRUCTURE FIRE

Unit Type	Number of Units	Total Personnel
Engine	3	9
Truck	0	0
Ambulance	1	2
Air Supply	0	0
Battalion Chief	1	1
Total Staffing Provided		**12**
Total Staffing Needed		**10**

HIGH RISE STRUCTURE FIRE (55+ FEET)

Unit Type	Number of Units	Total Personnel
Engine	3	9
Truck	1	2
Ambulance	1	2
Air Supply	0	0
Battalion Chief	1	1
Total Staffing Provided		**14**
Total Staffing Needed		**25**

MODERATE RISK COMMERCIAL STRUCTURE FIRE

Unit Type	Number of Units	Total Personnel
Engine	3	9
Truck	1	2
Ambulance	1	2
Air Supply	0	0
Battalion Chief	1	1
Total Staffing Provided		**14**
Total Staffing Needed		**23**

HIGH RISK COMMERCIAL STRUCTURE FIRE

Unit Type	Number of Units	Total Personnel
Engine	3	9
Truck	1	2
Ambulance	1	2
Air Supply	0	0
Battalion Chief	1	1
Total Staffing Provided		**14**
Total Staffing Needed		**25**

WILDLAND FIRE – LOW RISK (+ STATE AND FEDERAL DISPATCH)

Unit Type	Number of Units	Total Personnel
Brush Engine	2	6
Battalion Chief	1	1
Water Tender	0	0
Total Staffing Provided		**7**
Total Staffing Needed		**4**

WILDLAND FIRE: HIGH RISK – MEDIUM/HIGH DISPATCH + STATE AND FEDERAL DISPATCH

Unit Type	Number of Units	Total Personnel
Engine	3	9
Brush Engine	3	9
Battalion Chief	1	1
Water Tender	2	4
Total Staffing Provided		**23**
Total Staffing Needed		**25**

AIRCRAFT EMERGENCY

Unit Type	Number of Units	Total Personnel
Engine	2	6
Truck	0	0
ARRF	0	0
Rescue	0	0
Ambulance	2	4
Battalion Chief	1	1
Total Staffing Provided		**11**
Total Staffing Needed		**14**

HAZARDOUS MATERIALS – HIGH RISK

Unit Type	Number of Units	Total Personnel
Engine	2	6
Truck	0	0
Ambulance	1	2
Battalion Chief	1	1
Hazardous Materials Unit	1	4
Total Staffing Provided		**13**
Total Staffing Needed		**15**

HAZARDOUS MATERIALS – LOW RISK

Unit Type	Number of Units	Total Personnel
Engine	1	3
Truck	0	0
Ambulance	1	2
Battalion Chief	1	1
Hazardous Materials Unit	0	0
Total Staffing Provided		**6**
Total Staffing Needed		**15**

EMERGENCY MEDICAL SERVICE (LIFE-THREATENING) FIRST ALARM

Unit Type	Number of Units	Total Personnel
Engine or Utility	1	1
Ambulance	1	2
Total Staffing Provided		**3**
Total Staffing Needed		**4**

MAJOR MEDICAL RESPONSE (10+ PATIENTS) THIRD ALARM

Unit Type	Number of Units	Total Personnel
Engine/Paramedic	2	6
Ambulance	7	14
Rescue	0	0
Battalion Chief	1	1
Total Staffing Provided		**21**
Total Staffing Needed		**12**

MOTOR VEHICLE ACCIDENT (NON-TRAPPED) FIRST ALARM

Unit Type	Number of Units	Total Personnel
Engine	1	1–2
Ambulance	1	2
Battalion Chief	1	1
Total Staffing Provided		**4–5**
Total Staffing Needed		**4**

MOTOR VEHICLE ACCIDENT (TRAPPED) SECOND ALARM

Unit Type	Number of Units	Total Personnel
Engine	3	9
Ambulance	3	6
Rescue	0	0
Battalion Chief	1	1
Total Staffing Provided		**16**
Total Staffing Needed		**11**

TECHNICAL RESCUE – WATER

Unit Type	Number of Units	Total Personnel
Engine	1	3
Water Rescue Unit	0	0
Tech Rescue Unit	0	0
Ambulance	1	2
Battalion Chief	1	1
Total Staffing Provided		**6**
Total Staffing Needed		**14**

TECHNICAL RESCUE – ROPE

Unit Type	Number of Units	Total Personnel
Engine	1	3
Truck	0	0
Rescue		0
Ambulance	1	2
Battalion Chief	1	1
Total Staffing Provided		**6**
Total Staffing Needed		**14**

TECHNICAL RESCUE – CONFINED SPACE

Unit Type	Number of Units	Total Personnel
Engine	1	3
Truck	0	0
Rescue	0	0
Ambulance	1	2
Battalion Chief	1	1
Total Staffing Provided		**6**
Total Staffing Needed		**14**

TECHNICAL RESCUE – TRENCH

Unit Type	Number of Units	Total Personnel
Engine	1	3
Truck	0	0
Rescue	0	0
Ambulance	1	2
Battalion Chief	1	1
Total Staffing Provided		**6**
Total Staffing Needed		**14**

COMPONENT F | REVIEW OF HISTORICAL SYSTEM PERFORMANCE

Incident data for the period between January 1 and December 31, 2017, was evaluated in detail to determine NTFPD/MBFPD's current performance. Data was obtained from the dispatch center's computer-aided dispatch system.

Only priority incidents occurring within the North Tahoe Fire Protection District, Meeks Bay Fire Protection District, and Alpine Springs County Water District are included in the analysis. Performance is reported based on the initial type of incident, which may be different than the actual outcome. For example, a person may report smoke coming from a building that turns out only to be steam. It may have been dispatched as a structure fire, but its final type would be reported as "good intent."

Each phase of the incident response sequence was evaluated to determine current performance. This allows an analysis of each individual phase to determine where opportunities might exist for improvement.

The total incident response time continuum consists of several steps, beginning with initiation of the incident and concluding with the appropriate mitigation of the incident. The time required for each of the components varies. The policies and practices of the fire department directly influence some of the steps.

NTFPD/MBFPD's response performance was compared to its performance goals. In most all cases these goals compare to the national consensus standard for response performance found in the *National Fire Protection Association Standard 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, *2010 Edition*. Wildland fires are the only exception. Grass Valley Emergency Communications Center's (GVECC) and other dispatch agencies performance was compared to the NTFPD/MBFPD's goals as well as standards found in *National Fire Protection Association Standard 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, *2013 Edition.*

NTFPD/MBFPD has adopted the following service delivery goals for measuring response performance:

Dispatch Call Processing Time

- 911 calls will be answered at the primary PSAP within 15 seconds, 95 percent of the time.
- Calls will be transferred from the primary PSAP to GVECC within 30 seconds from the time answered, 95 percent of the time.
- Response resources shall be notified of a priority incident within 64 seconds from receipt of the call at the dispatch center, 90 percent of the time.

Turnout Time

- Response personnel shall initiate response to a priority non-wildland fire and special operations incidents within 80 seconds from notification, 90 percent of the time.
- Response personnel shall initiate response to a priority wildland fire incident within three minutes from notification, 90 percent of the time.
- Response personnel shall initiate response to all other priority incidents within 60 seconds from notification, 90 percent of the time.

Response time for arrival of the first response unit at a priority incident

- The first response unit capable of initiating effective incident intervention shall arrive at a priority non-wildland fire and special operations incident within 5 minutes, 20 seconds from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at a priority wildland fire incident within 8 minutes from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at all other priority incidents within 5 minutes, from notification of response personnel, 90 percent of the time.

Response time for arrival of the effective response force at a moderate risk structure fire

- The full effective response force shall arrive at a moderate risk structure fire within 9 minutes, 20 seconds, of notification of response personnel, 90 percent of the time.
- The full effective response force shall arrive at a wildland fire within 11 minutes of notification of response personnel, 90 percent of the time.

In keeping with *NFPA Standards 1710* and *1221,* along with NTFPD/MBFPD's performance goals, all response time elements are reported at a given percentile. Percentile reporting is a methodology by which response times are sorted from least to greatest, and a "line" is drawn at a certain percentage of the calls to determine the percentile. The point at which the "line" crosses the 90th percentile, for example, is the percentile time performance. Thus, 90 percent of times were at or less than the result. Only 10 percent were longer.

Percentile differs greatly from average. Averaging calculates response times by adding all response times together and then dividing the total number of minutes by the total number of responses (mean average). Measuring and reporting average response times is not recommended. Using averages does not give a clear picture of response performance because it does not clearly identify the number and extent of events with times beyond the stated performance goal.

What follows is a detailed description and review of each phase of the response time continuum. All phases will be compared to NTFPD/MBFPD's performance goals.

Detection

The detection of a fire (or medical incident) may occur immediately if someone happens to be present or if an automatic system is functioning. Otherwise, detection may be delayed, sometimes for a considerable period. The period for this phase begins with the inception of the emergency and ends when the emergency is detected. It is largely outside the control of the fire department and not a part of the event sequence that is reliably measurable.

Call Processing

Most emergency incidents are reported by telephone to the 911 center. Call takers must quickly elicit accurate information about the nature and location of the incident from persons who are apt to be excited. A citizen well-trained in how to report emergencies can reduce the time required for this phase. The dispatcher must identify the correct units based on incident type and location, dispatch them to the emergency, and continue to update information about the emergency while the units respond. This phase begins when the 911 call is answered at the primary public safety answer point (PSAP) and ends when response personnel are notified of the emergency. This phase, which has two parts, is labeled "call processing time."

There are several PSAPs in the region that receive and transfer 911 calls to GVECC. Most calls are received by the Placer County Sheriff's Office (PCSO) and El Dorado County Sheriff's Office (EDCSO) dispatch centers, and some by California Highway Patrol (CHP). Those callers initially answered at a PSAP who are requesting fire department services are transferred to GVECC, the regional fire department dispatch center providing dispatch services to NTFPD/MBFPD. This first part of call processing time is known as "answer/transfer time."

National Fire Protection Association Standard 1221 recommends that 911 calls be answered at the PSAP within 15 seconds, 95 percent of the time (within 40 seconds, 99 percent of the time) and then be transferred to the dispatch center within 30 seconds, 95 percent of the time. Data was provided to evaluate PCSO's and EDCSO's answer and transfer time performance.

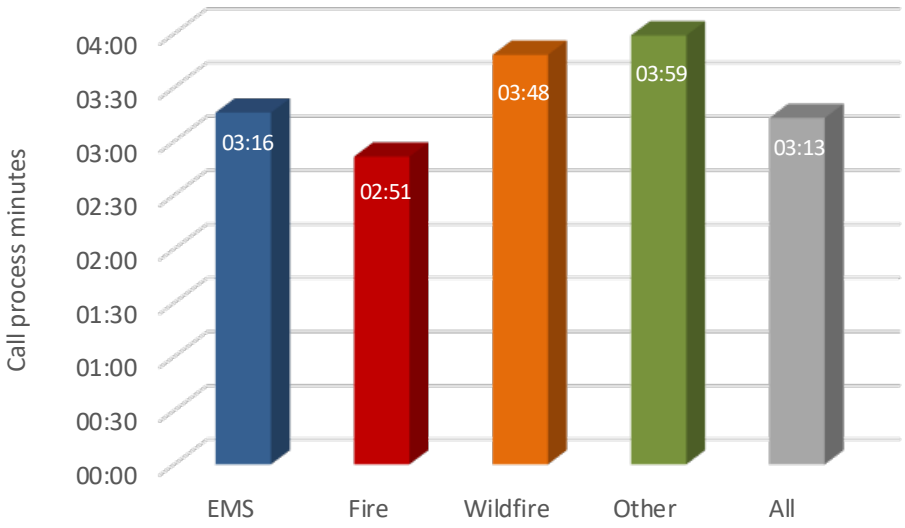
EDCSO's call answer time performance was within 8 seconds, 95 percent of the time during the study year. PCSO's call answer time performance was within 13 seconds, 95 percent of the time. Both agencies performed better than the *NFPA 1221* standard of within 15 seconds, 95 percent of the time.

EDCSO's call transfer time was within 95.4 seconds, 95 percent of the time. PCSO's call transfer time was within 75.5 seconds, 95 percent of the time. Both took longer to transfer calls than the *NFPA 1221* standard of 30 seconds, 95 percent of the time recommends.

The second part of call processing time, dispatch time, begins when the call is received at the dispatch center (GVECC) and ends when response units are notified of the incident. NTFPD/MBFPD's goal prescribes that this phase should occur within 64 seconds, 90 percent of the time.

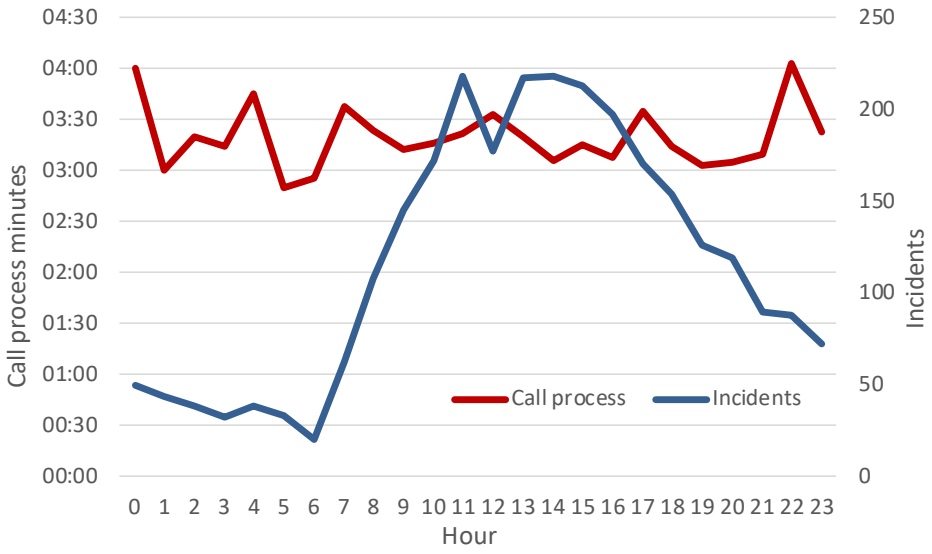
The following figure illustrates performance by GVECC from the time it receives the call until it notifies response units by type of incident. Overall performance was within 3 minutes, 13 seconds, 90 percent of the time.

Figure 35: GVECC Dispatch Time Performance



Workload can influence how quickly incidents are processed at the dispatch center. The following figure illustrates dispatch time performance by hour of day for the districts. Workload does not appear to be a factor in performance.

Figure 36: Dispatch Time Performance by Hour of Day



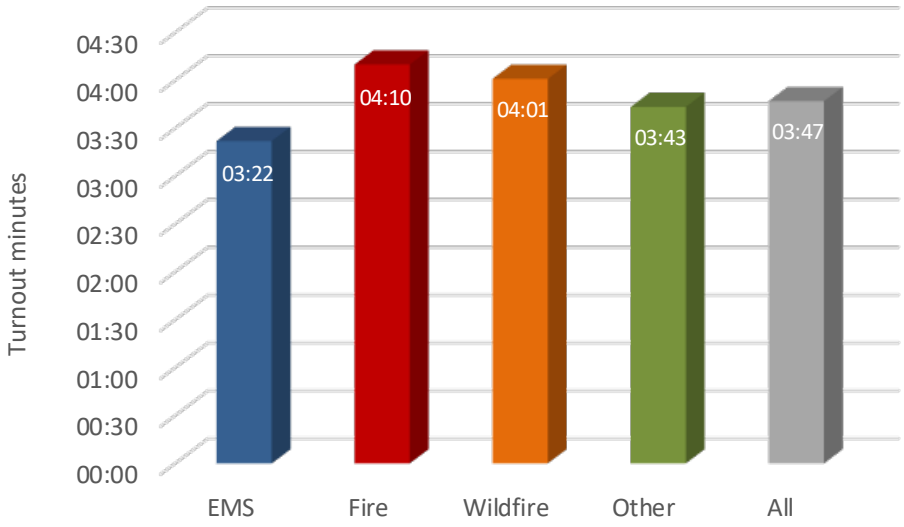
Turnout Time

Turnout time is a response phase controllable by the fire districts. This phase begins at notification of an emergency in progress by the dispatch center and ends when personnel and apparatus begin movement toward the incident location. Personnel must don appropriate equipment, assemble on the response vehicle, and begin travel to the incident. Good training and proper fire station design can minimize the time required for this step.

The NTFPD/MBFPD performance goal for turnout time is within 80 seconds, 90 percent of the time, for non-wildland fire and special operations incidents, within 3 minutes, 90 percent of the time for wildland fires, and within 60 seconds, 90 percent of the time, for all other incidents. The following figure illustrates turnout time for all incidents as well as specific incident types. Turnout time for all incidents is within 3 minutes, 47 seconds, 90 percent of the time, exceeding NTFPD/MBFPD's performance goal.

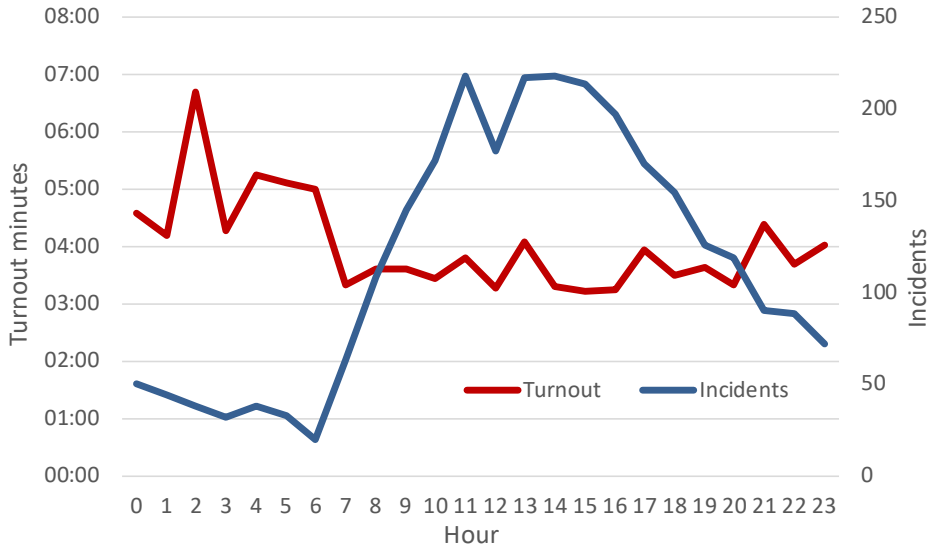
It is important to note that the dispatch process artificially lengthens turnout time for many multiple unit responses. Recording of the actual enroute time can be delayed.

Figure 37: Turnout Time Performance



Turnout time can vary by hour of day. Turnout time is typically longer at night than during the day.

Figure 38: Turnout Time by Hour of Day

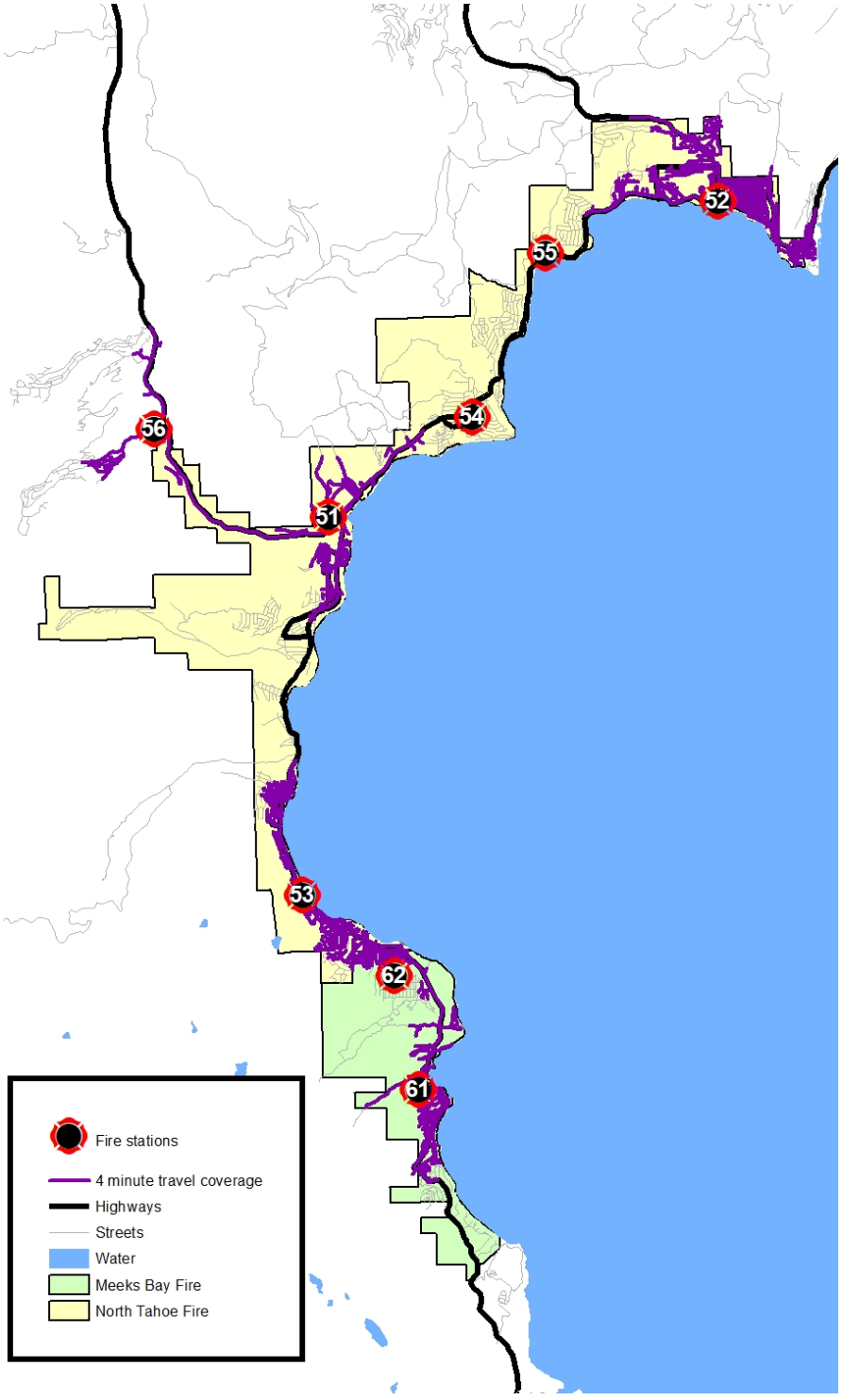


Distribution and Initial Arriving Unit Travel Time

Travel time is potentially the longest of the response phases. The distance between the fire station and the location of the emergency influences response time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also factors. This phase begins with initial apparatus movement towards the incident location and ends when response personnel and apparatus arrive at the emergency's location. Within the NTFPD/MBFPD goal, four minutes is allowed for the first response unit to arrive at an incident.

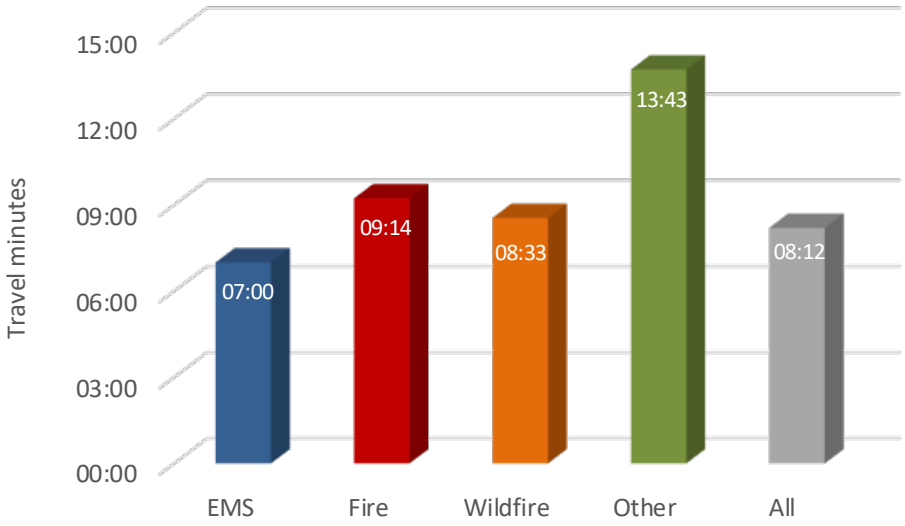
The following figure illustrates the street sections that can be reached from both NTFPD/MBFPD fire stations in four minutes of travel time. It is based on posted road speeds modified to account for turning, stops, and acceleration. Much of the territory in the districts is beyond four minutes travel from current stations.

Figure 39: Initial Unit Travel Time Capability



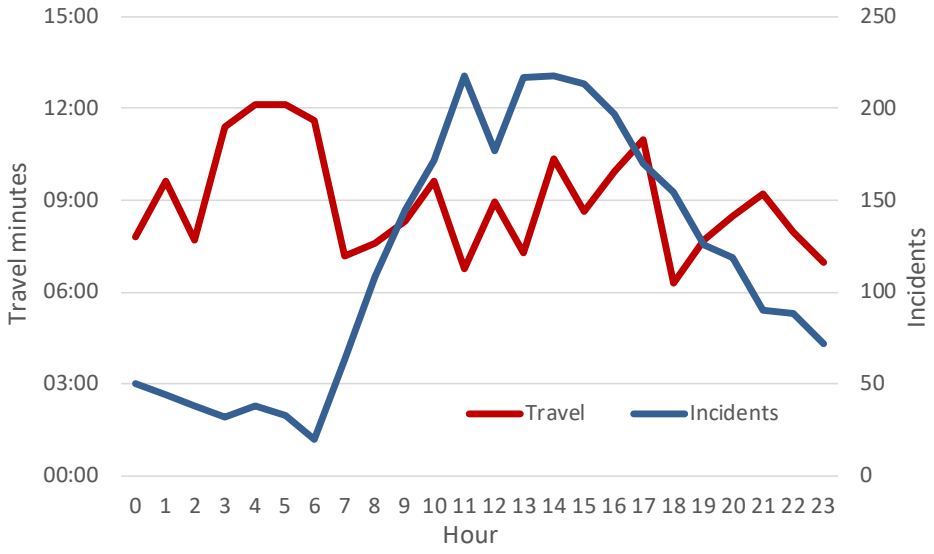
The following figure lists travel time by incident type. Overall, travel time for all incidents within the districts is within 8 minutes, 12 seconds, 90 percent of the time.

Figure 40: Travel Time Performance—First Arriving Unit



Travel time can vary considerably by time of day. Heavy traffic at morning and evening rush hours can slow fire department response. Concurrent incidents can also increase travel time since units from more distant stations would need to respond. In addition, severe weather, snow and ice, along with tourism traffic can extend travel times. Travel times are highly variable.

Figure 41: Overall Travel Time and Incidents by Hour of Day—First Arriving Unit

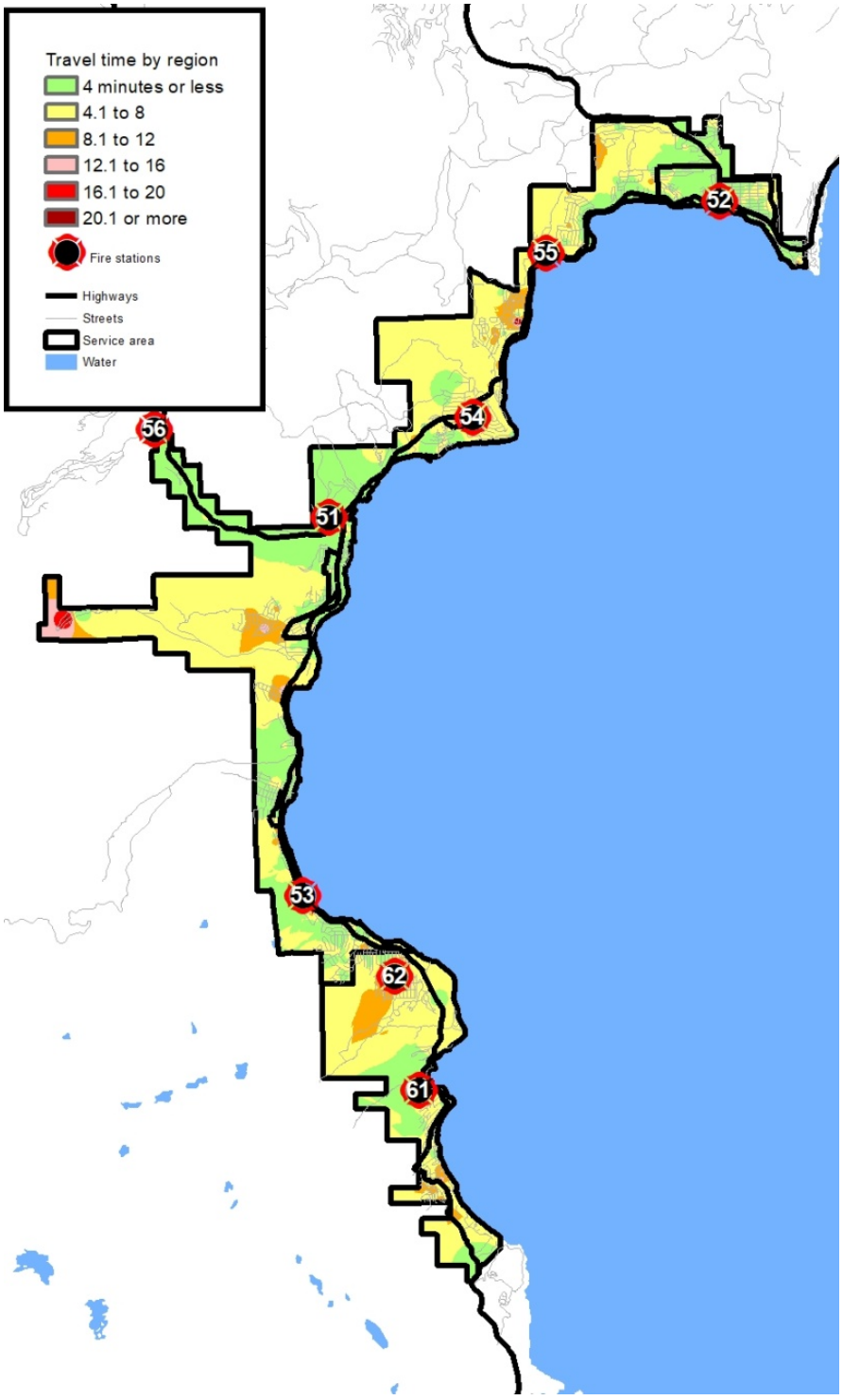


Travel Time Performance by Region

Travel time performance by region is variable and influenced by a number of factors, including individual station area workload and the number of times a station must cover another station's area. Additional factors include the size of the station area and the street system serving it. More highly connected, grid-patterned street systems contribute to faster response times than do areas with meandering streets with numerous dead-ends.

The following figure evaluates travel time performance by sub-area using inverse distance weighting analysis (IDW). This process uses travel time for known points (actual incidents) to predict travel time for the area surrounding the actual incidents. Better performance is generally noted near fire stations, with progressively longer response times for those incidents more distant from the stations.

Figure 42: Travel Time Performance by Region

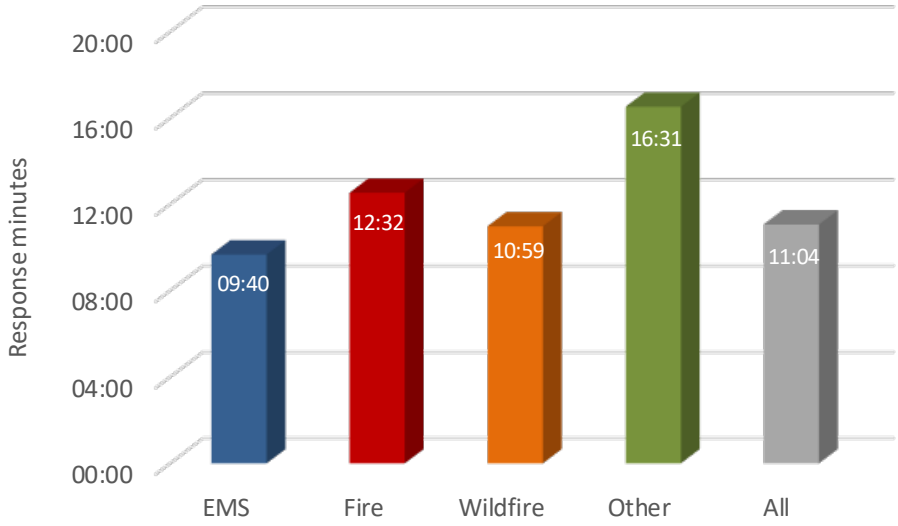


First Arriving Unit Response Time

Response time is defined as that period between the notification of response personnel by the dispatch center that an emergency is in progress until arrival of the first fire department response unit at the emergency. When turnout time and travel time are combined, the NTFPD/MBFPD performance goal for response time is within 5 minutes, 20 seconds, 90 percent of the time, for non-wildland fire and special operations incidents, within 7 minutes, 90 percent of the time for wildland fires, and within 5 minutes, 90 percent, of the time for all other incidents.

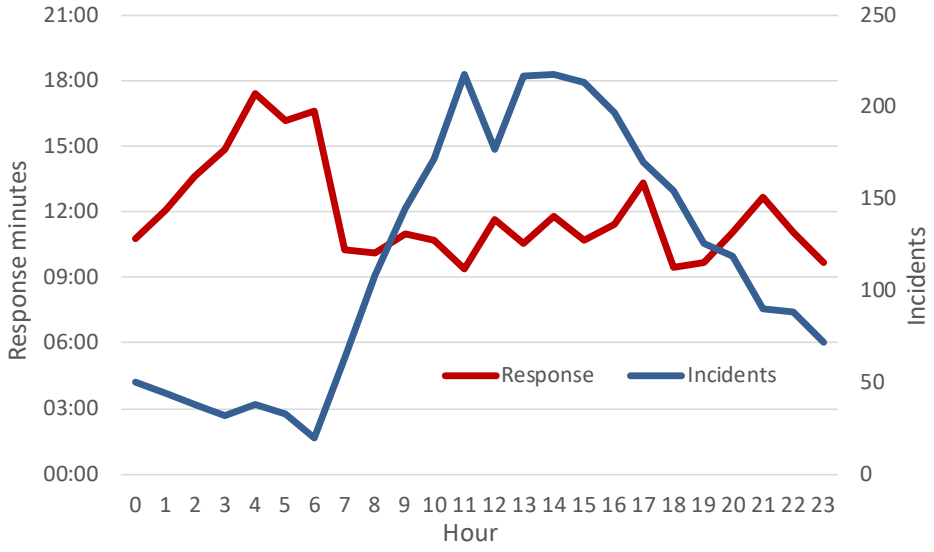
The following figure illustrates response time for all incidents as well as specific incident types during 2017. Overall, response time for all incidents was within 11 minutes, 4 seconds, 90 percent of the time.

Figure 43: Response Time Performance—First Arriving Unit



The next figure shows response time and number of incidents by hour of day for all incidents. Response time is slowest during the nighttime hours and fastest during the day. Generally, NTFPD/MBFPD's best response times occur during the period of the day when response activity is at its highest.

Figure 44: Hourly Response Time Performance



First Arriving Unit Received to Arrival Time

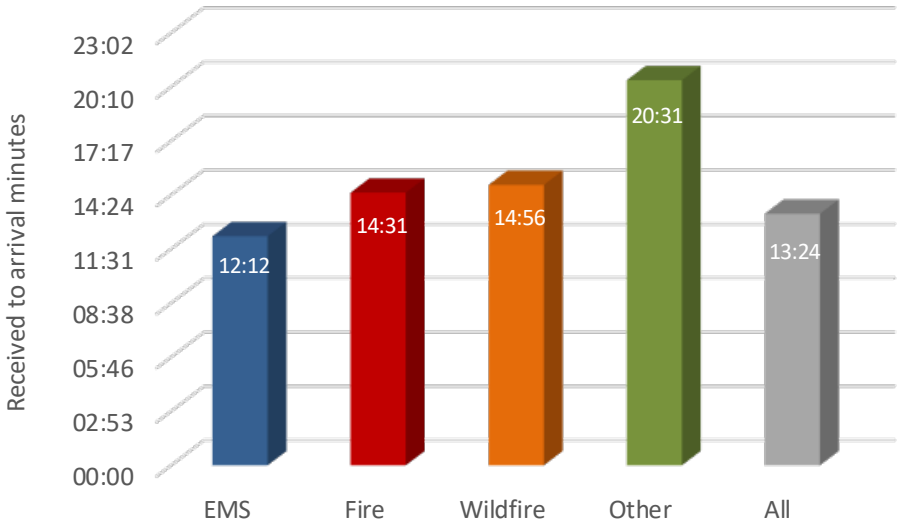
From the customer's standpoint, response time begins when the emergency occurs. Their first contact with emergency services is when they call for help, usually by dialing 911. Received to arrival time combines answer/transfer, call processing, turnout, and travel time.

Data limitations do not allow a complete analysis of the incident sequence. Call answer and transfer times are captured but in a format that requires extensive data manipulation to evaluate. Thus, for this discussion received to arrival time will be from the time the call is received at GVECC until a response unit arrives at the incident location. It is known that call answer and transfer time adds between 80 seconds and 100 seconds to total response time, at the 90th percentile.

When the NTFPD/MBFPD performance goals are combined, received to arrival time should be within 6 minutes, 20 seconds for non-wildland fire and special operations incidents, 8 minutes, 90 percent of the time for wildland fires, and within 6 minutes, 90 percent of the time, for all other incidents.

The next figure shows received to arrival performance during 2017 at the 90th percentile for priority incidents within the NTFPD/MBFPD service area. Overall, from the time the call is received at GVECC to first unit arrival is within 13 minutes, 24 seconds, 90 percent of the time. As noted earlier, the call answer and transfer sequence can add between 80 and 100 seconds at the 90th percentile.

Figure 45: Received to Arrival Time—First Arriving Unit



The next figure shows received to arrival performance by time of day also compared to incident activity by time of day. Received to arrival, from the customer's standpoint, is quickest during the day and slowest during the early morning hours.

Figure 46: Hourly Received to Arrival Performance

Concentration and Effective Response Force Capability Analysis

Effective Response Force (ERF) is the number of personnel and apparatus required to be present on the scene of an emergency incident to perform the critical tasks in such a manner to effectively mitigate the incident without unnecessary loss of life and/or property. The ERF is specific to each individual type of incident and is based on the critical tasks that must be performed. In accordance with *NFPA 1710*, a moderate risk building fire is modeled for this analysis.

The NTFPD/MBFPD response time goal for the delivery of the full ERF to a low-rise building fire is within 9 minutes, 20 seconds, 90 percent of the time. NTFPD/MBFPD has defined the minimum full effective response force for moderate risk building fires as three fire engines, two trucks, a rescue ambulance, and one battalion chief for a total of 23 firefighters.

The minimum full effective response force arrived at three building fires during 2017. There were many other building fires that did not receive the full effective response force. The full assignment typically does not arrive on fires out on arrival or quickly controlled by first arriving personnel. The following figure lists the time the full effective response force arrived at each building fire within the districts.

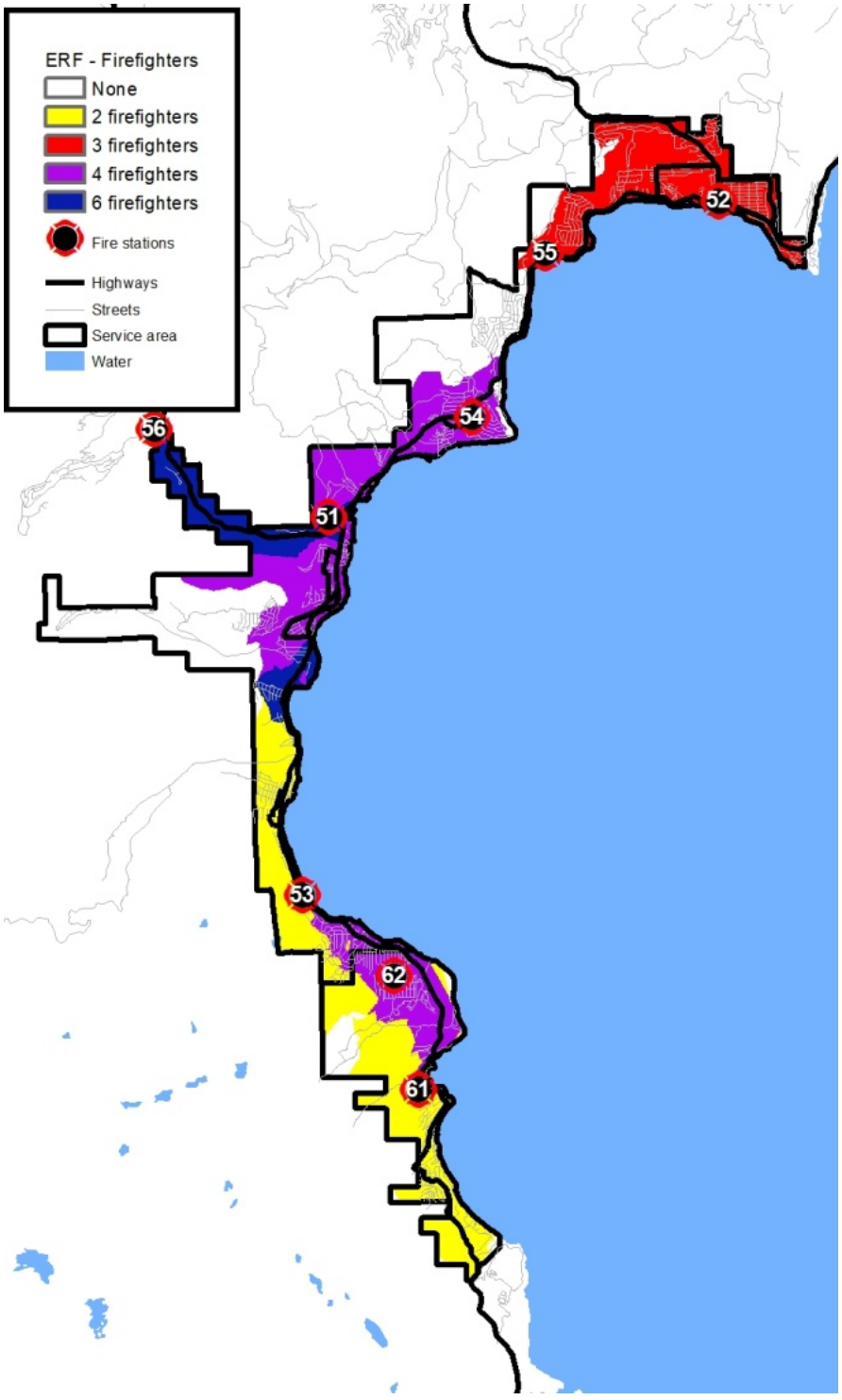
Figure 47: Effective Response Force Arrival Time

ERF Arrival Times
0:17:13
0:18:32
0:17:26

Concentration analysis reviews the physical capability of NTFPD/MBFPD's resources to achieve its target ERF travel time to its service area. The following figures depict the physical capability of NTFPD/MBFPD, along with its automatic aid partners, to assemble apparatus and firefighters by area within eight minutes travel time. The modeled analysis shown assumes that all response units are available.

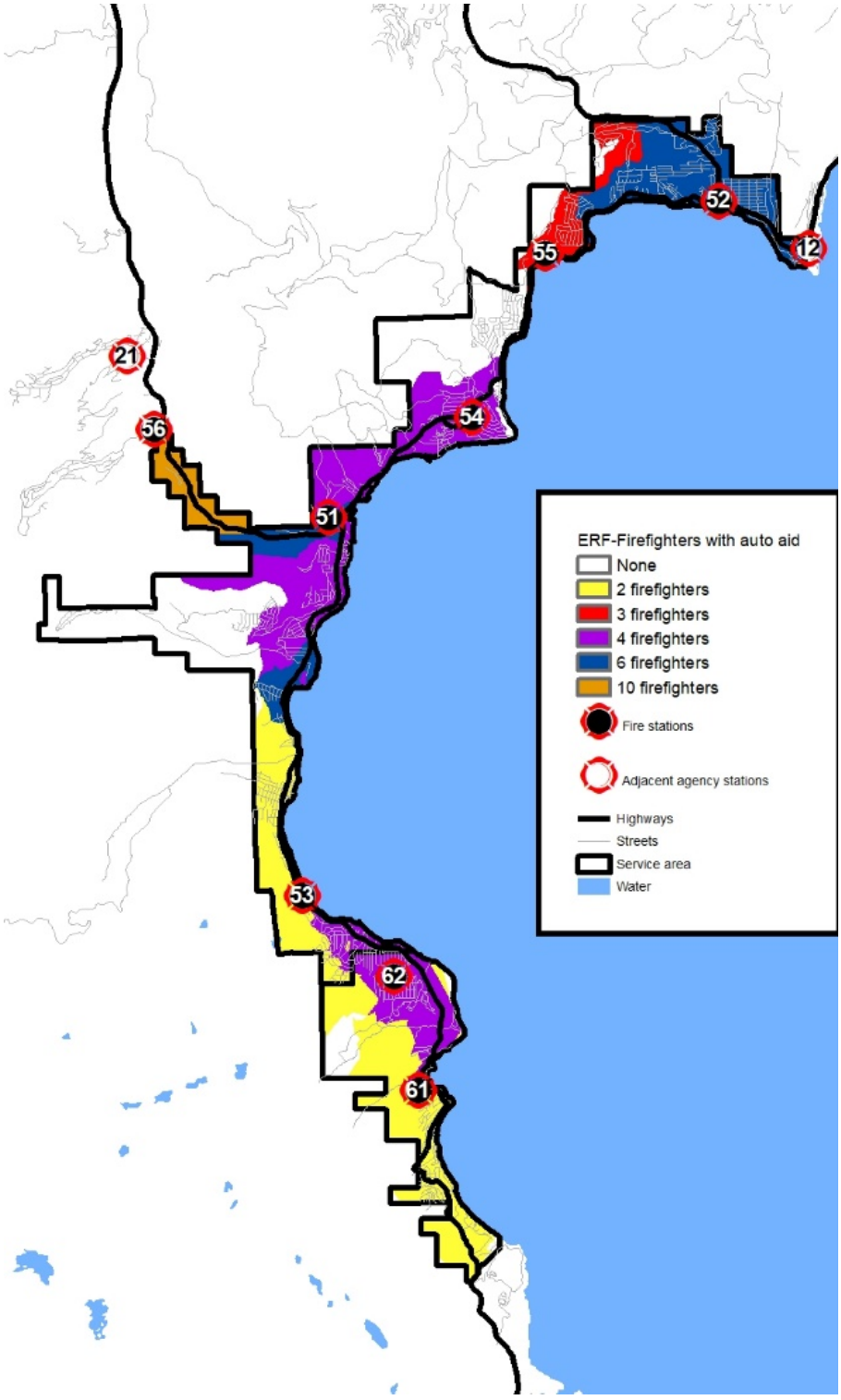
The first figure shows the area that can be reached by various numbers of firefighters. Eight minutes of travel time is allowed to assemble the defined full effective response force on scene. This figure includes the resources of adjacent automatic aid stations. There is no area within either district that the minimum 10 firefighters can be delivered in the target time of 8 travel minutes.

Figure 48: Effective Response Force—Firefighters



The next figure shows the area that can be reached by various numbers of firefighters including firefighters from neighboring Station 12 and 21. Only one small area between Station 51 and 56 can be provided the minimum 10 firefighters needed for a low-rise building fire.

Figure 49: Effective Response Force—Firefighters, With Automatic Aid



The modeling also determined that there is no area within either district to which the minimum complement of three engines, one medic unit, and one battalion chief can be delivered within the target 8 travel minutes.

Second Unit Arrival Time

NTFPD/MBFPD staff fire engines with two or three firefighters. Safety regulations require that at least four firefighters be on scene before firefighters can enter a burning building. The only exception is if it is known that a person is inside the building and needs rescue. Current staffing levels on NTFPD/MBFPD engines require the arrival of a second response unit before non-rescue interior firefighting activities can be initiated.

Incident data for building fires during the study period was reviewed to determine the time the second response unit arrived on the scene. The following figure illustrates the time the second unit arrived following dispatch and how long after the first unit's arrival.

Figure 50: Second Unit Arrival

Second Unit Arrival	Time
Time from dispatch to second unit arrival – 90th percentile	14:53
Time from dispatch to second unit arrival – Average	12:22
Time from first unit arrival to second unit arrival – 90th percentile	08:32
Time from first unit arrival to second unit arrival – Average	04:07

Incident Concurrency

When evaluating the effectiveness of any resource deployment plan, it is necessary to evaluate the workload of the individual response units to determine to what extent the availability for dispatch is affecting the response time performance. In simplest terms, a response unit cannot make it to an incident across the street from its own station in four minutes if it is unavailable to be dispatched to that incident because it is committed to another call.

One way to look at resource workload is to examine the number of times multiple incidents happen within the same time frame. Incidents during the study period were examined to determine the frequency of concurrent incidents. This is important because concurrent incidents can stretch available resources and extend response times.

The following figure shows the number times during the study period that one or more incidents occurred concurrently. This shows that in most cases (1,475) only one incident was in progress at a time. However, 832 times there were two incidents in progress at the same time and 362 times there were three incidents in progress at the same time.

Figure 51: Incident Concurrency

Concurrent Incidents	Count
1	1,485
2	839
3	345
4	96
5	27
6	9
7	1

It is also useful to review the number of times one or more response units are committed to incidents at the same time. The following figure shows the number of times one or more NTFPD/MBFPD response units were committed to incidents. It is very common for multiple response units to be simultaneously committed to incidents.

Figure 52: Response Unit Concurrency

Concurrent Units	Count
1	1,605
2	1,762
3	1,293
4	728
5	373
6	138
7	62
8	14
9	2

COMPONENT G | PERFORMANCE OBJECTIVES AND PERFORMANCE MEASURES

Dynamics of Fire in Buildings

Most fires within buildings develop in a predictable fashion unless influenced by highly flammable material. Ignition, or the beginning of a fire, starts the sequence of events. It may take several minutes or even hours from the time of ignition until a flame is visible. This smoldering stage is very dangerous, especially during times when people are sleeping, since large amounts of highly toxic smoke may be generated during this phase.

Once flames do appear, the sequence continues rapidly. Combustible material adjacent to the flame heat and ignite, which in turn heats and ignites other adjacent materials if sufficient oxygen is present. As the objects burn, heated gases accumulate at the ceiling of the room. Some of the gases are flammable and highly toxic.

The spread of the fire from this point continues quickly. Soon the flammable gases at the ceiling as well as other combustible material in the room of origin reach ignition temperature. At that point, an event termed "flashover" occurs; the gases and other material ignite, which in turn ignites everything in the room. Once flashover occurs, damage caused by the fire is significant and the environment within the room can no longer support human life. Flashover usually occurs about five to eight minutes from the appearance of flame in typically furnished and ventilated buildings. Since flashover has such a dramatic influence on the outcome of a fire event, the goal of any fire agency is to apply water to a fire before flashover occurs.

Although modern codes tend to make fires in newer structures more infrequent, today's energy-efficient construction (designed to hold heat during the winter) also tends to confine the heat of a hostile fire. In addition, research has shown that modern furnishings generally ignite more quickly and burn hotter (due to synthetics). In the 1970s, scientists at the National Institute of Standards and Technology found that after a fire broke out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today, that estimate is as short as three minutes.[2] The necessity of effective early warning (smoke alarms), early suppression (fire sprinklers), and firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

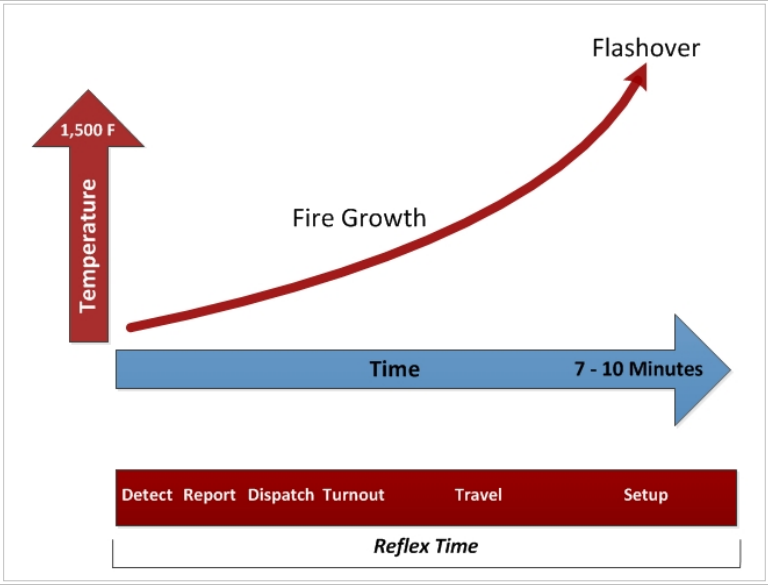
Perhaps as important as preventing flashover is the need to control a fire before it does damage to the structural framing of a building. Materials used to construct buildings today are often less fire resistive than the heavy structural skeletons of older frame buildings. Roof trusses and floor joists are commonly made with lighter materials that are more easily weakened by the effects of fire. "Light weight" roof trusses fail after five to seven minutes of direct flame impingement. Plywood I-beam joists can fail after as little as three minutes of flame contact. This creates a dangerous environment for firefighters.

[2] National Institute of Standards and Technology, *Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings,* Bukowski, Richard, et al.

In addition, the contents of buildings today have a much greater potential for heat production than in the past. The widespread use of plastics in furnishings and other building contents rapidly accelerate fire spread and increase the amount of water needed to effectively control a fire. All these factors make the need for early application of water essential to a successful fire outcome.

A number of events must take place quickly to make it possible to achieve fire suppression prior to flashover. The next figure illustrates the sequence of events.

Figure 53: Fire Growth vs. Reflex Time



As is apparent by this description of the sequence of events, application of water in time to prevent flashover is a serious challenge for any fire department. It is critical, though, as studies of historical fire losses can demonstrate.

The National Fire Protection Association found that fires contained to the room of origin (typically extinguished prior to or immediately following flashover) had significantly lower rates of death, injury, and property loss when compared to fires that had an opportunity to spread beyond the room of origin (typically extinguished post-flashover). As evidenced in the following figure, fire losses, casualties, and deaths rise significantly as the extent of fire damage increases.

Figure 54: Fire Extension in Residential Structures—United States

Consequence of Fire Extension in Residential Structures 2011–2015			
		Rates per 1,000 Fires	
Extension	Civilian Deaths	Civilian Injuries	Average Dollar Loss Per Fire
Confined to room of origin or smaller	1.8	24.8	$4,200
Confined to floor of origin	15.8	81.4	$36,300
Confined to building of origin or larger	24.0	57.6	$67,600

Source: National Fire Protection Association

Emergency Medical Event Sequence

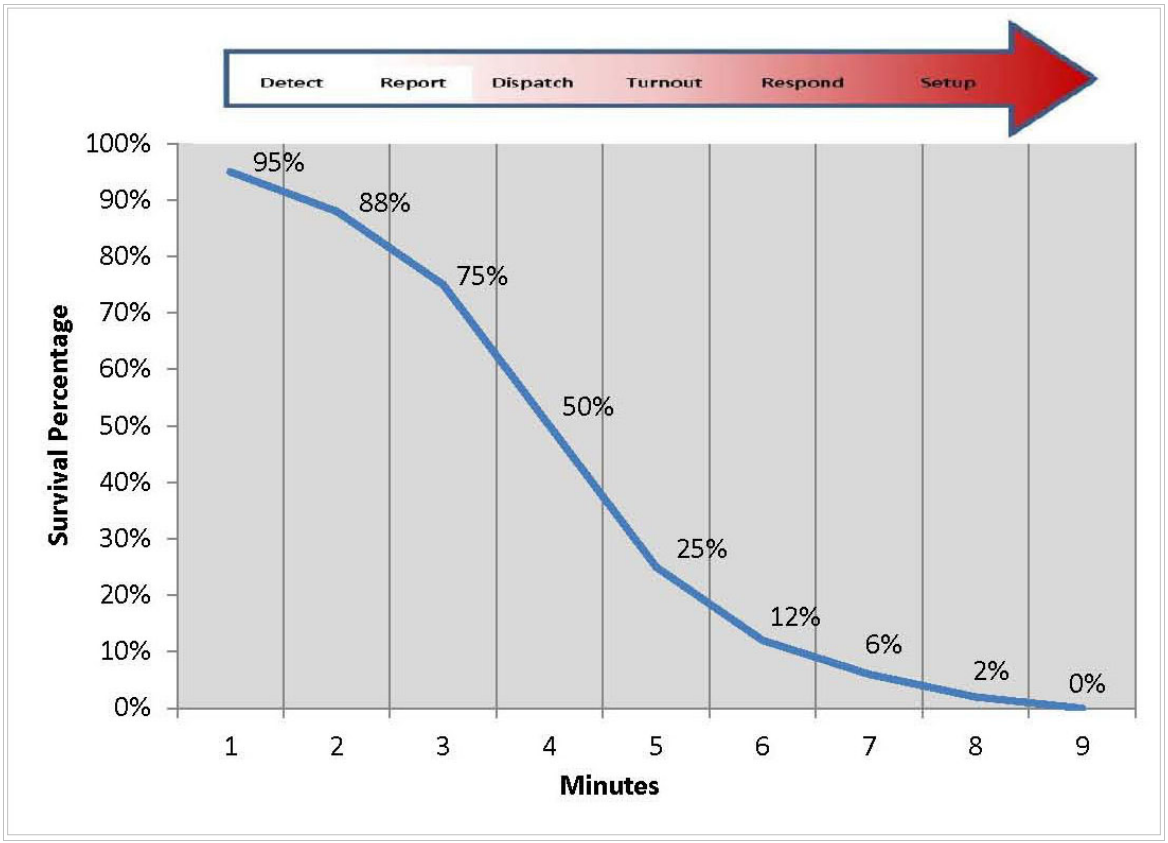
Cardiac arrest is the most significant life-threatening medical event in emergency medicine today. A victim of cardiac arrest has mere minutes in which to receive lifesaving care if there is to be any hope for resuscitation.

The American Heart Association (AHA) issued a set of cardiopulmonary resuscitation guidelines designed to streamline emergency procedures for heart attack victims, and to increase the likelihood of survival. The AHA guidelines include goals for the application of cardiac defibrillation to cardiac arrest victims.

Cardiac arrest survival chances fall by 7 to 10 percent for every minute between collapse and defibrillation. Consequently, the AHA recommends cardiac defibrillation within five minutes of cardiac arrest.

As with fires, the sequence of events that lead to emergency cardiac care can be graphically illustrated, as in the following figure.

Figure 55: Cardiac Arrest Event Sequence



The percentage of opportunity for recovery from cardiac arrest drops quickly as time progresses. The stages of medical response are very similar to the components described for a fire response. Recent research stresses the importance of rapid cardiac defibrillation and administration of certain medications as a means of improving the opportunity for successful resuscitation and survival.

People, Tools, and Time

Time matters a great deal in the achievement of an effective outcome to an emergency event. Time, however, is not the only factor. Delivering sufficient numbers of properly trained, appropriately equipped personnel within the critical time period completes the equation.

For medical emergencies, this can vary based on the nature of the emergency. Many medical emergencies are not time critical. However, for serious trauma, cardiac arrest, or conditions that may lead to cardiac arrest, a rapid response is essential.

Equally critical is delivering enough personnel to the scene to perform all the concurrent tasks required to deliver quality emergency care. For a cardiac arrest, this can be up to six personnel; two to perform CPR, two to set up and operate advanced medical equipment, one to record the actions taken by emergency care workers, and one to direct patient care.

Thus, for a medical emergency, the real test of performance is the time it takes to provide the personnel and equipment needed to deal effectively with the patient's condition, not necessarily the time it takes for the first person to arrive.

Fire emergencies are even more resource critical. Again, the true test of performance is the time it takes to deliver sufficient personnel to initiate application of water to a fire. This is the only practical method to reverse the continuing internal temperature increases and ultimately prevent flashover. The arrival of one person with a portable radio does not provide fire intervention capability and should not be counted as "arrival" by the fire department.

COMPONENT H | OVERALL EVALUATION, CONCLUSIONS, AND RECOMMENDATIONS

Overall Evaluation

This Standards of Coverage and Deployment Plan, based on the *CFAI Standards of Cover 5th Edition,* required the completion of an intensive analysis on all aspects of the NTFPD/MBFPD deployment policies. The analysis used various tools to review historical performance, evaluate risk, validate response coverage, and define critical tasking and alarm assignments. The analysis relied on the experience of staff officers and their historical perspective combined with incident data captured by both the dispatch center and NTFPD/MBFPD's in-house records management system.

The Description of the Organization section provided a general overview of the organization, including governance, lines of authority, finance, and capital and human resources. The Review of Services Provided section detailed the core services the organization provides based on general resource/asset capability and basic staffing complements. During the Review of Community Expectations, it was learned that the community expected NTFPD/MBFPD to be a well-trained and responsive organization.

An overview of community risk was provided to identify the risks and challenges faced by the fire department. Geospatial characteristics, topographic and weather risks, transportation network risks, physical assets, and critical infrastructure were reviewed.

Evaluating risk using advanced geographic information systems (GIS) provided an increased understanding of community risk factors.

During the analysis of service level objectives, critical tasking assignments were completed for incident types ranging from a basic medical emergency to a large structure fire. Critical tasking required a review of on-scene staffing requirements to mitigate the effects of an emergency. These tasks ultimately determine the resource allocation necessary to achieve a successful operation. The results of the analysis indicate that a low-rise structure fire required a minimum of 10 personnel.

The review of historical system performance evaluated each component of the emergency incident sequence. These included call processing, turnout, and travel times. Beyond the response time of the initial arriving units, the additional components of concentration and effective response force, reliability, and call concurrency were evaluated.

Based on the analysis and considering community expectations, recommendations are offered to improve the delivery of fire and emergency services to the community service by NTFPD/MBFPD. It is not expected that all will be implemented in the short-term. Some may wait until economic conditions allow their implementation. However, all the recommendations offered chart a course to improved capability and service.

Recommendations

During the course of this study a number of issues, concerns, and opportunities were identified. The following recommendations are intended to accomplish four primary objectives:

1. Define clearly the expected and actual level of performance provided by NTFPD/MBFPD.
2. Improve service delivery with no, or minimal, expenditure of funds.
3. Identify service level improvement opportunities that can be implemented as funding becomes available.
4. Manage current response workload and reduce future response workload growth rates.

The recommendations are described as improvement goals and should be implemented as funding allows. Each will improve NTFPD/MBFPD's ability to provide effective service to the community.

Improvement Goal A: Adopt Response Performance Goals that are Achievable

A community's desired level of service is a uniquely individual decision. No two communities are exactly alike. Performance goals must be tailored to match community expectations, community conditions, and the ability to pay for the resources necessary to attain the desired level of service.

Levels of service and resource allocation decisions are the responsibility of the community's elected officials, in this case the Boards of NTFPD and MBFPD. The policy making bodies must carefully balance the needs and expectations of its citizenry when deciding how to allocate money to all the services it provides.

The following are recommended as NTFPD/MBFPD fire and life safety response performance goals. They are, in some cases, longer than the organization's current planning goals. Since significant new revenue is not likely in the near to mid-term, adding resources to meet the current goals is not likely.

Adoption of goals allows NTFPD/MBFPD management to regularly report progress on achievement of these goals, conditions that are impeding progress, and resources needed to improve service.

Call-Processing Performance Goal

The first phase of overall response time is call processing time. This phase begins when the call is received at the PSAP center and ends when response resources are notified of an emergency. There are three components: answer time, transfer time, and dispatch time.

Recommended Call Processing Goal

- 911 calls will be answered at the primary PSAP within 15 seconds, 95 percent of the time.
- Calls will be transferred from the primary PSAP to GVECC within 30 seconds from the time answered, 95 percent of the time.
- Response resources shall be notified of a priority incident within 64 seconds from receipt of the call at the dispatch center, 90 percent of the time.

Turnout Time Performance Goal

Turnout time is one area over which the fire district has total control and is not affected by outside influences. Turnout time, or the time between when the call is received by the response units (dispatched) and when the unit is enroute to the incident location (responding), affects overall response times. Reducing this time component reduces total response time.

National Fire Protection Association Standard 1710 recommends turnout time performance of 80 seconds or less for fire and special operations response and 60 seconds or less for all other priority responses.

RECOMMENDED TURNOUT GOAL:

- Response personnel shall initiate the response of a unit capable of mitigating an incident to a priority fire and special operations incident 80 seconds from notification, 90 percent of the time.
- Response personnel shall initiate response to all other priority incidents within 60 seconds from notification, 90 percent of the time.

Response Time for the First-due Unit Goal

The time required to deliver the first response unit capable of intervening in the emergency includes both turnout time and travel time, but not call processing time. Based on current performance and implementation of operational improvements, the following are recommended.

RECOMMENDED FIRST-DUE RESPONSE TIME GOAL:

- The first response unit capable of initiating effective incident intervention shall arrive at a priority fire or special operations incident within 8 minutes, 20 seconds from notification of response personnel, 90 percent of the time.
- The first response unit capable of initiating effective incident intervention shall arrive at all other priority incidents within 8 minutes from notification of response personnel, 90 percent of the time.

Effective Response Force Performance Goal

A fire district's resource *concentration* is the spacing of multiple resources close enough together so that an initial "Effective Response Force" (ERF) for a given risk can be assembled on the scene of an emergency within the specific time frame identified in the community's performance goals for that risk type. An initial effective response force is defined as that which will be most likely to stop the escalation of the emergency.

The minimum ERF for structure fires is identified as the arrival of at least three fire engines, one medic, and one chief officer (10 personnel total). This initial ERF does not necessarily represent the entire alarm assignment, as additional units may be assigned based on long-term incident needs and risks. Additional engines, ladders, or other specialty companies are assigned to higher risk responses to accomplish additional critical tasks that are necessary beyond the initial attack and containment.

RECOMMENDED EFFECTIVE RESPONSE FORCE GOAL:

- The full effective response force shall arrive at a moderate risk structure fire within 15 minutes, 20 seconds of notification of response personnel, 90 percent of the time.

Cost to implement: None

Improvement Goal B: Reduce the Dispatch Call Process Time Interval

Call Transfer Time

CHP, PCSO, and EDCSO receives 911 calls originating within the districts. If the caller is requesting fire department services, the caller is transferred to GVECC. National standards recommend this transfer occur within 30 seconds, 95 percent of the time. During 2017, call transfer from the primary PSAPs to GVECC took between 45 and 65 seconds longer.

NTFPD/MBFPD should review procedures used to determine if the caller should be transferred to GVECC and adopt new procedures that transfer the caller more quickly.

Call Processing Time

Once the caller is transferred to GVECC, the caller is questioned about nature and location of the emergency. Typically, the dispatch of response personnel does not occur until the end of that question or very near the end.

GVECC should implemented a pre-alert system that notifies response personnel of the emergency once the basic nature of the call (EMS, house fire, etc.) and the location are known. This should typically be within the first 30 seconds of the conversation.

There are computer-based systems that can be implemented that broadcast this information via computer generated voice to responders that can be integrated into the computer aided dispatch system.

High performance dispatch centers using this pre-alert process are notifying responders with 30 to 40 seconds, 90 percent of the time, a significant overall response time savings versus GVECC's current performance of 3 minutes, 13 seconds, 90 percent of the time.

GVECC and NTFPD/MBFPD should review call processing performance regularly to determine if the pre-alert process is reducing dispatch times to the extent possible.

Cost to implement: None unless computer assisted pre-alert is implemented.

Improvement Goal C: Reduce the Turnout Time Interval

Turnout time is the period between when dispatchers notify response personnel of the incident and when response crews begin travel towards the incident location. The recommended performance goal for turnout time is within 80 seconds, 90 percent of the time for fire and special operations incidents and within 60 seconds, 90 percent of the time for all other incidents. NTFPD/MBFPD's overall turnout time performance is currently within 3 minute, 47 seconds, 90 percent of the time.

A review of fire station design should also be conducted to identify and remove impediments to quick response. This can include station alerting systems, pathways from quarters to apparatus, and the like.

Fire district management should regularly prepare information that describes current turnout time performance by individual response crews. Performance expectations should be reinforced and periodic monitoring conducted to determine if improvements are being made and sustained. Response personnel should avoid activities that extend turnout times. Response personnel must make serious efforts to improve their turnout time performance for the benefit of the community.

Cost to implement: Dependent on the cost of improvements to station configuration

Improvement Goal D: Improve Data Collection and Analysis for Ongoing Performance Assessment

Much can be revealed by collecting and evaluating incident data accurately and regularly. Challenges to quick response can be identified and solutions proposed. Trends can be identified allowing the fire department to prepare for changes and or increases in response workload. Frequent incident types can be identified and steps taken to reduce their occurrence such as public safety education or building engineering.

NTFPD/MBFPD collects data for every incident to which it responds. GVECC also collects data for these incidents. Combined this information can provide insight into the department's response strengths and weaknesses as was done in this report. Use of geographic information systems (GIS) software can also be useful to provide a spatial view of incident activity and challenges. Examples of this are also included in this report.

NTFPD/MBFPD should ensure it is capturing sufficient data to fully evaluate its response system. Frequent quality control reviews should be conducted to ensure data is collected and reported accurately. This data should be easily retrievable for analysis. Regular analysis of this data should be conducted so that system performance is understood. Performance reports, along with a discussion of challenges and potential solutions, should be provided to policy makers to support decision making.

NTFPD/MBFPD should find a source for public safety GIS analysis or develop that capability in-house. Computer hardware software and training for the GIS analyst will be required if done in-house.

Cost to implement: Staff time for improved collection and utilization of data. Approximately $10,000 for acquisition of GIS hardware, software, and training.

Improvement Goal E: Begin Using MDCs for Unit Status Changes to Provide More Accurate Data

In order to improve the accuracy of unit status change data collection, MDCs in the response units should be capable of reporting enroute, arrival, and clear to the computer aided dispatch system without the need to transmit a voice message. There are delays inherent in voice transmissions that degrade the accuracy of unit status change times.

Making this change will give the district a much clearer picture of actual response performance.

Cost to implement: The cost for programming of both the CAD and MDCs to enable this capability.

Improvement Goal F: Use Pro QA (EMD) to Differentiate Response to EMS Incidents

NTFPD/MBFPD's current practice is to send both a medic unit and fire engine to all emergency medical incidents regardless of severity. Since most requests for service are emergency medical this means that two response units are often committed to an incident.

Not all emergency medical incidents require both response units. Many non life-threatening incidents can be adequately served with only one. GVECC currently queries the caller with a standardized list of questions that can differentiate between a life-threatening incident and a non life-threatening incident. The number of units sent to a medical incident is based on the results of this query.

Cost to implement: Staff time to develop new response procedures.

Improvement Goal G: Staff M51 at Least 10–12 Hours per Day Seven Days per Week

Medic 51 is a heavily utilized response unit and currently exceeds 10 percent unit hour utilization. When Medic 51 is on an incident, Engine 51 is unstaffed and unavailable to another incident.

Medic 51's current workload warrants independent staffing during the day for at least 10 to 12 hours, seven days per week. Daytime workload is much greater than nighttime and is the period of time when Engine 51 is unstaffed by an emergency medical incident most often.

Cost to implement: ESCI recommends that the district initially pilot this recommendation utilizing overtime personnel. This will allow the collection of data that can be utilized to determine the most efficient staffing pattern.

Improvement Goal H: Use Data to Identify Community Risk Reduction Opportunities

An emerging trend in the fire service nationally is a concept called Integrated Community Risk Reduction (CRR). CRR is an integrated approach to risk management that marries emergency operations and prevention strategies into a more cohesive approach to reducing risks in any community. It includes the fire district partnering with the community, non-profit organizations, and any private sector agencies with a nexus to an identified community risk.

The concept starts with the fire district mining data to quantify community risk. Once the community risks have been identified, they are prioritized based on frequency of emergency service demand or consequence (to the victim, to the community, to the local economy). Upon prioritizing the risks, strategies are developed to mitigate the risks. These strategies are incorporated into a CRR plan, which integrates resources across the fire department, partner agencies, and the community to implement the various strategies in a cohesive manner. After plan implementation, the results are reviewed to determine the impact on the risks. Adjustments are made, as necessary, based on the results and the process is refined and continuously re-implemented.

The risks are not limited to structure fires. They can include falls, drowning, interface exposure, disasters, or any risk requiring fire department response. Risk can also be localized by station area. Station officers, in collaboration with fire prevention staff and community groups, can develop and manage a station area-specific CRR plan as a subset of the fire district's plan. CRR lends itself well to a volunteer supported effort, led by competent professional leadership. CRR also includes public education for risk reduction. A prepared and informed community is a safer community.

Estimated Cost: Staff time to interpret response data and determine the high frequency risks and staff time to develop and implement an education program.