Fire and Emergency Medical Services Operations and Data Analysis Prescott, Arizona

August 2014

FIRE/EMS OPERATIONS

CENTER FOR PUBLIC SAFETY MANAGEMENT

Submitted by and reply to:
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ICMA

Leaders at the Core of Better Communities

General Information

About ICMA

The International City/County Management Association (ICMA) is a 100-year-old nonprofit professional association of local government administrators and managers, with approximately 9,000 members located in 28 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments in providing services to their citizens in an efficient and effective manner. Our work spans all of the activities of local government: parks, libraries, recreation, public works, economic development, code enforcement, brownfields, public safety, and a host of other critical areas.

ICMA advances the knowledge of local government best practices across a wide range of platforms, including publications, research, training, and technical assistance. Our work includes both domestic and international activities in partnership with local, state, and federal governments, as well as private foundations. For example, we are involved in a major library research project funded by the Bill & Melinda Gates Foundation and are providing community policing training in El Salvador, Mexico, and Panama with funding from the United States Agency for International Development. We have personnel in Afghanistan helping to build wastewater treatment plants and have teams working with the United States Southern Command (SOUTHCOM) in Central America on conducting assessments and developing training programs for disaster preparedness.

ICMA Center for Public Safety Management

The ICMA *Center for Public Safety Management* (ICMA/CPSM), one of four centers within ICMA's U.S. Programs Division, provides support to local governments in the areas of police, fire, emergency medical services (EMS), emergency management, and homeland security. In addition to providing technical assistance in these areas, we also represent local governments at the federal level and are involved in numerous projects with the U.S. Department of Justice and the U.S. Department of Homeland Security.

ICMA/CPSM is also involved in police and fire chief selection, assisting local governments in identifying these critical managers through original research, the identification of core competencies of police and fire managers, and assessment center resources.

Our local government technical assistance includes workload and deployment analysis, using operations research techniques and credentialed experts to identify workload and staffing needs and best practices. We have conducted approximately 140 such studies in 90 communities ranging in size from 8,000 population (Boone, Iowa) to 800,000 population (Indianapolis, Indiana).

Thomas Wieczorek is the Director of the Center for Public Safety Management. Leonard Matarese is the Director of Research & Project Development.

Methodology

The ICMA Center for Public Safety Management team follows a standardized approach to conducting analyses of fire, police, and other departments involved in providing services to the public. We have developed this approach by combining the experience sets of dozens of subject matter experts in the areas of police, fire, and EMS. Our collective team has several hundred years of experience leading and managing public safety agencies, and conducting research in these areas for cities in and beyond the United States.

The reports generated by the operations and data analysis team are based upon key performance indicators that have been identified in standards and safety regulations and by special interest groups such as the International Association of Fire Chiefs (IAFC), the International Association of Fire Fighters (IAFF), the Association of Public-Safety Communication Officials International, and through ICMA's Center for Performance Measurement. These performance measures have been developed following decades of research and are applicable in all communities. For this reason, the data yield similar reporting formats, but each community's data are analyzed on an individual basis by the ICMA specialists and represent the unique information for that community.

The ICMA team begins most projects by extracting calls for service and raw data from a public safety agency's computer-aided dispatch system. The data are sorted and analyzed for comparison with nationally developed performance indicators. These performance indicators (e.g., response times, workload by time, multiple-unit dispatching) are valuable measures of agency performance regardless of departmental size. The findings are shown in tables and graphs organized in a logical format. Despite the size and complexity of the documents, a consistent approach to structuring the findings allows for simple, clean reporting. The categories for the performance indicators and the overall structure of the data and documents follow a standard format, but the data and recommendations are unique to the organization under scrutiny.

The team conducts an operational review in conjunction with the data analysis. The performance indicators serve as the basis for the operational review. The review process follows a standardized approach comparable to that of national accreditation agencies. Before the arrival of an on-site team, agencies are asked to provide the team with key operational documents (policies and procedures, asset lists, etc.). The team visits each city to interview fire agency management and supervisory personnel, rank-and-file, and local government staff.

The information collected during the site visits and through data analysis results in a set of observations and recommendations that highlight the strengths, weaknesses, and opportunities of—and threats to—the organizations and operations under review. To generate recommendations, the team reviews operational documents; interviews key stakeholders; observes physical facilities; and reviews relevant literature, statutes and regulations, industry standards, and other information and/or materials specifically included in a project's scope of work.

The standardized approach ensures that the ICMA Center for Public Safety Management measures and observes all of the critical components of an agency, which in turn provides substance to benchmark against localities with similar profiles. Although agencies may vary in size, priorities, and challenges, there are basic commonalities that enable comparison. The approach also enables the team to identify best practices and innovative approaches.

In general, the standardized approach adopts the principles of the scientific method: We ask questions and request documentation upon project start-up; confirm accuracy of information received; deploy operations and data analysis teams to research each unique environment; perform data modeling; share preliminary findings with the jurisdiction; assess inconsistencies reported by client jurisdictions; follow up on areas of concern; and communicate our results in a formal written report.

ICMA/CPSM Project Contributors

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Executive Summary

ICMA executed a contract with the city of Prescott, Arizona, to complete a comprehensive analysis of the city's fire, emergency medical services and wildland urban interface. This analysis is designed to provide the city with a thorough and unbiased review of all emergency services provided by the Prescott Fire Department (PFD). This report is accompanied by recommendations for ways to improve those services, identifies major issues confronting the PFD, and discusses in depth the operational strengths and weaknesses. The report also provides a benchmark of the city's existing service delivery performance based on a comprehensive data analysis of information provided by PFD. Also included in this report is the use of geographic information systems (GIS) data mapping to support the operational discussion and recommendations.

During our study, we analyzed performance data provided by the PFD and examined firsthand the department's operations. Fire departments tend to deploy resources using traditional approaches that are rarely reviewed. This report seeks to identify ways the department can improve efficiency, effectiveness, and safety for both its members as well as the community it serves. The recommendations provided may be adopted in whole, in part, or rejected.

To begin the review, the project management team asked the city for certain documents, data, and information. Team members used this information/data to familiarize themselves with the fire department's structure, assets, and operations. We also used this information in conjunction with the raw performance data collected to determine the existing performance of the fire department, and compare that performance to national benchmarks. These benchmarks have been developed by organizations such as the National Fire Protection Association (NFPA), Center for Public Safety Excellence, Inc. (CPSE), and the ICMA Center for Performance Measurement. The city of Prescott was also provided an electronic shared information folder to upload information for analysis and use by the ICMA project management team.

The project management team conducted site visits on February 3–5, 2014. Team members observed fire department and agency-related support operations, interviewed key fire department staff, and reviewed preliminary data and operations. Several telephone conference calls were also conducted between ICMA project management staff and the city so that ICMA staff could affirm the project scope and to elicit further discussion regarding this operational analysis.

Initial Steps Going Forward

As depicted in this report, the PFD provides excellent service to the Prescott community, its citizens and businesses, and the region. The department is respected by the community and city leaders. There are some unique issues, atypical to the normal environment, faced by the department at this time, however, as will be pointed out in this report. The most notable issue have resulted in near-term challenges stemming from the changes in the top position, as the department has transitioned from a permanent chief, to an interim chief, and then to a new permanent chief.

As the city begins to initiate the recommendations proposed in this report and as the new chief begins to develop his plans for the future, there is a need to infuse a new culture and ideas into the fire department. This is evidenced in the department survey conducted by ICMA in which 63.6

percent of respondents said they felt that morale in the department is not high; 57.6 percent feel that there is no clear department mission and vision; 30.3 percent would not recommend the department for employment; and 93.9 percent believe that communication between city hall and the department is poor. While there is no guarantee that having a new fire chief will change the culture, having a permanent fire chief does bring more consistent decision making, and hence results in greater stability and improved leadership.

Twenty-seven recommendations for the PFD are listed below and in the applicable sections within this report. In addition, both the facility and wildland sections of the report have specific and detailed recommendations. The recommendations are based on best practices derived from the NFPA, the CPSE, ICMA, the U.S. Fire Administration, the International Association of Emergency Managers (IAEM), and the Federal Emergency Management Agency (FEMA).

Recommendations:

- ICMA strongly recommends all strategic planning documents be incorporated into a single comprehensive strategic planning document and linked to the *City of Prescott Community Strategic Plan* as well as to city council goals.

- The PFD's performance measurement system should be designed to link to strategic goals and objectives, as well as to the comprehensive strategic planning document. The number of measurements related to quality (outcome) and customer satisfaction should be increased to determine how effectively the department is making progress in achieving its goals. The department should also begin the analysis of its cost effectiveness by establishing some efficiency ratios (output and outcome) to better determine progress on a year-to-year basis.

- It is strongly recommended that opportunities for partnerships to provide community paramedicine be explored with local hospital providers and accountable care organizations (ACOs) and that a needs/threat assessment be conducted for each policy consideration prior to implementation.

- It is strongly recommended that the expansion of the existing city EMS role to ALS patient transportation services only occur if this change is community driven.

- The PFD should complete a fire and community risk assessment of buildings and structures. This assessment should be done in conjunction with the fire and EMS calls-for-service demand analysis provided in this report and merged with the completed wildland risk assessment and analysis.

- It is strongly recommended that Prescott utilize an integrated risk management plan.

- It is strongly recommended that Prescott develop and institute a performance measurement system to align turnout time with nationally recommended best practices.

- It is strongly recommended that a comprehensive performance-based management strategy for all elements of response time be developed.

- Utilize a risk-based strategy to continue to refine a decision matrix for outlining which types of service requests require emergency responses and which can be responded to with the normal flow of traffic.

- It is strongly recommended that Prescott explore elements of dynamic deployment in an effort to better align resources to demand for services, thus improving the efficient allocation of resources.

- Develop a system to document nonemergency activities so that decisions about new efficiencies and work capacity are both accurate and transparent to city leaders and the broader community.

- If improved response capability in the eastern portion of the jurisdiction is desired, the general area of the proposed station is may not be appropriate.

- It is suggested that further analyses be conducted when considering expansion and/or station replacement to ensure that service enhancements cannot be realized by relocating existing stations as a first option. For example, leaders should carefully consider the proposal for a new station at East Sheldon Street to make sure that it is the best option available.

- Re-examine the necessity of the station proposed for the vicinity of Highway 89A.

- It is strongly recommended that Prescott prepare and adopt a standard of coverage document that will clearly articulate expectations for service performance.

- Revisit the inclusion of fire facilities in the facilities maintenance fund in order to ensure the useful life of valuable and well utilized capital facility assets.

- Develop and implement a capital replacement program for vehicles and qualifying capital vehicle equipment that includes projected future cost and target replacement years for all capital equipment and fleet apparatus.

- Conduct further study of potential cost savings and overall value to civilianization of the fire prevention staff.

- It is strongly recommended that the wildland division be eliminated and that the fuels mitigation personnel be reassigned to the fire marshal's division (within fire prevention).

- It is strongly recommended that Prescott utilize a relief staffing multiplier similar to the one presented in this report.

- It is strongly recommended that the current minimum staffing policy, at 17/16, be continued.

- It is recommended that a cost-benefit analysis be completed regarding the elimination of sleeping hours in the calculation of hours worked under the FLSA.

- As funding allows, Prescott should consider adding a dedicated plans reviewer position or an additional fire inspector position to meet current and future inspection and plans review demand.

- Due to the aggregate (manmade and environmental) risk potential, the emergency management function should be fully engaged from the top to the bottom of the organization to include training, assignment of emergency support functions to city staff in the event of an emergency operations center activation, and the development of a comprehensive city emergency management plan that will serve as an annex to the overall Yavapai County Joint Office of Emergency Management comprehensive emergency management plan.

- It is strongly recommended that automatic aid relationships in place today continue to be fostered. In addition, Prescott is encouraged to explore innovative ways to share resources that benefit the community.

- It is recommended that the Prescott Regional Communications Center (PRCC) develop another alternative backup dispatch center for their continuity of operations plan that is geographically distant from the original center.

- It is recommended that the PRCC continue to develop the automatic vehicle locator (AVL) system to include road miles as opposed to "as the crow flies."

- It is strongly recommended that the PRCC work with the PFD to fully utilize MPDS to eliminate PFD response to low-acuity medical calls for which a quick response has little or no impact on the clinical outcome.

Introduction

Project Scope

The scope of this project was to provide an independent review of the Prescott Fire Department (PFD) so that city officials can understand how well the city's fire delivery systems are working. This project is part of a combined effort to review city public safety operations to include the Prescott Police Department and Prescott Regional Communications Center (PRCC). City officials endeavor also to understand whether and how the fire department can provide services more efficiently and hence commissioned this study to measure the PFD against industry best practices, provide recommendations where appropriate, and provide input on strategic direction for the future.

Key areas to be evaluated during this study were:

- Major organizational issues faced by PFD. For example, city and department leaders should carefully consider the proposal for a new station at East Sheldon Street to make sure that it is the best option, as well as the fire department's more focused approach to prevention of wildland fires (defendable community best practices)
- Fire department response times and unit workloads benchmarked against station locations
- Operational analysis of departmental fire operations and essential resources
- Wildland urban interface and departmental operations

Study Process

This project combined multiple research techniques, including a two-day onsite visit by the operations team, interviews with city administrators and fire leaders, collecting and reviewing background information, analyzing computer aided dispatch (CAD) and incident data, and performing geographic information system (GIS) analyses. We also visited each of the city's fire stations and toured the city and the Central Yavapai Fire District to learn about their unique setting and geography. Throughout the project, we maintained contact with the city's designated project manager and followed up with key individuals by e-mail and telephone. Finally, a survey of Fire Department personnel was conducted.

Organization of the Report

Section I: This section discusses the overall organization and management of the city and the PFD. Included in this section is discussion regarding organizational elements such as strategic goals and performance measurement, as well as major issues confronting the PFD. Here, ICMA also provides a perspective on initial steps going forward regarding this study and the study's recommendations.

Section II: This section discusses the growth, risk and subsequent demand and potential pressures on fire and EMS services. Included in this section is a review of the city's population, growth, and development, as well as projections for the future; demand for emergency services (illustrated through mapping); fire and EMS risk analysis and its relevance/importance to staffing and deployment of resources; and target hazards as identified by the PFD.

Section III: This section discusses workload and response time of the PFD units and assesses fire station locations as well as the PFD fleet. Mapping is used to illustrate response travel time bleeds from each station and how the current station configuration supports service delivery.

Section IV: This section discusses fire and EMS operations, how these services are organized, emergency response, and staffing and overtime. ICMA provides key findings and recommendations for efficiencies and increased effectiveness.

Section V: This section discusses the essential resources the PFD provides or that are provided to the department through automatic aid or by other service delivery partners.

Section VI: This section discusses the city's wildland urban interface and the PFD wildland division organization and operations. Included in this discussion is how the PFD operates regionally and how it integrates within statewide and federal responses.

Section VII: This chapter analyzed performance of the department using raw data captured from the Prescott Regional Communications Center (PRCC) CAD system. From the raw data, information was categorized and the PFD workload was analyzed.

I. Organization and Management

Governance and Organization

The city of Prescott operates under a council-manager form of government. The city council consists of six members and a mayor, all of whom are elected at large. Council members serve staggered four-year terms; the mayor's term is two years. The council appoints a professional city manager to manage and oversee the daily operations of the city's government operation, and to carry out council policy.[1]

Figure 1 illustrates the FY 2014 organizational chart for the city of Prescott, Arizona.

Chapter 2-2 of the city of Prescott City Code creates the Prescott Fire Department (PFD). Chapter 2-2 also defines the appointments and members of the PFD; the duties of the fire chief and his/her staff; equipment; and the parameters of answering calls beyond the corporate limits of the city.[2] Established in 1885, the PFD is the oldest fire department in the state of Arizona.[3] The fire department currently consists of sixty-five FY2014 authorized positions operating out of five primary fire stations, administrative offices, a training facility, and a wildland facility.

Chapters 6-1 and 6-2 establish the fire prevention code and urban-wildland interface code respectively with accompanying city amendments. The fire prevention code is codified for the purpose of enforcing fire prevention and safety regulations. The urban-wildland interface is codified for the purpose of "establishing minimum regulations for land use and the built environment in designated wildland-urban interface areas using prescriptive and performance-related provisions."[4]

Figure 2 illustrates the organizational chart as of June 29, 2013 for the Prescott Fire Department.

[1] http://www.cityofprescott.net/_d/city_charter.pdf.
[2] Prescott City Code, http://www.codepublishing.com/AZ/Prescott/.
[3] Prescott FY 2014 Budget Document.
[4] International Code Council, *2012 International Wildland-Urban Interface Code*, https://law.resource.org/pub/us/code/ibr/icc.iwuic.2012.html.

Figure 1: City of Prescott, Arizona Organizational Chart

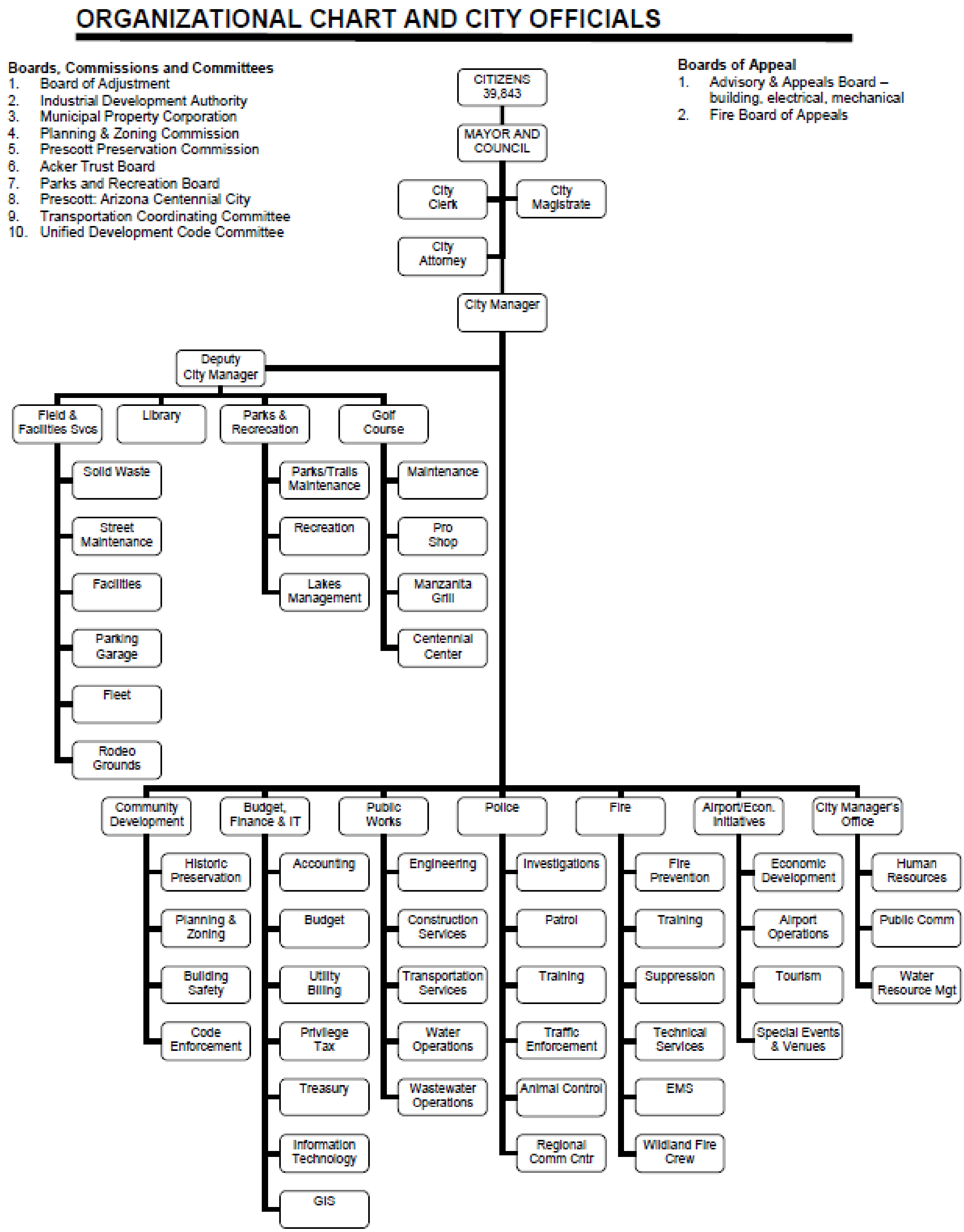


Figure 2: FY 2014 Prescott Fire Department Organizational Chart

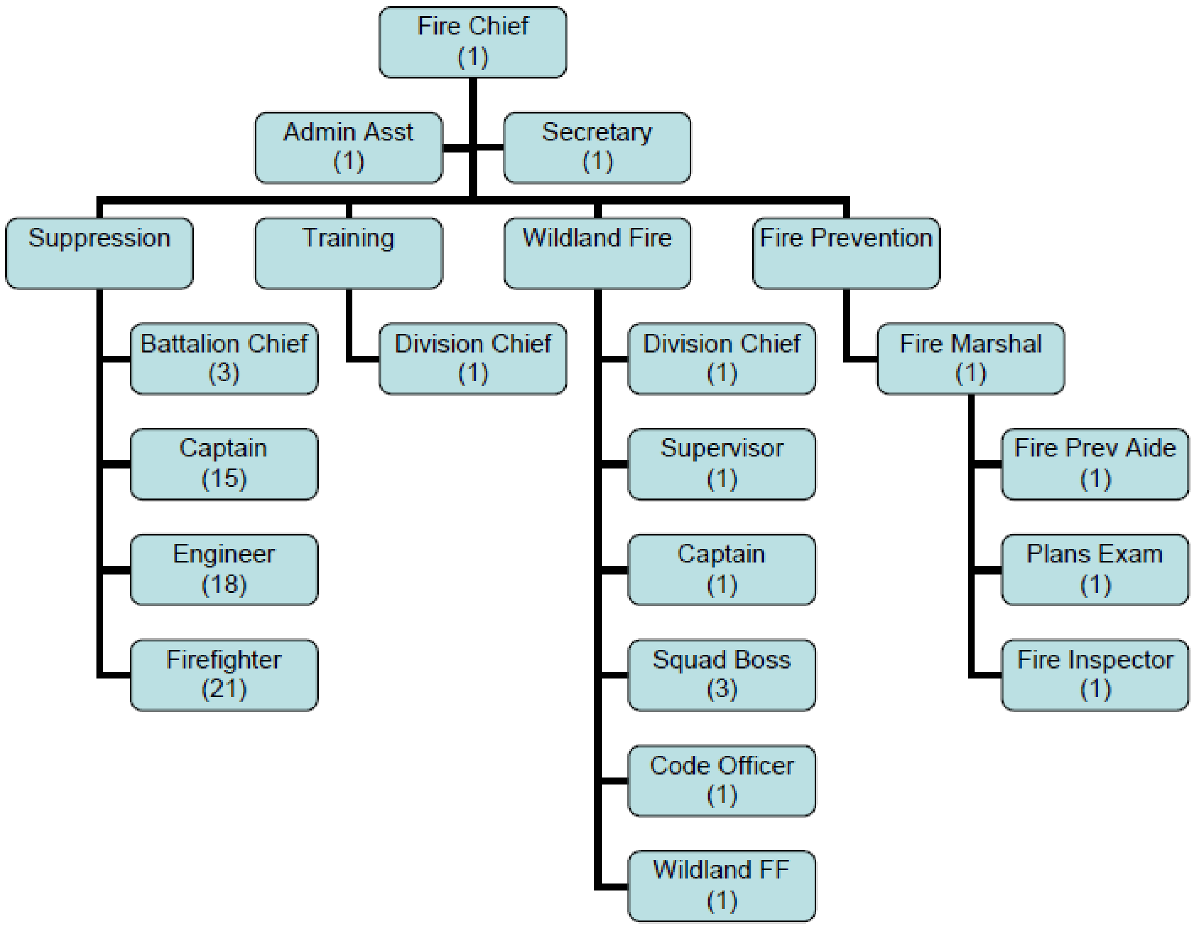
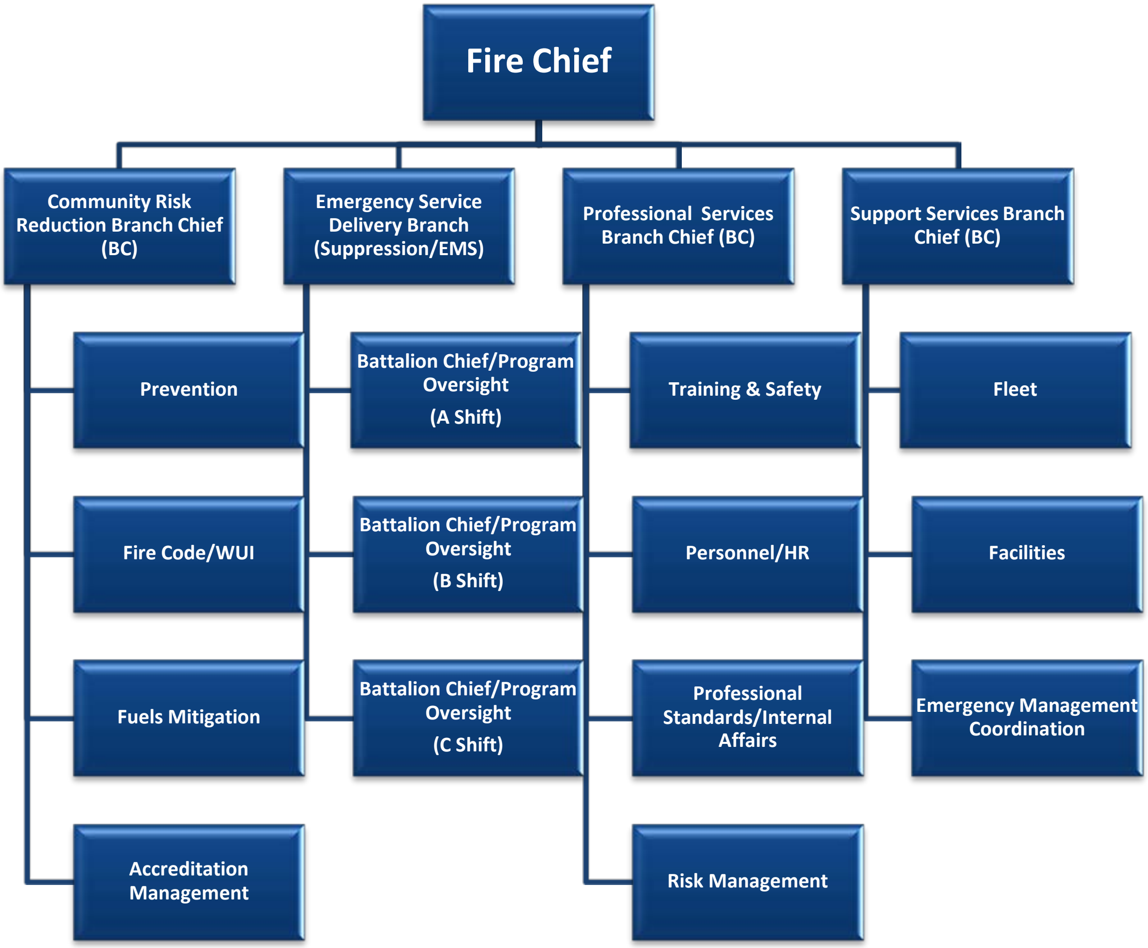


Figure 3 represents a staff proposed PFD organizational chart. This chart consolidates the wildland suppression function with the operations functions under the command of a single division chief. An additional alternative proposed change is to consolidate the fuels mitigation officer position within the Fire Prevention Division, as the purpose of fuels mitigation centers around programs specific to fuels management, defendable spaces around structures, and the reduction and prevention of wildland fires. Within the fire prevention office this position can also participate in other public education and community risk reduction activities. ***ICMA supports the proposed organizational chart in Figure 3 or an alternative that reassigns the fuels mitigation officer to fire prevention and keeps the wildland firefighting capability in fire operations.***

Figure 3: Staff Proposed PFD Organizational Chart

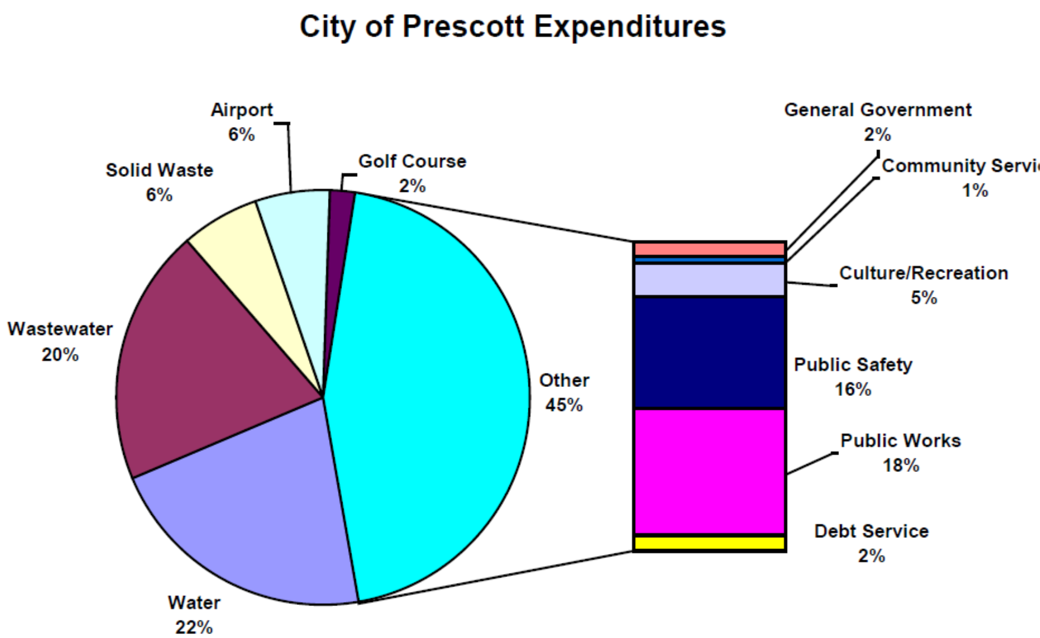


Fiscal Overview

Funding local government functions and programs requires finding the appropriate balance of needs, requests, future growth, and community vitality against available annual and borrowed funding. The PFD is funded through the city's general fund budget. The general fund in Prescott is established for the revenue and expenditures necessary to carry out basic governmental activities of the city, including police protection, recreation, planning, legal services, administrative services, and so forth.[5] General fund expenditures are made primarily for day-to-day operating expenses and operating equipment. Taxes (sales/use, state shared revenue /franchise) are the largest revenue source for the general fund; sales/use tax is the largest revenue source overall , with primary property tax support to the general fund representing less than 5% of total revenue.[6] Figure 4 illustrates the general fund expenditures by program. (Public safety includes the fire department.)

[5] City of Prescott FY2014 Budget Document.
[6] City of Prescott FY2014 Budget Document.

Figure 4: Figure 4: City of Prescott FY 2014 Expenditures - All Funds



The FY 2014 consolidated fire department budget is $9,536,457 and represents 30 percent of the general operating budget. The FY 2014 budget is 13.5 percent larger than the previous year estimated budget. The total PFD operating budget includes general fund and vegetation grant dollars. Capital outlay/equipment is generally budgeted with pay-as-you-go strategies. Figure 5 illustrates the FY2014 PFD program budget allocation. Figure 6 illustrates current year (FY2014) and past years PFD budgets and staffing allocations.

Figure 5: City of Prescott FY 2014 Program Budget Allocations: Fire Department

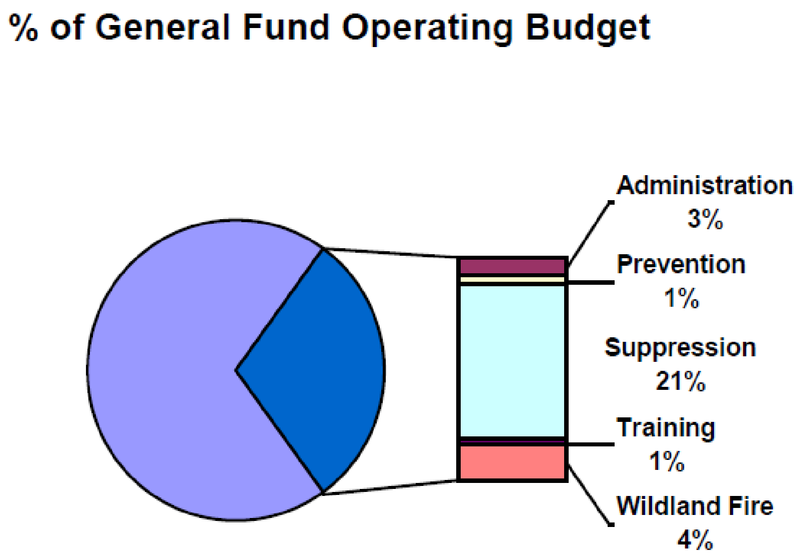


Figure 6: PFD Budget and Staffing Allocations FYs 12, 13, 14[7]

Consolidated Departmental Expenditure and Staffing Level Summary

	FY12 Actual	FY13 Estimate	FY14 Budget
Personnel	$ 7,220,791	$ 7,463,845	$ 8,017,117
Supplies	260,482	285,983	320,512
Other Services & Charges	853,502	832,159	816,607
Cost Recovery	(1,506,583)	(1,511,616)	(1,409,111)
Capital Outlay/Projects	-	143,513	451,712
Total	$ 6,828,192	$ 7,213,884	$ 8,196,837
Authorized Staffing Level	78.00	80.00	79.00
Administration	3.00	3.00	3.00
Prevention	4.00	4.00	4.00
Suppression	57.00	57.00	57.00
Training	1.00	1.00	1.00
Fire Vegetation Crew	13.00	15.00	14.00

A portion of the Fire Vegetation Crew is charged to the Vegetation Grant.

- FY13-14 PFD grants total $1,041,510
- FY-13-14 PRCC costs total $298,110

[7] City of Prescott FY 13-14 Budget Document

Strategic Planning

Strategic planning is "a deliberative, disciplined effort to produce fundamental decisions and actions that shape and guide what an organization … is, what it does, and why it does it."[8] This process helps to ensure that an adequate level of staffing, equipment and other resources are allocated as efficiently as possible to meet the community's needs for services.

Defining clear goals and objectives for any organization through a formal strategic planning document establishes a resource that any member of the organization or individuals external to the organization can view to see what direction the organization is heading and how the organization is planning to get there. Ultimately, the strategic plan defines the systems thinking the organization is conducting to serve its core mission.

The PFD has a comprehensive strategic plan that includes five strategic priorities:

- Improve existing and future infrastructure
- Deploy resources effectively
- Develop and manage resources
- Develop employees and the organization
- Reach out to the community

The plan is laid out so that each strategic priority is supported with action statements to satisfy the priority. Additionally, each strategic priority has a follow-up responsibility that is assigned to a specific person or organizational group such as battalion chiefs. This accountability action is a best practice that ICMA consistently recommends.

The existing strategic plan is dated and it has outlived its original five-year timeline (2007–2012). ICMA recommends that the PFD review the plan for completion, update the plan, and develop a report card.

There is also a strategic plan for wildland operations (2012–2017). As with the overall strategic plan, there are strategic priorities identified, each supported with action items. There are minimal action statements supporting the action items, however, which should identify how each strategic priority is satisfied. The ten strategic priorities in the wildland operations plan are:

- Conduct hazardous fuels treatment and disposal on 400 acres of land annually
- Maintain staffing of the wildland division to accomplish the mission
- Maintain a cost-effective and balanced approach to financing that utilizes grants and cost recovery accounts
- Maintain a positive partnership with the Prescott Wildland Urban Interface Commission and fifteen designated *Firewise USA* communities
- To provide the current level of all-risk emergency response with adequate equipment and apparatus

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[8] John M. Bryson and Farnum K. Alston, *Creating and Implementing Your Strategic Plan: A Workbook for Public and Nonprofit Organizations, 3*[nd] ed. (San Francisco: Jossey-Bass, 2011), 3.

- Maintain, support, and improve the relationship with the Arizona Wildfire and Incident Management Academy
- Maintain and conduct risk reduction assessment and wildland urban interface code enforcement on all new residential construction
- Build capacity through training opportunities to ensure that the Prescott Fire Department can respond to and manage all-risk incidents
- Maintain a high level of public educational offerings to assist the community in understanding and mitigating the wildland urban interface problem
- Maintain emergency snow removal response by following the city of Prescott's snow removal plan

The PFD special operations division also has a separate strategic plan that was developed and implemented in 2013. This plan is written as a one-to-three year plan. The special operations strategic plan identifies three program areas as follows:

- Aircraft rescue firefighting (ARFF)
- Hazardous materials (Haz-Mat)
- Technical rescue

Each program area of the special operations strategic plan identifies a program manager for accountability, program objectives, strategic priorities, action items developed to support and satisfy strategic priorities and program goals, and a target completion date.

The PFD can be commended for having these planning documents. As pointed out, strategic planning is an essential tool for any organization to be successful. However, having three separate planning documents potentially could create silos in an organization or areas in which priorities compete unnecessarily.

Recommendation:

- ICMA strongly recommends all strategic planning documents be incorporated into a single comprehensive strategic planning document and linked to the *City of Prescott Community Strategic Plan* as well as to city council goals.

Performance Measurement

Organizational programs need to be planned and managed so they achieve specific, agreed-upon results. This requires establishing a set of goals regarding the activities of any given program and the intended results. Determining how well an organization or program is doing requires measurable goals that are routinely measured against desired results. This is the goal of performance measurement.

Simply defined, performance measurement is the ongoing monitoring and reporting of progress toward pre-established goals. It captures data about programs, activities, and processes, and displays data in standardized ways to help communicate to service providers, customers, and other stakeholders how well the agency is performing in key areas. Performance measurement provides organizations with the tools and data needed to assess performance and identify areas in need of improvement. Simply put, what gets measured gets done.

The PFD has performance measures in the city's budget document. Each performance measure includes a strategic goal, strategy statement to satisfy the goal, and performance measures to benchmark outcomes in satisfying the strategic statement.

The majority of the PFD performance measures are output measures (i.e. number of X); some are efficiency measures (i.e. X percent of time).

Within local government, performance measures tend to focus on inputs, such as the amount of money and resources spent on a given program or activity, and short-term outputs, such as the number of fires in the community. One of the goals of any performance measurement system should be to include efficiency and cost-effectiveness indicators, as well as explanatory information that impacts how these measures should be interpreted, as depicted in Table 1.

Table 1: The Five GASB Performance Indicators

Category	Definition
Input indicators	**These are designed to report the amount of resources, either financial or other (especially personnel), that have been used for a specific service or program.**
Output indicators	**These report the number of units produced or the services provided by a service or program.**
Outcome indicators	**These are designed to report the results (including quality) of the service.**
Efficiency (and cost-effectiveness) indicators	**These are defined as indicators that measure the cost (whether in dollars or employee hours) per unit of output or outcome.**
Explanatory information	**This includes a variety of information about the environment and other factors that might affect an organization's performance.**
From Harry P. Hatry, et al., eds. *Service Efforts and Accomplishments Reporting: Its Time Has Come* (Norwalk, CT: GASB, 1990).	

One of the most important elements of performance measurement within local government is to describe service delivery performance so that both citizens and those providing the service have the same understanding. The customer will ask, "Did I get what I expected?" the service provider will ask, "Did I provide what was expected?" Ensuring that the answer to both questions is "yes" requires alignment of these expectations. To insure this, ICMA recommends the PFD expands their current cadre of performance measures to include output, efficiency, effectiveness, and outcome measures. For example, future analysis in this report regarding available time/capacity could have been more firm if better tracking measures were in place and data entry was enforced to validate actual capacity.

Recommendation:

- The PFD's performance measurement system should be designed to link to strategic goals and objectives, as well as to the comprehensive strategic planning document. The number of measurements related to quality (outcome) and customer satisfaction should be increased to determine how effectively the department is making progress in achieving its goals. The department should also begin the analysis of its cost effectiveness by establishing some efficiency ratios (output and outcome) to better determine progress on a year-to-year basis.

II. Population Growth, Risk, and Demand Analysis

Population Growth and Development

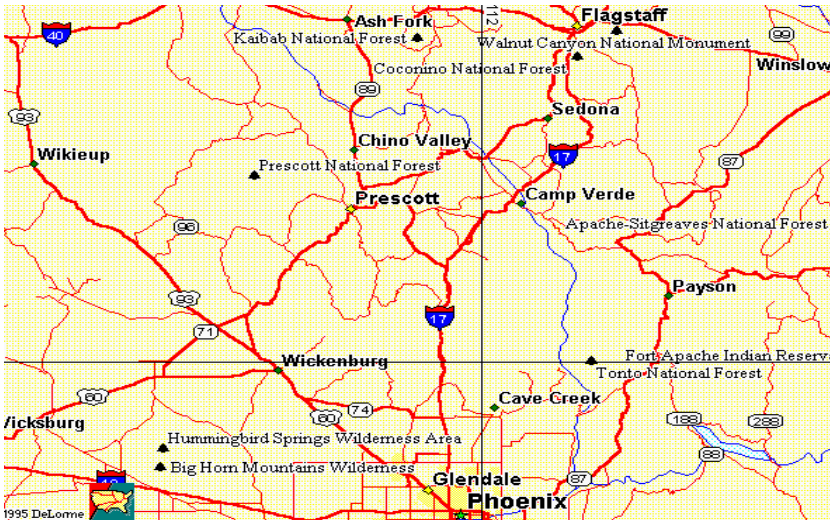


Figure 7

The city of Prescott is the county seat of Yavapai County. It is the largest city within the county and the twenty-fourth-largest city in the state of Arizona. As illustrated in Figure 7 to the left, Prescott is located in the basin of the Bradshaw Mountains and is bordered by the Prescott National Forest. The total area is 41.5 square miles (40.7 square miles of land area). The city's population in the 2010 U. S. census was 39,843.[9] From 2004 to 2010, the city experienced a 14.13 percent growth in population, but from 2010 to 2013, the population declined by approximately 12.38 percent. It is anticipated that by the year 2020, the city will realize a population of approximately 48,500.[10] The 2010 population density was approximately 979 people per square mile.

Water resources and finite growth boundaries are factors that may limit growth over the next decade. However, community leaders are proactively developing strategies to address the water issues expected to be encountered.[11]

Prescott is part of the Quad Cities area located in central Yavapai County. The total population for Yavapai County, according to the 2013 estimate from the U.S. Census Bureau, was 215,133.[12] Figure 8 shows the population of the nearby cities within Yavapai County and their growth in the last two decades.

[9] United States Census Bureau, State & County QuickFacts, Prescott (city), Arizona, http://quickfacts.census.gov/qfd/states/04/0457380.html.
[10] Arizona Demographics, http://www.arizona-demographics.com/prescott-demographics.
[11] Vision 2050 Water Committee, http://www.prescott-az.gov/_d/gpvision2050water.pdf.
[12] United States Census Bureau, State & County QuickFacts,Yavapai County, Arizona, http://quickfacts.census.gov/qfd/states/04/04025.html.

Figure 8: Population Percentage by Yavapai County Jurisdictions

Jurisdiction	1990 Population	1990 Portion Of County Population	2010 Population	2010 Portion Of County Population
City of Prescott	26,455	25.6%	39,843	18.9%
Town of Prescott Valley	8,858	8.2%	38,822	18.4%
Town of Chino Valley	4,837	4.5%	10,817	5.1%
Yavapai County	107,714		211,033	

The city of Prescott's economy relies upon retail trade, tourism, institutions of higher learning, the health care industry, government services, construction, industrial and commercial development, and manufacturing jobs. As Prescott is the county seat, it is home to a majority of county offices and court-related facilities. Prescott also has three campuses of higher learning: Embry-Riddle Aeronautical University, Yavapai College, and Prescott College. All three have a major positive connection to the city's economic vitality.[4] The city also has a wide range of healthcare providers and specialists and is home to the Community Health Center of Yavapai and the Yavapai Regional Medical Center's Prescott campus. These providers and facilities play an integral role in the community's economic prosperity. In addition, 2013 saw the influx of several new restaurants and national franchises, as well as an increase of activity in film office projects.[13]

Prescott is also an attractive tourist destination and regional hub for retail activity. The community often experiences a substantial population influx during a variety of tourist seasons (weekends, summer, Christmas, etc.) and multiple events that occur throughout the year. It is home to unique tourist attractions, capped by Historic Downtown Prescott's Courthouse Square and Whiskey Row, the Sharlot Hall Museum, and numerous festivals and events, such as the Prescott Rodeo, that highlight the town's historic importance as Arizona's territorial capital from 1864 to 1867 and again from 1879 to 1889. The Prescott area is also home to a variety of unique natural resources within the Prescott National Forest, including Lynx Lake, the Prescott Dells, and other developed campgrounds that offer climate relief and family outdoor recreation opportunities.

Based on hotel occupancy statistics provided by the Division of Tourism, it can be estimated that Prescott experienced approximately 902,000 overnight visitors from April 2013-April 2014. Although this statistic doesn't provide day-trip information, clearly tourism significantly increases the overall population that the PFD serves, and impacts the operations of the department. Additionally, according to a 2009 Prescott Area Tourism study, of the visitors surveyed over 90 percent traveled in an automobile, impacting traffic in the region. Per the same study, the most visited attraction in Prescott was Historic Downtown Prescott, visited by 80.1 percent of all visitors, and reflected in call volumes.

City of Prescott records indicate there are approximately 50 events held between April and October each year, with the majority hosted in the downtown, and ranging in visitors from 500 to 7,500 per event. The Recreation Services Department reports that 30 significant sporting events are also hosted, from tournaments, to bike races, to the senior games, with approximately 20,000 combined

[13] City of Prescott, 2013 Comprehensive Annual Fiscal Report,

teams/attendees of these activities. Finally, the 2013 Whiskey Off-Road Event Survey and Economic Impact Analysis shows that this event attracted 2,000 riders and 12,000 visitors for the three-day event, with more than 90 percent of riders and 80 percent of visitors from outside of Yavapai County. The significant impact of visitors on the PFD operation should be kept in perspective when looking at comparative data, call volumes and trends, and the overall strategy for the PFD.

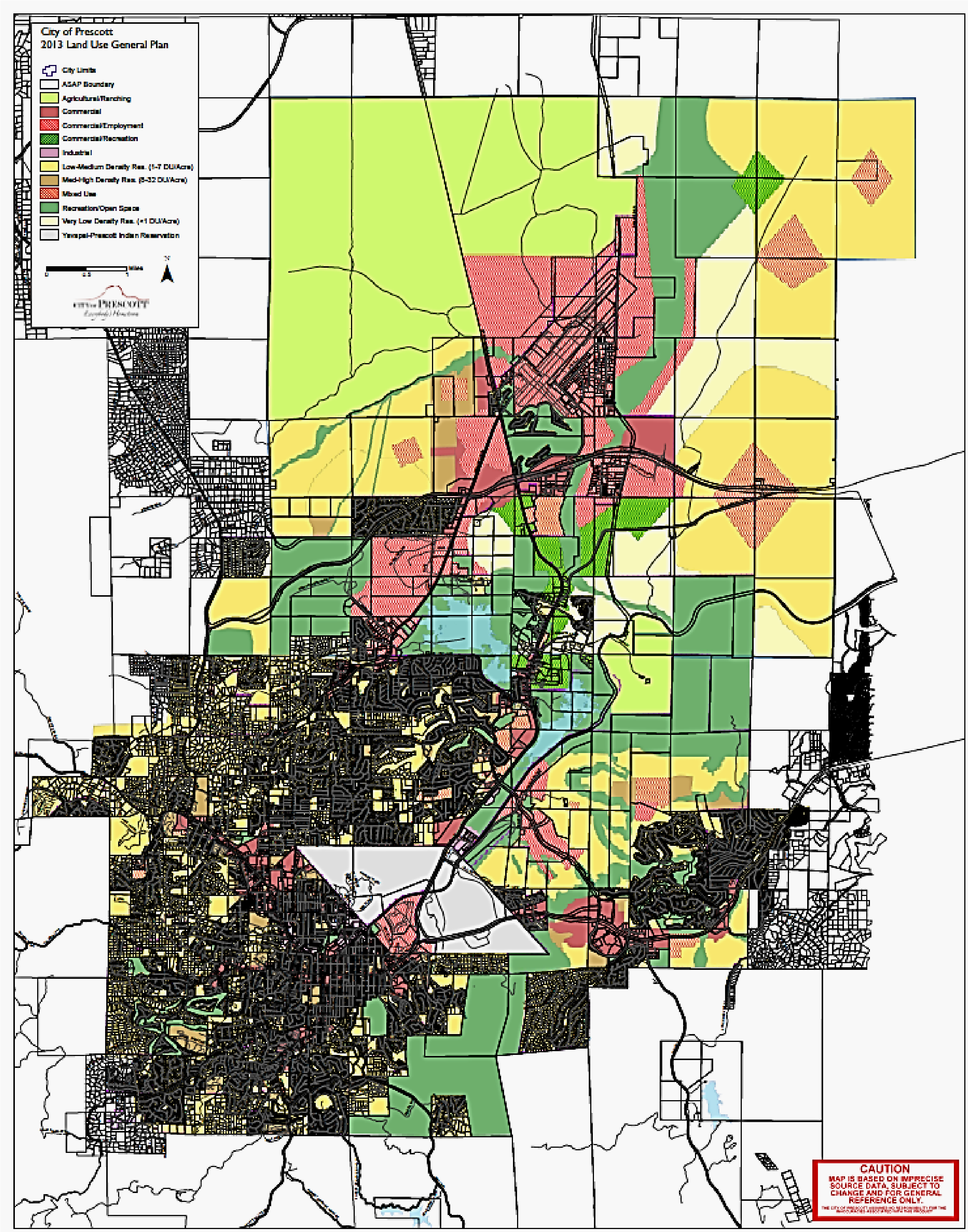
As noted, the city of Prescott encompasses 41.5 square miles, or about 27,264 acres. This includes the 2007 annexation of Granite Dells Estate, which added 1,142 total acres to property rolls and has a mix of residential, commercial and industrial development. In 2009, Granite Dells Ranch was also annexed, adding another 387 acres of commercially and industrially zoned parcels.[14] In 2013, two other small annexations were completed near Granite Dells Ranch, bringing in 497 acres in the North Airport Annexation, and 247 acres in the West Airport Annexation.

Residential development comprises an increasing proportion of the land uses within the city. In response to public sentiment, voters passed an open space initiative in 2000. As the city plans for the future growth and vision of the community, it is essential to maintain a balance between various land uses in an effort to support and promote the economic base of the community by ensuring adequate revenue to accommodate city services and to provide sufficient jobs and housing for residents. Figure 9 depicts the current land use in Prescott.

The city has also undertaken numerous capital projects to prepare for anticipated growth and ensure there is sufficient capacity through appropriate infrastructure. Within the past fiscal year, these projects include water reservoir pump stations, piping, mains, tanks, repairs, wastewater lift stations and treatment plants, reclamation facilities, utility improvements, roadways, and sidewalk improvements.

[14] Applied Economics, "Fiscal Impacts of the Granite Dells Ranch Annexation Area on the City of Prescott," (February 5, 2009),

Figure 9: Prescott Land Use Map



The city's residential development has increased since the economic recession and nationwide housing downturn has eased. There were nearly twice as many single-family housing permits in 2012 than in the 2009–2011 calendar years.[15] Planning documents indicate that new residential development seems to be returning to the "high-end, single family residential, in low density, large lot subdivisions located away from the city center."

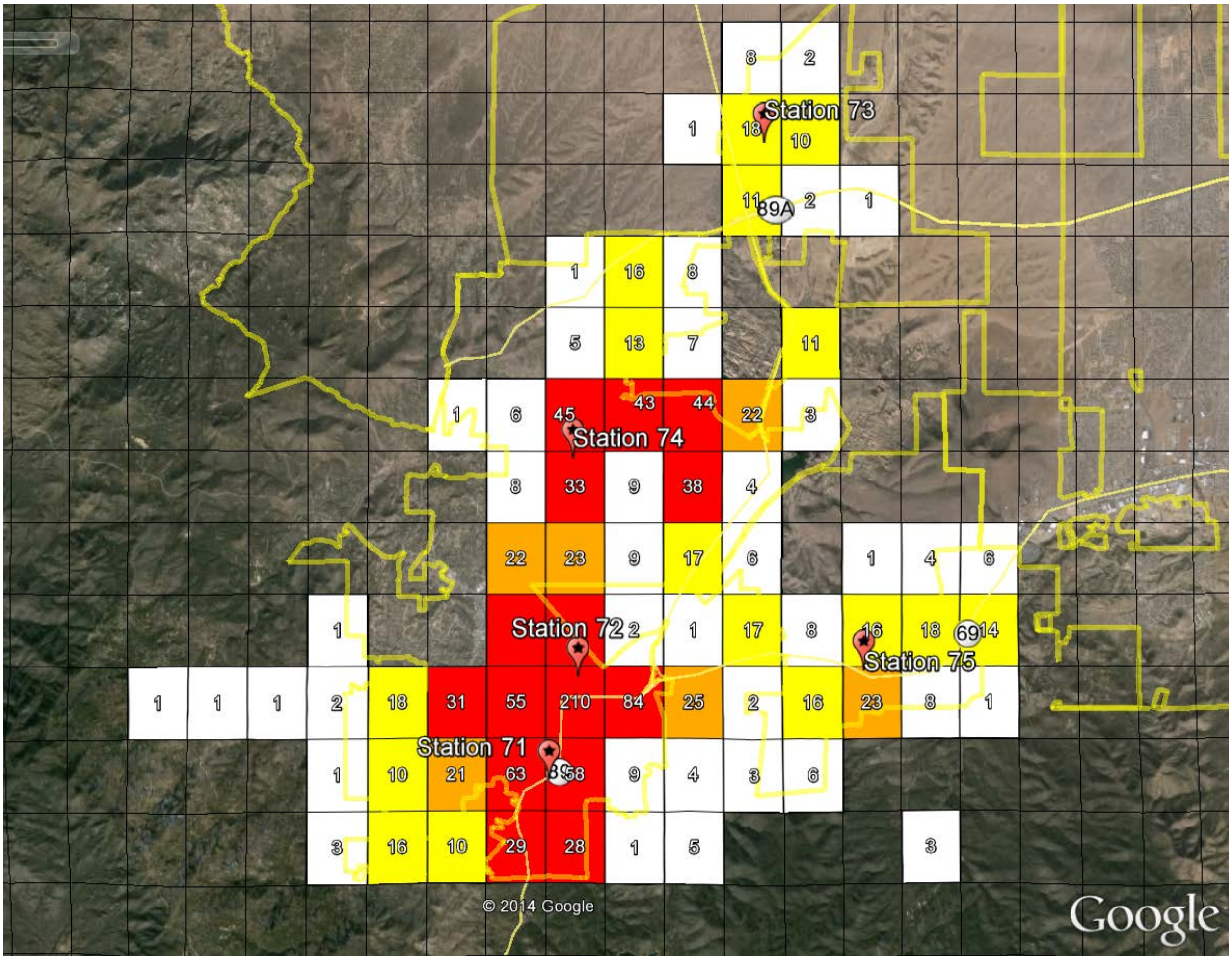
Due to state law, the city relies almost exclusively on sales tax and state shared revenue to fund necessary services, with less than 5 percent of the general fund budget attributed to property tax. As can be expected, privilege (consumption) taxes fluctuate based on the economy. However, in 2012 and 2013 Prescott has realized steady increases in revenue generated by the various taxes and had the highest rate in restaurant and bar taxable sales since 2007[16]. Recognizing the importance of the retail sector of the economy, the city has worked diligently to retain and expand the local tax base with Highway 69 corridor and downtown area projects.

Demand for Emergency Services

Figures 10 and 11 illustrate the demand and distribution of fire and EMS incidents occurring during the study period (July 1, 2012-June 30, 2013). Call activity is most concentrated in the city core. The stations and units servicing this core are among the busiest in the system. Overall the Prescott Fire Department (PFD) responded to 8,357 calls for service (fire and EMS). Of this, 4,538 or 54.3 percent were EMS responses, and 1,391 or 16.8 percent were fire responses. The remaining call data reveal that 15.3 percent of the total call volume was from automatic aid received and another 11 percent were from canceled calls.

[15] http://www.cityofprescott.net/_d/growth_indicators_2007-2012.pdf
[16] City of Prescott, Arizona CAFR, 2013

Figure 10: Fire Call Distribution



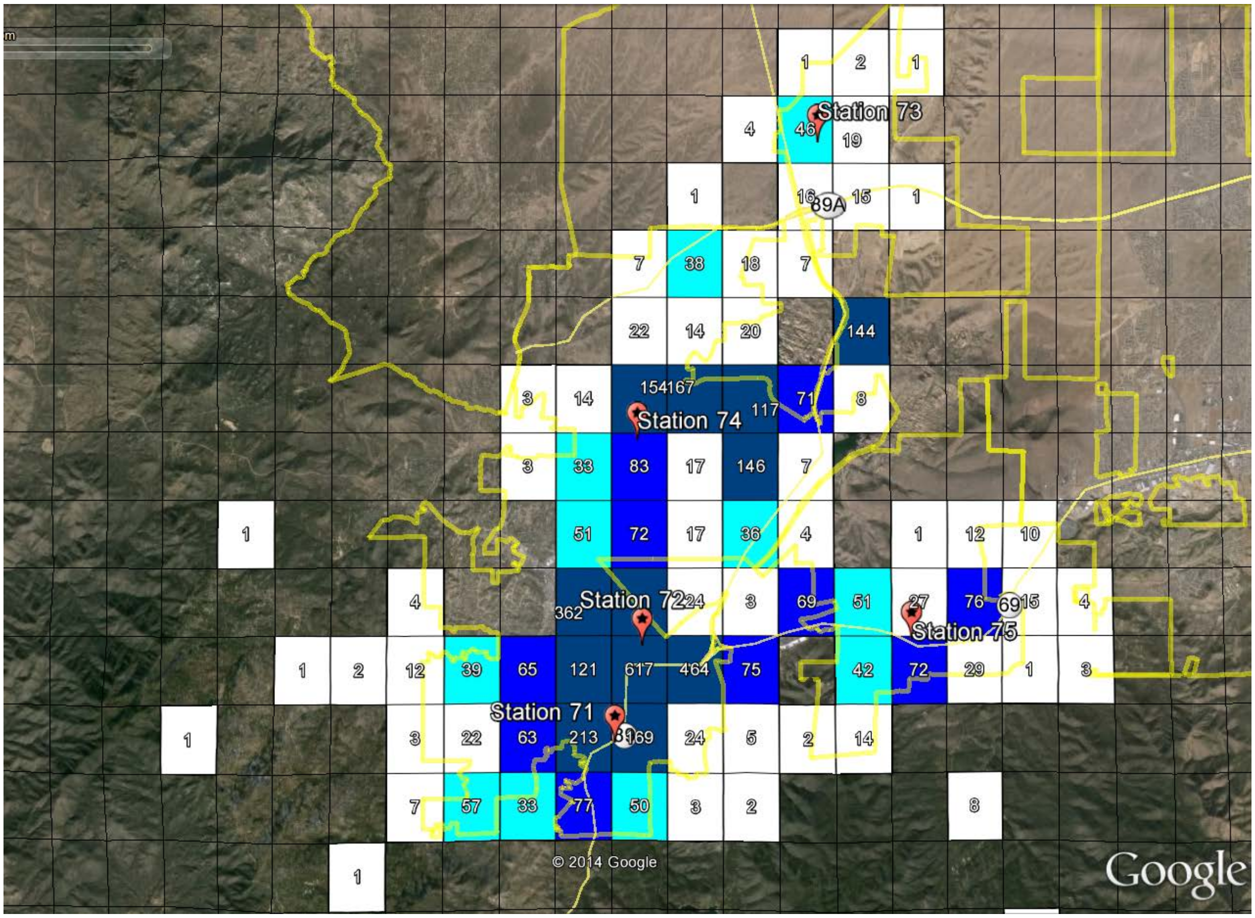
In Figure 10, the darker the color, the more concentrated the demand for fire service. Table 2 breaks down the types of fire calls the PFD responded to during the study period.

Table 2: Fire Call Types and Demand

Call Type	Number of Calls	Calls per Day	Call Percentage
Structure fire	32	0.1	0.4
Outside fire	44	0.1	0.5
Hazard	119	0.3	1.4
False alarm	254	0.7	3.0
Good intent	166	0.5	2.0
Public service	776	2.1	9.3
Fire Total	**1,391**	**3.8**	**16.6**

As noted previously, overall fire responses represent 16.6 percent of the total calls to which the PFD responded during the study period. Of the responses, public service (776) and false alarms (284) represented the greatest number of responses (76.29%). Actual fires combined (structure and outside) represent only 0.9 percent of the total calls to which the PFD responded.

Figure 11: EMS Call Distribution



In Figure 11, the darker the color the more concentrated the demand for EMS service. Table 3 breaks down the types of EMS calls the GRFD responded to during the study period.

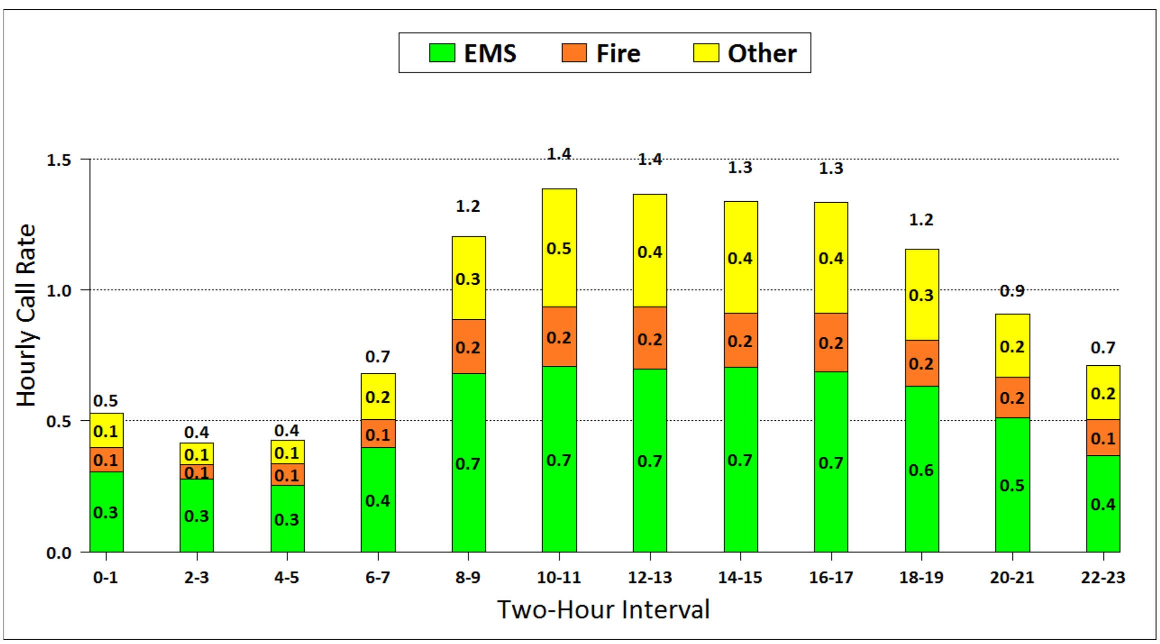
Table 3: EMS Call Types and Demand

Call Type	Number of Calls	Calls per Day	Call Percentage
Cardiac and stroke	305	0.8	3.6
Seizure and unconsciousness	532	1.5	6.4
Breathing difficulty	184	0.5	2.2
Overdose and psychiatric	137	0.4	1.6
MVA	247	0.7	3.0
Fall and injury	483	1.3	5.8
Illness and other	2650	7.3	31.7
EMS Total	**4,538**	**12.4**	**54.3**

As noted above, overall EMS responses represent 54.3 % of the total calls to which the PFD responded during the study period. Of the responses, illness and other (lower priority calls) represented the greatest number of EMS responses (31.7 percent of the total calls for service).

Figure 12 further illustrates demand by the time of day, which is a critical tool when determining peak load time for calls for service, specifically EMS calls, which should drive staffing and resource deployment.

FIGURE 12: Fire and EMS Calls by Hour of Day



Observations from this chart include:

- Call rates were highest during the day between 8:00 a.m. and 8:00 p.m., averaging between 1.15 and 1.38 calls per hour. The rate peaked between 10:00 a.m. and 5:00 p.m.

- Call rates were lowest between midnight and 8:00 a.m., averaging between 0.42 and 0.68 calls per hour.

Demand for service is an important factor in determining the most appropriate staffing and deployment model for fire and EMS services **and one ICMA strongly recommends the PFD utilize.** A fire department's staffing and deployment should be guided by:

- demand for service;
- the community's risks and hazards;
- response time from fixed fire stations;
- the ability to collect the first alarm fire assignment to a moderate to high risk incident in an acceptable time (either jurisdiction defined or utilizing national benchmarking such as NFPA 1710); the ability to sustain EMS unit response and utilization hours within acceptable standards as approved by the jurisdiction, the medical director, and as measured against national benchmarking; and available funding and resources.

Emergency Medical Service Risk Analysis: Affordable Care Act and Patient Transportation Services

To operate an ambulance or ambulance service in Arizona, a Certificate of Necessity (CON) is required. This certificate is issued by the state Department of Health Services, Bureau of Emergency Medical Services & Trauma System (ADHS) after successful application by the EMS provider. There are significant regulations surrounding both the issuance of a CON and requests to replace an existing provider as the CON holder that make changes to the prescribed transporting agency difficult.

Prescott is located in the CON's northern region. Lifeline Ambulance Service, Inc., a subsidiary of American Medical Response (AMR) is the issued holder of the CON servicing Prescott. Lifeline/AMR, has held the Certificate of Necessity (CON) for Prescott and the surrounding region since 1956, and maintained the CON in 1984 when significant changes to the process were put in place, designating ADHS as the issuing agency. The current CON was issued on March 19, 2014 and expires September 30, 2016, and outlines the service boundaries and certain performance criteria.

In June 2011, the Supreme Court upheld the Patient Protection and Affordable Care Act (PPACA) 17 (commonly referred to as Obamacare or the Affordable Health Care Act). The impact of PPACA on existing emergency medical service (EMS) systems is still largely speculative. The 2,000-page document references EMS only a handful of times. However, there appear to be several issues that must be considered for existing EMS and patient transport service providers, including the formation of Accountable Care Organizations (ACO), increased call volumes, and decreased revenue streams.

In Prescott, EMS is currently provided as a partnership between the city of Prescott through the Fire Department and Lifeline/AMR. The city of Prescott relies upon Lifeline/AMR to provide advanced life support (ALS) service as well as for patient transportation (per status as the CON holder). The current EMS system design does not require subsidy for ALS-level care or patient transportation, however the city currently dispatches fire department personnel to all medical calls. In this scenario, Lifeline/AMR is able to recover a fee for service, while city services rely upon tax revenue to subsidize the operation, which has little ability to recover any fees.

The economic downturn has encouraged many organizations to seek new opportunities for revenue streams. Among the prevalent considerations is for the government organization to assume ALS-level patient transportation services and to begin providing out-of-hospital preventative care as part of the goal of reducing hospital readmissions. Regarding patient transportation services, it is not uncommon for expenditures to exceed collections in fire-based EMS systems. Therefore, it is typically ruled out rather quickly as a new revenue source. Many fire departments want to provide this service because they believe that they can provide a higher quality of service with more accountability to the community than can their private counterparts. While quality and accountability can vary regardless of the provider, there is a higher likelihood that the city would have to subsidize the service delivery model with general fund revenue.

ICMA recommends that communities align community expectations for service with service design. Instilled in this process is the financial vetting that would take place through the political and representative process. In fairness to the fire departments that wish to provide this service, it can be done very effectively with high clinical outcomes, understanding that there are increased costs associated with public firefighter compensation, higher certification/classifications required, and less efficient deployment strategies.

One of the PPACA impacts to EMS service is the provision of financial penalties for hospital readmissions. The EMS community believes that EMS service providers could partner with the hospital organizations to reduce readmissions either for a fee or as a value-added measure to the community health system. The fines to the hospitals are substantial, and hospitals will continue to seek out preventative care models to lower readmissions. Prescott should engage the pre-hospital and hospital service providers, as well as Lifeline/AMR in dialogue regarding the potential to partner in providing services that reduce readmission and add value to medical services, without impact to the city General Fund in a model that discourages subsidy. The advantage for Prescott is that there is capacity to do additional work within the established infrastructure, allowing the Prescott Fire Department (PFD) the agility to act quickly. However, due to public employee costs, it is unclear if this approach will have longevity in a fire-based EMS system. The relationship with the local hospital and/or ACO may be the single most important aspect to help the community understand that the city may not be in a position to compete for provision of these services in an open market.

There are two areas of potential added risk to the city when considering pre-hospital preventative care. First, is the potential liability and exposure for providing a different level of care and whether the city's insurer will be willing to take on that risk, and at what cost. The intent of preventive programs is to evaluate patients and make a determination of the efficacy of the discharge treatment plan, whether the patient should remain home or be transported for follow-up care to another type of receiving facility (for a different level of care) so that the hospital would avoid a readmission penalty. This level of service from PFD would differ from their existing service, which offers emergency versus preventative care, and must be approved by the medical director of the Base Hospital, in this case Yavapai Regional Medical Center (YRMC). One of the contractual considerations, if this approach is taken, is to clearly identify under whose license, liability, and medical direction the paramedic is functioning under at the time of service. This determination has yet to be made at the state level, but will likely be tested in the city of Chandler, as their program is in its infancy.

The second area of risk assumed when establishing a new level of service expectation to the community, is that the new service level may not be sustainable, either operationally or financially. An effort to expand the department's role in community risk reduction activities should be applauded, as there are considerably more opportunities to improve the quality of life for the citizens and visitors to Prescott in non-fire-related service areas. In most communities, more people will die from car accidents, falls, or drowning than from a fire. The distinction in whether the increased service is necessary or will be sustainable often depends on the motivation of the initiative. These programs, although they are generally not cost-effective at point-of-service delivery, improve the overall quality of life and should be considered a matter of local policy. Pre-hospital preventative care is no different. However, if pre-hospital preventative care is to generate revenue, the city should consider a threat assessment to evaluate the impact on community expectations if these services are offered by less-costly private providers such as a hospital-based, nursing, or home-health care group. The competitive environment in the near future may very well serve to control costs to the point at which it is not desirable for the city to provide these services at the available price point, may create an environment where the city is no longer in a competitive posture to retain the contract, or ultimately may require the city to subsidize private enterprise or reduce its workforce if it discontinues service. Policy makers will be left with the task of reconciling community expectations with the service level provided.

Another result of the PPACA will be to increase the number of U. S. citizens with health insurance. Most people who have been previously uninsured will become insured through Medicare. Experts caution that this will likely increase the number of 911 calls, as the former lack of health insurance will no longer serve as a deterrent for seeking medical care. In addition, future EMS operations under the PPACA may require chronically ill patients to be transported to a wider array of facilities than in the past, as the number of urgent care clinics and stand-alone emergency departments is already growing rapidly. Recent studies suggest that between 7 and 34 percent of Medicare patients who were transported by EMS to an emergency room could have been transported to an alternate destination or did not require transport at all, which significantly impacts cost.[18] The framework for reimbursement and allowable cost recovery for changes in service levels has yet to be determined. Since the origin of much of the PPACA and related initiatives is to control costs, it is likely that reimbursement for service will be less. Hence, if the city opts to take on patient transportation services, recognizing that the first factor would be to challenge Lifeline/AMR in order to be assigned their existing CON, the risk to the city is twofold. First, the city will continue to be responsible for increased service demands, which may increase expenditures. Second, Medicare reimburses on the margin for existing services and reimbursement rates for spin-off services may be lower in the future. The resulting increased demand for services and lower reimbursement would exacerbate issues related to the tax subsidy, and already constrained revenue streams available to fund public safety services.

Finally, the formation of Affordable Care Organizations (ACOs) also may affect EMS delivery in a variety of ways. The intent of the ACO is to monitor and control reimbursements to healthcare providers as well as monitor the quality of care provided to Medicare recipients. The ACO may have the authority to deny or reduce payment if the provider fails to meet quality standards. For example, if a patient is readmitted to the hospital within three days of discharge, the transportation fee may not be reimbursed to the provider of the transport service, even though the transporter may have little ability to control re-admittance to the medical facility.

Regardless of all the changes facing EMS providers, they provide a critical component of the overall health care system which represents only a small aspect of the financial machine of health care. For example, Medicare is 50 percent or more of the payer mix in most communities. Medicare expenditures on EMS transport services amount to approximately $5 billion of the total $536 billion in healthcare benefits.[19] EMS systems thus are faced with the majority of their cost recovery associated with a huge federally funded program for which this reimbursement amounts to less than 1 percent of the expenditures.

Recommendations:

- It is strongly recommended that opportunities for partnerships to provide community paramedicine be explored with local hospital providers and accountable care organizations (ACOs) and that a needs/threat assessment be conducted for each policy consideration prior to implementation.

- It is strongly recommended that the expansion of the existing city EMS role to ALS patient transportation services only occur if this change is community driven.

Fire Risk Analysis

The cost of providing fire protection continues to escalate for local governments; therefore, the need to examine the planning processes involved in providing services is paramount. Each jurisdiction decides what degree of risk is acceptable based on criteria that the jurisdiction has developed. A comprehensive planning approach that includes a fire risk assessment and hazard analysis of the community's buildings and structures is essential to determine local fire resource and response needs.

In a community fire risk analysis, the fire department collects and organizes risk evaluation information about individual properties and, on the basis of the rating factors, then derives a "fire risk score" for each property. This is done by assessing the fire flow, probability, consequences, occupancy risk, and fire management zones. The score is used to categorize the property according to risk: low, moderate, or high (maximum). Many retail software products that rate the property based on information inputs are available to assist in this endeavor.

Plotting the rated properties on a map will provide a better understanding of how fire stations, response run cards, and staffing patterns can be used to provide a higher concentration of resources for worst-case scenarios or, conversely, fewer resources for lower levels of risk.[17] The community fire-risk analysis may also include determining and defining the differences in fire risk among a detached single-family dwelling, a multifamily dwelling, an industrial building, and a high-rise building by placing each in a separate category. Further, an overall community risk profile can be linked to historical response time data. That analysis can then be used to establish response-time baselines and benchmarks.

Community risk and vulnerability assessments are essential elements of a fire department's planning process. **The PFD has not completed a comprehensive community risk and vulnerability assessment for buildings and structures.** The PFD has completed a wildland risk assessment, however, which is discussed in great detail further in this report.

According to a National Fire Protection Association (NFPA) paper on assessing community vulnerability, fire department operational performance is a function of three considerations: resource availability/reliability, department capability, and operational effectiveness.[18] These elements can be further defined as:

Resource availability/reliability: The degree to which the resources are ready and available to respond;

Department capability: The ability of the resources deployed to manage an incident;

Operational effectiveness: The product of availability and capability. Operational effectiveness is the outcome achieved by the deployed resources or a measure of the ability to match resources deployed to the risk level to which they are responding.[19]

Understanding the community's risk greatly assists the fire department in planning for and justifying the need for staffing and apparatus resources**.** The critical tasks and resource deployment required on a typical moderate-risk incident such as a fire in an occupied single family dwelling are illustrated in Figure 13. Some jurisdictions add additional response resources to meet, and in some cases exceed, national benchmarks, such as National Fire Protection Association (NFPA) 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*.

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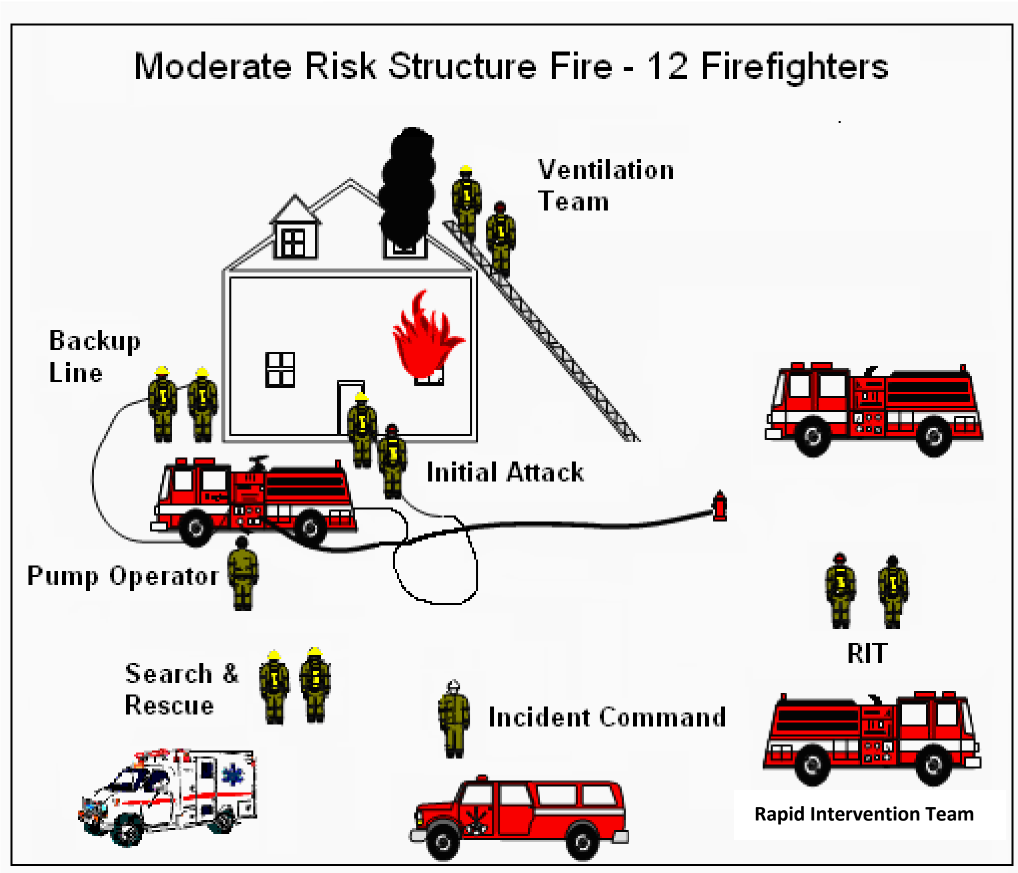
[17] Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 8th ed. (2009), 49.
[18] Urban Fire Forum and Metropolitan Fire Chiefs, *Fire Service Deployment: Assessing Community Vulnerability,*http://www.nfpa.org/assets/files/pdf/urbanfirevulnerability.pdf.
[19] National Fire Service Data Summit Proceedings, U.S. Department of Commerce, NIST Tech Note 1698 (May 2011).

Figure 13: Moderate Risk Fire Response



Recommendation:

- The PFD should complete a fire and community risk assessment of buildings and structures. This assessment should be done in conjunction with the fire and EMS calls-for-service demand analysis provided in this report and merged with the completed wildland risk assessment and analysis.

III. Station Location and Response Time Analysis

Response Time Analysis

This section presents dispatch and response time statistics for different call types and units. The main focus is the dispatch and response time of the first-arriving units for calls responded to with lights and sirens. For structure and outside fire calls, we also analyze the response time of the second-arriving units. For this section, a total of 3,403 calls were used in the analysis.

Different terms are used to describe the components of response time: *Dispatch time* is the time interval that begins when an alarm is received at the communication center and ends when the response information begins to be transmitted via voice or electronic means to the emergency response facility or emergency response units in the field. *Turnout time* is the time interval that begins when the notification process to emergency response facilities and emergency response units begins by an audible alarm or visual announcement or both and ends at the beginning point of travel time. **Management has the greatest control over these segments of the total response time.** *Travel time* is the time interval that initiates when the unit is enroute to the call and ends when the unit arrives at the scene. *Response time* (or total response time) is the time interval that begins when the call is received by the primary dispatch center and ends when the dispatched unit arrives on the scene to initiate action.

Measuring Response Time

The utilization of response times as a measure of service quality has been a long-held tenant of the fire and emergency medical services. For decades, the belief that "faster is better" and/or "more is better" served as the guiding force behind fire-based system design. New research and consensus standards have emerged in the past decade, however, and are beginning to influence fire and EMS system design.

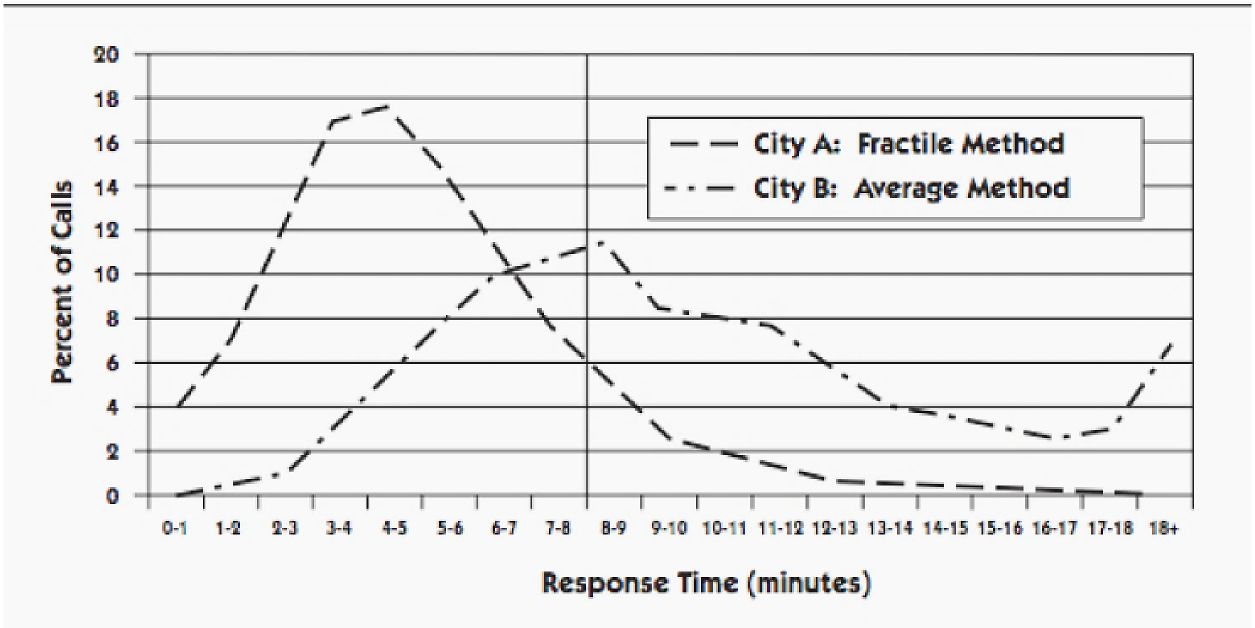
Most jurisdictions report all available data at the mean or average. While averages provide easily understood statistics, a more conservative and stricter measure of total response time is the 90th percentile measurement. Simply explained, for 90 percent of calls, the first unit arrives within a specified time. The average is a less conservative measure of typical performance. For comparative purposes, the average (mean) in a normal distribution of data will be represented near the 50th percentile. The average is more susceptible to influence from outliers such as zero response times (walk-ins) and delayed responses, so the average will generally reside between the 40th and 60th percentiles.

Systems that manage by average response times rather than by percentile or fractal methods generally perform more poorly. Figure 14 presents the actual results of response-time statistics from two cities. Both cities require an eight-minute or less response time to life-threatening emergencies, but City A used the percentile method (90th percentile) while City B used the average method.[20] The results, shown in Figure 14, reveal a significant difference in response-time reliability. The vertical line at the eight-minute point indicates more patients received ALS care in

[20] Jerry Overton and Jack Stout, "System Design," in: Alexander E. Kuehl (ed.), *Prehospital Systems and Medical Oversight,* 3rd ed. (Dubuque, IA: Kendall/Hunt Publishing Company, 2002).

eight minutes or less when the system was managed by the percentile basis (City A) than when the average performance was measured (City B).Since the responses (data) are more evenly distributed over the average, the measure is less informative and less reliable as an indicator of performance. Therefore, it is recommended that measures of system performance incorporate a percentile approach and that the percentile be set at a high measure of compliance, such as the 90th percentile.

Figure 14: Comparison of Response-Time Measurement Methods



From Jerry Overton and Jack Stout, "System Design," in: Alexander E. Kuehl (ed.), *Prehospital Systems and Medical Oversight,* 3rd ed. (Dubuque, IA: Kendall/Hunt Publishing Company, 2002.

According to NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments* (2010 Edition), where the primary public safety answering point is the communications center the alarm processing time or dispatch time should be less than or equal to 60 seconds 90 percent of the time.[21] This standard also states that the turnout time should be less than or equal to 60 seconds for emergency medical services 90 percent of the time, and travel time should be less than or equal to 240 seconds for the first responder basic life support (BLS) 90 percent of the time. The travel time for advanced life support (ALS) service should be 480 seconds 90 percent of the time. Fire responses are afforded an additional 20 seconds (80 seconds) for turnout time due to the impact of donning personal protective gear prior to beginning the travel segment while maintaining the same dispatch and travel requirements as the BLS EMS recommendations. **NFPA 1710 response time criterion is a benchmark for service delivery and not an ICMA recommendation.**

[21] NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments* (2010 Edition), 7.

Empirical research has found no clinical distinction between response times under eight minutes and those over eight minutes until the response time was less than four minutes for EMS services. [22] Similarly, research has found improved patient survival rates for a response time of less than five minutes but no statistical distinction in patient survival rates for response times greater than five minutes up to 10:59, 90 percent of the time.[23]

Research into the response times for EMS's role in trauma supportive care revealed similar results. A study of the efficacy of the eight-minute response standard found that exceeding the eight-minute recommendation did not have a statistically significant impact on patient survival after traumatic injury.[24] In other words, whether units responded in less or greater than eight minutes, patient survivability due to trauma did not change. Similarly, a study examining EMS's role in the "golden hour" for traumatic care looked at 146 EMS agencies transporting to fifty-one Level 1 and Level 2 trauma centers across North America and found no association between EMS intervals and mortality among injured patients with physiologic abnormality in the field.[25]

There is no empirical evidence recommending an optimal response time for fire suppression efforts. In addition, there is no empirical evidence linking response times to specific outcomes. It is the scientific knowledge that fire grows rapidly that leads designers of fire department systems intuitively to maintain a geographic distribution of fire stations that limit the travel distance between stations. This general design is still evaluated by agencies such as the Insurance Services Office (ISO). For example, ISO recommends that there be a fire engine every 1.5 miles and a ladder truck every 2.5 miles.[26] In general, fire suppression system design strategies have not changed in the past century. Yet, recent research by Underwriter's Laboratories (UL) Fire Research Division has found that today's fires grow very rapidly and may be untenable in as little as four minutes.[27] (This time has historically been reported to be upwards of twenty minutes.) Because few municipalities are in a position to fund labor-intensive deployment models that will meet the demands of the modern fire ground or the recommendations of NFPA 1710, ICMA recommends a risk-based integrated risk management plan (IRMP) that utilizes a system of efforts to reduce the community's risk (in this example the impact from fire), which provides optimal return on investment and improves long-term sustainability.

In summary, setting standards for response times should be a local policy decision that incorporates elements of risk, the community's willingness to pay for services, the level of risk the community is willing to assume, and the community's expectations for service.

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[22] Peter T., Pons, et. al., "Paramedic Response Time: Does It Affect Patient Survival?" *Academic Emergency Medicine* 12 (July 2005), 594–600.

[23] T. H. Blackwell and J. S. Kaufman, "Response Time Effectiveness: Comparison of Response Time and Survival in an Urban Emergency Medical Services System," *Academic Emergency Medicine* 9 (April 2002), 288–295.

[24] Peter T. Pons and V. J. Markovchick, "Eight Minutes or Less: Does the Ambulance Response Time Guideline Impact Trauma Patient Outcome?" *Journal of Emergency Medicine* 23 (July 2002): 43–48.

[25] Craig D. Newgard, et. al. "Emergency Medical Services Intervals and Survival in Trauma: Assessment of the 'Golden Hour' in a North American Prospective Cohort, *Annal of Emergency Medicine* 55 (March 2010): 235–246.

[26] Insurance Services Office. *Fire Suppression Rating Schedule* (Jersey City, NJ: ISO, 2012).

[27] Steve Kerber, *Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction* (Chicago: Underwriter's Laboratories, 2010), http://www.ul.com/global/documents/offerings/industries/buildingmaterials/fireservice/ventilation/DHS%202008%20Grant%20Report%20Final.pdf.

Recommendations:

- The PFD should complete a fire and community risk assessment of buildings and structures. This assessment should be done in conjunction with the fire and EMS calls-for-service demand analysis provided in this report and merged with the completed wildland risk assessment and analysis.

- It is strongly recommended that Prescott utilize an integrated risk management plan.

PFD Response Times

For this section, a total of 3,403 calls were used in the analysis. The average dispatch time was 1.1 minutes. The average turnout time was 1.0 minute, and the average travel time was 5.2 minutes. The average response time for EMS calls was 7.3 minutes, and the average response time for fire category calls was 7.6 minutes. The average response time for structure fire calls was 7.6 minutes. The average response time for outside fire calls was 8.4 minutes. These data are presented in Table 4.

When considering the 90th percentile measures, the data demonstrate that the 90th percentile dispatch time was 1.9 minutes, the turnout time was 1.9 minutes, the travel was 8.3 minutes, and the total response time was 10.8 minutes. The data for the 90th percentile measures are presented in Table 5.

If benchmarked against NFPA 1710, there are areas in which the Prescott Fire Department can improve in the 90th percentile response. The benchmark recommendation by both NFPA 1710 and the Center for Public Safety Excellence (CPSE) is that the dispatch time should be completed within 60 seconds 90 percent of the time.[28] While CPSE supports this benchmark, it also affords a baseline (minimum acceptable performance) of 90 seconds 90 percent of the time.[29] Overall, the dispatch in Prescott is performing approximately 30 seconds longer than best practice. If dispatch performed at the benchmark, the PFD may improve the total response time as well. As previously stated, this segment of the total response time continuum is where system managers generally have the greatest control.

[28] NFPA 1710, 7.
[29] Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 49.

Table 4: Average Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.1	1.0	5.2	7.3	275
Seizure and unconsciousness	1.1	1.0	5.0	7.0	448
Breathing difficulty	1.0	1.1	5.6	7.8	173
Overdose and psychiatric	1.0	0.9	5.2	7.1	63
MVA	1.3	0.9	4.6	6.8	218
Fall and injury	1.2	1.1	5.2	7.5	264
Illness and other	1.2	1.0	5.2	7.4	1,707
EMS Total	**1.1**	**1.0**	**5.2**	**7.3**	**3,148**
Structure fire	1.0	1.3	5.3	7.6	29
Outside fire	1.4	0.8	6.2	8.4	33
Hazard	1.4	0.8	4.3	6.5	25
False alarm	1.2	1.0	5.9	8.1	29
Good intent	1.4	1.0	5.1	7.5	55
Public service	1.2	1.1	5.3	7.6	84
Fire Total	**1.3**	**1.0**	**5.3**	**7.6**	**255**
Total	**1.1**	**1.0**	**5.2**	**7.3**	**3,403**

The aggregate turnout time at the 90th percentile for fire-related calls is 2.1 minutes (126 seconds). Benchmarking against NFPA 1710, the recommendation is for turnout time for fire-related responses to be 80 seconds 90 percent of the time.[30] The Commission on Fire Accreditation International (CFAI) affords a baseline of 90 seconds 90 percent of the time.[31] An analysis of PFD performance reveals that for fire-related incidents the turnout time varies considerably across call types. While it is understood that time may be of more concern for a structure fire than a fire alarm, the fact remains that in the absence of a performance measurement system, system performance is dependent on more subjective items such as culture and leadership style. ICMA recommends a commensurate level of performance across all call types distinguished by the necessity to don personal protective equipment prior to beginning the travel segment. Additionally, PFD is encouraged to examine response designations (emergency versus nonemergency) for the individual call types to determine calls that are not time sensitive. PFD currently categorizes response, but to a lesser degree than is recommended by best practice, and not through a uniformly applied policy with data that can be tracked. Utilizing this approach would afford management the ability to clearly articulate performance goals by call type, while retaining the flexibility in the system to make sound risk-management decisions for calls that do not require lights and sirens. In other words, the management approach of requiring emergency responses (lights and sirens) for

[30] NFPA 1710, 7.
[31] Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 70.

requests for service and simultaneously allowing slower turnout and travel time performance lacks validity. ICMA recommends that the more appropriate risk-based strategy is to respond nonemergency than to allow slower performance in areas that do not introduce risk to the community (e.g., running red lights) for calls that are determined to be less time critical.

Table 5: 90th Percentile Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.8	1.8	8.6	11.0	275
Seizure and unconsciousness	1.7	1.7	7.9	10.4	448
Breathing difficulty	1.6	2.0	9.0	11.2	173
Overdose and psychiatric	1.7	1.5	9.3	10.8	63
MVA	2.5	1.6	7.7	11.2	218
Fall and injury	1.9	2.1	8.2	10.9	264
Illness and other	1.9	1.9	8.2	10.6	1,707
EMS Total	**1.9**	**1.9**	**8.2**	**10.8**	**3,148**
Structure fire	1.6	2.1	10.5	13.0	29
Outside fire	2.6	1.6	13.8	15.5	33
Hazard	1.9	1.5	6.4	9.5	25
False alarm	2.2	1.6	10.6	12.4	29
Good intent	2.2	1.9	9.0	11.4	55
Public service	2.2	2.0	8.6	10.8	84
Fire Total	**2.1**	**1.8**	**9.2**	**11.8**	**255**
Total	**1.9**	**1.9**	**8.3**	**10.8**	**3,403**

The combination of improving both dispatch and turnout times to structure fires may improve overall performance by up to one full minute with no capital investment. Comparatively, adding resources to the deployment model to reduce response times by one minute would require considerable community investment—far beyond the process and management changes that require little or no investment.

The aggregate turnout time at the 90th percentile for emergency medical service calls is 1.9 minutes (114 seconds). Benchmarking against NFPA 1710, the recommendation for turnout time for EMS responses is 60 seconds 90 percent of the time for requests.[32] The CFAI affords a baseline of 90 seconds 90 percent of the time.[33] An analysis of PFD performance reveals that for EMS responses, performance varies across individual call types, an indication of inconsistent performance. However, current performance for turnout is approximately 30 to 60 seconds longer when

[32] NFPA 1710, 7.
[33] Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 70.

compared to the baseline and benchmark values, respectively. This suggests that there is the capacity for improvement in the EMS program as well.

When considering travel time, it is generally assumed that fire department apparatus drivers, with their direct supervisors riding on the apparatus, are traveling at the most expeditious speed while maintaining a high degree of safety awareness, obeying state and local laws, and following department policy and standard operating procedure. Additionally, since traffic patterns, available street infrastructure, and a fire department's fixed facilities remain constant, a consistent travel experience is expected. From this perspective, most agencies have little room for improvement without comprising the safety of the fire department crews and the traveling public.

Benchmarking PFD travel time with NFPA 1710 reveals that current travel capabilities are not aligned with the recommendations. For example, the four-minute travel time for basic life support (BLS) service is generally twice the recommended performance. The recommendation for fire-related responses, and particularly structure fires, is also a four-minute travel time. Prescott Fire Department has demonstrated that it is performing near the eight-minute travel time or less at the 90th percentile—twice as long as the recommendation. While it is not commensurate with the benchmark provided by NFPA 1710, it is a reasonable service level, as the standard is unattainable by most communities in the United States. This is why the CFAI has provided a baseline recommendation of 6 minutes and 30 seconds in suburban areas with a population density between 1,000 and 2,000 per square mile, as may be found in specific areas of Prescott.[34] Overall, Prescott would fall into the rural definition of less than 1,000 people per square mile.[35] At this level the CFAI affords a 10-minute travel time, or approximately 12 minutes total response time 90 percent of the time.[36]

Continued analysis of travel time by time of day during this study reveals that travel time during "sleeping hours" has little variability. Some variability to the greater amount of time is expected because crews must wake up, get dressed, and drive within seconds of being asleep. Similarly, the turnout time varies two-fold between sleeping and non-sleeping hours. In concert with other recommendations, management is encouraged to have a candid discussion of how much delay is appropriate during these sleeping hours. The data are presented as Figure 15.

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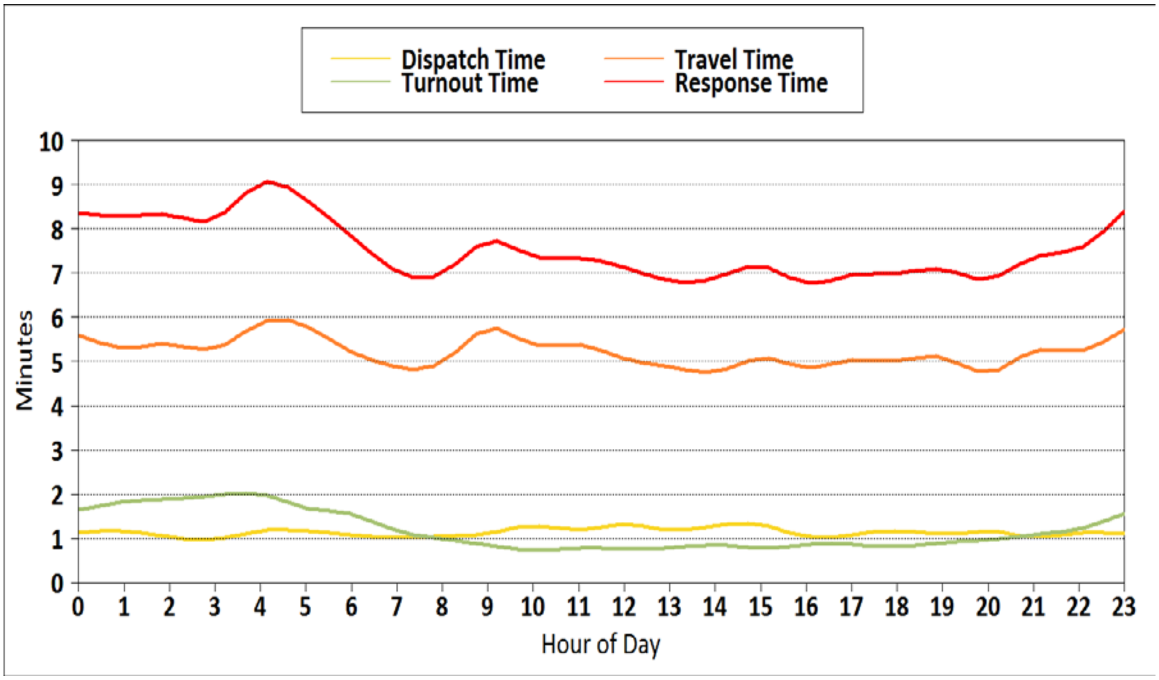
[34]Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 70.
[35]Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 70.
[36]Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 70.

Figure15: Average Dispatch, Turnout, Travel, and Response Time of First Arriving Unit, by Hour of Day



Finally, travel time varies across the fixed fire station locations. Analyses will be provided and discussed as part of the assessment of fire station locations. The most prominent factors influencing station performance are the geographic barriers to response and the number of road miles comprising the typical travel experience. However, management should consider that some of the variability across station and unit performance might also be behavioral in nature and seek to establish reasonable performance goals. Data are presented in Table 6.

Table 6: 90th Percentile Response Time of First Arriving Unit for Structure and Outside Fires by Unit

	Emergency			Nonemergency		
First Due Station	Average Response Time	90th Percentile Response Time	Sample Size	Average Response Time	90th Percentile Response Time	Sample Size
Station 71 - PFD	7.6	12.0	970	9.4	15.1	751
Station 72 - PFD	6.7	9.2	1,155	8.2	11.3	586
Station 73 - PFD	8.4	12.0	307	10.7	14.8	173
Station 74 - PFD	7.8	11.1	602	10.0	15.5	435
Station 75 - PFD	7.4	11.0	487	9.6	14.0	284
Station 51 - CYFD	7.1	10.5	560	9.1	13.0	384

Note: E51 is included in this analysis when it arrived first.

Recommendations:

- It is strongly recommended that Prescott develop and institute a performance measurement system to align turnout time with nationally recommended best practices.
- It is strongly recommended that a comprehensive performance-based management strategy for all elements of response time be developed.
- Utilize a risk-based strategy to continue to refine a decision matrix for outlining which types of service requests require emergency responses and which can be responded to with the normal flow of traffic.

Workload Analysis

The time a unit is deployed on a single call is referred to as the deployed time on a call for service and indicates the workload of that particular unit. This can be measured as the productive emergency response time during a shift or day. In the case of the PFD, most of the units that respond to requests for emergency service are continuously staffed, as the personnel are assigned to 24-hour shifts. An analysis of the PFD response data reveals that a total of 2,178 EMS category calls (48 percent) lasted less than one-half hour; 1,809 EMS category calls (40 percent) lasted between one-half and one hour; and 531 EMS category calls (12 percent) lasted between one and two hours. Only 20 EMS category calls (less than 1 percent) lasted more than two hours. On average, there were 1.5 EMS category calls per day that lasted more than one hour.

Additional analyses and observations regarding calls for service reveal that a total of 242 cardiac and stroke calls (79 percent) lasted less than one hour, and 63 cardiac and stroke calls (20 percent) lasted more than an hour. A total of 203 motor vehicle accidents (82 percent) lasted less than one hour, and 44 motor vehicle accidents (18 percent) lasted more than one hour.

A total of 1,162 fire category calls (84 percent) lasted less than one-half hour; 184 fire category calls (13 percent) lasted between one-half hour and one hour; and 23 fire category calls (2 percent) lasted between one and two hours. Only 22 fire category calls (2 percent) lasted more than two hours. A total of 20 structure fire calls (63 percent of all structure fire calls) lasted less than one hour; 3 structure fire calls (9 percent) lasted between one and two hours; and 9 structure fire calls (28 percent) lasted more than two hours. PFD responded to a total of 254 false alarm calls, of which 84 percent of those lasted less than one-half hour.

Calls were further broken down by the annual time deployed on calls, sorted by call type. The total deployed time for the year, or deployed hours, was 5,075 hours. This is the total deployment time of all the units deployed on all call types, including 184 hours spent on canceled calls. The deployed hours for all units combined averaged approximately 13.9 hours per day, of which 2 hours each day were from automatic aid responses. There were 9,906 runs in the year, with a daily average of 27.1 runs for all units combined, including 4.1 calls per day received from automatic aid. Runs are the vehicles responding to calls, and calls are incidents. For example, one call may come in from the dispatch center, but it may require two units to adequately handle the call. This would account for one call and two runs. Fire category calls accounted for 19 percent of the total runs and accounting for 18 percent of the total workload with an average duration of 28.7 minutes. Structure fire and outside fire calls accounted for 275 runs and 5.5 percent of the total workload. EMS calls accounted for 59.1 percent of the total workload. The average deployed time for EMS calls was 35.4 minutes. The deployed hours for all units dispatched to EMS calls averaged 8.2 hours per day. The data are presented in Table 7.

Due to the collaborative relationship associated with the staffing and deployment in Station 51 and Station 72, this analysis included both stations to represent the community's demand and workload for service regardless of which entity provided resources. In other words, the city has taken responsibility to ensure that service is provided and is encouraged to monitor performance as if the service was specifically provided by PFD. In all stations, engine companies were the most utilized type of apparatus, accounting for over 90 percent of the workload. Specifically, Engine 71 in Station 71 was the unit deployed most often and had the most deployed hours, averaging 5.3 runs and 2.6 hours of deployed time each day. The ladder truck (aerial apparatus) that was used most was Ladder 72 (Station 72), which averaged 2.2 runs and 0.9 hours of deployed time per day. However, most of the runs were EMS responses, as structure and outside fire calls only totaled 275 runs during the year. The data are presented in Table 8.

Table 7: Annual Deployed Time by Call Type

Call Type	Average Deployed Minutes per Run	Annual Hours	Percent of Total Hours	Deployed Minutes per Day	Annual Number of Runs	Runs per Day
Cardiac and stroke	42.4	237	4.7	39.0	336	0.9
Seizure and unconsciousness	41.4	405	8.0	66.5	587	1.6
Breathing difficulty	34.0	112	2.2	18.4	198	0.5
Overdose and psychiatric	35.6	86	1.7	14.1	144	0.4
MVA	32.3	214	4.2	35.2	398	1.1
Fall and injury	33.2	293	5.8	48.1	528	1.4
Illness and other	34.3	1,651	32.5	271.3	2,886	7.9
EMS Total	**35.4**	**2,997**	**59.1**	**492.7**	**5,077**	13.9
Structure fire	67.3	169	3.3	27.8	151	0.4
Outside fire	53.3	110	2.2	18.1	124	0.3
Hazard	24.5	87	1.7	14.3	213	0.6
False alarm	37.6	193	3.8	31.7	308	0.8
Good intent	18.9	74	1.5	12.2	236	0.6
Public service	19.1	279	5.5	45.8	874	2.4
Fire Total	**28.7**	**913**	**18.0**	**150.0**	**1,906**	**5.2**
Automatic aid received	29.8	753	14.8	123.7	1,513	4.1
Automatic aid given	42.3	228	4.5	37.4	323	0.9
Canceled	10.2	184	3.6	30.3	1,087	3.0
Total	**30.7**	**5,075**	**100.0**	**834.2**	**9,906**	**27.1**

Table 8: Call Workload by Unit

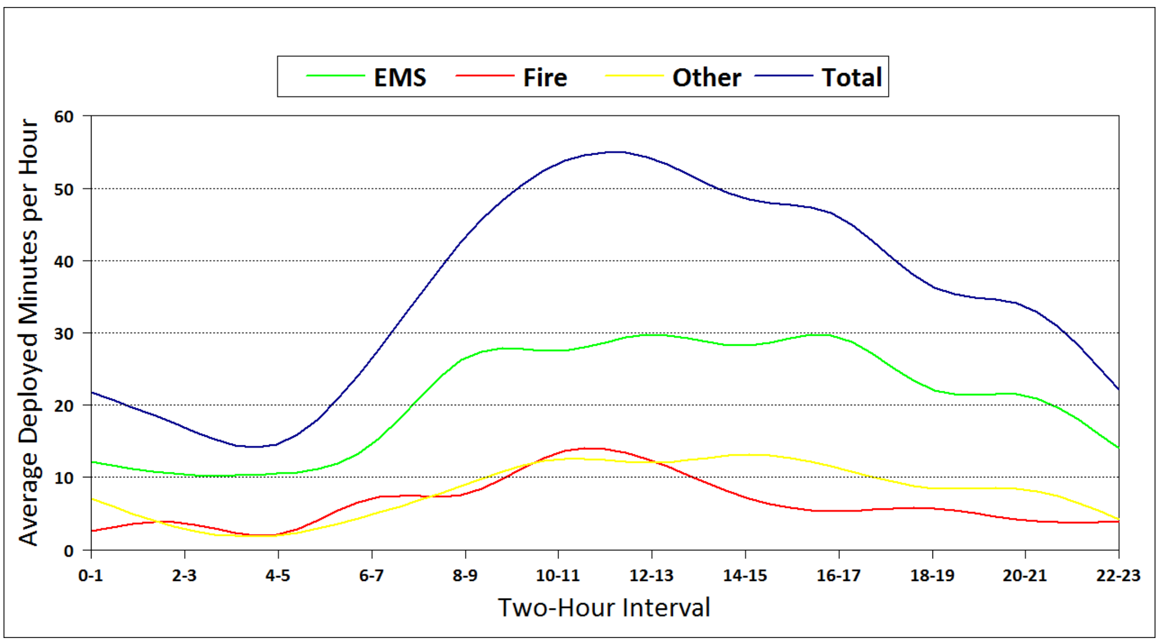
Station	Unit Type	Unit ID	Average Deployed Minutes per Run	Annual Number of Runs	Annual Hours	Runs per Day	Deployed Hours per Day
Station 51	Engine	E51	29.8	1,284	637.0	3.5	1.7
Station 71	Battalion chief	B1	37.8	350	220.4	1.0	0.6
	Wildland crew	C7	691.1	3	34.6	0.0	0.1
	Engine	E71	29.2	1,949	948.7	5.3	2.6
	Patrol vehicle	P71	43.5	30	21.7	0.1	0.1
	Ladder truck	TR71	28.1	266	124.5	0.7	0.3
	Utility vehicle	U71	75.9	49	62.0	0.1	0.2
Station 72	Engine	E72	26.5	1,610	711.7	4.4	1.9
	Engine	E722	81.9	19	25.9	0.1	0.1
	Patrol vehicle	P72	12.0	1	0.2	0.0	0.0
	Ladder truck	TR72	25.6	800	341.9	2.2	0.9
Station 73	Engine	E73	31.7	776	410.1	2.1	1.1
	Foam truck	FM73	34.6	32	18.4	0.1	0.1
	Patrol vehicle	P73	93.5	12	18.7	0.0	0.1
Station 74	Engine	E74	29.7	1,393	689.8	3.8	1.9
	Patrol vehicle	P74	96.6	27	43.5	0.1	0.1
Station 75	Engine	E75	33.6	1,262	706.4	3.5	1.9
	HazMat truck	HM75	86.9	27	39.1	0.1	0.1
	Patrol vehicle	P75	75.0	16	20.0	0.0	0.1

Unit hour utilization (UHU) is a workload indicator that describes the time on task of the emergency response units on runs or requests for service. The optimal utilization of resources results in a UHU of 0.45 to 0.55.[37] In other words, approximately 50 percent of a unit's available time is spent on tasks while handling service requests. Note this high utilization rate is not recommended for 24-hour shifts because of the need for rest and recovery. This is another component to the migration away from 24-hour shift schedules in EMS. The International Association of Firefighters (IAFF) and the International Association of Fire Chiefs (IAFC) both recommend maximum UHUs of 0.25 and 0.30, respectively.[38] The UHU for PFD's busiest unit (E71) is 0.11; the UHU for the least-utilized unit (E73) is 0.05. In other words, workload derived from responding to emergencies occupies between 5 and 11 percent of the available time in a 24-hour work period. Because of these low UHUs, it is important the PFD better track and be accountable for work not driven by calls for service.

[37] J. R. Henry Consulting Inc. *Calculating Your EMS Service's "Average Cost of Service" and "Unit Hour Analysis,"* (2011), http://www.emsconsult.org/images/Unit_Hour_Analysis_with_instructions.pdf..
[38] International Association of Fire Firefighters, *Emergency Medical Services: A Guidebook for Fire-Based Systems, 4th ed.* (Washington, DC: IAFF), http://www.iaff.org/tech/PDF/EMSGuideBk.pdf.

The 24-hour shift deployment drives a static deployment in which the 0.25 to 0.30 utilization is set as the maximum. However, the disparity in demand between peak and nonpeak hours causes significant disparity when discussing the utilization of units. Calls were analyzed also to reveal the call duration, or workload, on all units by time of day. Results are presented in two-hour increments over the 24-hour period in Figure 16. The daily totals shown equal the sum of each column multiplied by two, since each cell represents two hours. Automatic aid calls are not included. As shown in the figure, the hourly-deployed minutes were highest between 8:00 a.m. and 6:00 p.m., averaging between 43 minutes and 54 minutes per hour. The hourly deployed minutes were lowest between 10:00 p.m. and 8:00 a.m., when they averaged between 15 minutes and 27 minutes per hour. In other words, on average, no more than 26.5 minutes of the available 300 minutes (5 units with 60 minutes of capacity each) were spent on calls in the nonpeak periods. It is therefore recommended that some elements of dynamic deployment be considered to increase the efficient use of resources.

Figure 16: Deployed Minutes by Hour of Day



Prescott Fire Department does not formally report on nonemergency activities in terms of staff hours. The documentation and reporting of nonemergency productive time are critical to enable transparency of operations. Accounting for nonemergency downtime requires a regular reporting system. This information should be reported in a standard format on a monthly basis by each operational shift. Data demonstrating both emergency and nonemergency productivity should be reported annually. This would enable the data to be used to plan, set annual goals and objectives, conduct performance reviews (where applicable), and justify programs and funding.

Recommendations

- It is strongly recommended that Prescott explore elements of dynamic deployment in an effort to better align resources to demand for services, thus improving the efficient allocation of resources.

- Develop a system to document nonemergency activities so that decisions about new efficiencies and work capacity are both accurate and transparent to city leaders and the broader community.

Assessment of Fire Station Locations

Traditionally, fire departments utilize a geography-based deployment strategy that uses facilities and resources that remain constant irrespective of the changes in demand. In other words, this deployment strategy results in fire stations that are geographically distributed across the jurisdiction to respond to each area of the city within a similar time frame. As discussed previously, this strategy is based on the premise that the number of road miles, or travel distance, has a linear relationship to travel time. Prescott Fire Department utilizes this deployment strategy.

Several strategies are offered to assess the validity of the PFD deployment model. First is a station-by-station comparison of total response time. This analysis assumes that all other factors—such as motivation to respond in a timely manner, driving habits, ease of travel on roadways, dispatch time, and turnout time—are held constant. Second is a geographic analysis of actual road miles from each fixed fire station location represented by a geographic information system (GIS). Third is the ability for the PFD to assemble multiple units on a single call, adding validity to the disbursement of the existing stations.

This analysis focuses on structure fire responses for fire engines. The current workload or demand for services for these apparatus is relatively low, which provides the greatest reliability that they will be available for calls and at the station when a request for service is received. The data from stations' total response times suggest that variations exist. Engine 72 has a total emergency response time of 9.2 minutes or less at the 90th percentile, while Engines 73 and 71 have a total response time of 12.0 minutes at the 90th percentile. It is not uncommon for older stations that were built at the "core" of the city to outperform newer stations built later where the geographic coverage area is larger. The data are presented in Table 9.

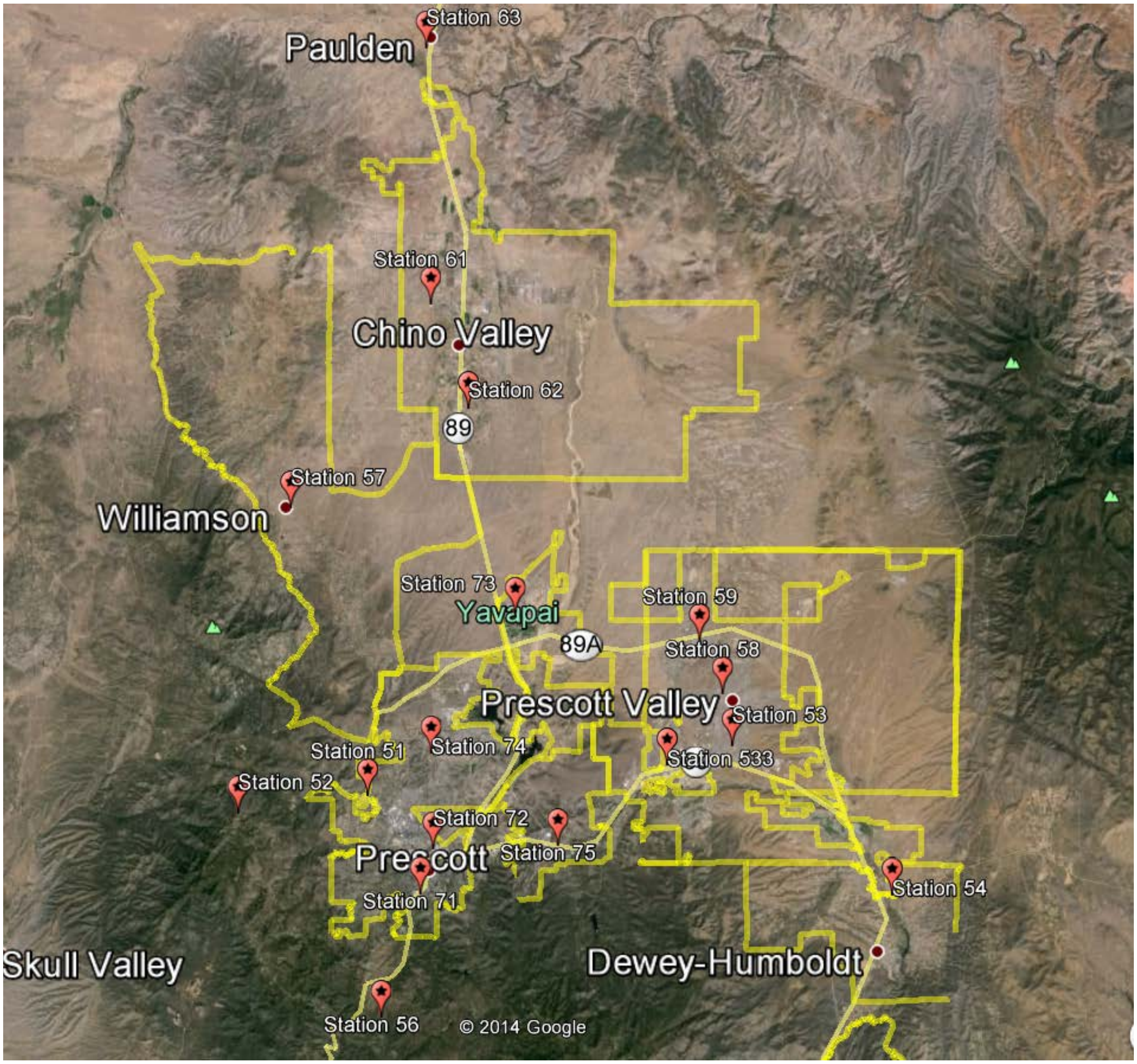
Table 9: 90th Percentile Response Time of First Arriving Unit for Structure and Outside Fires by Unit

First Due Station	Emergency			Nonemergency		
	Average Response Time	90th Percentile Response Time	Sample Size	Average Response Time	90th Percentile Response Time	Sample Size
Station 71 - PFD	7.6	12.0	970	9.4	15.1	751
Station 72 - PFD	6.7	9.2	1,155	8.2	11.3	586
Station 73 - PFD	8.4	12.0	307	10.7	14.8	173
Station 74 - PFD	7.8	11.1	602	10.0	15.5	435
Station 75 - PFD	7.4	11.0	487	9.6	14.0	284
Station 51 - CYFD	7.1	10.5	560	9.1	13.0	384

Note: E51 is included in this analysis when it arrived first.

A GIS representation of the current station locations is provided in Figure 17. Visually, it confirms that the majority of fire stations are approximately equally distributed throughout Prescott with the exception of along the Eastern border of the Yavapai Fire District.

Figure17: Current Station Locations in Prescott and Automatic Aid Districts



Due to potential compounding variables in this type of analysis, ICMA mapped the locations and capabilities of each station to respond through actual road miles using four-, six-, and eight-minute travel times. In accordance with the NFPA-1710 recommended four-minute travel time, a travel time bleed is provided in red. A six-minute bleed is provided in green, and an eight-minute travel time bleed in blue. These geographic representations are resented individually in Figures 18, 19 and 20. Without consideration of where the demand for services is occurring, the GIS mapping suggests that the eastern part of the city has the lowest performance with respect to travel time capability.

Figure18: Four-Minute Travel Time Bleeds for Current Area Stations

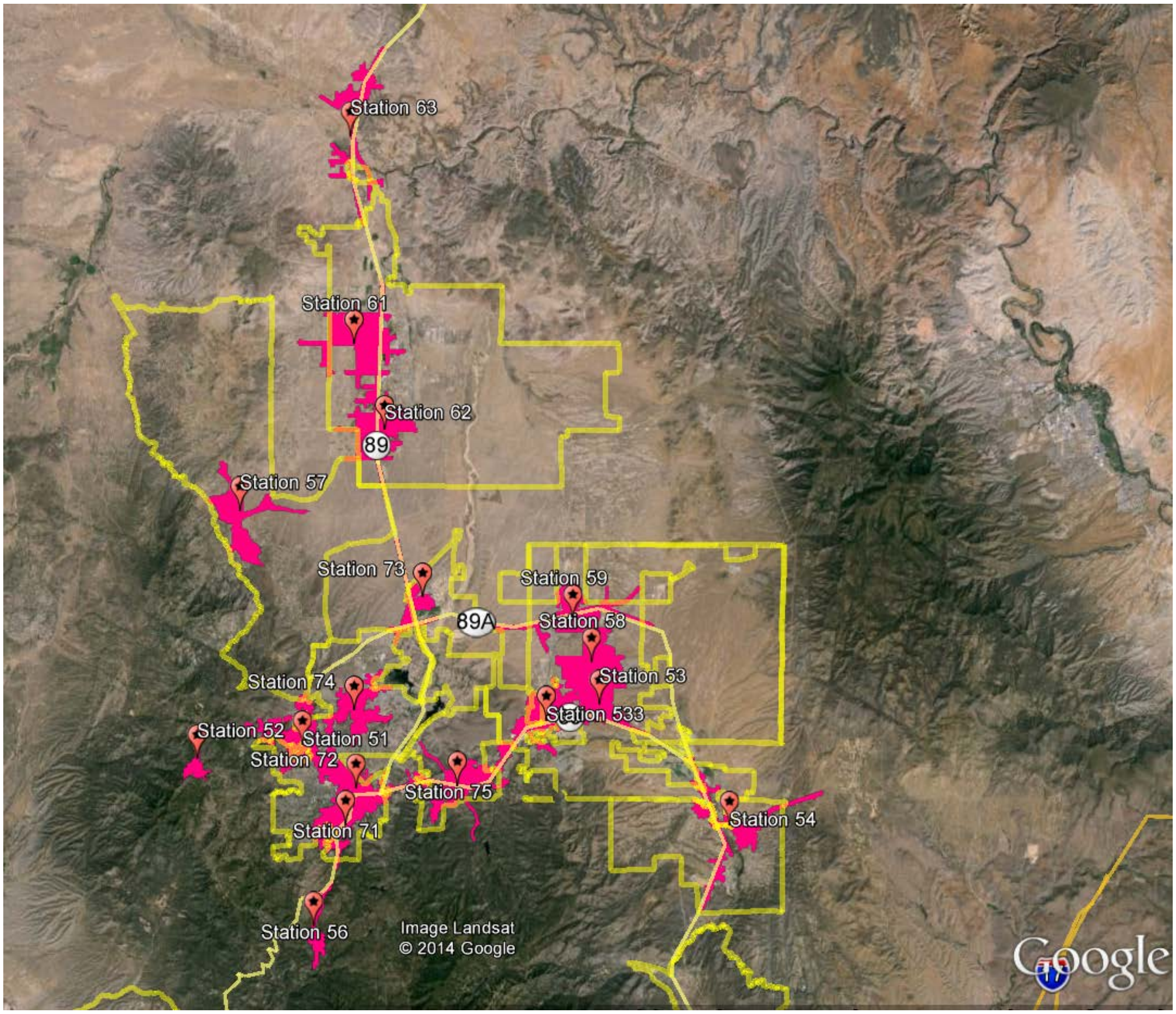


Figure19: Six-Minute Travel Time Bleeds for Current Area Stations

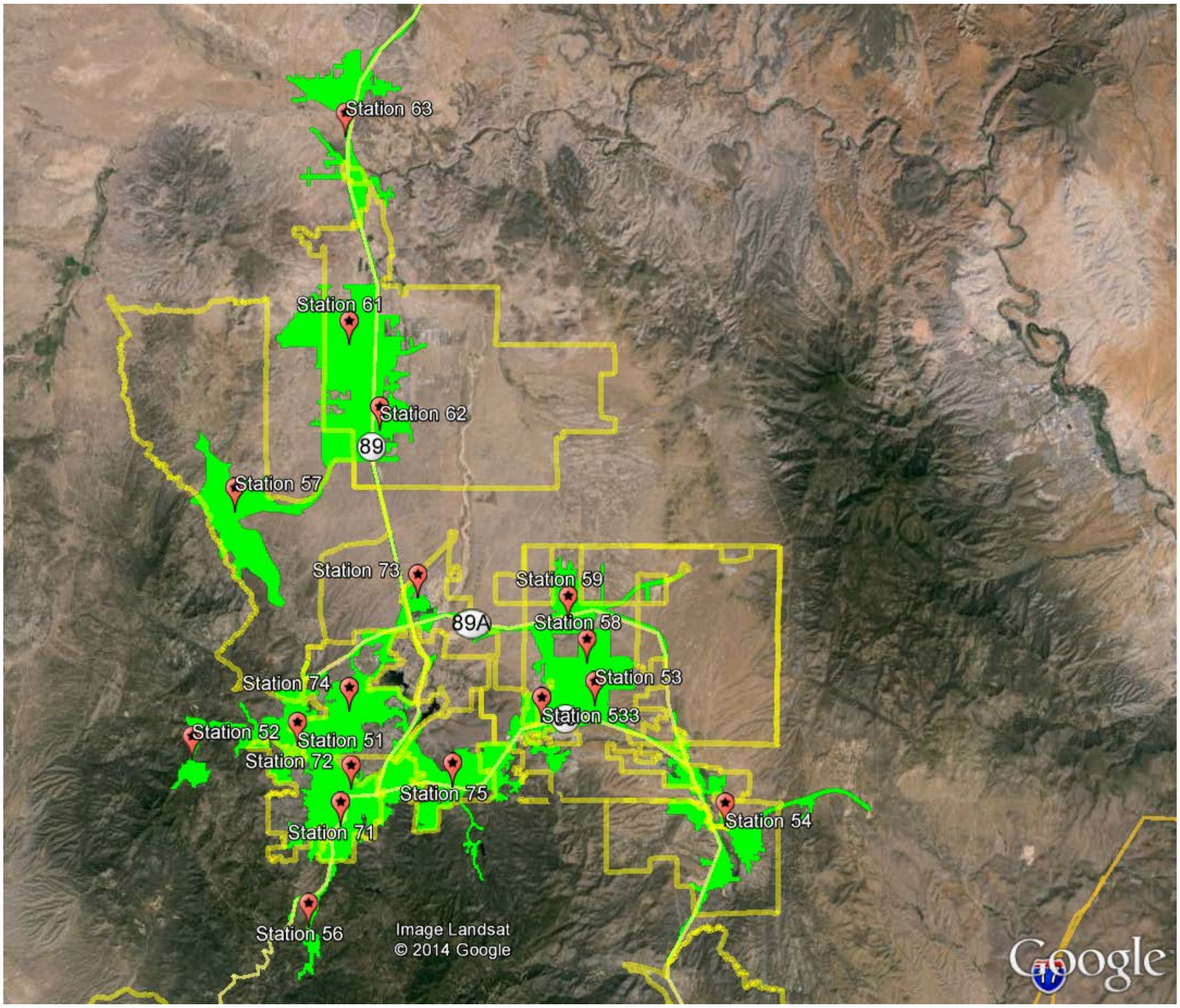
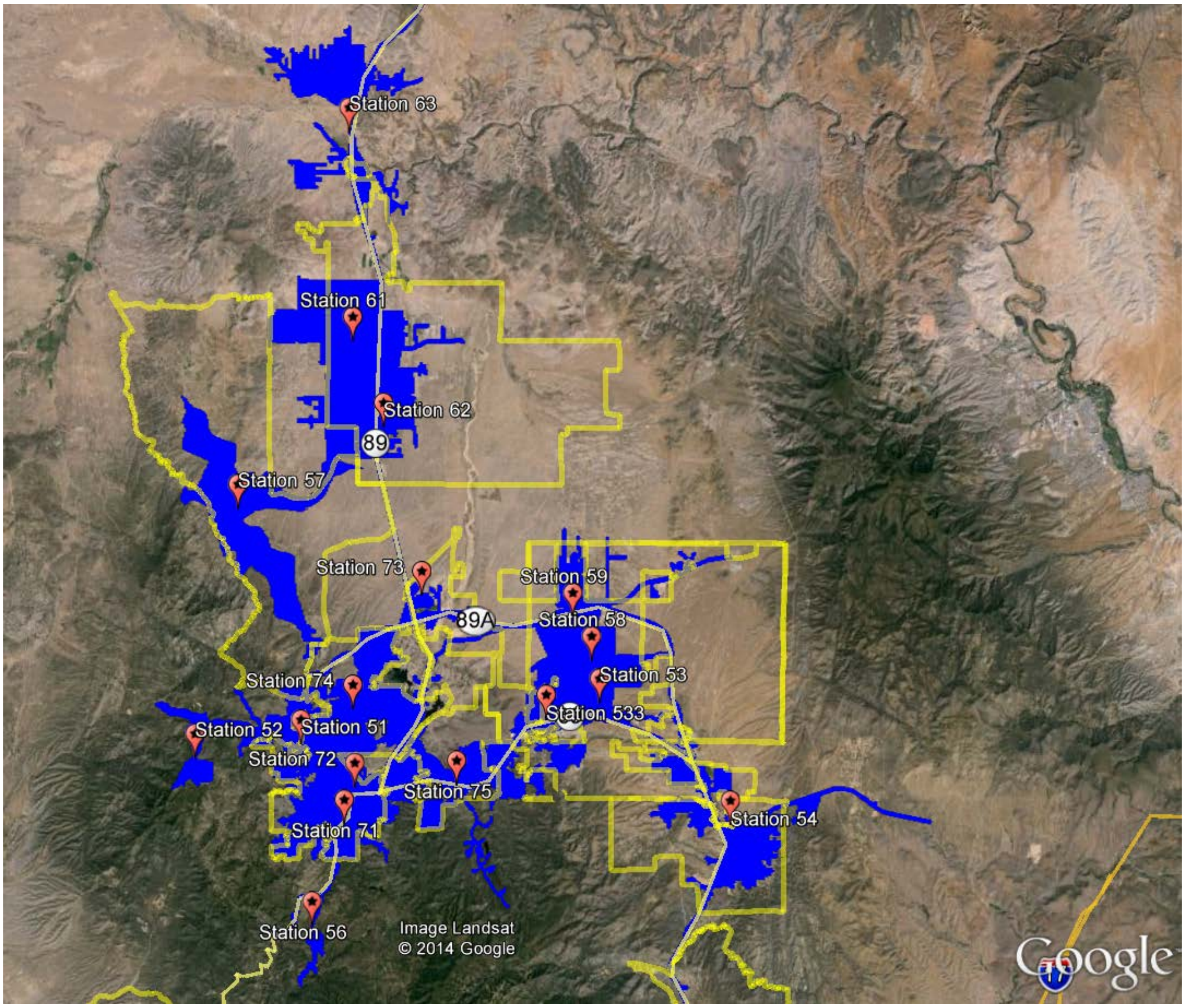


Figure 20: Eight-Minute Travel Time Bleeds for Current Area Stations



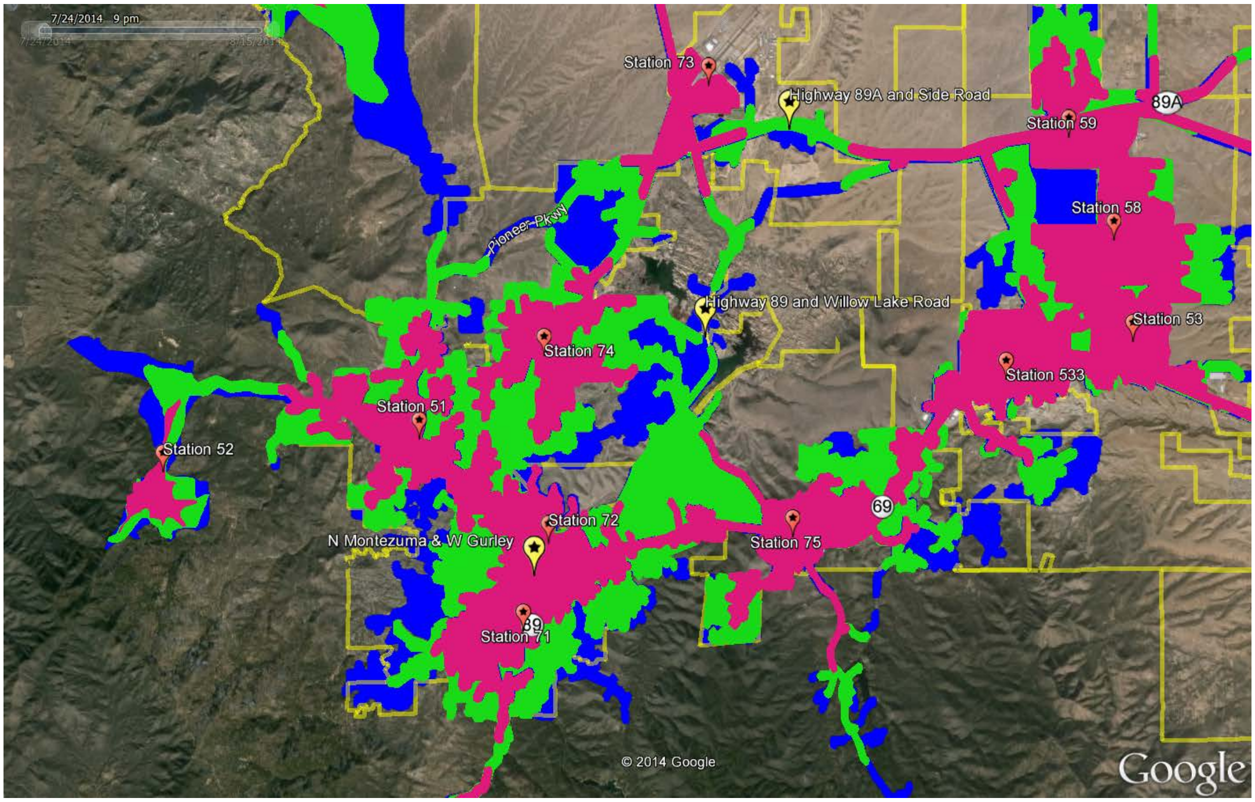
Ideally, the travel time bleeds would be approximately concentric around the fixed facility address. This would allow for an equal opportunity to respond in a timely manner in all directions around the station. The GIS mapping suggests that most stations outside of the city center may be partially restricted by the available road infrastructure related to topography. In addition, the city does not have a concentric growth pattern like typical urban environments because land use is at least partially driven by topography and "buildable" sites. As a result, the city has stations in population/risk centers that may be distant from other stations and somewhat isolated by road infrastructure. This in turn affects service delivery through travel time from two perspectives. The first is those calls involving multiple units such as building fires. While the first in company may have travel times of six minutes or less, the next arriving unit may have travel times in excess of eight minutes as illustrated in Figure 20, particularly in the station 73 and 75 response zones. As a benchmark NFPA 1710 recommends an eight minute travel time response of the initial full alarm assignment capability for a structure fire[39]. The second impact is when a unit is on a call in their response zone and a second call for service is dispatched in that response zone. Travel times when considering this perceptive are increased as well, as illustrated in Figures 18, 19, and 20.

Further analyses should be conducted when the city considers expansion and/or station replacement that also includes a demand analysis as illustrated in figures 22 and 23. This will ensure that service enhancements are targeted to those areas where the demand necessitates service improvement while also considering travel time.

The city of Prescott has tentative plans for several new fire stations. One is in the vicinity of East Sheldon Street near the core of the city, one in the vicinity of Highway 89 and Willow Lake Road, and one in the vicinity of Highway 89A and Side Road. A GIS representation of the new travel time capabilities with the proposed stations is provided in Figure 21. An examination and comparison between the four-, six-, and eight-minute bleeds of the current stations and the proposed fire station locations suggest a positive impact on response capability in the downtown corridor on East Sheldon Street and in the eastern portion of the city on Highway 89 and Willow Lake Road. However, when considering response capability in the absence of risk, the proposed station on Highway 89A does not suggest considerable improvement in response capabilities and therefore could be reconsidered or developed last.

[39] NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments* (2010 Edition), 9.

Figure 21: Four-, Six-, and Eight-Minute Travel Time Bleeds for PFD Proposed Fire Station Location



The current demand for fire and EMS services is concentrated near the center of the city. The fire demand and EMS demand maps are revisited in this discussion in Figures 22 and 23, respectively. The two core program areas (fire and EMS) follow the same general pattern. The deployment of fire stations is generally aligned with this demand; the greatest concentration of resources is in the areas of greatest demand.

The demand map does not support the geographic assumptions about the urgency of a new station on Highway 89A. The road miles demonstrate little substantive gain in response capabilities, and the demand map clearly demonstrates little drive for demand for services. The current station location serves both the fire and EMS demand very well on the north end of the city. The station on Highway 89 and Willow Lake Road appears to be in a good location both geographically and for assisting with an area of higher demand toward the city center. The proposed station on East Sheldon Street is appropriately sited for demand for services, but it may lose some measure of efficiency and response capability due to the close proximity of Station 71. If possible, consideration should be given to moving the proposed station farther north into the next immediate grid area of the map sited between stations 72 and 74 to close travel time gaps.

Figure 22: Fire Demand Map for the City of Prescott

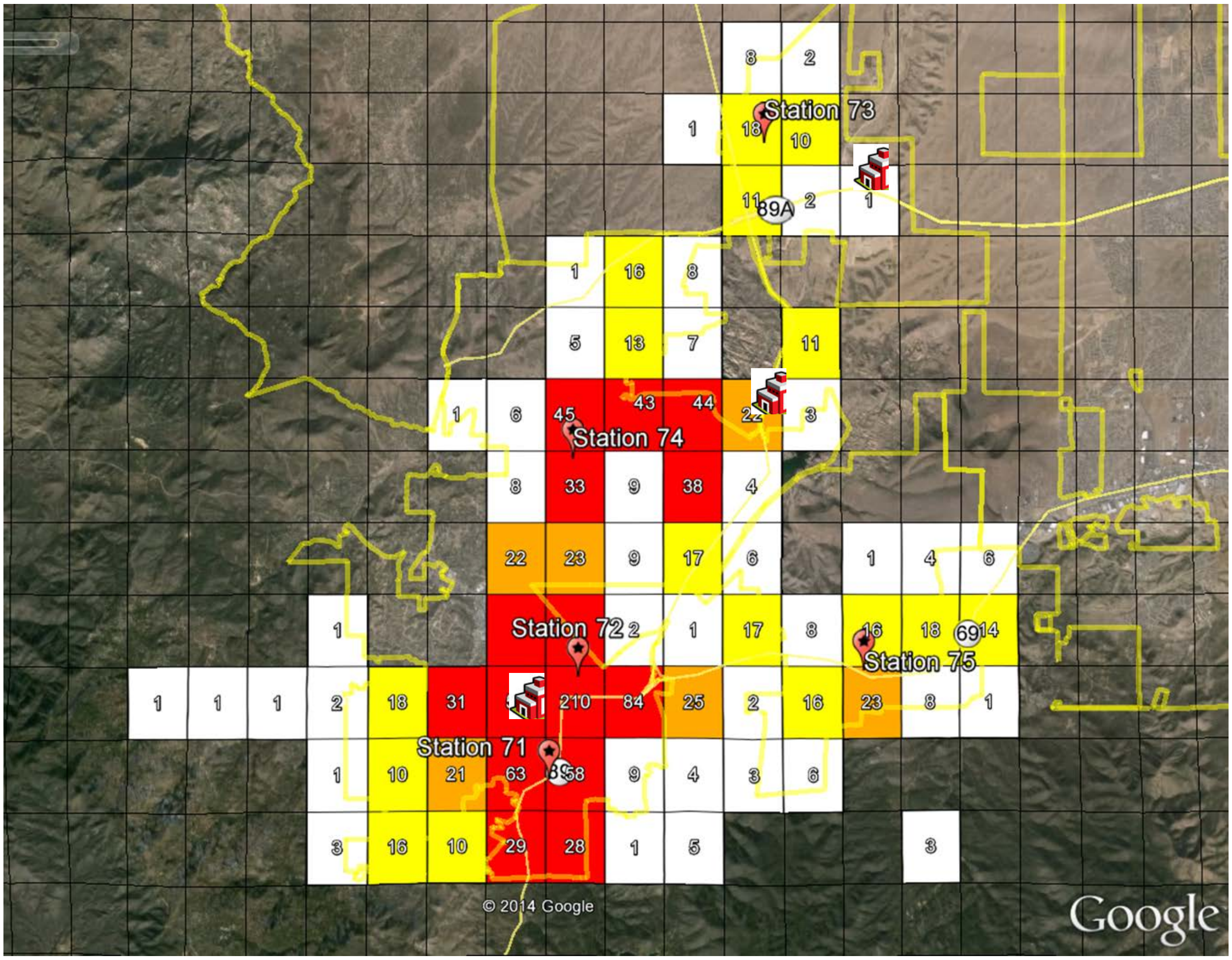


Figure23: EMS Demand Map for the City of Prescott

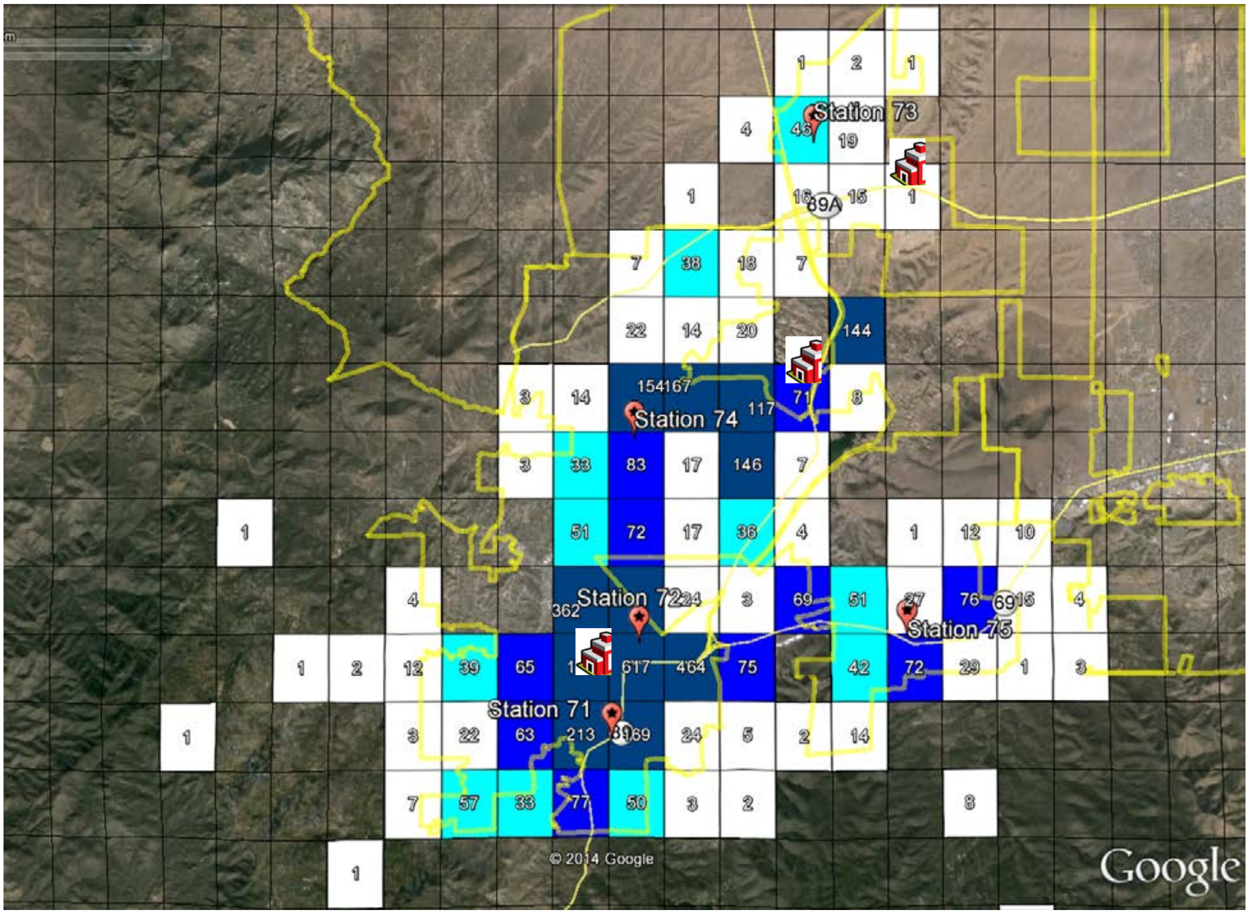
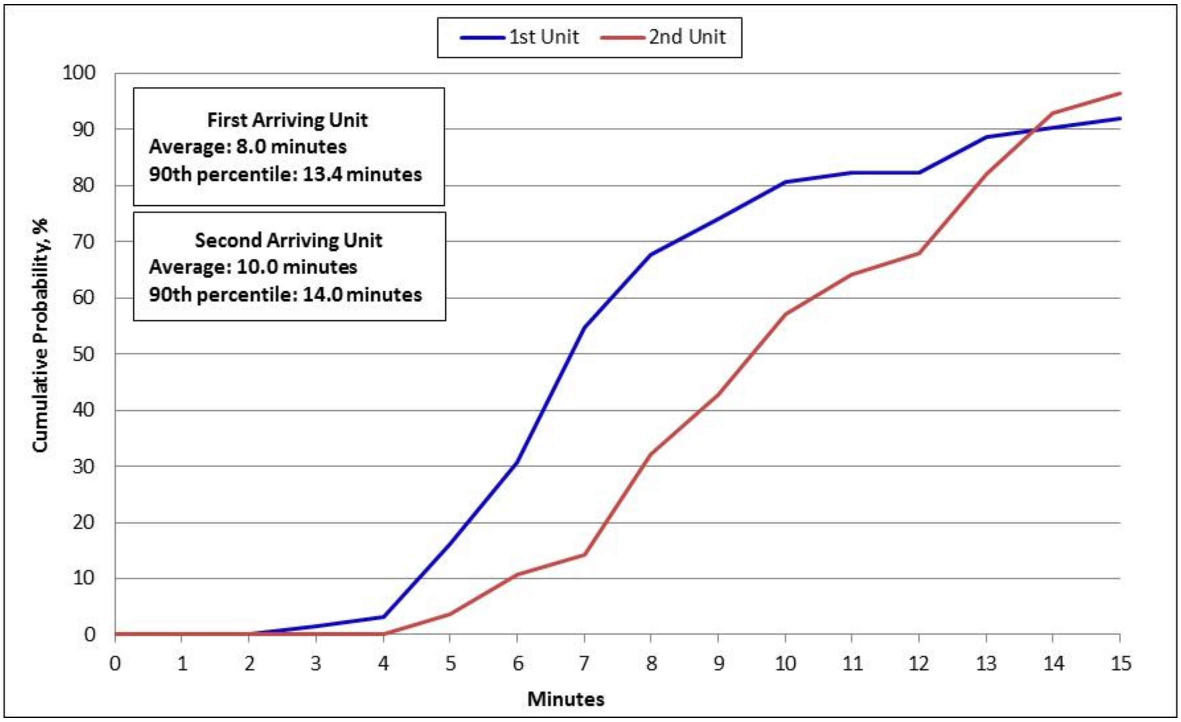


Figure 24: Cumulative Distribution Function (CDF) of Response Time of First and Second Arriving Units for Structure Fire Calls



This analysis attempted to examine the entire effective response force (ERF) necessary and deployed by the PFD to structure fires. However, there were only six calls in the one-year study period in which all four units arrived on scene. When examining the data, it would appear that units may have been called to the scene at times other than original dispatch of the call; therefore, travel time may be the most reliable measure. The travel time for all four units to arrive on scene was no more than 10.6 minutes on average. Again, this is an extremely small sampling of calls and may not be representative of actual performance. ICMA has included this portion of the analysis at the request of the PFD.

Finally, any decision to expand the fire department deployment model by adding stations to the system is being driven by limitations in travel-time coverage and not by risk. Since the geographic area is at the root of response time capability, it is an important consideration. Demand-for-service maps suggest that the current deployment strategy adequately covers the areas of the highest demand for both fire and EMS services. From this perspective, the city should be comfortable with a reasonable and responsible timeline for the planned expansion while continually monitoring overall demand for service, any increase in risk and potential impacts on the fire department, and actual growth in population.

One of the PFD chief officers provided an analysis for future station locations and the expansion of deployment capabilities that align with measures of demand and response time. This analysis was well developed, considering the assumptions that frame the argument. However, the applicability of this analysis is predicated on the city's adoption of performance standards. For example, the PFD's proposal for three new stations is based on the assumption that approximately 1,000 calls per year is the appropriate and maximum workload that should be maintained. The other tenet for this proposal is that response time should not exceed five minutes on average. In other words, the PFD would expand as either the response time exceeded five minutes or the workload began to exceed approximately 1,000 calls per year. The department should be commended for taking a performance-based metric for managing growth and maintaining service levels. The efficacy of fire response time is largely undetermined, and thus response time capabilities and workload are local policy decisions. ICMA suggests that the current levels of service are approximately aligned with community expectations for service, as there is no evidence that elected officials or city administrators have received complaints or other indicators of community dissatisfaction. In addition, for a community with Prescott's population density, the CFAI affords a benchmark service level of approximately 12 minutes total response time at the 90th percentile and a baseline of up to 15 minutes at the 90th percentile.[40] In other words, given Prescott's population density and risk, the PFD's current response capabilities are well in line with industry recommendations. Finally, it should be pointed out that NFPA 1710 has been created to guide urban fire departments; its application for more rural communities or those with lower population density may be limited.

Analyzing PFD's workload, no more than 11 percent of the available work hours are spent on emergency incidents. From this perspective, ICMA would suggest that the PFD has excess capacity to handle increased demand for service without having to reinvest in additional resources. **All said, decisions regarding response time and response capabilities are local policy decisions. It would serve all parties well to establish performance measures and goals so that both the city and the department manage from a common framework.**

Recommendations:

- If the city desires to improve response capability in the eastern portion of the jurisdiction, the general area of the proposed station is appropriate.

- It is suggested that further analyses be conducted when considering expansion and/or station replacement to ensure that service enhancements cannot be realized by relocating existing stations as a first option. For example, city and department leaders should carefully consider the proposal for a new station at East Sheldon Street to make sure that it is the best option available.

- The city is encouraged to re-examine the necessity of the station proposed for the vicinity of Highway 89A.

- The PFD is strongly recommended to prepare and adopt a standard of coverage document that will clearly articulate expectations for service performance.

Assessment of Facilities and Fleet

Sound community fire-rescue protection requires the strategic distribution of an adequate number of stations to achieve effective service area coverage and ensure that predicted response travel times satisfy prevailing community goals and national best practices, and that the facilities are

[40] Center for Public Safety Excellence, *Fire and Emergency Service Self-Assessment Manual,* 70.

capable of supporting mission-critical personnel and equipment-oriented requirements and needs. Depending on a fire-rescue department's scope of services, size, and complexity, additional facilities may be necessary to support emergency communications, personnel training, fleet and essential equipment maintenance and repair, and supply storage and distribution.

Fire facilities must be designed and constructed to accommodate current and future vehicle types and manufactured dimensions. Stations must have sufficiently large bay doors for all vehicle types, adequate circulation space between garaged vehicles, departure and return aprons with adequate length and turn geometry to ensure safe response, and floor drains and oil separators to address ecological concerns. Vehicle bay areas in fire stations need to consider tactical vehicles that may need to be added to the fleet in the future to address forecasted response challenges, even if this consideration merely involves finding a parcel space that will allow for additional bays to be built in the future.

Fire facilities also must take into account the needs of personnel. They must support personnel in their day-to-day duties by providing adequate space for vehicle maintenance and minor repair, storage areas for essential equipment and supplies, administrative work, training, physical fitness, laundering, meal preparation, personal hygiene/comfort, and—where a fire department is committed to minimizing "turnout time" (the response time interval from receipt of call until the required emergency vehicle is fully staffed and able to respond)—bunking facilities.

Fire department facilities also must support the expectation that emergency services will continue to function in an uninterrupted manner during local communitywide emergencies. Public safety facilities serve as *de facto* neighborhood "safe havens" during such emergencies and can provide geographically proximate command posts for managing large scale, complex, and protracted campaign emergency incidents. Thus, construction design should embrace a goal of ensuring that buildings that will be able to withstand a wide range of seismic and severe weather conditions and perform in an uninterrupted manner even when utilities are disrupted. Programmatic details, such as having an emergency generator connected to automatic transfer switching or providing tertiary redundancy of power supply via a "piggyback" roll-up generator with manual transfer (should the primary generator fail) provide safeguards that would permit the fire department to function fully during local emergencies when response activity predictably peaks.

Personnel and occupant safety is a key element of effective station design. Small details, such as the quality of finish on bay floors and non-slip treads on stairwell steps, are important as they lower tripping and fall hazards during response. Similarly, hands-free plumbing fixtures and easily disinfected countertops and surfaces can reduce the risk of infection and the spread of illnesses. Stations also need to have an exhaust recovery system to capture and remove cancer-causing byproducts of diesel fuel exhaust emissions. Combined, such details incorporate best practices for achieving a safe and hygienic work environment that satisfies essential Occupational Safety and Health Administration (OSHA) mandates and NFPA best-practice standards.

Ergonomic layout and corresponding space adjacencies in a fire station should seek to limit the travel distances between occupied crew areas and the apparatus bays. Careful attention to space planning should result in a layout with lavatories and showers in proximity to bunk rooms and break rooms, fitness areas, and other work spaces that are sufficiently separate from sleeping quarters.

Furnishings, fixtures, and equipment selections should provide thoughtful consideration of the around-the-clock occupancy inherent to fire facilities. Durability is essential, given the accelerated wear of systems and goods in facilities that are constantly occupied and operational.

PFD Facilities

The PFD currently operates and responds from five fire-rescue stations geographically distributed across the city's thirty-seven square-mile area. There is also one former PFD facility where the Central Yavapai Fire District deploys services from. Additionally, PFD operates a modest campus of facilities to support personnel training. The city has recently acquired a vacant commercial property that is planned to be outfitted as the administrative headquarters for the department. The Prescott Regional Communications Center, an enhanced-911 facility that provides dispatch and communications services for PFD, is operated through a partnership of ten area public safety agencies, including the city of Prescott.

PFD's current station facilities were constructed between 1974 and 1993, and reflect varied floor-plans, staffing and apparatus capacities, and construction methods and materials. As is customary in the fire service, PFD operations staff provides daily housekeeping and general facility support, resulting in stations that appear to be uniformly clean and organized. Staff reports that there is a lack of customary contractual services, such as carpet and duct cleaning, although such measures can appreciably benefit employee health. PFD's pride in its station facilities is evident, but some of the finishes (such as flooring and millwork) are showing some wear and some of the equipment (appliances and emergency generators) is aging.

It was noted that the HVAC and roofing systems of several stations are beyond their predicted lifespans. Concerns were also expressed about electrical distribution, wiring, and plumbing in some facilities and that all of the stations lack effective diesel exhaust recovery equipment and adequate storage space for equipment and supplies.

The fire department's budget covers all repair and maintenance costs to keep the stations operating, as well as for replacing equipment and furnishings as needed. The current annual budgetary allocation is $25,000. The larger facilities support budget was $150,000, until 2008, when it was reduced to $5,000 to address budget constraints resulting from the economic downturn. The facilities support budget was increased back to $118,900 in FY14 and will be $130,000 in FY 15. The current funding level is adequate for minor repairs, maintenance, supplies, and periodic replacement of furnishings and kitchen/laundry appliances, but major work (HVAC or roofing system replacements, paving/concrete work for apparatus bays and internal driveways) and the installation of new exhaust recovery systems are beyond what the budget can support. However, funding of $160,000 is included in the FY 15 General Fund Budget for installation of new exhaust recover systems. When asked if the city's public works or facilities maintenance agency provides assistance with station support, it was explained that discussions regarding having the facilities maintenance agency assume responsibilities for station upkeep had stalled after it was determined that inclusion in the facilities maintenance fund would require a budget transfer of $25,000 per station in order to support appropriate maintenance levels. It did not appear there was a detailed fiscal plan to provide for scheduled renovation and replacement of major building systems for the PFD.

Recommendation:

- Revisit the inclusion of fire facilities in the facilities maintenance fund in order to ensure the useful life of valuable and well utilized capital facility assets.

A station-by-station account of the PFD's facilities follows.

Fire Station 71

Fire station 71, located at 333 White Spar Road, was originally constructed in 1959 and operated as an automotive business until it was acquired and renovated by the city to become a fire station in 1990. Comprising a floor area of 10,246 square feet, Fire Station 71 is the largest of PFD's stations, and it is flanked by two accessory buildings (1,815 and 1,560 square feet in size) on a parcel of 1.65 acres. The station's response district comprises an area of approximately nine square miles, serving the southernmost portion of the city, Prescott National Forest, a portion of Highway 89, and rural properties surrounding the city. In addition to PFD's six assigned motorized operational vehicles, the station provides garage space for a U.S. Forest Service-owned type III wildland engine.

Station 71 is a masonry and brick structure with a flat roof profile. It has the customary apparatus bay, bay support, and crew areas. The floor plan provides effective space adjacencies and spacial massing, resulting in a station that is operationally effective. In addition to expected crew support spaces, Station 71 is furnished with display cases and wall hangings that capture and preserve the history and culture of the PFD.

Figure 25: Station 71

This is a clean, well-organized facility, and the station staff on the premises reported no significant outstanding concerns regarding the property, except for the absence of sufficient exhaust recovery equipment. Unlike the layout at several other PFD stations, the fitness room is located in an adjacent accessory building.

The floor of the apparatus bay is concrete and displays significant cracks and separations in several areas. Not only are these trip hazards, future degradation may compromise floor support integrity if the cracks are not remediated. The apparatus bay floor is outfitted with floor drains, but the drain openings are small in diameter and standing water is an issue when apparatus returns to the station during inclement weather or when conditions necessitate those response vehicles are washed indoors. There are no bollards at bay door openings, which increase the risk of significant structural damage if an apparatus collides with the building as it is backed into a bay.

There is evidence of minor leaks in the apparatus bays and at a couple of locations within the crew quarters, giving credence to the concern that the roofing system has exceeded its effective lifespan. If, as reported, the current roof was installed at the time of building up-fit for station operations nearly twenty-five years ago, this concern is well-founded, particularly given the flat profile of the roof and the propensity for rainfall to pool in surface depressions that develop over time.

It was also indicated that the rooftop HVAC equipment dates back to when the station opened in 1990, placing the equipment at the outer limits of its expected life cycle.

The pedestrian doors leading into the apparatus bays should have weather-stripping to help protect against heat loss during the winter.

The station's access and egress lanes are constructed of concrete, which is historically far more durable and has more longevity than asphalt—a concern given the weight of modern fire apparatus. The station's aprons and travel lanes permit effective vehicle circulation and are in good condition, with a positive grade away from the building footprint and no reported areas of standing water.

Compressed-gas cylinders and flammable-liquids containers were stored in a manner consistent with regulations and best practices. As was observed at all PFD stations, Station 71 has no designated personnel decontamination shower or eyewash station, although a utility sink and adjacent mop sink in the bay allow for equipment decontamination.

Recommendations for Fire Station 71

1. Install industry-standard exhaust recovery equipment.
2. Conduct an engineering evaluation of apparatus bay floors and perform repairs as necessary.
3. Set aside an area within the apparatus bay footprint and use existing plumbing tie-in to construct a personnel decontamination area. Given the lack of available space in other Prescott fire stations, this location could serve as an emergency decontamination facility for the department.

4. Consider setting aside an area within the apparatus bay to protect firefighter personal protective clothing from potential damage from ultraviolet light exposure and vehicle exhaust byproducts.

5. Establish a schedule (or revisit the existing schedule) for replacement of HVAC/mechanical equipment.

6. Establish a schedule (or revisit the existing schedule) for replacement of the station's roof.

7. Inspect and seal openings in the building envelope, particularly around pedestrian doors.

8. Install bollards at bay door openings.

Fire Station 72

Fire station 72, located at 530 6th Street, was completed and opened in 1990. The property and improvements are owned and maintained by the Central Yavapai Fire District, with staffing provided by PFD via a cooperative service agreement. Comprising a floor area of 6,720 square feet, the facility is sited on a 1.39-acre parcel. The station's response district comprises an area of approximately four square miles, serving downtown Prescott in the south central area of the city. The station garages four assigned motorized operational vehicles operated by PFD.

Figure 26: Station 72

Station 72 is a pre-engineered steel structure with a flat roof profile and two apparatus bays. The floor plan provides effective space adjacencies and, although it is small, it is operationally effective.

The facility appears clean and reasonably well organized, although supplies blocked one of the pedestrian doors because the facility lacks sufficient storage space.

While the building envelope appeared to be in generally good condition, properly heating and cooling the facility is challenging; the building's high utility costs are likely a result of this problem. Mechanical system performance is often a concern in pre-engineered facilities, but the opening from the bays into the attic space, the absence of carpeting in crew support spaces, and other conditions may be contributing to the problem. Staff has found it necessary to install window air-conditioning units to augment the station's central cooling system.

Bay floors were generally in good condition, but the small drain openings contributed to the accumulation of standing water, creating a fall hazard. There are no bollards at bay door openings, which increases the risk of significant structural damage to the facility should the apparatus collide with the building as it is being backed into a bay. This is a particular concern for this station due to its construction type.

As observed at all PFD facilities, Station 72 has no dedicated exhaust recovery equipment. The central exhaust equipment currently in place does not effectively eliminate all of the carcinogenic byproducts of diesel exhaust and may also be contributing to higher utility bills during the winter.

The station's communication equipment is located in the bay. This may have a negative impact on equipment performance because the bay area is not cooled and increases the risk of a problem resulting from water during the wash-down of bay floors or apparatus.

Compressed-gas cylinders and flammable-liquids containers are stored in a manner consistent with regulations and best practices.

The station is equipped with a robust emergency generator, but the generator has a manual switch rather than being engaged automatically.

Station 72 is well equipped with fitness resources. Much of the equipment is located in the apparatus bays, which creates a health concern due to potential exposure to diesel exhaust and excessive heat during the summer months.

The station's concrete departure ramp shows signs of deterioration, and the threshold at the front pedestrian door is excessively worn. These issues constitute tripping hazards.

Recommendations for Fire Station 72

1. Install industry-standard exhaust recovery equipment.
2. Consider erecting an accessory building to facilitate storage of bulk station supplies.
3. Set aside and condition an area within the apparatus bay to provide a safe fitness environment.

4. Inspect the building envelope and mechanical systems to find ways to improve staff comfort and reduce energy costs. Install carpet in crew support areas to reduce conductive cooling and increase staff comfort.

5. Consider relocating station communication equipment from the bays to a dry, conditioned space.

6. Repair or replace the pedestrian door threshold and front concrete apron.

7. Install bollards at bay door openings.

Fire Station 73

Fire station 73, located at 1980 Clubhouse Drive, was completed and opened in 1974. Comprising a floor area of only 4,000 square feet, Station 73 is the smallest PFD station. A small accessory building provides storage for goods and equipment. The station's response district comprises an area of approximately twelve square miles, serving Earnest A. Love Field, industrial properties along Highway 89 and Highway 89A, state lands, and rural properties surrounding the city. The station provides garage space for three assigned motorized operational vehicles, including an airport rescue and firefighting (ARFF) unit (Figure 15), and PFD's mass casualty incident trailer.

Figure 27: Station 73

Station 73 is a masonry structure with a split sloped roof profile. It has apparatus bay, bay support, and crew areas. The floor plan provides effective space adjacencies, but space is inadequate for the number of staff and operations supported. As a result, the station is only marginally effective. The station is on a well and septic system, and the drain field was recently replaced to resolve significant septic issues that had plagued facility operations.

As at other PFD facilities, Station 73 has no dedicated exhaust recovery equipment, and there is evidence of exhaust soot throughout the bay area. Station 73 also has no dedicated personnel decontamination shower, and fitness equipment was located in the apparatus bay. Collectively, these factors create employee health concerns.

The station staff on the premises agreed with assessment that the facility is appreciably undersized. Particularly noteworthy is a non-ADA compliant restroom and the limited space allocated for personnel lockers. The apparatus bay provides little room for personnel movement around the garaged response vehicles; the engine has to be parked at an oblique angle to permit the truck cab's door swing for entry and egress by the driver. The distance between the vehicle and firefighter protective clothing was less than three feet—too close to cancer-contributing diesel exhaust.

Several areas of the concrete bay floor and departure aprons are badly spalled and cracked and some areas of the concrete are sunken off-grade, particularly over the area traveled by the station's heavy ARFF vehicle. The extent of damage is so profound as to constitute a tripping hazard and, if not remediated, may cause future degradation of floor support integrity. Although the PFD have placed large rocks around the perimeter of the station's propane tank, the lack of bollards at bay door openings increases the risk for significant structural damage to the facility should the apparatus collide with the building as it is backed into the bay.

The millwork, floor finishes, and many of the furnishings are in poor condition and in need of renovation. There are a number of other minor and easily correctable safety issues, such as an unilluminated exit sign, a missing floor duct covering, and the lack of pedestrian door weather stripping increase heating and cooling efficiency.

The mechanical and the hot water heater had been replaced recently; however, concerns remain regarding the age and condition of the roofing system and station plumbing.

The station was equipped with a robust emergency generator, but it has a manual transfer switch rather than gear to engage the generator automatically in the case of an electricity outage.

Compressed-gas cylinders and flammable-liquids containers are stored in a way that is consistent with regulations and best practices.

Recommendations for Fire Station 73:

1. Consider expansion, renovation, remodeling, or replacement of this worn, undersized facility. Renovation could prove sufficient if structural and wildland apparatus is transferred to a new station that effectively covers existing service areas outside of the airport property.

2. Install industry-standard exhaust recovery equipment.

3. Conduct an engineering evaluation of apparatus bay floors and perform repairs as necessary.

4. Establish a schedule (or revisit the existing schedule) for replacing the station's roofing system.

5. Seal openings in the building envelope, particularly around pedestrian doors.

6. Perform a safety inspection of the facility and resolve minor issues, including unlit emergency exit signs and missing HVAC duct/vent coverings.

7. Install bollards at bay door openings.

Fire Station 74

Fire station 74, located at 2747 North Smoke Tree Lane, was completed and opened in 1987. While data regarding the station's floor area was unavailable, the station is reported to be located on a one-quarter-acre parcel. The station's response district comprises an area of roughly ten square miles, serving the north-central portion of the city of Prescott including the Prescott Lakes community, and multiple city recreation areas. The station also supports response to the airport. In addition to PFD's two assigned motorized operational vehicles, the station operates technical rescue and water rescue assets garaged at this facility. The station also houses resources that support the department's respiratory protection program.

Figure 28: Station 74

Station 74 is a two-bay, masonry/stucco structure with a mixed pitched-tile and flat-roof profile. It has the customary inventory of apparatus bay, bay support, and crew areas. The floor plan provides effective space adjacencies and spacial massing, resulting in a station that is operationally effective. Given the small parcel size on which the station is situated, parking is inadequate—particularly during change of shift—and the short departure apron, coupled with the prevailing street geometry, creates line-of-sight concerns during response. The short departure ramp would make it difficult to place aerial apparatus at this facility in the future.

A steep slope at the rear of the facility shows signs of erosion and, despite the construction of a retaining wall along the back edge of the property, fallen rock was observed near the generator, air conditioning compressor, and radio tower. The radio tower was reportedly installed to correct poor radio reception at the facility; however, the tower has not completely remedied the problem.

The facility is clean and well-organized but, as is typical of smaller facilities, dedicated storage space is limited. A mezzanine storage space has been repurposed to support PFD's self-contained breathing apparatus maintenance program, which has made it necessary for a significant amount of bulk goods to be stored in the apparatus bay.

The bay area is not outfitted with exhaust recovery equipment, and there is evidence of diesel soot on the walls and ceiling. Firefighter protective clothing is stored on wall-mounted hooks, subjecting the garments to damaging ultraviolet light and contamination by diesel exhaust. The combination of the amount of specialized apparatus that is garaged at this station and the modest size of the crew quarters precludes placement of fitness equipment within this station, which limits the ability of on-duty personnel to conduct daily physical training regimens.

Apparatus bay floor appear to be in good condition. The trench drain system is effective in draining water from floor and apparatus cleaning and is sufficiently sized to safeguard the facility from flooding should apparatus inadvertently dump the contents of mounted water tanks. It is recommended that Station 74's bay drainage design detail be replicated in future PFD facilities. There are no bollards at bay door openings, which increases the risk of significant structural damage to the facility should the backing of apparatus result in collision with the building.

While no roof leaks were evident in the apparatus bay, the age of this flat roof system suggests that it could be at or beyond its effective lifespan.

Mechanical equipment and plumbing fixtures were reportedly in good condition, and finishes were generally satisfactory. Information technology equipment was racked in the station's mechanical room, with questionable cooling and no cabinetry to protect sensitive electronic components from debris or temperature-related damage.

The station's departure ramp was observed to be in good condition, with an effective slope away from the building to facilitate storm-water runoff. The station is equipped with a robust emergency generator with automatic transfer switch. Compressed-gas cylinders and flammable-liquids containers are stored in a manner consistent with regulations and best practices.

While an effective equipment decontamination area exists in an alcove of the apparatus room, the station has no designated personnel decontamination shower or eyewash station.

Recommendations for Fire Station 74:

1. Install industry-standard exhaust recovery equipment.

2. Consider adding a signal light at the apparatus departure ramp or flashing signage on the street near the station to alert motorists to the response of emergency vehicles. The signal/signage could be activated by PFD personnel as part of the response procedures.

3. Inspect the steep slope and the retaining wall at the rear of the facility to prevent equipment outside the station from being damaged by falling rocks.

4. Re-evaluate the storage of sensitive information technology equipment.

5. Evaluate the condition of the flat roof at the apparatus bay and plan for its replacement.

6. Consider setting aside an area within the apparatus bay to protect stored firefighter personal protective clothing from potential damage resulting from ultraviolet light exposure and contamination by vehicle exhaust byproducts. Alternately (given space constraints), purchase gear lockers that would eliminate or reduce ultraviolet light damage.

7. Install bollards at bay door openings.

Fire Station 75

Fire station 75, located at 315 Lee Boulevard, was completed and opened in 1993. Comprising a floor area of roughly 6,000 square feet, the station is situated on a 0.7 acre parcel. The stations response district comprises an area of seventeen square miles—the largest coverage area for any of PFD's facilities. Station 75 serves the southeastern part of the city of Prescott, Prescott National Forest, Highway 69, Highway 89, and surrounding areas. Among PFD's three assigned motorized operational response vehicles garaged at this station is the hazardous materials response unit. In addition, Lifeline/AMR, a contract EMS transport provider, garages ambulances at this facility.

Station 75 is a four-bay, masonry/stucco structure with a mixed pitched-tile roof profile. It has the expected inventory of apparatus bay, bay support, and crew areas. The floor plan, which includes crew support areas distributed over three floors, provides reasonably satisfactory space adjacencies and spacial massing, resulting in a station that is operationally effective.
A major drainage issue at the rear of the station, which includes an elevated parking area atop a slope, had caused storm-water flooding to parts of the facility, but this problem has been definitively corrected. Given the elevation offset, staff and visitors must enter the facility via stairs or elevated walkway.

Figure 29: Station 75

The staff assigned to this clean and well-organized facility reported no major concerns, except for the challenge of storing the large amount of bulk hazardous materials mitigation supplies typical of such a programmatic service. Personnel also communicated concerns regarding potential delays in "reaction time"—the response time interval from receipt of dispatch until emergency apparatus is staffed to depart—given the need to descend stairs from living and bunking areas within the facility. Despite the presence of all required railings and effective tread materials covering the steps, several foot and ankle injuries have repeatedly occurred due to personnel navigating the stairwell to staff the apparatus for emergency response. Although parcel size or site development challenges often necessitate multistory fire stations, PFD is encouraged to employ single-floor station design in future projects.

As at other PDF stations, Station 75's bay area is not outfitted with exhaust recovery equipment; however, two central-bay exhaust fans have been positioned on the rear wall. While the CFM rating of the exhaust fans appears robust, concerns over residual diesel byproducts persist, and the placement of one of the fans immediately below a station bunkroom with an operating window is problematic. Firefighter protective clothing is stored in open storage units, subjecting the garments to contamination by diesel exhaust.

The complement of specialized apparatus and associated storage required preclude placement of an effective inventory of fitness equipment within this station, which limits the ability of on-duty personnel to conduct daily physical training regimens.

Apparatus bay floors were observed to be in good condition, with no evidence of damage or deterioration. Bollards are present at bay door openings and adjacent to mechanical equipment at the rear of the station.

Mechanical equipment and plumbing fixtures are reportedly in good condition. The upstairs administrative office is not ducted to provide heating or cooling, however, requiring the use of a freestanding portable heater. Finishes are generally in satisfactory condition, although carpeted areas show wear. Millwork is in good condition, and showers and lavatories are outfitted with prudent features such as bench seats and hooks for uniform garments. Personal and bedding storage closets in bunkrooms help to keep bunk facilities tidy.

The station's departure ramp was observed to be in good condition, with an effective slope away from the building to facilitate storm-water runoff. All parking areas, internal travel lanes, and sidewalks are likewise in good condition.

. The station is equipped with an older repurposed emergency generator that shows signs of age, although staff reports that the unit functions properly.

Compressed-gas cylinders and flammable-liquids containers are generally stored in a manner consistent with regulations and best practices. A gas grill was observed somewhat precariously positioned on the elevated grated decking at the rear of the station. A damaged section of the gutter downspout at the rear of the station should be repaired.

Effective equipment decontamination/cleaning area exist in an alcove of the apparatus room. This could be employed as a personnel decontamination shower with minimal refit.

Recommendations for Fire Station 75

1. Install industry-standard exhaust recovery equipment.
2. Consider constructing an accessory building for storage of bulk hazardous materials response supplies.
3. Consider upfit of the bay mop basin to permit use as a decontamination shower.
4. Remodel and equip an area of the station for on-duty firefighter fitness training.
5. Evaluate and correct heating/cooling performance in the upstairs administrative office.
6. Consider setting aside an area within the apparatus bay to protect stored firefighter personal protective clothing from potential health risks resulting from contamination by vehicle exhaust byproducts. Alternately (given observed space constraints), purchase gear lockers that would eliminate or reduce ultraviolet light damage.
7. Calculate the expected lifespan of the existing generator and plan for replacement.
8. Relocate or stabilize gas grill, and repair damaged gutter downspout.

Fire Station 51

Fire station 51 (formerly PFD Station 72), located at 1700 Iron Springs Road, was completed and opened in 1979. Comprising roughly 9,335 square feet, the station is situated on a 0.64-acre parcel. The stations response district comprises an area of roughly twelve square miles, with the Central Yavapai Fire District providing staffing and apparatus under the auspices of a cooperative service agreement with PFD. The station serves the westernmost areas of the city of Prescott, Prescott National Forest, and surrounding areas.

Figure 30: Station 51

Station 51 is a two-story, masonry structure with a complex pitched-roof profile. It has two apparatus bays, bay support, and crew areas. Station facilities and current PFD administrative headquarters are located on the ground floor; the basement level provides administrative offices for the PFD fire prevention program. Until recently, a training room located in the basement had been employed as Prescott's emergency operations center. While administrative spaces supporting PFD's leadership team are tight, the facility provides reasonably satisfactory space adjacencies and spacial massing to facilitate emergency response operations.

The facility was observed to be clean and well organized. There were no operations staff on the premises during the inspection, but PFD administrative staff communicated no major concerns with the facility, except for poor heat in the basement work space and limited storage space to support administrative staff.

As in all of PFD's facilities, the Station 51 bay area was not outfitted with exhaust recovery equipment, relying instead on an underperforming, central-roof-mount exhaust fan. Accumulation of diesel soot was observed on the bay ceiling. Firefighter protective clothing is stored in open storage units, subjecting the garments to contamination by diesel exhaust.

There is a good selection of fitness equipment to facilitate physical training, but this equipment is located in the apparatus bays, subjecting staff to diesel fumes and byproducts, as well as to excessive heat during the summer months.

Apparatus bay floors were observed to be in satisfactory condition, with some noticeable cracks outside the expansion joints that traverse large areas of the bay width. Reports indicate that the station has experienced issues with the bay area drainage system, which is comprised of small round intake grates that can handle only modest water volumes. Recent inspection by a fiber-optic camera resulted in the equipment becoming lodged in the drain, where it remains. Bollards are present at bay door openings and other locations, but not at the gas meter adjacent to the apparatus travel lane.

Mechanical equipment and plumbing fixtures were reportedly in good condition. The downstairs administrative space was reportedly not heating effectively at the time of assessment, however; the staff was using small space heaters.

Finishes are generally in satisfactory condition, although carpeted areas, particularly within the PFD administrative areas, show accumulated wear and are fraying along seams. Millwork appears to be in good condition, as were showers and lavatory fixtures. Serviceable but well-worn furnishings were observed throughout the building.

The station's departure ramp was observed to be in good condition, with an effective slope away from the building to facilitate storm-water runoff. All parking areas, internal travel lanes, and sidewalks are likewise in good condition.

The station is equipped with an older emergency generator that shows signs of age, although staff reports that the unit functions properly. The exterior pedestrian door next to the generator has deteriorated so much that it has corroded shut and is in need of replacement.

Compressed-gas cylinders and flammable-liquids containers are generally stored in a manner consistent with regulations and best practices. A gas grill was observed to be stored between two bay entrances. Its location relative to the path of vehicles backing into the station creates a hazard.

Effective equipment decontamination and cleaning area is in the apparatus room, with cleaning chemicals stored and distributed via an automated proportioning system that prevents waste and promotes fiscal savings. The facility has no decontamination shower or eye wash station. Station

51's inventory of laundry equipment includes a large, commercial washer/extractor that is used periodically to clean firefighter protective garments.

Recommendations for Fire Station 51

1. Install industry-standard exhaust recovery equipment.
2. Evaluate bay floor and remedy as necessary.
3. Consider replacing carpeting and furnishings in PFD administrative spaces. Alternately, up-fit and occupy the recently acquired commercial building at 215 North McCormick for better administrative space.
4. Consider setting aside and conditioning an area of the station to permit on-duty firefighter fitness training.
5. Correct heating and cooling problems in the downstairs administrative spaces.
6. Consider setting aside an area within the apparatus bay to protect stored firefighter personal protective clothing from potential health risks resulting from contamination by vehicle exhaust byproducts. Alternately (given observed space constraints), purchase gear lockers that would eliminate or reduce the risk of ultraviolet light damage to the stored garments.
7. Evaluate existing generator lifespan and plan for future replacement, and replace personnel door accessing this space.
8. Relocate the gas grill.

Station 7: Wildland Division

Station 7, located at 501 6th Street, and was occupied by the Granite Mountain Interagency Hotshot Crew (GMIHC) in 2010. It was previously a commercial property operated by a local gas company. Accessory buildings provide storage of goods and equipment. The station houses the fuels mitigation crew, as well as equipment and apparatus necessary for fuels reduction. The facility garages apparatus formerly utilized to support GMIHC.

Figure 31: Station 7

Station 7 is a pre-engineered metal structure with a sloped-roof profile. It has a mixed inventory of apparatus bay, bay support, and crew areas. The nature of the former GMIHC's specialized mission, as well as the remaining fuels mitigation result in several areas within the building that are dedicated to storage and repair of wildland firefighting gear and mitigation tools. The equipment is still utilized by the fuels mitigation crew, and for wildland firefighting efforts conducted by suppression firefighters that maintain proper training and certification and are deployed for initial attack of fires within Prescott, and as resources to fires statewide and nationally.

The fitness room is large, well-equipped, and ideally located within the crew support space of the facility.

The personnel on the premises said that the classroom and fitness areas are particularly functional, but noted several areas in need of attention, including the overall worn condition of the facility, the potential presence of asbestos given the building’s age, multiple remodeling efforts that have left partition walls with gaps, and the absence of customary plumbing fixtures (including a shower and a sink in the kitchenette). Most of the furnishings within the crew support area were donated or have been repurposed for use at this facility.

The facility’s concrete bay floor is in reasonably good condition, but the asphalt departure aprons, travel lanes, and site parking are in poor condition with numerous potholes and cracks. This trip-and-fall hazard has resulted in injuries. There are no bollards at bay door openings or where utility meters and mechanical equipment abuts paved travel lanes. This increases the risk of a significant emergency should the operation of vehicles result in a collision with the building or gas lines.

The millwork, floor finishes, and walls are in fair condition, but a number of carpeted areas within the facility show fraying and separation—some areas are so bad that they are a tripping hazard.

The mechanical system's performance is poor, and there have been reports of electrical distribution concerns, including recurrently tripping breakers and outlets that no longer supply power. In addition, the roofing system is beyond its effective lifespan, as suggested by the signs of water leaks throughout the crew support areas and within the vehicle bays.

Pedestrian doors leading into the apparatus bays could benefit from weather-stripping or replacement to decrease heat loss during the winter.

Compressed-gas cylinders and flammable-liquids containers were stored in a manner consistent with regulations and best practices, with flammable-liquids containers located in an appropriately DOT-labeled accessory building.

Recommendations for Wildland Division Station 7

1. Consider renovating or remodeling this facility. The associated scope of work would entail new roofing, improving the building envelope, replacing mechanical equipment, improving electrical distribution and safety, adding a personnel shower and kitchen sink, installing new floor finishes, painting, and resurfacing asphalt paving.

2. Install bollards at bay door openings and where utility lines/meters and building mechanical equipment abut vehicle travel lanes or parking.

In response to known facility issues, the FY 2015 budget includes funding for exhaust systems for all PFD fire facilities; and $130,000 for facility refurbishment. The FY 2016 budget includes funds for re-surfacing the parking lot at station 7.

Training Facilities

PFD operates a small campus of training facilities on a portion of a city-owned 172-acre tract of land on Sundog Ranch Road. The complex includes a small classroom building, a decommissioned burn building, several accessory buildings, and training props. PFD uses the facilities to conduct recruit training and deliver continuing education programs. The training facilities are also used for the fire science courses offered by Yavapai College which maintains a breathing apparatus compressor onsite.

Figure 32: PFD Training Site

The classroom facility is generally in good condition, and staff reports no issues related to the mechanical equipment, plumbing, or power supply. However, loose and missing floor tiles pose a trip-and-fall hazard. The berm of a law enforcement firing range is immediately adjacent to the classroom facility, but the property is fenced and has appropriate signage. There have not been any incidents that would suggest that the proximity of the range constitutes a safety concern.

The three-story concrete block tower facility formerly served as a live structural-firefighting burn building, but the facility was decommissioned when it fell into disrepair and became structurally unsafe. Those interviewed could not recall when a structural engineering assessment was last performed on the building, but brief examination showed areas of concrete spalls and other issues, suggesting that the department was wise to retire the building from live training. It is presently used only for training and skills practice that do not involve a fire load. PFD was awaiting receipt of a newly fabricated portable burn trailer when the site visit was conducted, which has since been placed on a freshly poured concrete pad. The arrival of this new burn-training prop, coupled with the fact that a larger regional burn facility is located within thirty miles of the city, suggests that repairing the decommissioned tower would represent a needless expense.

Additional facilities at the Sundog Ranch Road site include storage buildings, a "propane tree" training prop, a "roof mock-up" training prop, and a pit that enables PFD to conduct pump testing on apparatus in accordance with NFPA recommendations. All of these assets were reported to be in good condition.

Figure 33: Training Site Training Props

<u>Recommendation for the PFD Training Facilities:</u>

1. Repair/replace missing floor tile in the classroom building.

Exhaust Recovery/Extraction

One area of particular concern at all of Prescott's fire stations is the lack of exhaust recovery/extraction equipment, which needlessly subjects fire department personnel to diesel exhaust. Numerous studies indicate that breathing vehicle exhaust fumes inside the fire station can cause or contribute to serious illnesses—including emphysema, cancer, heart attack, and stroke—or even death. Firefighters work, eat, and sleep in these facilities, contributing to the danger. The following are but a few of the documented issues related to diesel exhaust in fire stations:

> *More than 40 substances emitted in diesel exhaust are listed as hazardous air pollutants. These pollutants are "likely to be carcinogenic to humans and are shown to be a chronic respiratory hazard to humans"* (Environmental Protection Agency).
>
> *"Based on human and animal studies, it is recommended that diesel exhaust be regarded as an occupational carcinogen"* (National Institute for Occupational Safety and Health).
>
> *"Workers exposed to diesel exhaust face the risk of adverse health effects ranging from headaches and nausea to cancer and respiratory disease"* (Occupational Safety and Health Administration).
>
> *"It has been documented that fire department personnel exposed to vehicle exhaust emissions have had adverse health effects, including death, even in areas where only short-term exposure had taken place"* (National Fire Protection Agency Standard 1500, Chapter 9).

Vehicle-exhaust-removal systems are essential equipment in maintaining a fire station that is free of the particulates and gases present in diesel engine emissions. There are three basic types of systems that meet emission-reduction goals set forth in the applicable laws, regulations and standards: (1) direct-source extraction using hoses; (2) direct-source extraction using vehicle-mounted filtration; and (3) indirect-capture filtration systems within bay spaces.

Direct-source, "hose-based" extraction systems: These systems use flexible hose that attaches directly to the apparatus exhaust pipe to capture engine emissions before they leave the vehicle's exhaust system. Manufacturers use either a pneumatic boot or a magnetic coupling attachment to connect the hose to the exhaust pipe. Exhaust fans and ductwork route the emissions out of the building.

The emission exhaust hose follows the exiting vehicle along a track until the vehicle reaches a predetermined threshold, at which point the exhaust hose disengages from the vehicle's exhaust pipe and retracts back to its original position. To accommodate the varying needs and layouts of fire stations, these direct-source capture systems can include specialized equipment, such as track systems for single-lane, back-in bays, rail systems for drive-through bays or bays where vehicles are parked in tandem, and vertical stack systems for vehicles with overhead exhaust stacks.

The main advantage of the direct-source, hose-based system is that diesel engine emissions are captured before they enter the station. The technology also is time-tested. The hoses and equipment serve as a visual reminder about the hazards of diesel engine emissions. The disadvantages of this type of system include the relatively high replacement and maintenance costs for hoses and retracting gear. These types of systems also require station personnel to know how to use the system in compliance with operating procedures. Finally, this system type does not permit relocation of vehicles apparatus within the station bays.

Direct-source, "vehicle-mounted" extraction systems: The second type of direct-capture system consists of a specialized filter and diverter that are mechanically installed alongside the vehicle's exhaust system. The vehicle mounted system uses an electronic control device that automatically diverts the vehicle's exhaust flow from its normal path and through the filter after the vehicle starts. The cycle time can be adjusted to allow sufficient time for the vehicle to safely leave the station. Once the set time has elapsed, the diverter reroutes the exhaust from the filter and back to its normal route through the muffler and exhaust pipe. The system also engages when the vehicle transmission is placed in reverse for backing. After the vehicle has been backed up and shifted out of reverse gear, the system will continue in the filter mode for the preset time to ensure that no unfiltered emissions enter the bays.

A direct source, vehicle-mounted system has several advantages: engine emissions are captured before they enter facility bays, the system requires no human intervention, the system requires no equipment hanging from ceiling to bay floor, and vehicles can be relocated anywhere within the station bays and system still functions. The main disadvantage is the relatively high initial cost of installation on apparatus and the ongoing cost of filter replacement.

Indirect-source, building space filtration systems: These systems exchange the air in the apparatus bays by pulling particulates and gases through a series of filters. Filtration system equipment, similar in size to forced air heating units, is typically mounted to the ceiling. Diesel emissions are forced through a series of disposable filters that trap particulates and chemically absorb other exhaust components. Some manufacturers offer filtration units that have a fourth-stage photo-catalytic oxidizer reported to eliminate airborne viruses and bacteria.

Door switches or electric eyes that detect vehicle movement serve as system activators. The unit also can be triggered by a manually activated mushroom switch (for vehicle maintenance or inspection conducted inside) and relay switching when ambient carbon monoxide levels are elevated above a preset threshold. Once activated, the typical filtration system runs for a user-determined period to exchange the air several times. As the air exchange rate of any single unit is limited, the total number of units required for a particular bay space is determined by the cubic size of the area to be filtered and the number of times the air in that space needs to be exchanged to achieve satisfactory air filtration.

The advantages of indirect building-space filtration systems include ease of installation (only an electrical power source and ceiling mounting space are needed). No vehicle modifications are needed, the system automatically engages without need for human intervention, other respiratory hazards besides diesel engine emissions can be filtered, no tripping hazards are created as the system requires no equipment suspended to bay floor, and apparatus can be relocated within the bays. These systems are typically 30 percent less costly to install than corresponding direct-capture hose-based systems.

The disadvantages of these systems include the cost and inconvenience of having to replace filters and that engine emissions, especially particulates, enter the bay space and can land on hard surfaces, making their removal by the filtration equipment difficult.

Outfitting existing stations with exhaust removal equipment—or incorporating such systems into new facility design—can be a significant expense for smaller fire departments/jurisdictions. Fortunately, grant funding to acquire this building equipment does meet eligibility guidelines for awards made through the United States Fire Administration's Assistance to Firefighters Grant (AFG) Program.

Fleet

The provision of an operationally ready and strategically located fleet of mission-essential fire-rescue vehicles is fundamental to the delivery of reliable and efficient public safety within a community. Reliable vehicles are needed to deliver responders and the equipment/materials they need to the emergency scenes in an efficient and reliable manner. The procurement, maintenance, and eventual replacement of aging response vehicles are among the largest expenses involved in sustaining a community's fire-rescue department.

The PFD has a total of fifty-three vehicles: seventeen fire response vehicles; sixteen wildland response vehicles; eight technical rescue vehicles; eleven staff vehicles of varying types; and one ARFF response unit. The fleet is generally up-to-date and in good condition, with two Type I engine apparatus recently placed into service to address two Type I engine apparatus that were approaching the term of the NFPA recommended replacement schedule.

The annex of NFPA 1901 includes recommendations and worksheets to help fire departments make decisions regarding vehicle purchases. With respect to recommended vehicle service life, the following excerpt is noteworthy:

> "It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, Standard for Fire Apparatus Refurbishing, to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus. … Apparatus that were not manufactured to the applicable apparatus standards or that are over 25 years old should be replaced."[41]

The impetus for the recommended service life thresholds is that there have been—and will continue to be—significant advances that improve occupant safety, such as fully enclosed cabs, enhanced rollover protection and air bags, three-point restraints, antilock brakes, higher visibility, cab noise abatement and hearing protection, and a host of other improvements as reflected in each revision of NFPA 1901. These improvements provide safer response vehicles for providers of emergency services within the community, as well for those who share the road with these responders.

As discussed earlier, the city of Prescott has a pay-as-you-go capital vehicle replacement program. Previously, the city had established a sinking fund within the general fund to replace apparatus. This funded the apparatus replacement on average at 70 percent. According to PFD staff, the fire department, in conjunction with city fleet services, has established an apparatus replacement plan, but it is utilized inter-departmental and not as a formal budget planning document. A vehicle replacement plan ultimately is only as successful as the funding commitments and availability to implement it.

The city's fleet services group performs repairs and maintenance on PFD vehicles. PFD staff reports that there is a good relationship between the agencies and that fleet services provides timely repair service, a sound preventive maintenance program, and the completion of annual NFPA apparatus certification testing. The fleet services group is involved at the micro level with new apparatus specifications, procurement, and the placing in service of a new apparatus.

Recommendation:

> Develop and implement a capital replacement program for vehicles and qualifying capital vehicle equipment that includes projected future cost and target replacement years for all capital equipment and fleet apparatus.

[41] NFPA 1901.

IV. Analysis of Fire and EMS Operations

Organization and Resources

The Prescott Fire Department protects the response area with a total of five fixed facility fire stations (six, counting Station 51 operated by Central Yavapai Fire District). Each fire station is staffed with an advanced life support (ALS) fire engine and has at least one cross-staffed apparatus, such as a ladder truck, hazardous materials truck, or wildland vehicle. Stations 71 and 72 have a cross-staffed ladder/aerial apparatus. The crews at these stations staff both the fire engines and the ladder apparatus and respond on the apparatus that is most appropriate for the service requested. In total, the response fleet consists of five fire engines, two ladder trucks (Quints), one crash fire rescue truck (airport), one air and light truck, one hazardous materials truck, three Type III pumpers, and three Type IV patrol vehicles. There also is a boat and a technical rescue team (TRT) support unit.

The deployment of physical resources is accomplished with a total of sixty-five authorized full-time positions. There are sixty uniform personnel, five civilians, and one part-time position. Uniform personnel are divided among the three shifts, with the remainder being assigned to headquarters for various administrative positions. Shift personnel work a fifty-six-hour workweek. This schedule requires three platoons, or shifts, to cover twenty-four-hour continuous coverage seven days a week.

The minimum staffing level for each unit is three, with the exception of Station 73 because the airport requires a fourth person to remain with the ARFF apparatus during the day when the airport receives commercial traffic. In the evenings, this fourth person is utilized for the best advantage of the department, thus reducing the overtime liability. This minimum staffing equates to a minimum of seventeen positions to staff all of the equipment during the day and sixteen at night. In addition, the department allows two personnel off each day on scheduled leave or paid time off.

Staffing and Overtime Analysis

An analysis was completed regarding the department staffing. The current deployment strategy accounts for nineteen or twenty personnel on duty to staff the allocated resources. This analysis included a relief staffing multiplier of 3.23 derived from the average actual hours worked by employees and the total available hours that need to be staffed.[42] In other words, it requires 3.23 employees to cover one position twenty-four hours a day, seven days a week. This is a continuous staffing approach and should account for the average leave history (including vacation, sick, paid-time-off, and miscellaneous) while limiting overtime dependency. Therefore, the total number of personnel that should be assigned to shift work is fifty-five, or two fewer than is currently allocated. It is a policy decision whether to provide continuous staffing as suggested here, or to carry a higher overtime liability in lieu of hiring full time employees (See Table 10).

[42] David Ammons, *Tools for Decision Making,* 2nd ed.. (Washington, DC: CQ Press, 2009).

Table 10: PFD Current and Recommended Staffing Matrix

Unit Type	Number of Units	Staffing Per Unit	Minimum Number of Personnel per Shift	Total Required Personnel for Department
Engine	5	3	15	48.45
Battalion Chief	1	1	1	3.23
ARFF Truck	1	1	1	3.23
Current Deployment			19–20	57
Staffing Multiplier	7		17	55
Current Staffing Capacity			1-2	**Plus 2**

As shown in Table 10, using the staffing relief multiplier could allow for the release of two firefighters for reallocation, such as staffing a new fire station, or provide an opportunity to reduce these positions through attrition and use the money saved from their salaries on areas that provide a higher return on investment, such as additional fire prevention staff. However, depending on the attrition rate and the opening date of a new fire station, ICMA would recommend retaining the employees to avoid the costs of recruitment, training, and personal protective equipment as well as to take advantage of the experience of a seasoned firefighting force.

Many organizations are beginning to use civilian staff rather than uniformed staff for administrative and other key positions. Fire marshal personnel may be appropriate for civilian status. The fire prevention mission is of utmost importance, as it is the only area of service delivery that dedicates 100 percent of its effort to reducing the incidence of fire. The city may have an opportunity to hire civilian inspectors at lower cost than uniform personnel. Even if civilian personnel are used for fire inspection, it is suggested that the fire marshal position (division head) continue as a uniformed officer with firefighting experience, so that decisions may be made in concert with the modern fire environment and the department's firefighting strategies and tactics. In no manner does this suggestion diminish the importance of the fire prevention efforts; rather, it represents an opportunity to better align employee groups by classification.

Looking to the future, there is no strong indication that a stand-alone wildland division is needed within the PFD. It is therefore recommended that the wildland division be eliminated as part of an overall reorganization effort, and that the fuels management supervisor and part-time temporary fuels management personnel be reassigned to work under the direction of the fire marshal. The full-time fuels manager could also assist in public education and other non-fire community risk-reduction activities. All aspects of the fuels mitigation program are directly aligned with the mission of the prevention division, and the span of control would be appropriate for the supervisory capacity.

An examination of PFD's overtime expenditures was conducted using the city of Prescott Suppression Overtime Report for FY 2013.[43] For the sample review period in FY 13, overtime budget expenditures amounted to $793,575. A total overtime budget of approximately 10 percent of budget would be considered relatively high. However, more than half of the overtime expenses ($476,850) are associated with wildland response and may be recovered through federal grants. Another $187,993 is directly attributable to the firefighters' schedule, resulting from the requirements of the Fair Labor Standards Act (FLSA). Considering that a different management philosophy regarding wildland firefighting may serve to reduce the wildland overtime liability and/or that the overtime is relatively cost neutral in hourly costs, the area in which the city is most likely to be able to reduce overtime liability is with the calculation of "sweat" hours under the FLSA. For example, the city of Prescott could elect to utilize the Fair Labor Standards Act (FLSA) 207 (k) exemption to limit overtime expenditure at the premium or half-time rate for sleeping hours.

> "The FLSA permits employers to exclude up to 8 hours from work time when shifts are exactly 24 consecutive hours (private sector) or more than 24 hours (public sector), as "sleep time." To permit sleep time exclusion requires that there be an "agreement" with the employees. An employee who takes a job which has sleep time exclusion in place will be deemed to have "agreed" to it. There must also be adequate sleeping facilities, and the employees must normally have the opportunity to obtain 5 hours of sleep. The 5 hours need not be consecutive, and if an employee does not have the opportunity to get at least 5 hours of sleep no sleep time exclusion is permitted. Any time during the sleep period when an employee is actually performing work must be counted as work time."[44]

This application of the 7(k) exemption for sleep time is not widely utilized in the fire service. The PFD would need to require shift personnel to work for 24.25 hours per shift, thus exceeding the 24-hour threshold for public employees. The department also would have to enact a quality process to track the hours, captured by both the supervisor and the employee each shift to calculate whether the sleep time met the threshold for exemption. The benefit to this approach is that the city would limit the liability for the premium overtime.

Recommendations:

- Conduct further study of potential cost savings and overall value to civilianization of the fire prevention staff.
- It is strongly recommended that the wildland division be eliminated and that the fuels mitigation personnel be reassigned to the fire marshal's division (within fire prevention).
- It is strongly recommended that Prescott utilize a relief staffing multiplier similar to the one presented in this report.
- It is strongly recommended that the current minimum staffing policy, at 17/16, be continued.
- It is recommended that a cost-benefit analysis be completed regarding the elimination of sleeping hours in the calculation of hours worked under the FLSA.

[43] City of Prescott Fire Suppression Overtime Report, FY 13. Prepared 6/27/14.
[44] 29 USC SS 207(k). *Special 7(k) Work Periods,* Fair Labor Standards Act.

V. Essential Resources

Fire Prevention

Fire prevention for the city of Prescott is provided through the PFD's fire prevention division. This division is managed and lead by a division chief who serves as the fire marshal. Chapter 6-1-1 of the *Prescott City Code* adopts the 2006 International Fire Code (IFC). Chapter 6-1-2 adopts certain amendments to the IFC specific to the city of Prescott. Chapter 6-1-3 establishes the specific enforcement provisions of the fire prevention code. The city and the PFD are preparing to adopt the 2012 IFC.

The fire prevention division has a comprehensive set of division standard operating guidelines (SOGs). These SOGs range in implementation date from 2001–2012 and include division job descriptions, an administrative section, a plans review section, inspection processes, and a fire cause investigations and juvenile fire setters section.

There are currently over four thousand "inspectable" properties in Prescott. The PFD has one full-time fire inspector to handle all inspections. When available, light-duty personnel assist with inspections, but they are not always available for this responsibility. The fire inspector also handles special events inspections and plans review, which includes fire department review of civil, building, and fire protection plans. According to staff, more than four hundred plans were reviewed in the past year.

Although the division's goal is to inspect each property on a semiannual basis, this has proven unfeasible. In reality, some properties are inspected just every six to eight years. Currently, some properties participate in a Business Self-Inspection Program in which the business completes and sends back to the fire prevention office a self-inspection form. Fire prevention staff then reviews the inspection form and address any irregularities. This is considered a best practice.

In addition, currently some properties are assigned to fire suppression engine companies. Managed through fire prevention SOGs 503 and 504, this approach serves two critical purposes. First, the inspections create an opportunity for fire suppression personnel to visit properties in their response district, which enhances their overall situational awareness and knowledge of the buildings before they have to respond to an emergency. Second, the program supports the fire prevention division's overall inspection program output goals and increases overall fire prevention enforcement and public education.

Recommendation:

- As funding allows, the PFD should consider adding a dedicated plans reviewer or an additional fire inspector position to meet current and future inspection and plans review demand.

Training

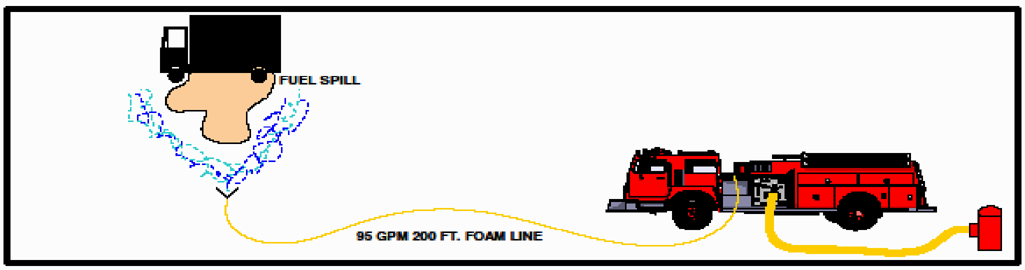
Training for the PFD is under the management and supervision of a division chief. To ensure consistent and effective organizational training, the PFD has developed and implemented a comprehensive training manual that outlines basic and advanced foundational and technical skills training, as well as minimum company training standards. Most important, the manual outlines specific skills and competencies to be practiced and completed, a best practice. While four sections of the manual are still under development, it serves as the basis for PFD training. This manual also provides appropriate training codes for documenting training and minimum company standards proficiency evolutions, as illustrated in Figure 34.

Figure 34: Minimum Company Standards Proficiency Evolution

MINIMUM COMPANY STANDARDS

SECTION: 311.04.15 **TYPE: ENGINE** **ABS: 7134**

COMPANIES: ONE **REVISED: 07 OF 04** **TIME: 02:30**



An Engine company makes a light water attack on a gasoline spill. The crew has advanced a 200 foot hand line flowing foam, tank water is utilized. *Crews are equipped for exterior attack.*

OPERATIONS:

The Engine company is spotted appropriately to make the light water attack. Time starts when the Engine comes to a complete stop. The Captain orders a light water attack. The crew, wearing PPE for an exterior attack, advances a line flowing foam at 95 GPM.

TIME STOPS WHEN:

A foam blanket is being applied to the spill.
The Engine is on tank water.
The crew is in proper PPE. (Full turn-outs, S.C.B.A.).
The crews are properly equipped. (Forcible entry tools, hand lantern and radio).
The relief valve is properly set.
Accountability procedures are in place.
All Safety precautions have been adhered to.

The PFD has also developed and implemented a recruit training guide for new department members. This guide encompasses the basic training, competencies, and demonstrated skill delivery for personnel at the recruit level. Minimum requirements for appointment include Arizona FF I & II certification or equivalent, as determined by the division chief of training and Arizona emergency medical technician (EMT) or eligible for Arizona state certification. The purpose of the recruit training guide is to ensure that certain tasks and skills can be successfully performed, as evaluated by an officer of the department. This guide also depicts the career path (minimum course work) to reach other levels in the organization, including technician and officer. Career path training is a best practice, as it establishes prerequisites, formal training and education, and the all-important time-in-service eligibility requirements to advance in the organization.

The PFD utilizes Target Solutions to assist with organizational training. Target Solutions provides access to video-based training that encompasses the technical side of the fire industry, as well as courses on human resources, occupational safety, emergency medical services, and other topics.

Emergency Management

Yavapai County has an intergovernmental agreement (IGA) with the city of Prescott and with other incorporated entities to create the Yavapai County Joint Office of Emergency Management (YCEM).[45] Taken collectively, these agreements create a unified emergency management structure in which YCEM provides oversight and has overarching accountability for the emergency management function in the county. As the lead agency, YCEM integrates with the state of Arizona's office of emergency management and implements an all-hazards approach through the various emergency support functions. The purpose of the unified management organization is to develop strategic plans (such as the YCEM's Emergency Operations Plan) for deterrence, prevention, preparedness and response to emergency or disaster events within the city and/or county, thereby strengthening the functional capabilities across all levels of government through information sharing, planning, training, and equipping at the appropriate levels.

As a condition of the IGA, the city must appoint an emergency management coordinator. The city has designated a division chief as the PFD representative to YCEM.

YCEM provides initial and recurrent National Incident Management System (NIMS) training in accordance with Homeland Security Presidential Directive (HSPD)-5. According to YCEM senior staff, the city does not routinely participate in NIMS training, but the PFD division chief who is responsible for the city's emergency management function has met the intent of HSPD-5. YCEM staff further communicated that city officials have limited involvement with overall emergency management preparedness. YCEM holds annual emergency management drills. These are fully functional drills in which all emergency operations centers (EOCs) are opened within the unified emergency management structure. The last drill involved a flooding event, but the last three EOC activations were driven by wildland fires.

The PFD emergency management function measures activities through formal output performance measurements, which can be found in the city's budget document. Additionally, the PFD has updated in FY 2013 the city's Hazardous Mitigation Plan, Airport Emergency Plan, and its disaster procedures.

[45] Intergovernmental Agreement for the Establishment of Unified Emergency Management, executed 8/5/13.

Recommendation:

- Due to the aggregate (manmade and environmental) risk potential, the emergency management function should be fully engaged from the top to the bottom of the organization to include training, assignment of emergency support functions to city staff in the event of an emergency operations center activation, and the development of a comprehensive city emergency management plan that will serve as an annex to the overall Yavapai County Joint Office of Emergency Management comprehensive emergency management plan.

Cooperative Service Delivery and Automatic-Aid

The ICMA team conducted analyses of the relationships among the automatic aid departments, the ambulance provider, and the Prescott Fire Department. Including the calls provided by design from Station 51 by the Central Yavapai Fire District, Prescott received 1,278 calls from the automatic aid fire districts in the surrounding area. This equates to 3.5 calls per day and approximately 15 percent of all of PFD's calls. In contrast, PFD contributed 229 calls in the 12-month rating period. These data are presented as Table 11.

Table 11: Analysis of Automatic Aid Given/Received

Call Type	Number of Calls	Calls per Day	Call Percentage
Automatic aid received	1,278	3.5	15.3
Automatic aid given	229	0.6	2.7
Canceled	921	2.5	11.0
Other Total	**2,428**	**6.7**	**29.1**

A workload analysis of the units from other agencies that provide automatic aid to the city of Prescott was conducted to evaluate the equity associated with workload and call volume. As expected, the Central Yavapai Fire District provided the greatest workload and aid due primarily to the fact that they operate and staff Station 51. The Central Yavapai Fire Department was deployed an average of 1.1 hours per day. All other agencies combined averaged approximately 0.5 hours per day. Overall, the greatest continuous provider of services in the city of Prescott is the ambulance provider Lifeline/AMR, with 9.3 hours per day and nearly 6,500 runs per year. Data are presented as Table 12.

Table 12: Workload Analysis of Units from Other Agencies

Agency	Number of Runs	Runs per Day	Annual Deployed Hours	Deployed Hours per Day
Lifeline Ambulance	6,498	17.8	3,385.6	9.3
Central Yavapai Fire District	359	1.0	390.6	1.1
Chino Valley Fire District	30	0.1	37.9	0.1
Groom Creek Fire District	9	0.0	23.7	0.1
Walker Volunteer Fire District	1	0.0	0.0	0.0
Williamson Valley Fire District	1	0.0	2.1	0.0
Unknown	254	0.7	123.4	0.3
Total	**7,152**	**19.6**	**3,963.4**	**10.9**

Overall, this analysis would suggest that the city of Prescott is providing a valuable service and response capability to the surrounding communities. In addition, it is clear that the city of Prescott is receiving more aid than it is providing. This is not unexpected, as the city is the population and risk center of the surrounding area.

The city should continue to foster collaborative and cooperative relationships as they are in the mutual interest of the greater community. It is important to note that automatic aid agreements are tentative agreements. When communities seek equality in the exchange of services, these types of agreements become challenging. ICMA would recommend that these relationships be approached from the perspective that each agency, on its own, lacks sufficient resources to handle non-routine events. The mutually beneficial aspect of the exchange of services is in capacity not workload. Of course, these relationships are not intended to forgo an individual agencies need to provide primary services.

Recommendation:

- It is strongly recommended that PFD continue to foster automatic aid relationships in place today. In addition, the PFD is encouraged to continue to explore innovative way to share borderless resources that benefit the community.

Emergency Communications

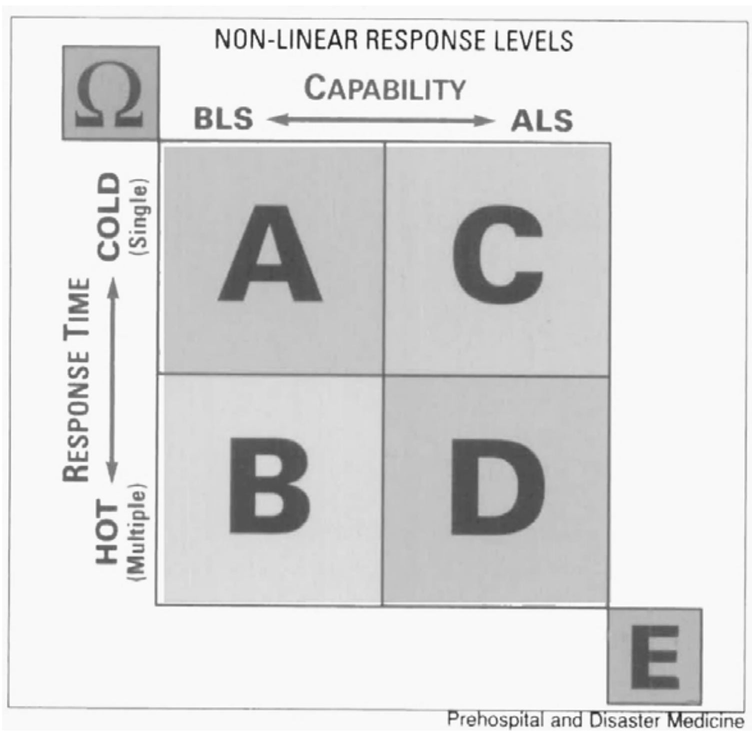
The Prescott Regional Communications Center (PRCC), the regional 911 PSAP received 270,615 inbound calls, which resulted in 83,254 calls dispatched. The fire service accounted for 18,068 total dispatches, with EMS calls accounting for 14,713 of the total dispatched calls. The PRCC dispatches for six fire and four law enforcement agencies. The staffing includes a minimum of five personnel: a supervisor or lead dispatcher and four dispatchers who rotate twelve-hour shifts.

The PRCC utilizes a dedicated call taker and rotates call taking. There are some performance measures in place, such as that calls must be picked up in two rings or fewer, and that dispatch is to occur in 60 seconds or less once the address is captured and verified. All dispatchers and call takers are certified as emergency medical dispatchers (EMDs). In addition, the call center utilizes the

ProQA Medical Priority Dispatch System (MPDS) to prioritize medical calls for service. However, the PFD currently responds to all requests for emergency medical services at the request of the PFD administration. This is not considered best practice.

The MPDS system categorizes calls based on clinical risk as either Alpha, Bravo, Charlie, Delta, Echo, or Omega. The MPDS system then recommends a response matrix to determine whether ALS or BLS services are required, whether single resources or multiple resources are needed, and whether the response should be emergency (hot) or nonemergency (cold). This response matrix, created by the National Academies of Emergency Dispatch (NAED), is provided as Figure 35.

Figure 35: National Academies of Emergency Dispatch (NAED) Response Matrix



From J.C. Clawson, et. al. "Predictive Ability of Emergency Medical Priority Dispatch System Protocols Should Be Assessed at the Atomic Level of the Determinant Code," *Prehospital and Disaster Medicine 25*(4) (2010): 318-319.

As shown in the matrix, an Alpha response is to receive a single BLS resource responding in nonemergency mode. In contrast, a Delta or Echo call should receive an emergency response from multiple units, at least one of which should have the capability to provide advanced life support.

The intent of the MPDS is to match appropriate resources to the appropriate clinical risk. An analysis of the number of EMS calls categorized according to the type of call would be needed to determine the effectiveness and efficiency of the MPDS. However, the PRCC's CAD system is incapable of providing the EMS determinants. Therefore, ICMA recommends that the PRCC fully adopt the CAD-based version of ProQA and utilize it as designed to send the appropriate resources to the appropriate risk.

As mentioned, the PFD sends fire suppression units to all EMS calls. The utilization of the MPDS system as it is designed would suggest discontinuing the practice of sending fire suppression units to Alpha, some Bravo, and Charlie calls. The NAED suggests that fire suppression units respond to Bravo calls at least when an emergency response is needed. A generally accepted model for systems that have BLS first responders and ALS ambulances is shown in Table 13. While the PFD operates an ALS service, this approach is appropriate because it does not provide patient transport.

Table 13: Generally Accepted MPDS Priority Levels

MPDS Priority Level	Response Units	Response Mode
Echo	Ambulance	Hot
	Fire Department	Hot
Delta	Ambulance	Hot
	Fire Department	Hot
Charlie	Ambulance	Cold
Bravo	Fire Department	Hot or cold
	Ambulance	Cold
Alpha	Ambulance	Cold
Omega	Ambulance	Cold
	*Referral to alternate care	

From Thomas H. Blackwell, et al., *Emergency Medical Services Evidenced-Based System Design: White Paper for EMSA* (Tulsa, Oklahoma: University of Oklahoma, 2011).

The CAD used by the PRCC is ADSi system. All systems and processes are within acceptable practice. The PRCC utilizes the statewide VHF system. All systems are backed up, and a continuity of operations plan has been established. However, there may be problems if a disaster were to hit the geographical area, rather than stemming from a more local problem, because the backup location is in the same geographical area.

Recommendations:

- It is strongly recommended that automatic aid relationships in place today continue to be fostered. In addition, Prescott is encouraged to explore innovative ways to share resources that benefit the community.

- It is recommended that the Prescott Regional Communications Center (PRCC) develop another alternative backup dispatch center for their continuity of operations plan that is geographically distant from the original center.

- It is recommended that the PRCC continue to develop the automatic vehicle locator (AVL) system to include road miles as opposed to "as the crow flies."

- It is strongly recommended that the PRCC work with the PFD to fully utilize MPDS to eliminate PFD response to low-acuity medical calls for which a quick response has little or no impact on the clinical outcome.

VI. Wildland Urban Interface and Operations

Defining the Wildland Fire Ground

Both internal and external risk assessments undertaken regarding wildland fires and urban/wildland interface over the past decade describe Prescott as a community at risk.[46] Prescott has been identified as one of nine communities in the southwestern United States at risk of a catastrophic wildland fire. The City of Prescott fire protection district is adjacent to nineteen linear miles of land owned and managed by the U.S. Forest Service with the greater Prescott area surrounded on three sides by the Prescott National Forest.

At an altitude of 5,400 feet, Prescott has a four-season climate with relatively mild winters. The area is an attractive retirement location, and its many amenities draw thousands of outdoor recreationists and other vacationers to the area, increasing its population during the summer season. Community growth patterns have resulted in an extensive wildland urban interface (WUI) area with ponderosa pine, juniper, and manzanita as the predominant vegetation.

The wildland fire issue for the city of Prescott and within the larger Prescott response basin is typically referred to as an "urban-wildland interface" (or intermix) problem. This means that structures that abut or that are blended in with unmodified, combustible vegetation are at direct risk from an urban wildland fire. Much of the Prescott area includes structures exposed to this type of vegetation, and therefore these structures can be considered part of the intermix area. Thus at the interface nexus, the fuel feeding a wildland fire changes from natural (wildland) to human-made (urban) fuel, which are the structures. Jack Cohen, USFS scientist who specializes in WUI fires and fuels, has conducted numerous post-wildland-fire research projects that show that homes and other structures become fuel for a wildland fire. Once a structure is becomes involved with the wildland fire, the fire can potentially rapidly move from structure to structure to quickly become a conflagration (a fire involving many structures at once).

According to data received from the PFD, over the past three years the greater Prescott area has averaged forty-nine wildland fires per year of various sizes. Prescott National Forest has provided mutual aid to the city of Prescott on average ten times per year. Prescott Fire Department has assisted Prescott National Forest an average of nine times per year and Arizona Department of Forestry five times per year.[47]

Wildland Risk Analysis

A universally accepted definition of risk management is the identification, assessment, and prioritization of risks (defined in ISO 31000 as the effect of uncertainty on objectives, whether positive or negative)[48] followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize

[46] Prescott Wildland Division Briefing Paper (1/17/13); Prescott Fire Wildland Division Strategy Plan 2012–2017; Hunt Research Corporation, Conceptual Community Vegetation Management Plan, (April 2001).

[47] Statistics provided by Prescott Fire Department Division Chief Darrell Willis.

[48] ISO 31000 is a family of standards relating to risk management codified by the International Organization for Standardization.

the realization of opportunities. In the context of wildland fires, the city of Prescott must identify, assess, and prioritize the risks and then follow up with a coordinated and fiscally efficient commitment of resources to minimize, monitor, and control the probability and/or impact of a wildland fire. Prevention, fuel management, education, and suppression of fires are all actions that must be taken to mitigate, eliminate or respond to the risk. Key to these actions is insuring a defendable WUI community through aggressive wildland fire prevention and education program, as well as an aggressive fuel mitigation program.

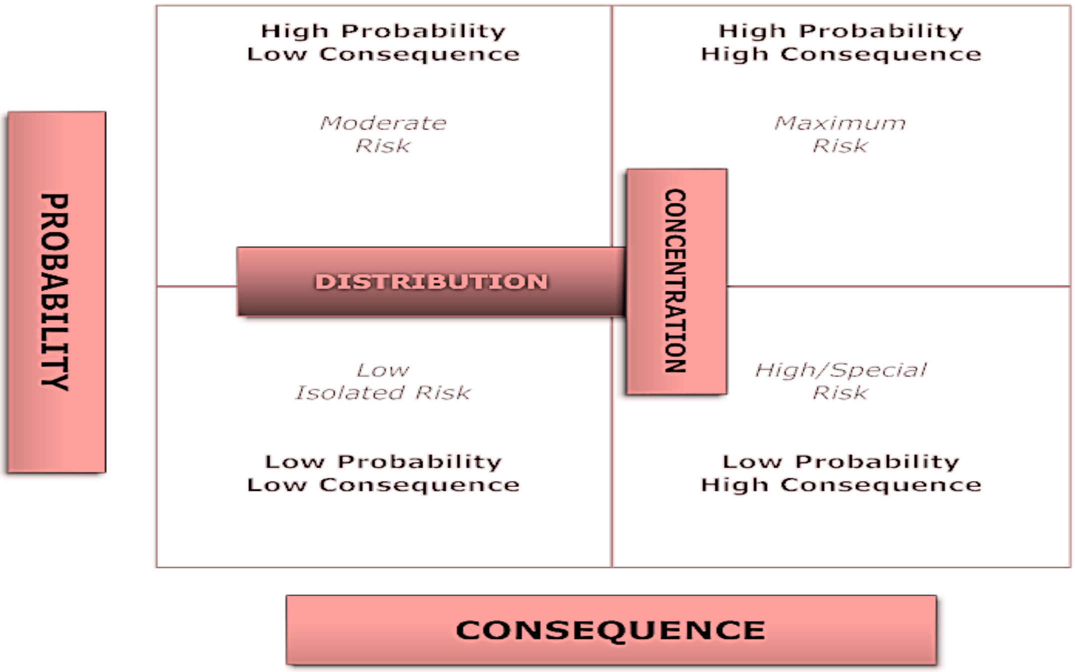
The National Fire Protection Association (NFPA) conducts a program that has a focus on establishing a wildland fire defendable community. Known as Firewise, this program "encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes to withstand and reduce the risk of wildfire. Firewise is a key component of *Fire Adapted Communities* – a collaborative approach that connects all those who play a role in wildfire education, planning and action with comprehensive resources to help reduce risk."[49] Prescott currently has fifteen active Firewise communities although more can be achieved through an aggressive prevention and education program. The strength of Firewise is community education in "the basics of defensible space and sound landscaping techniques" to reduce individual and a potential neighborhood wide WUI.

The term integrated risk management, developed first in the United Kingdom, refers to a planning methodology that recognizes that citizen safety, plus the protection of property and the environment from fire and related causes must include provisions for the reasonable safety of those to be protected and the emergency responders. This means assessing the risk faced, taking preventive action such as fuel mitigation in the wildland setting, and deploying the proper resources in the right place at the right time.[50] Understanding the probability of an event occurring and the associated consequence is important in the public safety planning process to include wildland fires.

Figure 36 is representative of the considerations of risk assessment, that is, the probability of an event occurring and the consequences related to the event occurring. This probability and consequence matrix divides the risk assessment into four quadrants. Each quadrant of the chart creates different requirements in the community for commitment of resources, as well as identifies risk consequence level. This model is linked to the two models illustrated in Figures 37 and 38 and ensuing discussion regarding potential risk of an unplanned wild fire in or around the Prescott incorporated area. The modeling in Figures 37 and 38 illustrate a wildland fire in extreme condition; in other words high risk high consequences.

[49] http://www.firewise.org/about.aspx
[50] Ibid, 12 -3.

Figure 36: Probability and Consequence Matrix



In February of 2014, two computer-based fire behavior models were completed with the assistance of fire behavior analyst Ron Beery to show the **potential** risks of an unplanned wildland fire in certain weather conditions. This modeling utilized the best available science for wildland fire behavior predictions available. Using both FSPro[51] and the FarSite[52] fire behavior/projection models, the **potential** risk from an unplanned wildland fire that cannot be controlled by fire suppression crews over a simulated four day burn period is illustrated in Figures 36 and 38. This modeling is designed to estimate potential fire spread in the WUI for decision-making purposes and does not intend to indicate that fire would spread as quickly or vastly as depicted, depending on the initial attack resources applied to extinguish or mitigate the spread of the fire. Initial attack efforts have been highly successful in the Prescott area in recent years.

[51] FSPro is a geospatial probabilistic model used as a strategic decision aid tool – looking at fire risk as it is determined by uncertainty in the weather. Greater uncertainty is present in weather as we go further into the future. A way of dealing with this uncertainty is to model a large sample of possible weather scenarios and see how that affects the variability in fire growth. FSPro is generally used for long-term decision making (more than 5 days). FSPro calculates two-dimensional fire growth and maps the probabilities of a fire reaching each point (cell) on the landscape.

[52] FARSITE is a fire behavior and growth simulator. It is used by Fire Behavior Analysts from the USDA FS, USDI NPS, USDI BLM, and USDI BIA. FARSITE is designed for use by trained, professional wildland fire planners and managers familiar with fuels, weather, topography, wildfire situations, and the associated concepts and terminology.

Figure 37: Far Site Daily Fire Spread Model

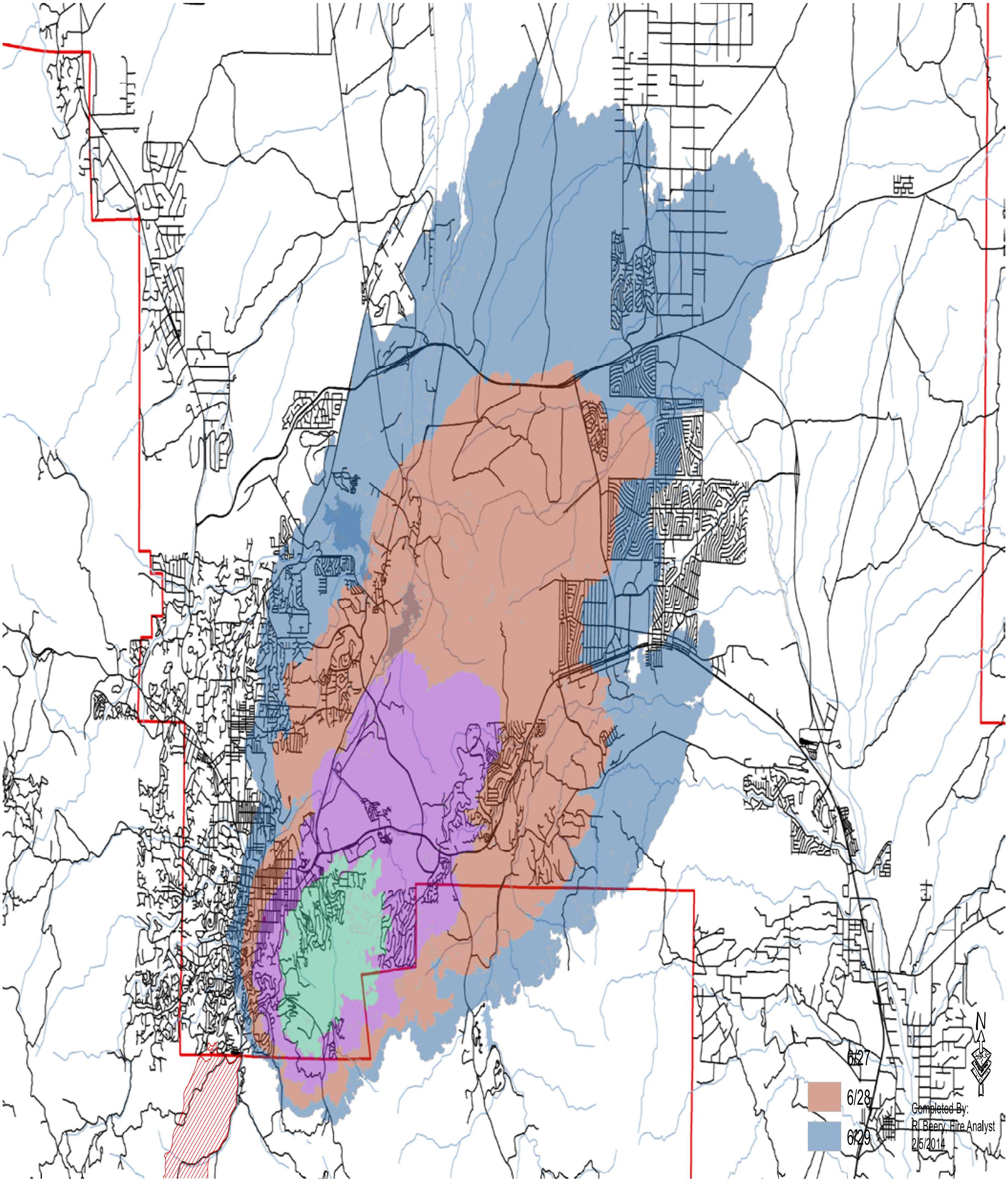
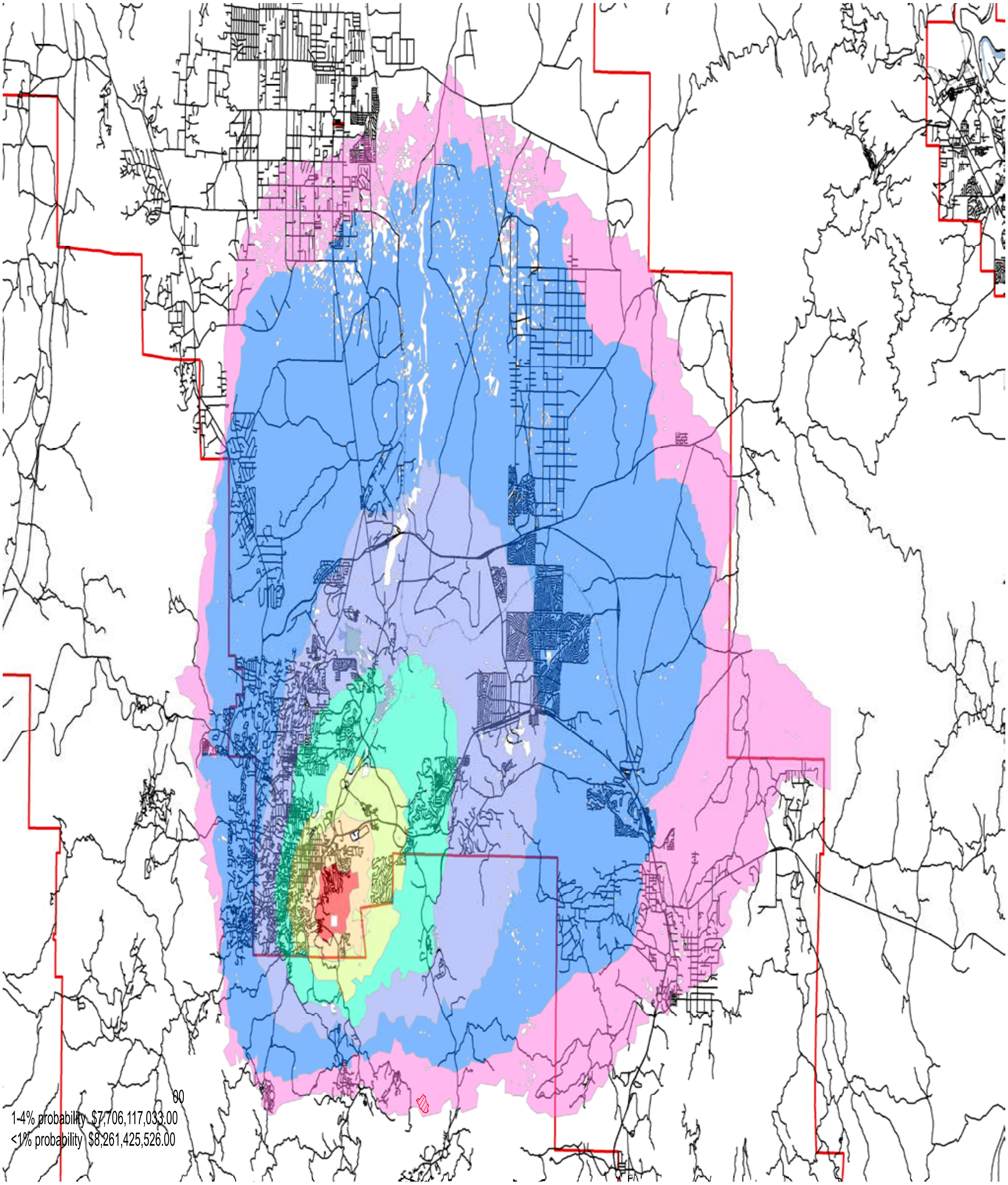


Figure 38: FSPro Fire Spread Probability Model



Observations/assumptions from the two models represent a "worst case scenario" and include the following:

FarSite

Assumptions: On June 26 (the height of a normal fire season) the unplanned wildfire ignition occurs along the southern perimeter of Prescott (the location where the most recent fire history records prove to be the highest occurrence of unplanned wildland fire ignitions from all causes);[53] the initial action and extended attack efforts fail; this is atypical to annual experience based on the initial attack response model in place in the Prescott Basin; the fire exceeds 15 acres. The following results could occur:

- Size of the wildland fire after four days could be 54,557 acres.
- The maximum ember shower or spotting distance in the chaparral fuel model (Manzanita) could be 2.1 miles from the main fire perimeter.

FSPro

Assumptions: On June 26th (the height of a normal fire season) the unplanned wildfire ignition occurs along the southern perimeter of Prescott (the location where the most recent fire history records prove to be the highest occurrence of unplanned wildland fire ignitions from all causes);[54] the initial action and extended attack efforts fail; this is atypical to annual experience based on the initial attack response model in place in the Prescott Basin; the fire exceeds 15 acres. The following results could occur:

- 80–100 percent probability of a fire reaching built upon/improved areas—there is a potential per the model for the fire to continue to spread to other built upon/improved areas each day.
- The maximum ember shower or spotting distance in the chaparral fuel model (Manzanita) could be 2.1 miles from the main fire perimeter.

Additional risks that must be considered in the Prescott area when evaluating the risk of wildland fire, the opportunities for mitigation, and the resources that are available to mitigate or minimize the consequences include: the transportation system results in state highways 69 and 89A as the only two major routes for motor vehicle access to and from Prescott. If one or both were closed for an extended period of time due to a wildland fire, the loss of commerce could be significant. Additionally, egress routes to escape potential fire areas would be impacted. The social and financial risks associated with the potential injury and loss of life to emergency responders and the general public in the event of wildland fire are significant factors that support the need for mitigation and planning efforts.

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[53] Records of wildland fire occurrence/history since 2000, provided by Prescott Fire Department on February 5, 2014.

[54] Records of wildland fire occurrence/history since 2000, provided by Prescott Fire Department on February 5, 2014.

Wildland Fire Preparedness

The industry standards for wildland fire preparedness are best described in the *Interagency Standards for Wildland Fire and Aviation Operations,* an annual guide offered by the National Interagency Fire Center (NIFC).[55] These standards are considered policy for the NIFC federal agencies and provide guidance for state and local governments with wildland fire responsibilities. Additionally, the National Fire Protection Association and the International Code Council provide nationally recognized ordinances and codes for defensible space, building codes, and sprinkler systems. The PFD and the city of Prescott have adopted the International Wildland Urban Interface Code on new residential construction in designated high hazard areas of the city of Prescott and are preparing to adopt the 2012 update, currently proposed to bolster the continuing maintenance requirements for newly built property.[56]

Wildland fire preparedness is the state of being ready to provide an appropriate response to wildland fires based on identified objectives. Preparedness is the result of activities that are planned and implemented prior to fire ignitions, such as *Firewise*. Preparedness requires identifying necessary firefighting capabilities and implementing coordinated wildland prevention programs to develop those capabilities. Preparedness requires a continuous process of developing and maintaining firefighting infrastructure; predicting fire activity; implementing prevention and community education programs and activities; identifying values to be protected; hiring, training, equipping, pre-positioning, and deploying firefighters and equipment; evaluating performance; correcting deficiencies; and improving operations. Preparedness activities should: focus on developing firefighting operations capabilities and performing successful firefighting operations; be consistent with actions identified in fire management plans and based on operational plans including preparedness plans, fire danger operating plans, preparedness level plans, step-up or staffing plans, and initial response plans.[57]

Assessment of Risks and Recommendations/Alternatives for Wildland Fire

After a thorough review of applicable documents provided by the city of Prescott, interviews with interagency stakeholders and city officials and leaders, ICMA has identified several recommendations for the wildland fire component. Collectively, these recommendations may mitigate the risk of wildland fire occurrence within the PFD response area. Additionally, the recommendations may reduce the risk of wildland fires moving beyond the PFD jurisdiction to neighboring jurisdictions or transferring the risk to others.

- Assuming that all tactical resources and leadership were available and located at designated duty stations, the total local resources that could be committed to a wildland fire with an interagency response would be three Type III engines, five Type I engines, three Type VI patrols, two FS Type III engines, an air tactical platform, and a battalion chief and other appropriate command and control staff. Based on this response and the assumption that tactical resources are both available and at designated duty stations, this level of response should control a three-acre wildland fire, even if structures were threatened. The city of

[55] National Interagency Fire Center, *Interagency Standards for Wildland Fire and Aviation Operations.* Available at http://www.nifc.gov/policies/pol_ref_redbook.html,

[56] Prescott Fire Department Wildland Division Strategic Plan 2012–2017.

[57] NIFC, *Interagency Standards,* Chapter 10.

Prescott, in conjunction with automatic aid partners, should consider alternatives during a fire season, if funding is available, that would add capacity (such as adding at least one additional hand crew, one Type III wildland engine and one Type II tactical water tender). These additional tactical resources will enhance operational response capability and potentially minimize the risk of a wildland fire reaching the 15-acre threshold identified in the FSPro and FarSite fire prediction models. This supplemental resource alternative does not necessitate the hiring of new employees, as contracting with other entities for services may be more efficient.

- Implement both the Conceptual Community Vegetation Management Plan (April 2001) and the PFD Wildland Division Strategic Plan for 2012–2017, with the exception of staffing an interagency hotshot crew. A wildland fuels mitigation crew with four people in the winter season and six in the summer season is an alternative that enhances the fuel mitigation effort. The solutions for both tactical response and wildland fuels mitigation are specifically identified with measurable and realistic outcomes.

- Maintain the wildland fire component, (e.g. training, certification, and initial attack response utilizing existing suppression fire fighters), within the PFD to provide both leadership and successful planning efforts for wildland operations.

- Continue with both FireWise and the Ready, Set, Go[58] programs to enhance community and neighborhood participation in both wildland fire prevention and mitigation.

- Adopt the latest version of the International Wildland Urban Interface Code. This code was updated in 2013.

- Continue to explore alternatives and effectiveness for wildland fuels mitigation treatment on private lands within the PFD jurisdiction. This would include a mix of strategies, including fuels mitigation hand crew, mechanical treatments, and strategic fuels treatment to both maximize accomplishments and minimize the risk. Potential grant funding is available for this activity.

- Continue to participate in, strengthen, and seek new stakeholder partnerships with the interagency wildland fire community within Yavapai County. The reality is a wildland fire will not recognize jurisdictional boundaries. The key to successful wildland fire mitigation is full engagement, participation, and commitment to protecting the citizenry, properties, and natural resources utilizing all available resources.

[58] The Ready, Set, Go! (RSG) Program, managed by the International Association of Fire Chiefs (IAFC), seeks to develop and improve the dialogue between fire departments and the residents they serve. Launched nationally in March 2011 at the Wildland-Urban Interface (WUI 2011) Conference, the program helps fire departments to teach individuals who live in high-risk wildfire areas and the wildland-urban interface how to best prepare themselves and their properties against fire threats. The RSG! Program tenets help residents “be ready” with preparedness understanding, “be set” with situational awareness when fire threatens, and “go” by acting early when a fire starts.

- Continue to support mutual aid responses and incident management participation to foster critical interagency and intergovernmental relationships, realizing these relationships are reciprocal. Continue to actively participate and provide leadership to the Prescott Area Wildland/Urban Interface Commission.[59]

- Strengthen the existing city of Prescott weed abatement ordinance; consider both consequences for noncompliance and additional educational endeavors to focus on changing attitudes, behaviors, and culture.

[59] The Prescott Area WUI Commission (PAWUIC) is comprised of volunteers and cooperating agencies in the Prescott Basin area. The commission is supported by representatives from the city of Prescott, the county of Yavapai Emergency Management, Prescott Fire Department, Central Yavapai Fire District, Arizona Department of Forestry, Prescott National Forest, and the Bureau of Land Management. The PAWUIC was formed in 1990 by a joint resolution of Yavapai Board of Supervisors and the city of Prescott's mayor and council. The PAWUIC has been active in educating residents to live safely in high-fire-hazard areas and has coordinated community planning efforts for hazardous fuel reduction and defensible space projects.

Appendix I: Data Analysis

Introduction

This data analysis was prepared as a key component of the study of the Prescott Fire Department (PFD). This analysis examines all calls for service between July 1, 2012, and June 30, 2013, as recorded in the regional dispatch center.

This analysis is divided into five sections: the first section focuses on call types and dispatches; the second section explores time spent and workload of individual units; the third section presents analysis of the busiest hours in a year; the fourth section provides a response time analysis; and the fifth section presents Life Line Ambulance transport call and response time analysis.

During the period covered by this study, the department operated out of five stations. The agency deploys five frontline engines and a battalion chief vehicle. It cross-staffs five brush trucks (patrol vehicles), two ladder trucks, a HazMat truck, a foam truck, and a backup engine when needed. In addition, Prescott station 51 houses an engine staffed by Central Yavapai Fire District. Calls responded to by station 51 are mostly in Prescott, and therefore included in this report.

During the study period, the PFD and station 51 responded to 8,357 calls, including 921 canceled calls. The total combined yearly workload (deployed time) for all units including engine 51 was 5,075 hours. The average estimated dispatch time was 1.1 minutes and the average response time was 7.3 minutes.

Methodology

In this report, we analyze calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit. Thus, a call might include multiple runs.

We received regional computer-aided dispatch (CAD) data and PFD's National Fire Incident Reporting System (NFIRS) data. We first cross-validated CAD and NFIRS data and primarily used CAD data in this report. We removed non-valid calls, which are created by dispatchers for record-keeping purposes.

We classified the calls in a series of steps. First, calls with first due station of "Station 51" were categorized "automatic aid received." Calls in Prescott, but with no PFD unit responding, were also categorized "automatic aid received." Calls outside Prescott and responded by the PFD were categorized "automatic aid given." For the remaining calls, we used standard NFIRS incident types to assign call type. The classification based upon these types is documented in Appendix V. As the NFIRS incident type does not describe the nature of EMS calls, these were distinguished based on the NFIRS provider impression. When provider impression data were not available, EMS calls were listed, by default, as "illness and other."

In this report, automatic aid received, automatic aid given and canceled calls are included within the introductory summary and workload analysis. However, they are not included in duration and response time analysis.

Aggregate Call Totals and Dispatches

During the year studied, PFD responded to 8,357 calls. Of these, 32 were structure fire calls and 44 were outside fire calls within PFD jurisdiction.

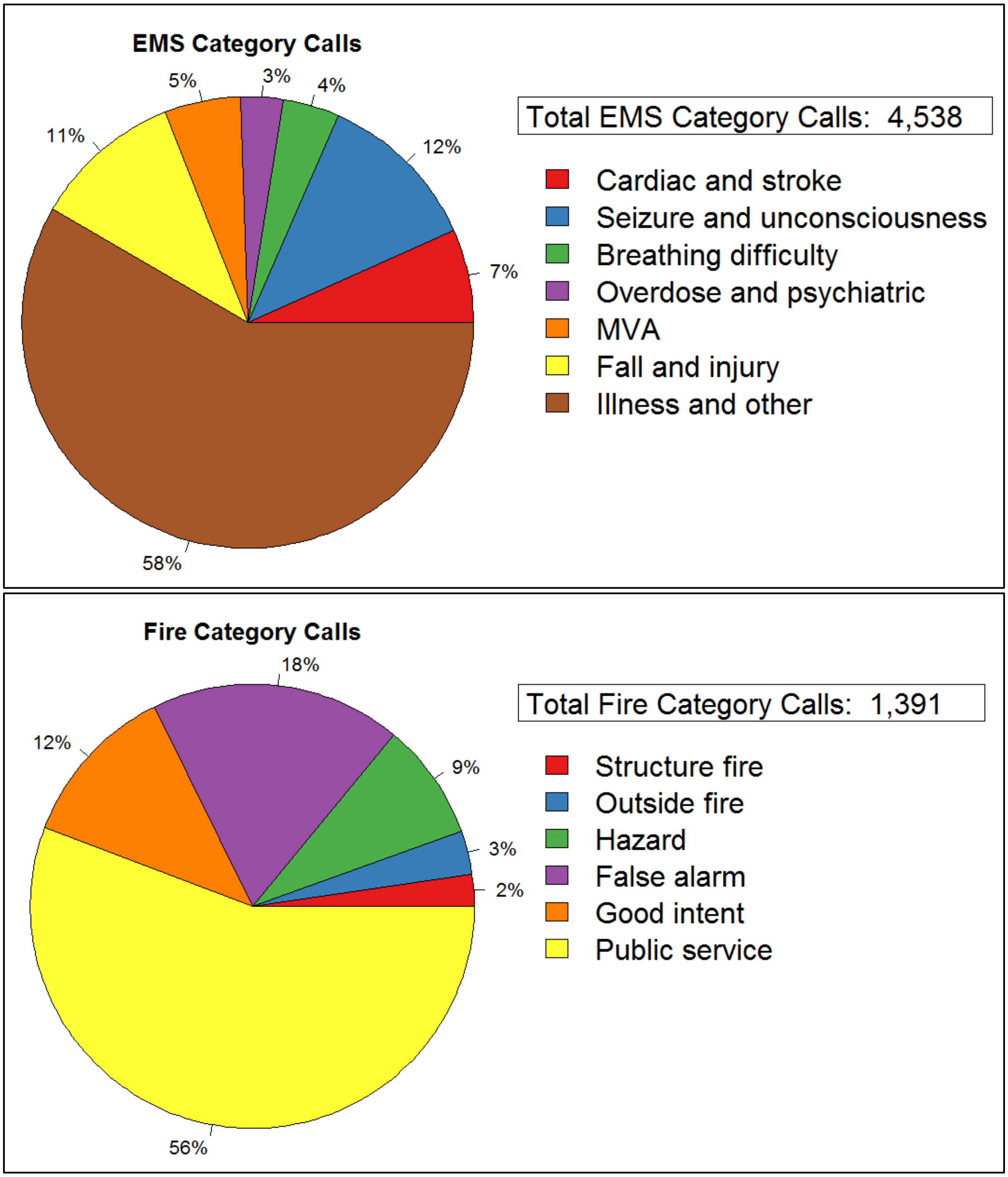
TABLE 1: Call Types

Call Type	Number of Calls	Calls per Day	Call Percentage
Cardiac and stroke	305	0.8	3.6
Seizure and unconsciousness	532	1.5	6.4
Breathing difficulty	184	0.5	2.2
Overdose and psychiatric	137	0.4	1.6
MVA	247	0.7	3.0
Fall and injury	483	1.3	5.8
Illness and other	2,650	7.3	31.7
EMS Total	**4,538**	**12.4**	**54.3**
Structure fire	32	0.1	0.4
Outside fire	44	0.1	0.5
Hazard	119	0.3	1.4
False alarm	254	0.7	3.0
Good intent	166	0.5	2.0
Public service	776	2.1	9.3
Fire Total	**1,391**	**3.8**	**16.6**
Automatic aid received	1,278	3.5	15.3
Automatic aid given	229	0.6	2.7
Canceled	921	2.5	11.0
Other Total	**2,428**	**6.7**	**29.1**
Total	**8,357**	**22.9**	**100.0**

Observations:

- The department received an average of 22.9 calls, including 2.5 canceled calls, per day.
- EMS calls for the year totaled 4,538 (54 percent of all calls), averaging 12.4 per day.
- Fire calls for the year totaled 1,391 (17 percent of all calls), averaging 3.8 per day.
- Structure and outside fires combined for a total of 76 calls during the year.
- PFD received automatic aids in 1,278 calls, among which 87 percent occurred within the jurisdiction of station 51.

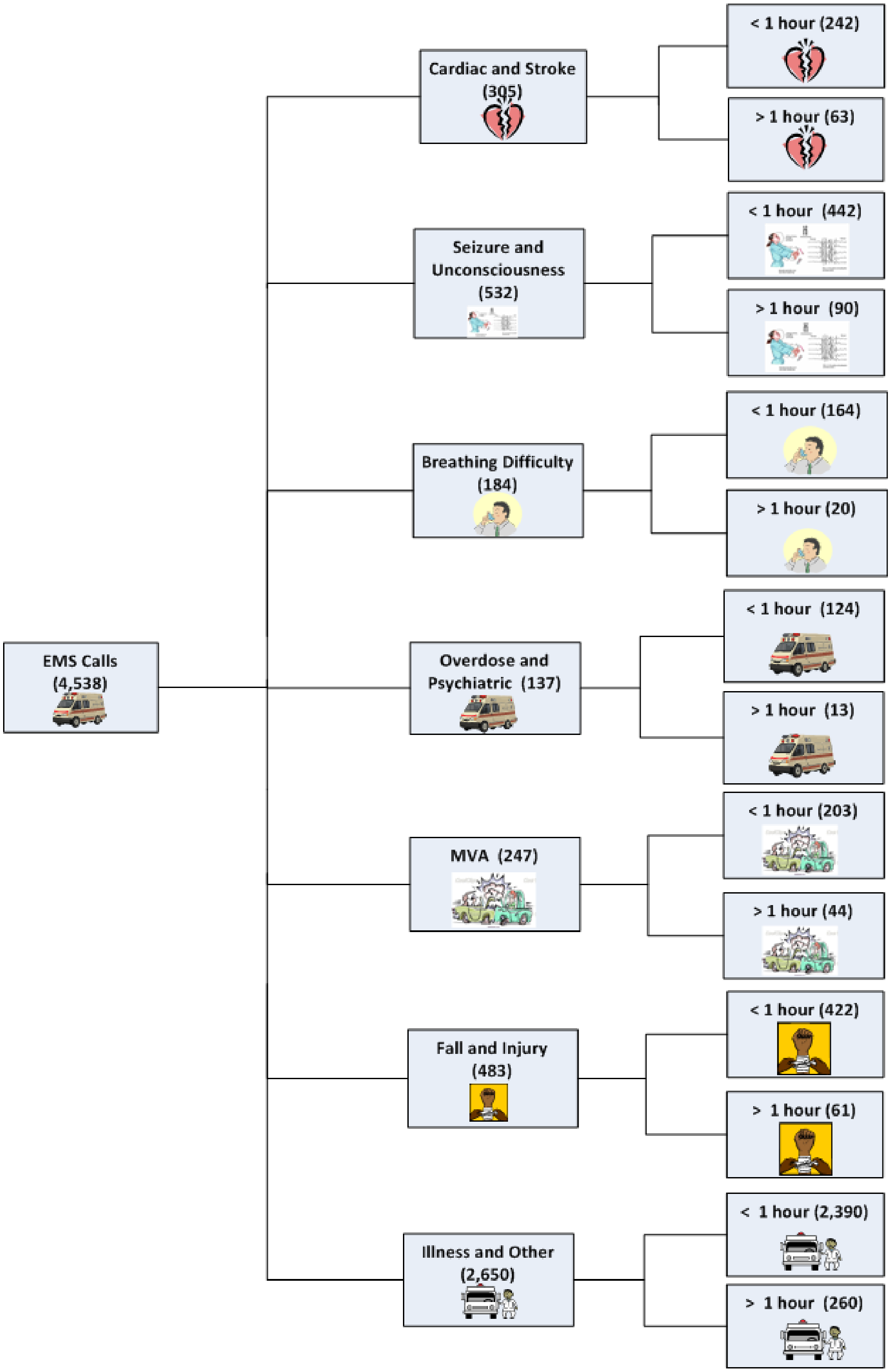
FIGURE 1: EMS and Fire Calls by Type



Observations:

- A total of 32 structure fire calls accounted for 2 percent of the fire category total.
- A total of 44 outside fire calls accounted for 3 percent of the fire category total.
- Public service calls were the largest fire call category, making up 56 percent of the fire category total.
- False alarm calls were 18 percent of the fire category total.
- Illness and other calls were the largest EMS call category, accounting for 58 percent of the EMS category total.
- Cardiac or stroke calls were 7 percent of the EMS category total.
- Motor vehicle accidents were 5 percent of the EMS category total.

FIGURE 2: EMS Calls by Type and Duration

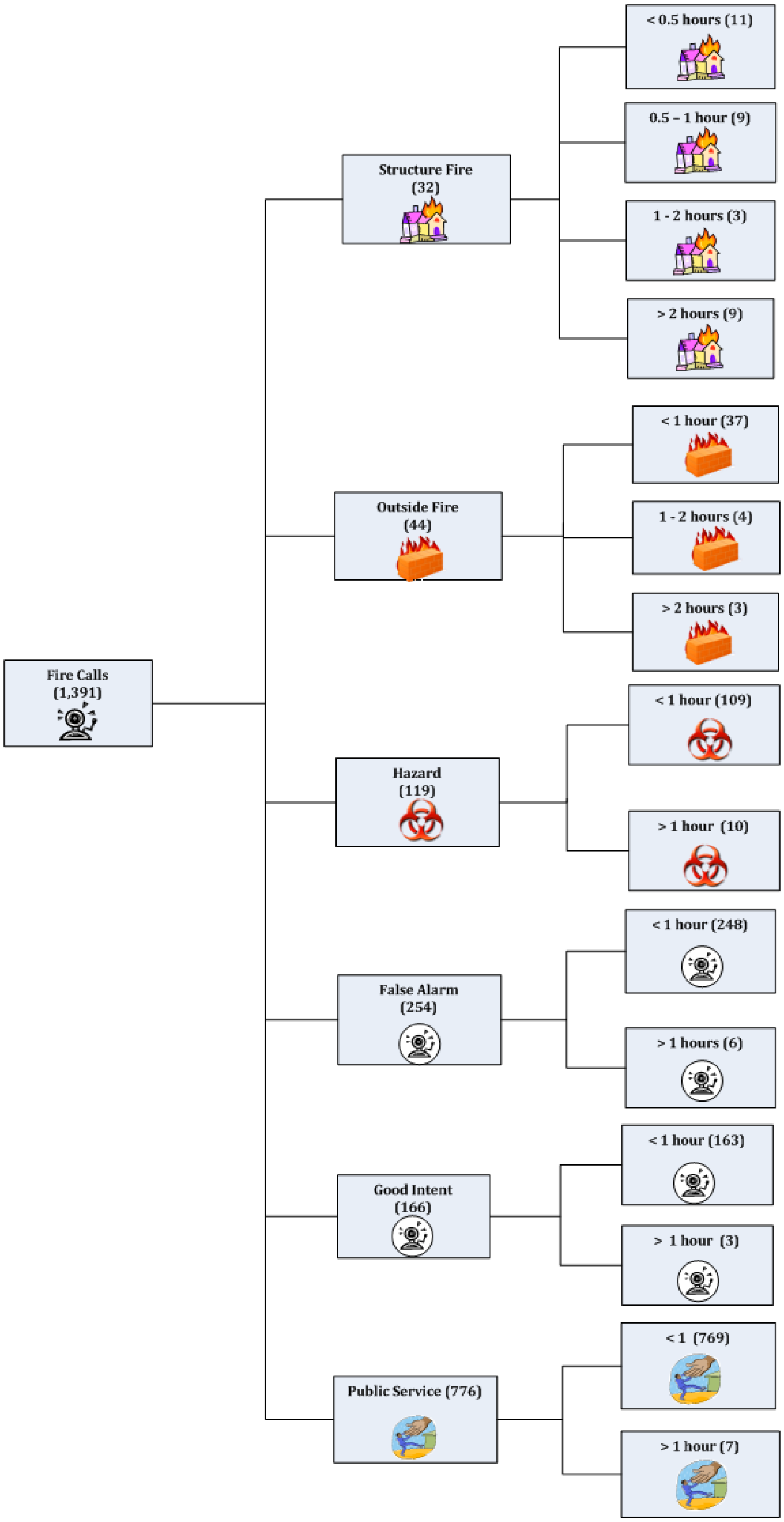


Note: Duration of a call is defined as the longest deployed time of all PFD units responding to the same call.

Observations:

- A total of 2,178 EMS category calls (48 percent of EMS calls) lasted less than one-half hour, 1,809 EMS category calls (40 percent) lasted between one-half hour and an hour, 531 EMS category calls (12 percent) lasted between one and two hours, and 20 EMS category calls (less than 1 percent) lasted more than two hours. On average, there were 1.5 EMS category calls per day that lasted more than one hour.
- A total of 242 cardiac and stroke calls (79 percent) lasted less than one hour, 63 cardiac and stroke calls (20 percent) lasted more than an hour, and one cardiac and stroke call lasted more than two hours.
- A total of 203 motor vehicle accident calls (82 percent) lasted less than one hour, and 44 motor vehicle accident calls (18 percent) lasted more than an hour.

FIGURE 3: Fire Calls by Type and Duration

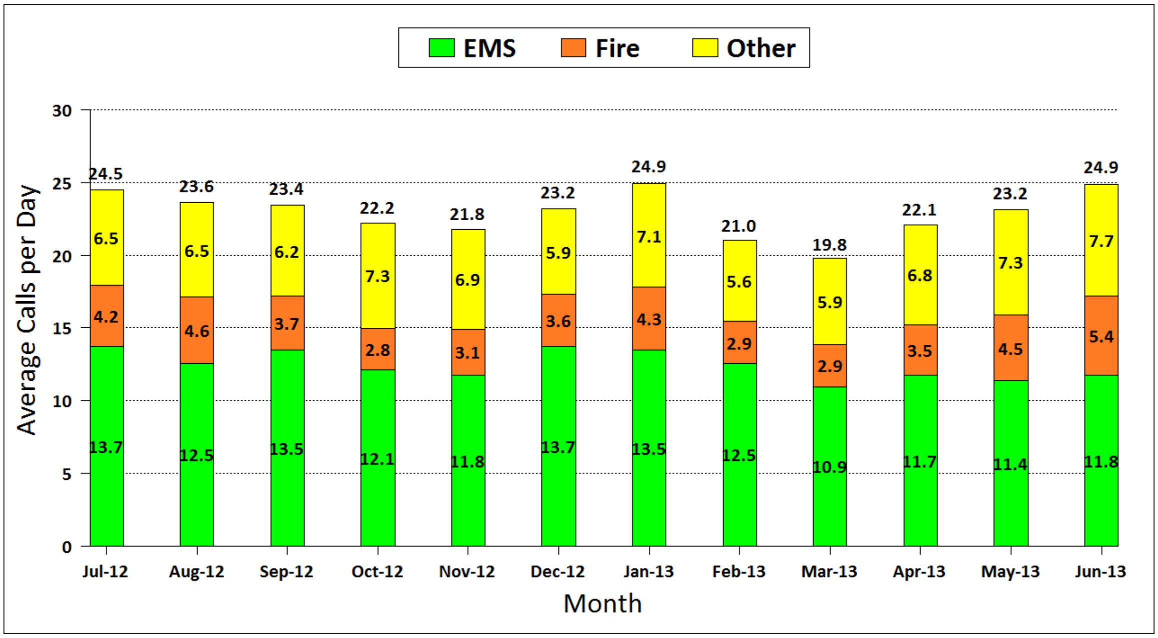


Note: Duration of a call is defined as the longest deployed time of all PFD units responding to the same call.

Observations:

- A total of 1,162 fire category calls (84 percent of fire calls) lasted less than one-half hour, 184 fire category calls (13 percent) lasted between one-half hour and one hour, 23 fire category calls (2 percent) lasted between one and two hours, and 22 fire category calls (2 percent) lasted more than two hours.
- A total of 20 structure fire calls (63 percent of all structure fire calls) lasted less than one hour, 3 structure fire calls (9 percent) lasted between one and two hours, and 9 structure fire calls (28 percent) lasted more than two hours.
- A total of 37 outside fire calls (84 percent of outside fire calls) lasted less than one hour, 4 outside fire calls (9 percent) lasted between one and two hours, and 3 outside fire calls (7 percent) lasted more than two hours.
- A total of 213 false alarm calls (84 percent of these calls) lasted less than one-half hour, 35 false alarms (14 percent) lasted between one-half hour and one hour, and 6 false alarm calls (2 percent) lasted more than an hour.

FIGURE 4: Average Calls per Day, by Month



Observations:

- Average calls per day ranged from a low of 19.8 calls per day in March 2013 to a high of 24.9 calls per day in January 2013 and June 2013. The highest monthly average was 26 percent greater than the lowest monthly average.
- Average EMS calls per day ranged from a low of 10.9 calls per day in March 2013 to a high of 13.7 calls per day in July 2012 and December 2012.
- Average fire calls per day ranged from a low of 2.8 calls per day in October 2012 to a high of 5.4 calls per day in June 2013.
- Average other calls per day ranged from a low of 5.6 calls per day in February 2013 to a high of 7.7 calls per day in June 2013.

FIGURE 5: Calls by Hour of Day

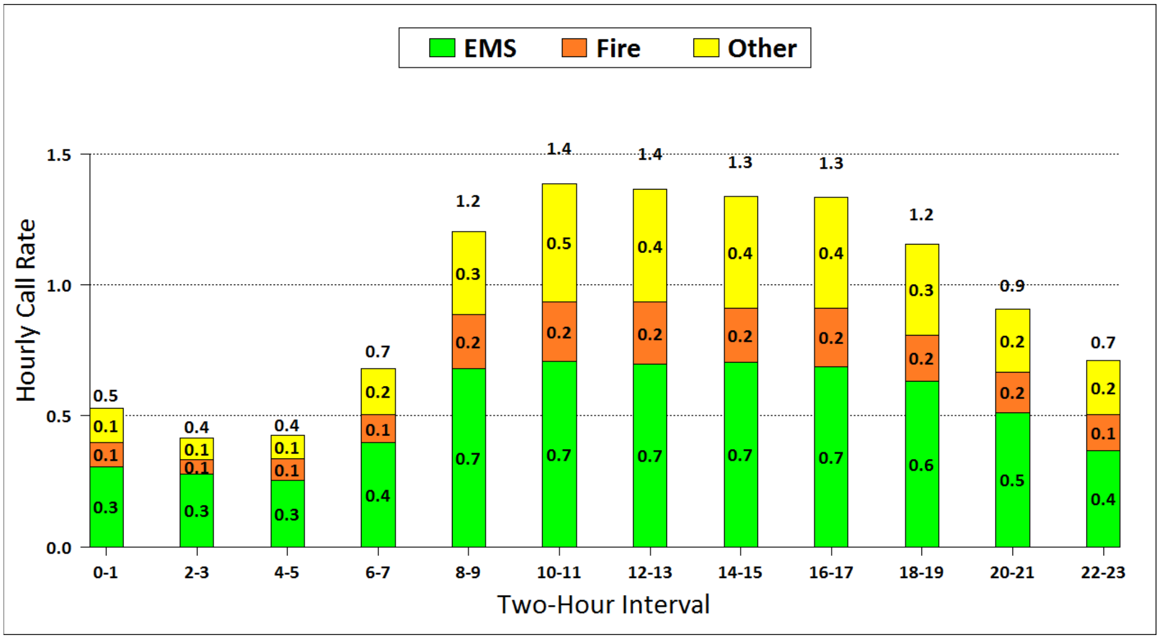


TABLE 2: Calls by Hour of Day

Two-Hour Interval	Hourly Call Rate			
	EMS	Fire	Other	Total
0-1	0.31	0.09	0.13	0.53
2-3	0.28	0.05	0.08	0.42
4-5	0.25	0.08	0.09	0.42
6-7	0.40	0.11	0.18	0.68
8-9	0.68	0.21	0.32	1.20
10-11	0.71	0.23	0.45	1.38
12-13	0.70	0.24	0.43	1.36
14-15	0.70	0.21	0.43	1.34
16-17	0.69	0.22	0.42	1.33
18-19	0.63	0.18	0.35	1.15
20-21	0.51	0.16	0.24	0.91
22-23	0.37	0.14	0.21	0.71
Calls per Day	**12.43**	**3.81**	**6.65**	**22.90**

Note: Average calls per day shown are the sum of each column multiplied by two, since each cell represents two hours.

Observations:

- Hourly call rates averaged between 0.42 calls and 1.38 calls per hour.
- Call rates were highest during the day between 8:00 a.m. and 8:00 p.m., averaging between 1.15 and 1.38 calls per hour.
- Call rates were lowest between midnight and 8:00 a.m., averaging between 0.42 and 0.68 calls per hour.

TABLE 3: First Due Station Call Analysis

First Due Station	Number of Calls	Percent of Calls	Calls per Day	Percent of Calls with Units from First Due Station
Station 71 - PFD	2,056	25.3	5.6	86.3
Station 72 - PFD	2,127	26.2	5.8	82.7
Station 73 - PFD	644	7.9	1.8	89.4
Station 74 - PFD	1,205	14.8	3.3	88.3
Station 75 - PFD	988	12.2	2.7	91.3
Station 51 - CYFD	1,108	13.6	3.0	84.2

Note: Automatic aid received and canceled calls are included.

Observations:

- The most calls for first due went to station 72. It accounted for 26 percent of total and it averaged 5.8 calls per day.
- Calls with first due station 51 averaged 3.0 per day, and it accounted for 14 percent of total.
- The percentage of calls with at least one responding unit from the same first due station ranged from 83 percent to 91 percent.

FIGURE 6: Number of Units Dispatched to Calls

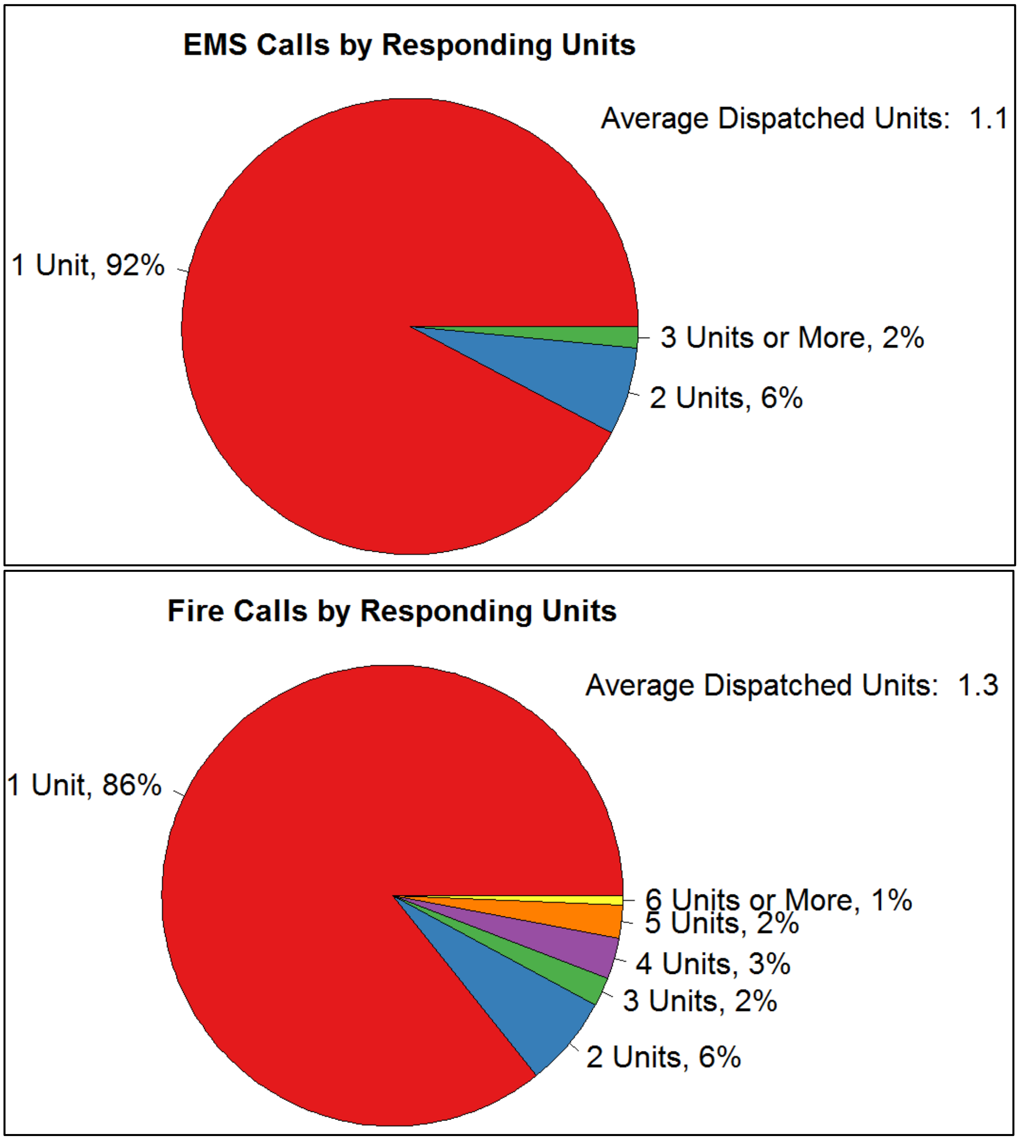


TABLE 4: Number of Prescott Fire Department Units Dispatched to Calls

Call Type	Number of PFD Units				
	One	Two	Three	Four or More	Total
Cardiac and stroke	282	23	0	0	305
Seizure and unconsciousness	490	40	1	1	532
Breathing difficulty	175	9	0	0	184
Overdose and psychiatric	132	5	0	0	137
MVA	166	40	31	10	247
Fall and injury	452	26	4	1	483
Illness and other	2,490	138	13	9	2,650
EMS Total	**4,187**	**281**	**49**	**21**	**4,538**
Structure fire	6	2	3	21	32
Outside fire	18	6	7	13	44
Hazard	83	8	6	22	119
False alarm	233	13	0	8	254
Good intent	144	5	4	13	166
Public service	709	54	9	4	776
Fire Total	**1,193**	**88**	**29**	**81**	**1,391**
Automatic aid received	210	41	12	16	279
Automatic aid given	164	46	15	4	229
Canceled	818	76	11	16	921
Grand Total	**6,572**	**532**	**116**	**138**	**7,358**
Percentage	**89.3**	**7.2**	**1.6**	**1.9**	**100**

Note: E51 is not included.

Observations:

- A total of 999 (78 percent) automatic aid calls had no PFD unit responding.
- On average, 1.3 units were dispatched per fire category call.
- For fire category calls, one unit was dispatched 86 percent of the time, two units were dispatched 6 percent of the time, three units were dispatched 2 percent of the time, and four or more units were dispatched 6 percent of the time.
- For structure fire calls, one unit was dispatched 19 percent of the time, two units were dispatched 6 percent of the time, three units were dispatched 9 percent of the time, and four or more units were dispatched 66 percent of the time.
- For outside fire calls, one unit was dispatched 41 percent of the time, two units were dispatched 14 percent of the time, three units were dispatched 16 percent of the time, and four or more units were dispatched 30 percent of the time.

- On average, 1.1 units were dispatched per EMS category call.
- For EMS category calls, one unit was dispatched 92 percent of the time, two units were dispatched 6 percent of the time, and three or more units were dispatched 2 percent of the time.

TABLE 5: Annual Deployed Time by Call Type

Call Type	Average Deployed Minutes per Run	Annual Hours	Percent of Total Hours	Deployed Minutes per Day	Annual Number of Runs	Runs per Day
Cardiac and stroke	42.4	237	4.7	39.0	336	0.9
Seizure and unconsciousness	41.4	405	8.0	66.5	587	1.6
Breathing difficulty	34.0	112	2.2	18.4	198	0.5
Overdose and psychiatric	35.6	86	1.7	14.1	144	0.4
MVA	32.3	214	4.2	35.2	398	1.1
Fall and injury	33.2	293	5.8	48.1	528	1.4
Illness and other	34.3	1,651	32.5	271.3	2,886	7.9
EMS Total	**35.4**	**2,997**	**59.1**	**492.7**	**5,077**	**13.9**
Structure fire	67.3	169	3.3	27.8	151	0.4
Outside fire	53.3	110	2.2	18.1	124	0.3
Hazard	24.5	87	1.7	14.3	213	0.6
False alarm	37.6	193	3.8	31.7	308	0.8
Good intent	18.9	74	1.5	12.2	236	0.6
Public service	19.1	279	5.5	45.8	874	2.4
Fire Total	**28.7**	**913**	**18.0**	**150.0**	**1,906**	**5.2**
Automatic aid received	29.8	753	14.8	123.7	1,513	4.1
Automatic aid given	42.3	228	4.5	37.4	323	0.9
Canceled	10.2	184	3.6	30.3	1,087	3.0
Total	**30.7**	**5,075**	**100.0**	**834.2**	**9,906**	**27.1**

Note: Each dispatched unit is a separate "run." As multiple units are dispatched to a call, there are more runs than calls. Therefore, the department responded to 22.9 calls per day and had 27.1 runs per day.

Observations:

- There were 9,906 runs, including runs from engine E51 housed at station 51. The daily average was 27.1 runs for all units combined.
- Fire category calls accounted for 18.0 percent of the total workload.
- There were 275 runs for structure and outside fire calls, with a total workload of 279.5 hours. This accounted for 5.5 percent of the total workload. The average deployed time for structure fire calls was 67.3 minutes, and the average deployed time for outside fire calls was 53.3 minutes.

- EMS calls accounted for 59.1 percent of the total workload. The average deployed time for EMS calls was 35.4 minutes. The deployed hours for all units dispatched to EMS calls averaged 8.2 hours per day.

Workload by Individual Unit—Calls and Total Time Spent

In this section, the actual time spent by each unit on calls is reported in two types of statistics: workload and runs. A dispatch of a unit is defined as a *run*; thus one call might include multiple runs. The deployed time of a run is from the time a unit is dispatched through the time a unit is cleared.

TABLE 6: Call Workload by Unit

Station	Unit Type	Unit ID	Average Deployed Minutes per Run	Annual Number of Runs	Annual Hours	Runs per Day	Deployed Hours per Day
Station 51	Engine	E51	29.8	1,284	637.0	3.5	1.7
Station 71	Battalion chief	B1	37.8	350	220.4	1.0	0.6
	Wildland crew	C7	691.1	3	34.6	0.0	0.1
	Engine	E71	29.2	1,949	948.7	5.3	2.6
	Patrol vehicle	P71	43.5	30	21.7	0.1	0.1
	Ladder truck	TR71	28.1	266	124.5	0.7	0.3
	Utility vehicle	U71	75.9	49	62.0	0.1	0.2
Station 72	Engine	E72	26.5	1,610	711.7	4.4	1.9
	Engine	E722	81.9	19	25.9	0.1	0.1
	Patrol vehicle	P72	12.0	1	0.2	0.0	0.0
	Ladder truck	TR72	25.6	800	341.9	2.2	0.9
Station 73	Engine	E73	31.7	776	410.1	2.1	1.1
	Foam truck	FM73	34.6	32	18.4	0.1	0.1
	Patrol vehicle	P73	93.5	12	18.7	0.0	0.1
Station 74	Engine	E74	29.7	1,393	689.8	3.8	1.9
	Patrol vehicle	P74	96.6	27	43.5	0.1	0.1
Station 75	Engine	E75	33.6	1,262	706.4	3.5	1.9
	HazMat truck	HM75	86.9	27	39.1	0.1	0.1
	Patrol vehicle	P75	75.0	16	20.0	0.0	0.1

Observations:

- Engine E51 made 1,284 runs, averaging 3.5 runs and 1.7 hours of deployed time per day.
- Of the five engines which are staffed 24/7, E71 was utilized the most often and it averaged 5.3 runs and 2.6 hours of deployed time per day. Engine E73 was utilized the least often and it averaged 2.1 runs and 1.1 hours of deployed time per day.
- The five patrol vehicles (brush truck) combined were dispatched 86 times, and were deployed 104 hours in the study year.

- Ladder truck TR72 made 800 runs, and it averaged 2.2 runs, and 0.9 hours of deployed time per day. Ladder truck TR71 made 266 runs, and it averaged 0.7 runs per day.

FIGURE 7: Deployed Minutes by Hour of Day

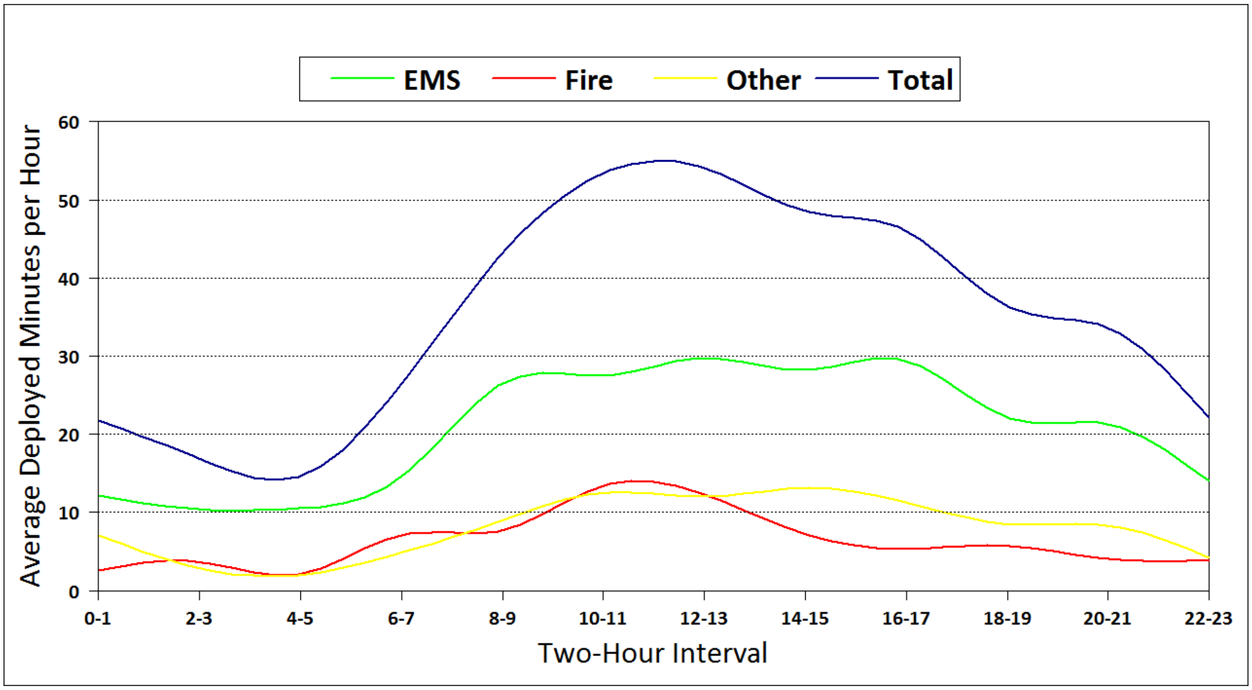


TABLE 7: Deployed Minutes by Hour of Day

Two-Hour Interval	EMS	Fire	Other	Total
0-1	12.1	2.6	7.1	21.8
2-3	10.4	3.7	2.8	16.9
4-5	10.5	2.1	2.0	14.6
6-7	14.5	7.1	4.8	26.5
8-9	26.5	7.7	9.0	43.2
10-11	27.5	13.4	12.5	53.4
12-13	29.8	12.3	12.0	54.1
14-15	28.2	7.2	13.1	48.5
16-17	29.4	5.3	11.3	46.1
18-19	22.1	5.7	8.5	36.3
20-21	21.3	4.0	8.3	33.6
22-23	14.0	3.9	4.2	22.1
Daily Total	492.7	150.0	191.4	834.2

Note: Daily totals shown equal the sum of each column multiplied by two, since each cell represents two hours.

Observations:

- Hourly deployed minutes were highest during the day between 8:00 a.m. and 6:00 p.m., averaging between 43 minutes and 54 minutes per hour. Average deployed minutes peaked between 10:00 a.m. and 2:00 p.m., averaging about 54 minutes per hour.
- Hourly deployed minutes were the lowest between 10:00 p.m. and 8:00 a.m., averaging between 15 minutes and 27 minutes per hour.

TABLE 8: Total Annual and Daily Average Number of Runs by Call Type and Unit

Station	Unit	EMS	**Structure Fire**	**Outside Fire**	Hazard	False Alarm	Good Intent	Public Service	Automatic Aid Given	Automatic Aid Received	Canceled	**Total**	**Runs per Day**
Station 51	E51	89	**21**	**12**	5	9	12	12	6	1,103	15	**1,284**	**3.5**
Station 71	B1	112	**25**	**20**	31	10	17	15	41	46	33	**350**	**1.0**
	C7	0	**0**	**0**	0	2	0	0	1	0	0	**3**	**NA**
	E71	1,235	**13**	**18**	38	60	75	220	18	50	222	**1,949**	**5.3**
	P71	0	**0**	**9**	0	1	4	3	3	7	3	**30**	**NA**
	TR71	156	**10**	**5**	7	7	8	33	0	9	31	**266**	**0.7**
	U71	1	**19**	**3**	1	2	3	1	3	14	2	**49**	**NA**
Station 72	E72	1,027	**9**	**11**	19	58	27	130	20	105	204	**1,610**	**4.4**
	E722	9	**2**	**1**	0	1	1	1	0	2	2	**19**	**NA**
	P72	0	**0**	**0**	0	0	0	0	0	0	1	**1**	**NA**
	TR72	497	**17**	**5**	13	24	13	64	9	51	107	**800**	**2.2**
Station 73	E73	438	**7**	**7**	25	30	12	66	56	13	122	**776**	**2.1**
	FM73	1	**0**	**1**	20	0	1	2	0	0	7	**32**	**NA**
	P73	0	**0**	**3**	0	2	0	2	3	1	1	**12**	**NA**
Station 74	E74	827	**14**	**13**	34	58	9	189	9	85	155	**1,393**	**3.8**
	P74	13	**0**	**0**	0	0	0	3	4	3	4	**27**	**NA**
Station 75	E75	671	**14**	**12**	17	43	48	132	131	20	174	**1,262**	**3.5**
	HM75	0	**0**	**0**	3	0	5	0	14	3	2	**27**	**NA**
	P75	1	**0**	**4**	0	1	1	1	5	1	2	**16**	**NA**

Note: A dispatch of a unit is defined as a *run*; thus a call might include multiple runs

Observations:

- Engine E71 had the most runs during the year and it averaged 5.3 runs per day. However, most of the runs were EMS responses, and structure and outside fire calls only totaled 31 runs during the year.
- Engine 51 staffed by the Central Yavapai Fire District averaged 3.5 runs per day.
- The battalion chief vehicle averaged 1.0 run per day.
- Of the two ladder trucks, TR72 averaged 2.2 runs per day and TR71 averaged 0.7 runs per day.

TABLE 9: Daily Average Deployed Minutes by Call Type and Unit

Station	Unit	EMS	**Structure Fire**	**Outside Fire**	Hazard	False Alarm	Good Intent	Public Service	Automatic Aid Given	Automatic Aid Received	Canceled	**Total**	**Fire Category Calls Percentage**
Station 51	E51	4.4	4.3	0.8	0.1	2.4	0.5	0.2	0.9	90.7	0.4	104.7	**95.8**
Station 71	B1	12.1	4.6	6.1	1.4	1.5	1.2	1.0	2.9	4.2	1.3	36.2	**66.6**
	C7	0.0	0.0	0.0	0.0	4.3	0.0	0.0	1.4	0.0	0.0	5.7	**100.0**
	E71	116.5	2.7	2.8	2.4	5.2	3.3	11.0	2.5	3.9	5.8	156.0	**25.3**
	P71	0.0	0.0	1.8	0.0	0.5	0.1	0.2	0.1	0.8	0.1	3.6	**100.0**
	TR71	14.3	1.7	0.3	0.7	0.4	0.4	1.5	0.0	0.2	0.9	20.5	**30.2**
	U71	0.0	4.1	0.3	0.0	0.0	0.2	0.8	0.9	3.7	0.0	10.2	**99.7**
Station 72	E72	90.0	2.0	1.2	1.5	2.4	1.5	6.2	1.7	6.5	4.0	117.0	**23.1**
	E722	0.7	0.2	0.0	0.0	2.6	0.1	0.0	0.0	0.5	0.0	4.3	**84.7**
	P72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
	TR72	41.2	2.3	0.2	0.8	1.1	0.6	2.8	0.3	4.1	2.7	56.2	**26.6**
Station 73	E73	49.9	1.0	0.6	0.7	2.2	0.9	3.6	5.5	0.8	2.3	67.4	**26.0**
	FM73	0.2	0.0	0.1	2.3	0.0	0.1	0.2	0.0	0.0	0.2	3.0	**95.0**
	P73	0.0	0.0	0.1	0.0	1.0	0.0	0.3	1.5	0.1	0.1	3.1	**100.0**
Station 74	E74	81.5	2.2	1.1	1.9	4.6	0.4	10.1	0.9	6.0	4.6	113.4	**28.1**
	P74	5.7	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.7	0.3	7.1	**20.8**
Station 75	E75	76.1	2.7	1.7	1.9	2.6	2.2	7.2	13.7	1.3	6.7	116.1	**34.5**
	HM75	0.0	0.0	0.0	0.5	0.0	0.7	0.0	4.3	0.1	0.8	6.4	**100.0**
	P75	0.2	0.0	1.1	0.0	0.8	0.1	0.2	0.9	0.0	0.1	3.3	**94.8**

Observations:

E71 was utilized the most often; it averaged 156 minutes (2 hours and 36 minutes) deployed time per day.

Engine 51 staffed by the Central Yavapai Fire District averaged 105 minutes (1 hour and 45 minutes) deployed time per day.

The battalion chief vehicle averaged 36 deployed minutes per day.

Of the two ladder trucks, TR72 averaged 56 minutes deployed time per day and TR71 averaged 21 minutes deployed time per day.

Analysis of Busiest Hours

There is significant variability in the number of calls from hour to hour. One special concern relates to the fire and EMS resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Approximately once every 5.9 days (five days and twenty one hours), the Prescott Fire Department responded to from five to seven calls in an hour. This occurred within 0.7 percent of the total number of hours. We report the top ten hours with the most calls received and discuss the two hours with the most calls received.

TABLE 10: Frequency Distribution of the Number of Calls

Number of Calls in an Hour	Frequency	Percentage
0	3,627	41.4
1	2,974	33.9
2	1,415	16.2
3	503	5.7
4	179	2.0
5	46	0.5
6	14	0.2
7	2	0.0

Observations:

- During 62 hours (0.7 percent of all hours), five, six, or seven calls occurred; in other words, the PFD responded to from five to seven calls in an hour roughly once every 5.9 days (five days and twenty one hours).

- Six or seven calls occurred only during 16 hours during the year.

TABLE 11: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
6/30/2013, 2 p.m. to 3 p.m.	7	22	33.7
2/7/2013, 11 a.m. to 12 p.m.	7	9	2.6
6/28/2013, 2 p.m. to 3 p.m.	6	10	3.9
9/6/2012, 11 a.m. to 12 p.m.	6	10	3.8
6/14/2013, 4 p.m. to 5 p.m.	6	9	3.2
7/30/2012, 3 p.m. to 4 p.m.	6	8	3.9
12/18/2012, 6 p.m. to 7 p.m.	6	8	2.0
3/29/2013, 3 p.m. to 4 p.m.	6	8	1.9
9/24/2012, 4 p.m. to 5 p.m.	6	7	3.5
10/26/2012, 10 a.m. to 11 a.m.	6	7	3.1

Note: The combined workload is the total deployed minutes spent responding to calls received in the hour, and which may extend into the next hour or hours. Number of runs only includes dispatches from PFD units and E51.

Observations:

- The hour with the most calls received was 2:00 p.m. to 3:00 p.m. on June 30, 2013. The seven calls involved 22 individual dispatches. These seven calls included one structure fire, two outside fires, two automatic aid received calls, one automatic aid given call, and one canceled call. The combined workload was 33.7 hours. The longest call lasted 381 minutes (six hours and 21 minutes), and it was a level two wildland fire which was responded to by seven PFD units. The structure fire call was responded to by two PFD units and E51 and it lasted 18 minutes.
- During the hour from 11:00 a.m. to noon on February 7, 2013, seven calls involving nine individual dispatches occurred. The seven calls included three illness and other calls, and four automatic aid received calls. The combined workload was 2.6 hours. The longest call was an illness and other call responded to by one PFD unit and E51, and which lasted 40 minutes.

TABLE 12: Unit Workload Analysis between 2:00 p.m. and 3:00 p.m. on June 30, 2013

Hour	Station	71				72		73		74	75		51	Number of Busy Units
	Unit	B1	E71	P71	U71	E72	TR72	E73	FM73	E74	E75	P75	E51	
6/30/2013, 2:00 p.m. to 3:00 p.m.	0–5								5.0					1
	5–10								5.0	3.5			4.4	3
	10–15								5.0	5.0			5.0	3
	15–20								5.0	5.0			5.0	3
	20–25					3.2			5.0	1.4			5.0	4
	25–30					5.0			5.0				5.0	3
	30–35					5.0			5.0				5.0	3
	35–40	3.4				5.0			5.0		3.4	3.4	5.0	6
	40–45	4.9	3.3	3.3		2.0			5.0	3.3	5.0	5.0	3.1	9
	45–50	5.0	5.0	5.0	0.3	0.3	0.3		5.0	5.0	2.8	2.7	0.3	11
	50–55	5.0	5.0	5.0	5.0	5.0	3.1		5.0	5.0	5.0		5.0	10
	55–60	5.0	5.0	5.0	2.6	5.0			5.0	4.9	2.5		2.5	9
	Total	23.3	18.3	18.3	7.9	30.5	3.4		60.0	33.1	18.7	11.1	45.3	

Note: The numbers in the cells are the deployed minutes within the five-minute block. The cell values greater than 2.5 are coded red.

Observations:

- During this hour, PFD units and E51 made 22 runs and responded to seven calls. These seven calls included one structure fire, two outside fires, two automatic aid received calls, one automatic aid given call, and one canceled call. The longest call lasted 381 minutes (six hours and 21 minutes), and it was a level two wildland fire which was responded to by seven PFD units.
- During the busiest ten minutes in the hour (2:45 to 2:55 p.m.), 10 or 11 units were deployed simultaneously.
- Four units (FM73, E72, E74, and E51) were deployed more than 30 minutes in this hour.

TABLE 13: Unit Workload Analysis between 11:00 a.m. and 12:00 p.m. on February 7, 2013

Hour	Station	71		72	73	74	75	51	Number of Busy Units
	Unit	B1	E71	E72	E73	E74	E75	E51	
2/7/2013, 11:00 a.m. to 12:00 p.m.	0–5		3.0					0.6	2
	5–10		5.0						1
	10–15		5.0						1
	15–20		5.0						1
	20–25		5.0				1.1		2
	25–30		5.0				5.0	0.5	3
	30–35		5.0				5.0	5.0	3
	35–40		5.0	1.8		1.3	5.0	5.0	5
	40–45		4.9	5.0		2.4	0.7	3.3	5
	45–50		5.0	5.0					2
	50–55		4.9	5.0					2
	55–60		5.0	3.4				3.8	3
	Total		57.8	20.2		3.7	16.8	18.2	

Note: The numbers in the cells are the deployed minutes within the five-minute block. The cell values greater than 2.5 are coded red.

Observations:

- During this hour, PFD units and E51 made nine runs and responded to seven calls. The seven calls included three illness and other calls, and four automatic aid received calls. The combined workload was 2.6 hours. The longest call was an illness and other call responded to by one PFD unit and E51, and which lasted 40 minutes.
- During the busiest ten minutes in the hour (11:35 to 11:45 a.m.), five units were deployed simultaneously.
- E71 was deployed more than 30 minutes in this hour.

Dispatch Time and Response Time

This section presents dispatch and response time statistics for different call types and units. The main focus is the dispatch and response time of the first arriving PFD units for calls responded with lights and sirens. However, for structure and outside fire calls, we also analyze the response time of the second arriving units.

Different terms are used to describe the components of response time: ***Dispatch processing time*** is the difference between the unit dispatch time and call received time of the first arriving unit. ***Turnout time*** is the difference between the unit time enroute and the unit dispatch time. ***Travel time*** is the difference between the unit on-scene arrival time and the time enroute. ***Response time*** is the difference between the on-scene arrival time and call received time.

In this section, we focused on calls which were responded to with lights and sirens; a total of 3,403 calls were used in the analysis. The average dispatch time was 1.1 minutes. The average turnout time was 1.0 minutes, and the average travel time was 5.2 minutes. The average response time for EMS calls was 7.3 minutes, and the average response time for fire category calls was 7.6 minutes. The average response time for structure fire calls was 7.6 minutes. The average response time for outside fire calls was 8.4 minutes. The 90th percentile dispatch time was 1.9 minutes and the 90th percentile response time was 10.8 minutes.

TABLE 14: Average Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.1	1.0	5.2	7.3	275
Seizure and unconsciousness	1.1	1.0	5.0	7.0	448
Breathing difficulty	1.0	1.1	5.6	7.8	173
Overdose and psychiatric	1.0	0.9	5.2	7.1	63
MVA	1.3	0.9	4.6	6.8	218
Fall and injury	1.2	1.1	5.2	7.5	264
Illness and other	1.2	1.0	5.2	7.4	1,707
EMS Total	**1.1**	**1.0**	**5.2**	**7.3**	**3,148**
Structure fire	1.0	1.3	5.3	7.6	29
Outside fire	1.4	0.8	6.2	8.4	33
Hazard	1.4	0.8	4.3	6.5	25
False alarm	1.2	1.0	5.9	8.1	29
Good intent	1.4	1.0	5.1	7.5	55
Public service	1.2	1.1	5.3	7.6	84
Fire Total	**1.3**	**1.0**	**5.3**	**7.6**	**255**
Total	**1.1**	**1.0**	**5.2**	**7.3**	**3,403**

FIGURE 8: Average Dispatch, Turnout, and Travel Times of First Arriving Unit, by EMS Call Type

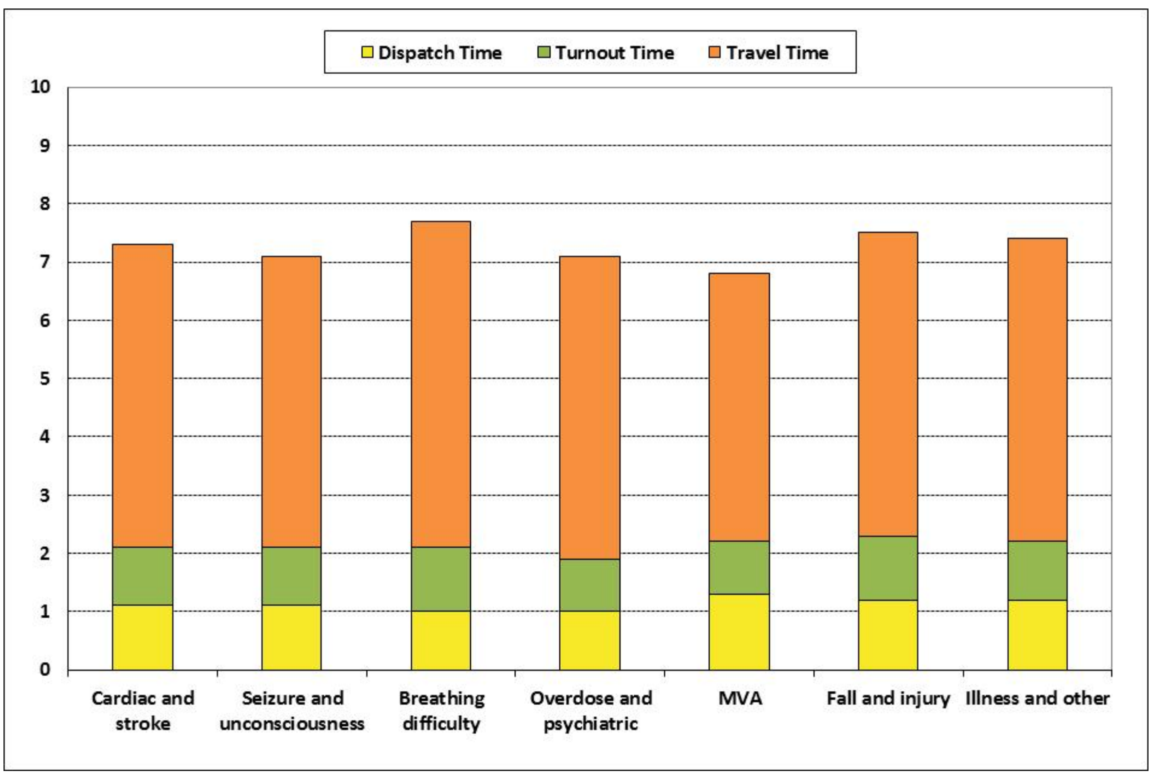
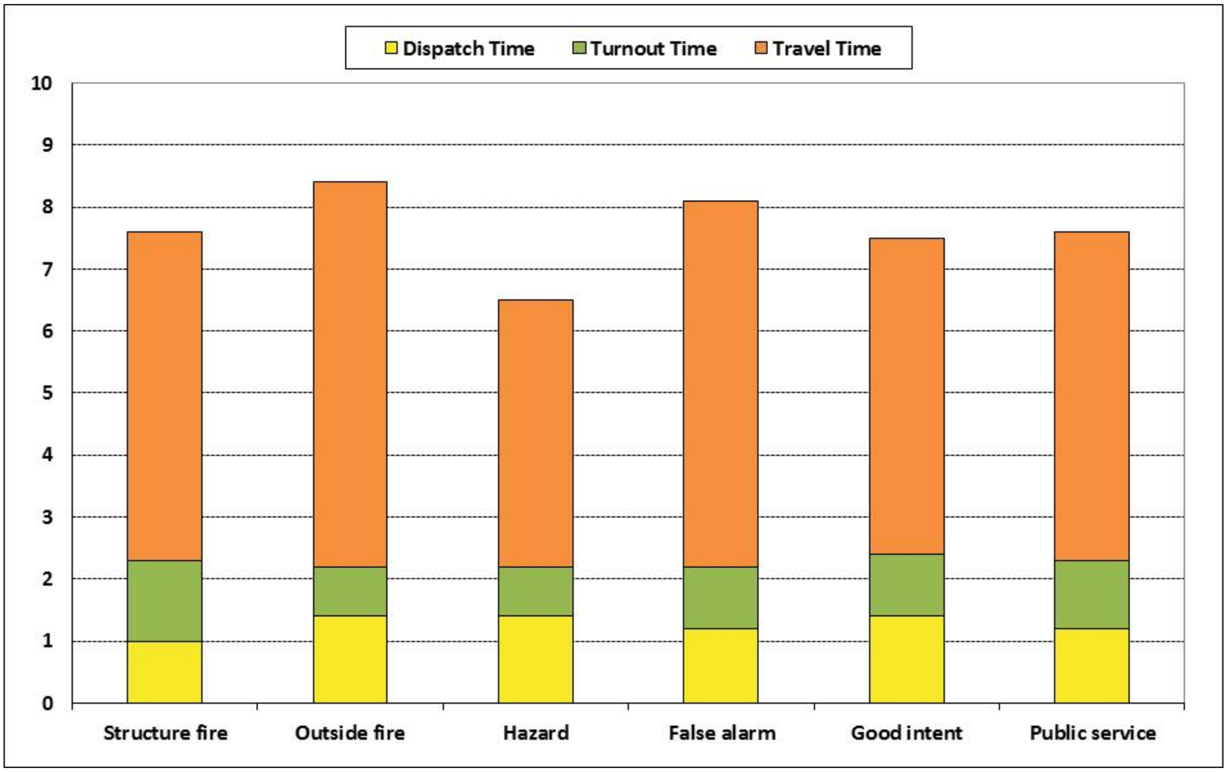


FIGURE 9: Average Dispatch, Turnout, and Travel Times of First Arriving Unit, by Fire Call Type



Observations:

- The average dispatch time was 1.1 minutes.
- The average turnout time was 1.0 minutes.
- The average travel time was 5.2 minutes.
- The average response time for EMS calls was 7.3 minutes.
- The average response time for fire category calls was 7.6 minutes.
- The average response time for structure fire calls was 7.6 minutes. The average response time for outside fire calls was 8.4 minutes.

TABLE 15: 90th Percentile Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.8	1.8	8.6	11.0	275
Seizure and unconsciousness	1.7	1.7	7.9	10.4	448
Breathing difficulty	1.6	2.0	9.0	11.2	173
Overdose and psychiatric	1.7	1.5	9.3	10.8	63
MVA	2.5	1.6	7.7	11.2	218
Fall and injury	1.9	2.1	8.2	10.9	264
Illness and other	1.9	1.9	8.2	10.6	1,707
EMS Total	**1.9**	**1.9**	**8.2**	**10.8**	**3,148**
Structure fire	1.6	2.1	10.5	13.0	29
Outside fire	2.6	1.6	13.8	15.5	33
Hazard	1.9	1.5	6.4	9.5	25
False alarm	2.2	1.6	10.6	12.4	29
Good intent	2.2	1.9	9.0	11.4	55
Public service	2.2	2.0	8.6	10.8	84
Fire Total	**2.1**	**1.8**	**9.2**	**11.8**	**255**
Total	**1.9**	**1.9**	**8.3**	**10.8**	**3,403**

Note: A 90th percentile value of 10.8 indicates that the total response time was less than 10.8 minutes for 90 percent of all calls. Unlike averages, the 90th percentile response time is not equal to the sum of the 90th percentile of dispatch time, turnout time, and travel time.

Observations:

- The 90th percentile dispatch time was 1.9 minutes.
- The 90th percentile turnout time was 1.9 minutes.
- The 90th percentile travel time was 8.3 minutes.
- The 90th percentile response time for EMS calls was 10.8 minutes.
- The 90th percentile response time for fire category calls was 11.8 minutes.
- The 90th percentile response time for structure fire calls was 13.0 minutes.
- The 90th percentile response time for outside fire calls was 15.5 minutes.

FIGURE 10: Average Dispatch, Turnout, Travel, and Response Time of First Arriving Unit, by Hour of Day

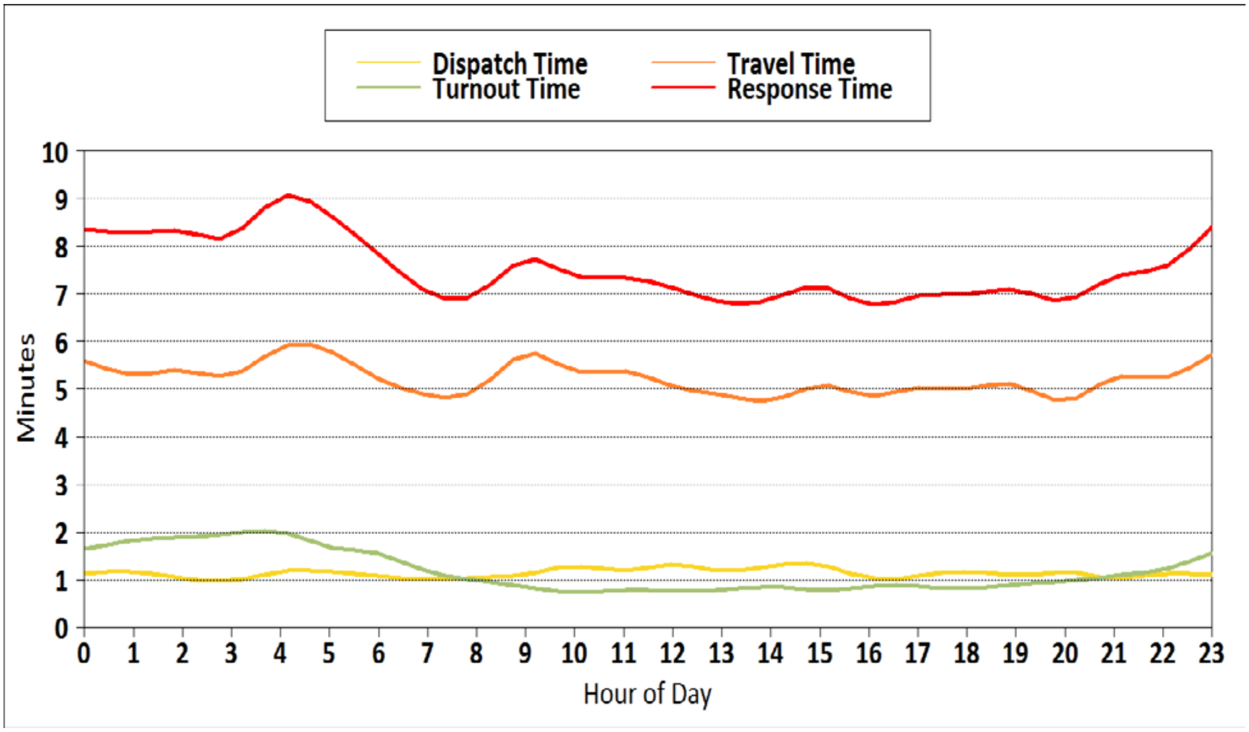


TABLE 16: Average Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Hour of Day

Hour	Dispatch Time	Turnout Time	Travel Time	Response Time	90th Percentile Response Time	Sample Size
0	1.1	1.6	5.6	8.4	10.8	76
1	1.2	1.8	5.3	8.3	11.2	76
2	1.0	1.9	5.4	8.3	11.2	67
3	1.0	2.0	5.3	8.2	10.7	68
4	1.2	2.0	5.9	9.0	12.3	56
5	1.2	1.7	5.8	8.7	11.6	86
6	1.1	1.5	5.2	7.8	10.7	102
7	1.0	1.2	4.9	7.0	9.6	130
8	1.0	1.0	5.0	7.0	10.2	190
9	1.1	0.8	5.8	7.7	10.9	206
10	1.3	0.7	5.4	7.4	11.3	207
11	1.2	0.8	5.4	7.3	11.7	194
12	1.3	0.7	5.1	7.1	11.5	203
13	1.2	0.8	4.9	6.8	10.8	199
14	1.3	0.8	4.8	6.9	10.0	183
15	1.3	0.8	5.1	7.2	11.6	195
16	1.0	0.9	4.9	6.8	10.1	198
17	1.1	0.9	5.0	7.0	10.1	189
18	1.2	0.8	5.0	7.0	9.7	169
19	1.1	0.9	5.1	7.1	10.3	147
20	1.2	1.0	4.7	6.9	10.1	148
21	1.0	1.1	5.2	7.4	10.7	126
22	1.1	1.2	5.2	7.6	10.4	98
23	1.1	1.6	5.7	8.4	11.7	90

Observations:

- Average dispatch time was between 1.0 and 1.3 minutes.
- Average turnout time was between 0.7 and 2.0 minutes. The turnout time peaked between 3:00 a.m. and 5:00 a.m., averaging 2.0 minutes.
- Average travel time was between 4.7 and 5.9 minutes.
- Average response time was between 6.8 and 9.0 minutes.
- 90th percentile response time was between 9.6 and 12.3 minutes.

FIGURE 11: Number of Total Calls by First Arriving Units

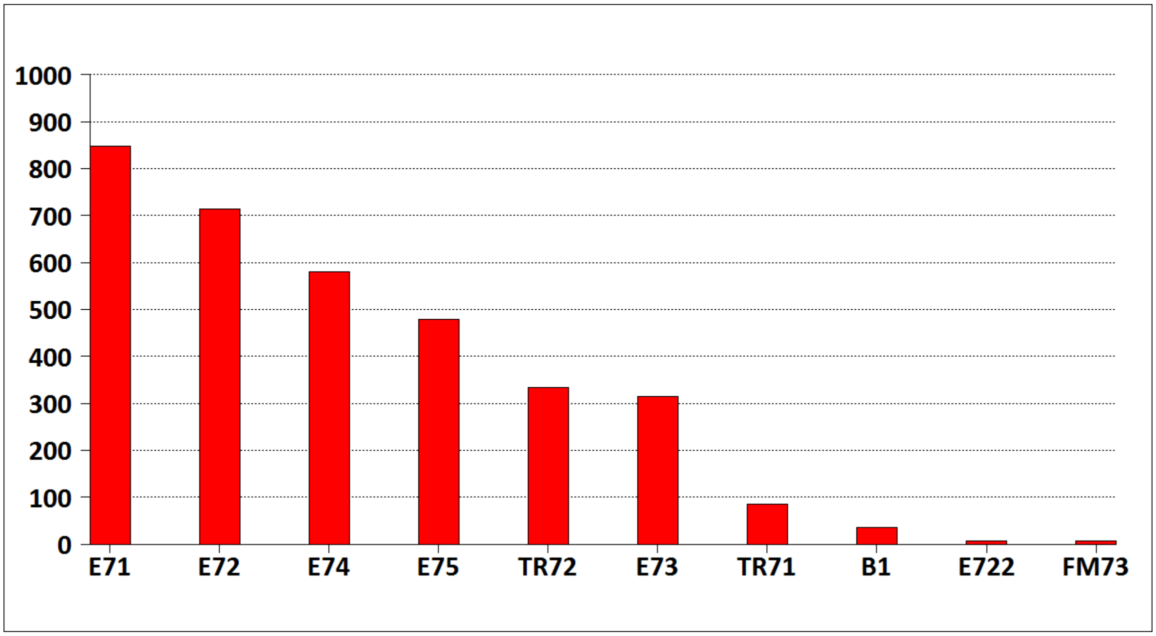


TABLE 17: Number of Total Calls by First Arriving Units

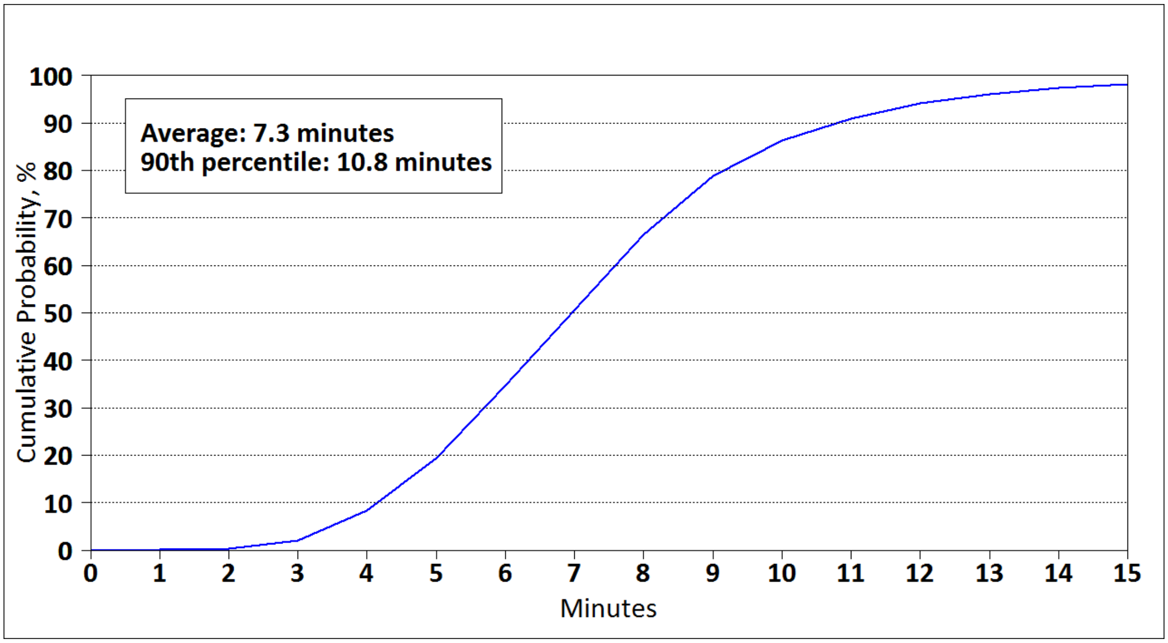
Unit	EMS	Structure and Outside Fire	Other Fire	Total	Percentage	Cumulative Percentage
E71	777	17	53	847	24.9	24.9
E72	664	7	43	714	21.0	45.9
E74	554	11	16	581	17.1	62.9
E75	442	5	31	478	14.0	77.0
TR72	314	4	16	334	9.8	86.8
E73	295	5	15	315	9.3	96.1
TR71	81	0	4	85	2.5	98.6
B1	14	12	9	35	1.0	99.6
E722	7	0	0	7	0.2	99.8
FM73	0	1	6	7	0.2	100.0

Observations:

E71 arrived first on scene most often, followed by E72 and E74. Those three units accounted for 63 percent of the first arrivals at calls.

For structure and outside fire calls, E71, B1, and E74 in that order arrived first on scene most often.

FIGURE 12: Cumulative Distribution Function (CDF) of Response Time of First Arriving Unit for EMS calls



Reading the CDF Chart: The vertical axis is the probability or percentage of calls. The horizontal axis is response time. For example, with regard to EMS calls, the 0.9 probability line intersects the graph at the time mark at about 10.8 minutes. This means that units had a response time of less than 10.8 minutes for 90 percent of these calls.

FIGURE 13: Frequency Distribution Chart of Response Time of First Arriving Unit for EMS calls

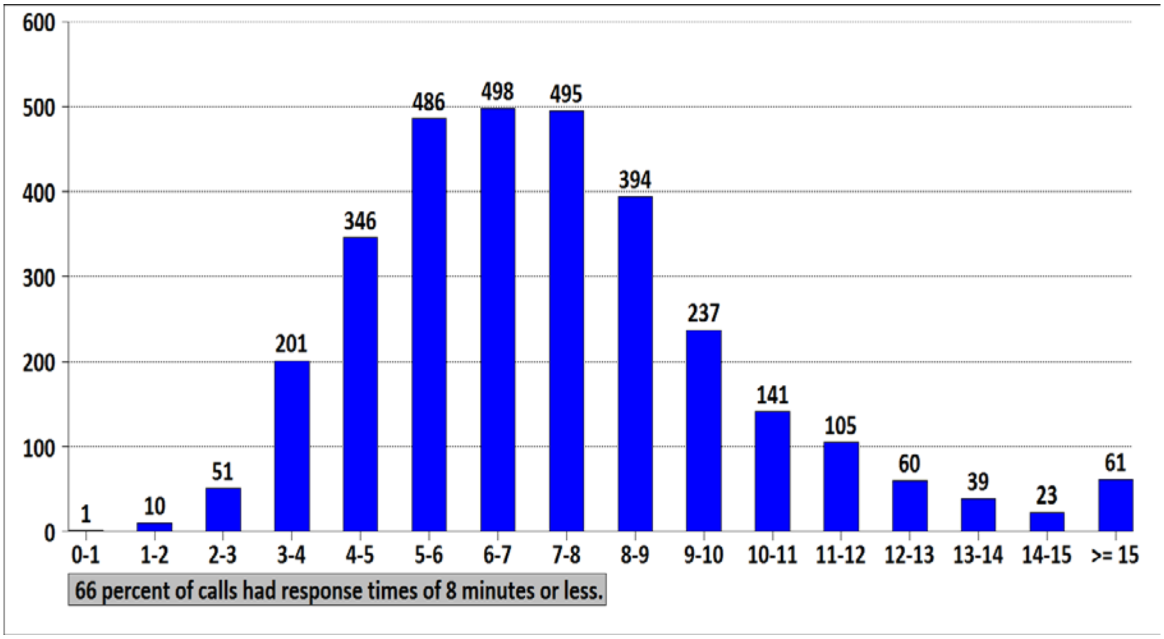


TABLE 18: Cumulative Distribution Function (CDF) of Response Time of First Arriving Unit for EMS Calls

Response Time (minute)	Frequency	Cumulative Percentage
0 - 1	1	0.0
1 - 2	10	0.3
2 - 3	51	2.0
3 - 4	201	8.4
4 - 5	346	19.3
5 - 6	486	34.8
6 - 7	498	50.6
7 - 8	495	66.3
8 - 9	394	78.8
9 - 10	237	86.4
10 - 11	141	90.9
11 - 12	105	94.2
12 - 13	60	96.1
13 - 14	39	97.3
14 - 15	23	98.1
> 15	61	100.0

Observations:

- The average response time for EMS calls was 7.3 minutes.
- For 66.3 percent of EMS calls, the response time was less than or equal to 8 minutes.
- For 90 percent of EMS calls, the response time was less than 10.8 minutes.

TABLE 19: Average Response Time for Structure and Outside Fire Calls by First Arriving Unit

Unit Type	First Arriving Unit	Outside Fire		Structure Fire		Total	
		Response Time	Number of Calls	Response Time	Number of Calls	Response Time	Number of Calls
Battalion chief	B1	5.4	4	7.8	8	7.0	12
Engine	E71	11.5	10	7.8	7	10.0	17
	E72	5.4	4	6.3	3	5.8	7
	E73	13.9	2	9.3	3	11.1	5
	E74	7.5	7	6.0	4	7.0	11
	E75	7.0	4	15.2	1	8.7	5
Foam truck	FM73	4.6	1	NA	0	4.6	1
Ladder truck	TR72	5.7	1	6.0	3	5.9	4
Total		**8.4**	**33**	**7.6**	**29**	**8.0**	**62**

Observations:

- For outside fire calls, the average response time of the first arriving unit was 8.4 minutes.
- For outside fire calls, engine E71 was the first unit on scene most often and had an average response time of 11.5 minutes.
- For structure fire calls, the average response time of the first arriving unit was 7.6 minutes.
- For structure fire calls, battalion chief B1 was the first unit on scene most often and had an average response time of 7.8 minutes.

TABLE 20: Average Response Time for Structure and Outside Fire Calls by Second Arriving Unit

Unit Type	Second Arriving Unit	Outside Fire		Structure Fire		Total	
		Response Time	Number of Calls	Response Time	Number of Calls	Response Time	Number of Calls
Battalion chief	B1	10.1	4	9.7	7	9.9	11
Engine	E71	5.5	2	9.8	1	6.9	3
	E72	NA	0	12.5	2	12.5	2
	E73	11.2	2	NA	0	11.2	2
	E74	NA	0	10.2	1	10.2	1
	E75	10.7	2	9.8	2	10.3	4
Foam truck	FM73	5.9	1	7.2	1	6.6	2
Ladder truck	TR72	NA	0	12.4	3	12.4	3
Total		**9.2**	**11**	**10.4**	**17**	**10.0**	**28**

Observations:

- For outside fire calls, the average response time of the second arriving unit was 9.2 minutes, which was 0.8 minutes longer than the first arriving unit.
- For structure fire calls, the average response time of the second arriving unit was 10.4 minutes, which was 2.8 minutes longer than the first arriving unit.

FIGURE 14: Cumulative Distribution Function (CDF) of Response Time of First and Second Arriving Units for Structure and Outside Fire Calls

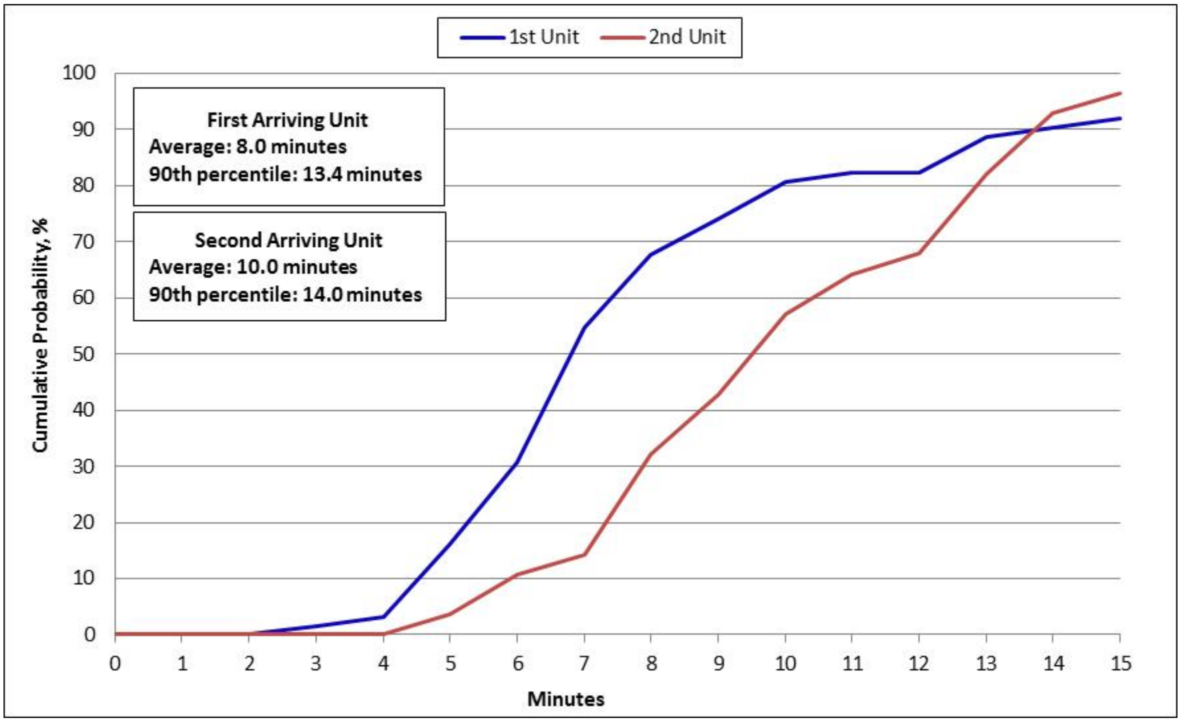


FIGURE 15: Frequency Distribution Chart of Response Time of First Arriving Unit for Structure and Outside Fire Calls

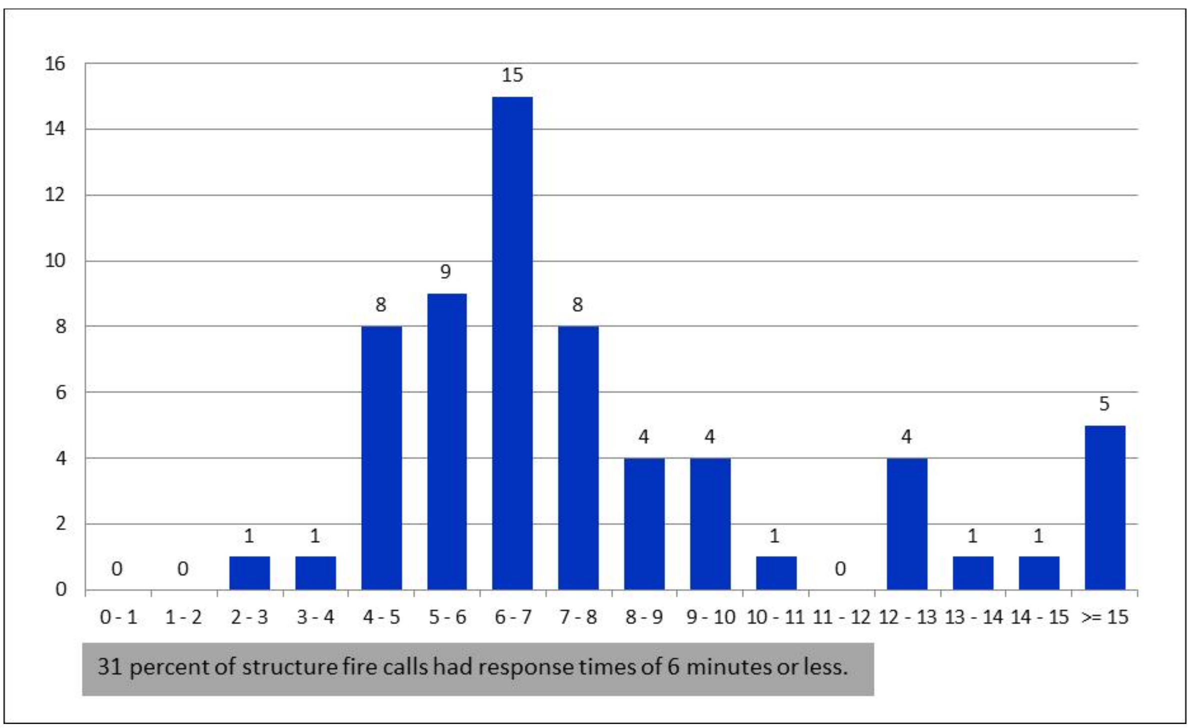


TABLE 21: Cumulative Distribution Function (CDF) of Response Time of First and Second Arriving Units for Structure and Outside Fire Calls

Response Time (minute)	First Unit		Second Unit	
	Frequency	Cumulative Percent	Frequency	Cumulative Percent
0 - 1	0	0.0	0	0.0
1 - 2	0	0.0	0	0.0
2 - 3	1	1.6	0	0.0
3 - 4	1	3.2	0	0.0
4 - 5	8	16.1	1	3.6
5 - 6	9	30.6	2	10.7
6 - 7	15	54.8	1	14.3
7 - 8	8	67.7	5	32.1
8 - 9	4	74.2	3	42.9
9 - 10	4	80.6	4	57.1
10 - 11	1	82.3	2	64.3
11 - 12	0	82.3	1	67.9
12 - 13	4	88.7	4	82.1
13 - 14	1	90.3	3	92.9
14 - 15	1	91.9	1	96.4
> 15	5	100.0	1	100.0

Observations:

- The average response time of the first arriving fire unit for structure and outside fire calls was 8.0 minutes.
- 31 percent of the time, the first fire unit's response time was less than six minutes.
- 90 percent of the time, the first fire unit's response time was less than 13.4 minutes.
- The average response time of the second arriving fire unit for structure and outside fire calls was 10.0 minutes.
- 90 percent of the time, the second fire unit's response time was less than 14.0 minutes.

TABLE 22: Average and 90th Percentile Response Time by First Due Station and Response Type

First Due Station	Emergency			Nonemergency		
	Average Response Time	90th Percentile Response Time	Sample Size	Average Response Time	90th Percentile Response Time	Sample Size
Station 71 - PFD	7.6	12.0	970	9.4	15.1	751
Station 72 - PFD	6.7	9.2	1,155	8.2	11.3	586
Station 73 - PFD	8.4	12.0	307	10.7	14.8	173
Station 74 - PFD	7.8	11.1	602	10.0	15.5	435
Station 75 - PFD	7.4	11.0	487	9.6	14.0	284
Station 51 - CYFD	7.1	10.5	560	9.1	13.0	384

Note: E51 is included in this analysis when it arrived first.

Observations:

- For emergency calls, the average response time for calls with the first due station of 72 is the shortest at 6.7 minutes.
- For emergency calls, the average response time for calls with the first due station of 73 is the longest at 8.4 minutes.
- For emergency calls, the 90th percentile response time for first due responses varied from 9.2 minutes to 12.0 minutes.
- For nonemergency calls, the average response time for first due responses varied from 8.2 minutes to 10.7 minutes.

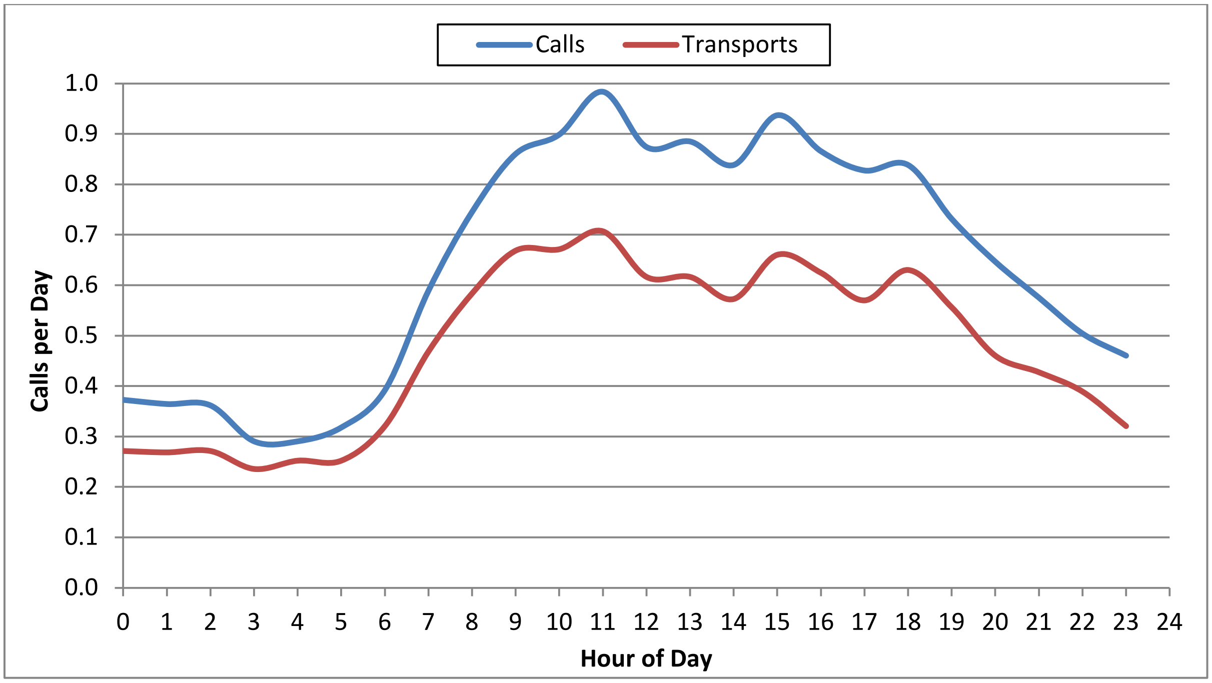
Life Line Ambulance Transport Call Analysis and Response Time Analysis

To understand how many calls involved transporting patients, and the variations by hour of day, we requested data from Life Line Ambulance. Since Life Line Ambulance does not have the system capability to track the original CAD incident number from the PFD, we were unable to completely merge CAD and Life Line Ambulance data. This section focuses on incidents to which Life Line responded and subsequent transports in the PFD's jurisdiction.

TABLE 23: Life Line Ambulance: Total and Number of Transport Calls per Day, by Hour of Day

Hour	Number of Calls	Number of Transports	Calls per Day	Transports per Day	Percent of Calls with Transport
0	136	99	0.37	0.27	72.8
1	133	98	0.36	0.27	73.7
2	132	99	0.36	0.27	75.0
3	106	86	0.29	0.24	81.1
4	106	92	0.29	0.25	86.8
5	116	92	0.32	0.25	79.3
6	143	117	0.39	0.32	81.8
7	215	171	0.59	0.47	79.5
8	272	213	0.75	0.58	78.3
9	314	244	0.86	0.67	77.7
10	328	245	0.90	0.67	74.7
11	359	258	0.98	0.71	71.9
12	319	225	0.87	0.62	70.5
13	323	225	0.88	0.62	69.7
14	306	209	0.84	0.57	68.3
15	342	241	0.94	0.66	70.5
16	316	228	0.87	0.62	72.2
17	302	208	0.83	0.57	68.9
18	306	230	0.84	0.63	75.2
19	267	203	0.73	0.56	76.0
20	236	168	0.65	0.46	71.2
21	210	156	0.58	0.43	74.3
22	184	142	0.50	0.39	77.2
23	168	117	0.46	0.32	69.6
Total	5,639	4,166	15.45	11.41	73.9

FIGURE 16: Life Line Ambulance: Number of Transport Calls, by Hour of Day



Observations:

- Overall, 74 percent of incidents to which Life Line responded involved transporting patients.
- On average, Life Line Ambulance responded to 15.5 calls per day, and provided 11.4 transports per day.
- Life Line-responded call rates and transports were highest between 8:00 a.m. and 8:00 p.m., averaging between 0.58 and 0.71 transports per hour.
- Life Line- responded call rates and transports were lowest between midnight and 6:00 a.m., averaging between 0.24 and 0.27 transports per hour.

To analyze Life Line Ambulance's contribution to each call's overall response time, we needed to match calls recorded within the city CAD system with those recorded by the Life Line's separate dispatch center. We linked CAD and ambulance records based upon similar approximate time and identical addresses. By this method, we matched 39 percent of Life Line's recorded calls with a corresponding CAD incident.

We proceeded to measure the overall ambulance response time for each matched call. First, we measured the dispatch time as the elapsed time between when CAD system's call receipt time and the ambulance system's initial dispatch time. Then, the ambulance response time, which is entirely measured by Life Line, is computed as the time from the ambulance's initial dispatch until it arrives on scene. Finally, the total response time is the sum of both components.

Please note that this section of the analysis only uses a portion of Life Line Ambulance responses that were matched to CAD incidents. When all Life Line's responses are included, the average Life Line response time for emergency and nonemergency calls decreases to 7.1 and 9.5 minutes, respectively, compared to the 8.1 and 10.2 minute averages shown below.

TABLE 24: Life Line Ambulance: Average Dispatch Time and Response Time by Priority

Priority	Dispatch Time	Life Line Response Time	Total Response Time	Sample Size
Emergency	1.7	8.1	9.9	1,384
Nonemergency	2.4	10.2	12.6	684

Observations:

- For emergency calls, the average dispatch time was 1.7 minutes, and on average it took Life Line Ambulance 8.1 minutes to arrive on scene, and the average total response time was 9.9 minutes.
- For nonemergency calls, the average dispatch time was 2.4 minutes, and on average it took Life Line Ambulance 10.2 minutes to arrive on scene, and the average total response time was 12.6 minutes.

TABLE 25: Life Line Ambulance: 90th Percentile Dispatch Time and Response Time by Priority

Priority	Dispatch Time	Life Line Response Time	Total Response Time	Sample Size
Emergency	2.5	12.4	14.3	1,384
Nonemergency	3.3	15.3	18.2	684

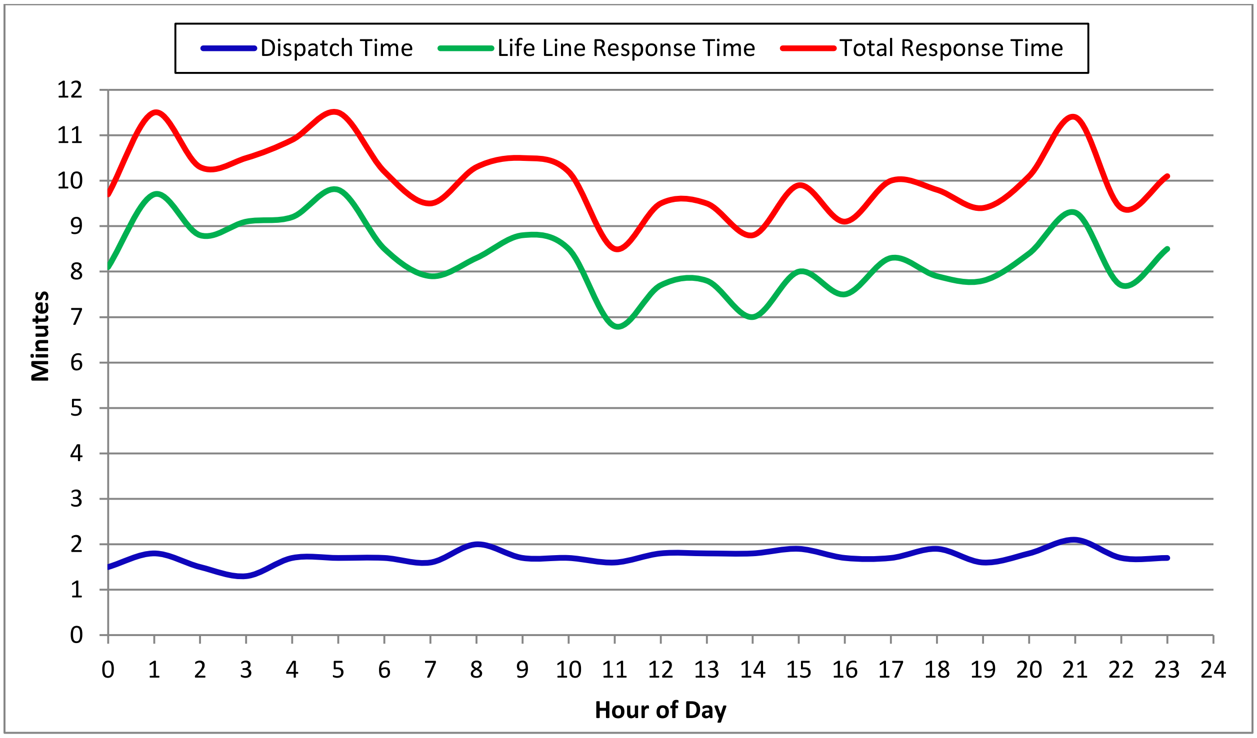
Observations:

- For emergency calls, the 90th percentile dispatch time was 2.5 minutes, the 90th percentile Life Line response time was 12.4 minutes, and the 90th percentile total response time was 14.3 minutes.
- For nonemergency calls, the 90th percentile dispatch time was 3.3 minutes, the 90th percentile Life Line response time was 15.3 minutes, and the 90th percentile total response time was 18.2 minutes.

TABLE 26: Life Line Ambulance: Average Dispatch Time and Response Time, by Hour of Day for Emergency Calls

Hour	Dispatch Time	Life Line Response Time	Total Response Time	Sample Size
0	1.5	8.1	9.7	34
1	1.8	9.7	11.5	28
2	1.5	8.8	10.3	30
3	1.3	9.1	10.5	24
4	1.7	9.2	10.9	30
5	1.7	9.8	11.5	44
6	1.7	8.5	10.2	50
7	1.6	7.9	9.5	55
8	2.0	8.3	10.3	68
9	1.7	8.8	10.5	81
10	1.7	8.5	10.2	89
11	1.6	6.8	8.5	98
12	1.8	7.7	9.5	79
13	1.8	7.8	9.5	70
14	1.8	7.0	8.8	70
15	1.9	8.0	9.9	61
16	1.7	7.5	9.1	82
17	1.7	8.3	10.0	69
18	1.9	7.9	9.8	69
19	1.6	7.8	9.4	68
20	1.8	8.4	10.1	57
21	2.1	9.3	11.4	52
22	1.7	7.7	9.4	37
23	1.7	8.5	10.1	39

FIGURE 17: Life Line Ambulance: Average Dispatch Time, and Response Time, by Hour of Day for Emergency Calls



Observations:

- Dispatch time varied between 1.3 and 2.1 minutes.
- Life Line Ambulance response time varied between 6.8 and 9.8 minutes. It was highest between 1:00 a.m. and 6:00 a.m., averaging above 8.8 minutes.
- Total response time varied between 8.5 and 11.5 minutes. It peaked between 1:00 a.m. to 2:00 a.m. and 5:00 a.m. to 6:00 a.m., averaging 11.5 minutes.

Number of Calls by Original Call Type

Call Type	Number of Calls	Calls per Day	Call Percentage
Cardiac and stroke	361	1.0	4.4
Seizure and unconsciousness	622	1.7	7.7
Breathing difficulty	214	0.6	2.6
Overdose and psychiatric	160	0.4	2.0
MVA	313	0.9	3.9
Fall and injury	570	1.6	7.0
Illness and other	3,084	8.4	37.9
EMS Total	**5,324**	**14.6**	**65.5**
Structure fire	39	0.1	0.5
Outside fire	58	0.2	0.7
Hazard	144	0.4	1.8
False alarm	307	0.8	3.8
Good intent	208	0.6	2.6
Public service	934	2.6	11.5
Fire Total	**1,690**	**4.6**	**20.8**
Canceled	1,114	3.1	13.7
Total	**8,128**	**22.3**	**100.0**

Note: This table excludes automatic aid given calls, and breaks down automatic aid received calls into their original call types, which could be EMS, fire or canceled call type.

Workload Analysis of Units from Other Agencies

Agency	Number of Runs	Runs per Day	Annual Deployed Hours	Deployed Hours per Day
Lifeline Ambulance	6,498	17.8	3,385.6	9.3
Central Yavapai Fire District	359	1.0	390.6	1.1
Chino Valley Fire District	30	0.1	37.9	0.1
Groom Creek Fire District	9	0.0	23.7	0.1
Walker Volunteer Fire District	1	0.0	0.0	0.0
Williamson Valley Fire District	1	0.0	2.1	0.0
Unknown	254	0.7	123.4	0.3
Total	**7,152**	**19.6**	**3,963.4**	**10.9**

Workload of Administrative Units

Unit Description	Number of Runs	Annual Hours
Duty Officer	87	114.9
Fire Prevention Officer / Inspector	44	76.1

Property and Content Loss Analysis for Structure and Outside Fire Calls

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Structure fire	$354,580	17	$164,800	18
Outside fire	$148,451	12	$115,826	8
Total	**$503,031**	**29**	**$280,626**	**26**

Note: This analysis only includes calls with property loss or content loss greater than 0.

Observations:

- Out of 32 structure fire calls, 17 calls (53 percent) had recorded property loss, with total recorded loss value of $354,580. The structure fire call with the largest property loss of $160,000 occurred at 605 Carson Dr. in Prescott.
- Out of 44 outside fire calls, 12 (27 percent) had recorded property loss, with total loss value of $148,451.

Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Structure fire	Outside fire
Extinguishment by fire service personnel	20	32
Salvage & overhaul	2	1
Control fire (wildland)	0	1
Ventilate	2	1
Investigate	6	3
Investigate fire out on arrival	0	5
Action taken, other	0	1
Blank	2	0

Note: Two structure fire calls did not record any action taken in NFIRS.

Correspondence between NFIRS Incident Type and Call Type

NFIRS Incident Type	Incident Description	Call Type
100	Fire, other	Outside fire
111	Building fire	Structure fire
113	Cooking fire, confined to container	Structure fire
114	Chimney or flue fire, confined to chimney or flue	Structure fire
118	Trash or rubbish fire, contained	Structure fire
130	Mobile property (vehicle) fire, other	Outside fire
131	Passenger vehicle fire	Outside fire
140	Natural vegetation fire, other	Outside fire
141	Forest, woods or wildland fire	Outside fire
142	Brush or brush-and-grass mixture fire	Outside fire
143	Grass fire	Outside fire
151	Outside rubbish, trash or waste fire	Outside fire
154	Dumpster or other outside trash receptacle fire	Outside fire
160	Special outside fire, other	Outside fire
220	Overpressure rupture from air or gas, other	Hazard
221	Overpressure rupture of air or gas pipe/pipeline	Hazard
251	Excessive heat, scorch burns with no ignition	Hazard
300	Rescue, EMS incident, other	EMS
311	Medical assist, assist EMS crew	EMS
321	EMS call, excluding vehicle accident with injury	EMS
322	Motor vehicle accident with injuries	MVA
323	Motor vehicle/pedestrian accident (MV Ped)	MVA
324	Motor vehicle accident with no injuries.	MVA
342	Search for person in water	EMS
350	Extrication, rescue, other	EMS
353	Removal of victim(s) from stalled elevator	EMS
360	Water & ice-related rescue, other	EMS
363	Swift water rescue	EMS
381	Rescue or EMS standby	EMS
400	Hazardous condition, other	Hazard
410	Combustible/flammable gas/liquid condition, other	Hazard
411	Gasoline or other flammable liquid spill	Hazard
412	Gas leak (natural gas or LPG)	Hazard
413	Oil or other combustible liquid spill	Hazard
421	Chemical hazard (no spill or leak)	Hazard
422	Chemical spill or leak	Hazard
424	Carbon monoxide incident	Hazard
440	Electrical wiring/equipment problem, other	Hazard
441	Heat from short circuit (wiring), defective/worn	Hazard
442	Overheated motor	Hazard
443	Breakdown of light ballast	Hazard
444	Power line down	Hazard

NFIRS Incident Type	Incident Description	Call Type
445	Arcing, shorted electrical equipment	Hazard
460	Accident, potential accident, other	Hazard
461	Building or structure weakened or collapsed	Hazard
462	Aircraft standby	Hazard
463	Vehicle accident, general cleanup	Hazard
480	Attempted burning, illegal action, other	Hazard
500	Service Call, other	Public service
510	Person in distress, other	Public service
511	Lock-out	Public service
520	Water problem, other	Public service
521	Water evacuation	Public service
522	Water or steam leak	Public service
531	Smoke or odor removal	Public service
540	Animal problem, other	Public service
541	Animal problem	Public service
542	Animal rescue	Public service
550	Public service assistance, other	Public service
551	Assist police or other governmental agency	Public service
552	Police matter	Public service
553	Public service	Public service
554	Assist invalid	Public service
555	Defective elevator, no occupants	Public service
561	Unauthorized burning	Public service
571	Cover assignment, standby, moveup	Public service
600	Good intent call, other	Good intent
611	Dispatched & canceled enroute	Canceled
622	No incident found on arrival at dispatch address	Canceled
631	Authorized controlled burning	Good intent
650	Steam, other gas mistaken for smoke, other	Good intent
651	Smoke scare, odor of smoke	Good intent
652	Steam, vapor, fog or dust thought to be smoke	Good intent
661	EMS call, party transported by non-fire agency	Good intent
671	HazMat release investigation w/no HazMat	Good intent
672	Biological hazard investigation, none found	Good intent
700	False alarm or false call, other	False alarm
710	Malicious, mischievous false call, other	False alarm
711	Municipal alarm system, malicious false alarm	False alarm
713	Telephone, malicious false alarm	False alarm
715	Local alarm system, malicious false alarm	False alarm
721	Bomb scare - no bomb	False alarm
730	System malfunction, other	False alarm
731	Sprinkler activation due to malfunction	False alarm
733	Smoke detector activation due to malfunction	False alarm

NFIRS Incident Type	Incident Description	Call Type
734	Heat detector activation due to malfunction	False alarm
735	Alarm system sounded due to malfunction	False alarm
736	CO detector activation due to malfunction	False alarm
740	Unintentional transmission of alarm, other	False alarm
741	Sprinkler activation, no fire - unintentional	False alarm
743	Smoke detector activation, no fire - unintentional	False alarm
744	Detector activation, no fire - unintentional	False alarm
745	Alarm system activation, no fire - unintentional	False alarm
746	Carbon monoxide detector activation, no CO	False alarm
814	Lightning strike (no fire)	Public service
900	Special type of incident, other	Public service
911	Citizen complaint	Public service

Appendix II: ICMA-PFD Employee Survey

1. Age (in years)

	Response Percent	Response Count
18 - 29	14.3%	5
30 - 39	**31.4%**	**11**
40 - 49	**31.4%**	**11**
50+	22.9%	8
	answered question	**35**
	skipped question	**1**

2. Gender

	Response Percent	Response Count
Male	**97.1%**	**34**
Female	2.9%	1
	answered question	**35**
	skipped question	**1**

3. Rank

	Response Percent	Response Count
Firefighter	12.1%	4
Firefighter/EMT	12.1%	4
Firefighter/Paramedic	15.2%	5
Driver Engineer	**30.3%**	**10**
Lieutenant and/or Captain	15.2%	5
Battalion Chief and above	15.2%	5
	answered question	**33**
	skipped question	**3**

4. Tenure (in years of service)

	Response Percent	Response Count
0-5	**25.7%**	**9**
6-10	20.0%	7
11-15	**25.7%**	**9**
16-20	14.3%	5
21+	14.3%	5
	answered question	**35**
	skipped question	**1**

5. Climate/Work Conditions

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Rating Count
I believe the Prescott Fire Department (PFD) provides an excellent service to the community	**69.7% (23)**	27.3% (9)	3.0% (1)	0.0% (0)	0.0% (0)	33
My work conditions are acceptable	3.0% (1)	21.2% (7)	**33.3% (11)**	15.2% (5)	27.3% (9)	33
The radios we use work effectively	3.2% (1)	**35.5% (11)**	32.3% (10)	12.9% (4)	16.1% (5)	31
The Personal Protective Equipment (PPE) we use works effectively	9.4% (3)	**43.8% (14)**	34.4% (11)	6.3% (2)	6.3% (2)	32
The vehicles we use are appropriate for their use	13.3% (4)	33.3% (10)	**36.7% (11)**	13.3% (4)	3.3% (1)	30
The technology we employ, in general, is effective	3.2% (1)	25.8% (8)	**38.7% (12)**	16.1% (5)	16.1% (5)	31
I have adequate supplies/equipment necessary to do my job	6.1% (2)	**33.3% (11)**	21.2% (7)	24.2% (8)	15.2% (5)	33
I have adequate employee space to do my job	6.1% (2)	**27.3% (9)**	15.2% (5)	**27.3% (9)**	24.2% (8)	33
The fire stations are in acceptable condition	0.0% (0)	0.0% (0)	6.1% (2)	45.5% (15)	**48.5% (16)**	33
I am satisfied with my work schedule	**66.7% (22)**	27.3% (9)	3.0% (1)	0.0% (0)	3.0% (1)	33
The department would be better off with a different work schedule	9.4% (3)	0.0% (0)	0.0% (0)	12.5% (4)	**78.1% (25)**	32
I am proud to be a member of the PFD	**51.5% (17)**	30.3% (10)	15.2% (5)	3.0% (1)	0.0% (0)	33
I often think of resigning from the department	23.3% (7)	6.7% (2)	13.3% (4)	13.3% (4)	**43.3% (13)**	30
In general, I am satisfied with my career	**39.4% (13)**	33.3% (11)	9.1% (3)	15.2% (5)	3.0% (1)	33
Morale is high in the department	0.0% (0)	0.0% (0)	9.1% (3)	27.3% (9)	**63.6% (21)**	33

The department has a clear sense of its mission	0.0% (0)	6.1% (2)	18.2% (6)	18.2% (6)	**57.6% (19)**	33
There needs to be more firefighters on shift to handle the workload	**42.4% (14)**	36.4% (12)	15.2% (5)	6.1% (2)	0.0% (0)	33
Whenever I have a concern at work I can always have my concerns resolved	0.0% (0)	21.2% (7)	21.2% (7)	**33.3% (11)**	24.2% (8)	33
I would recommend the PFD to anyone interested in a career in fire fighting	9.1% (3)	15.2% (5)	24.2% (8)	21.2% (7)	**30.3% (10)**	33
I would recommend the PFD to anyone interested in a career in emergency medical services (EMS)	9.1% (3)	15.2% (5)	24.2% (8)	18.2% (6)	**33.3% (11)**	33
The Department is innovative when it comes to fighting fires	21.2% (7)	**39.4% (13)**	9.1% (3)	15.2% (5)	15.2% (5)	33
The Department is innovative when it comes to fire prevention activities	6.3% (2)	**28.1% (9)**	**28.1% (9)**	18.8% (6)	18.8% (6)	32
The Department is innovative when it comes to providing EMS	15.2% (5)	**39.4% (13)**	21.2% (7)	18.2% (6)	6.1% (2)	33
The Department is innovative when it comes to dealing with the community	**42.4% (14)**	15.2% (5)	21.2% (7)	15.2% (5)	6.1% (2)	33
					answered question	**33**
					skipped question	**3**

6. Communication

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Rating Count
I know what is expected of me at work	33.3% (11)	**45.5% (15)**	12.1% (4)	6.1% (2)	3.0% (1)	33
I have clear information about how to do my job	30.3% (10)	**39.4% (13)**	24.2% (8)	3.0% (1)	3.0% (1)	33
I feel comfortable with what I am asked to do in meeting my job requirements	36.4% (12)	**42.4% (14)**	18.2% (6)	3.0% (1)	0.0% (0)	33
My supervisor and I maintain a clear understanding about what I am expected to do and how I am expected to carry it out	36.4% (12)	**48.5% (16)**	12.1% (4)	3.0% (1)	0.0% (0)	33
My supervisor does a good job communicating information to people in my unit	36.4% (12)	**39.4% (13)**	18.2% (6)	6.1% (2)	0.0% (0)	33
Often times I hear about changes in the department from the press	**51.5% (17)**	27.3% (9)	15.2% (5)	0.0% (0)	6.1% (2)	33
In general, I believe there is good communication between the department and city hall	0.0% (0)	0.0% (0)	0.0% (0)	6.1% (2)	**93.9% (31)**	33
My immediate supervisor listens to my ideas about improving the department	24.2% (8)	**42.4% (14)**	18.2% (6)	3.0% (1)	12.1% (4)	33
My supervisor is able to share my ideas with department leadership	9.4% (3)	25.0% (8)	**34.4% (11)**	12.5% (4)	18.8% (6)	32
In general, the communication process in the fire department is excellent	0.0% (0)	12.1% (4)	24.2% (8)	**33.3% (11)**	30.3% (10)	33
I wish there was a better way where my ideas could be heard	21.2% (7)	33.3% (11)	**36.4% (12)**	9.1% (3)	0.0% (0)	33
					answered question	**33**
					skipped question	**3**

7. Meaningful Work

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Rating Count
I receive timely feedback that my work contributes to the overall success of the department	3.0% (1)	**45.5% (15)**	21.2% (7)	12.1% (4)	18.2% (6)	33
I receive necessary training to maintain/improve my skill and competency levels	6.1% (2)	**33.3% (11)**	30.3% (10)	15.2% (5)	15.2% (5)	33
My immediate supervisor is properly trained for the position he/she holds	36.4% (12)	**45.5% (15)**	12.1% (4)	3.0% (1)	3.0% (1)	33
Training opportunities are readily available in the department	12.1% (4)	15.2% (5)	18.2% (6)	**30.3% (10)**	24.2% (8)	33
Training opportunities are distributed fairly in the department	6.1% (2)	30.3% (10)	**39.4% (13)**	9.1% (3)	15.2% (5)	33
Selections to specialized assignments in the department are done fairly	3.1% (1)	**37.5% (12)**	34.4% (11)	15.6% (5)	9.4% (3)	32
Promotions in the department are done fairly	6.3% (2)	**46.9% (15)**	25.0% (8)	9.4% (3)	12.5% (4)	32
In the department, discipline is applied fairly	6.1% (2)	30.3% (10)	**33.3% (11)**	15.2% (5)	15.2% (5)	33
In the department, people are held accountable	9.1% (3)	**27.3% (9)**	**27.3% (9)**	24.2% (8)	12.1% (4)	33
My work in important	**68.8% (22)**	21.9% (7)	3.1% (1)	3.1% (1)	3.1% (1)	32
My work makes a positive contribution to the community	**78.8% (26)**	21.2% (7)	0.0% (0)	0.0% (0)	0.0% (0)	33
					answered question	**33**
					skipped question	**3**

8. Support/Relationships

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Rating Count
My supervisor takes personal interest in me	33.3% (11)	**48.5% (16)**	12.1% (4)	3.0% (1)	3.0% (1)	33
My supervisor supports my professional development	30.3% (10)	**45.5% (15)**	15.2% (5)	3.0% (1)	6.1% (2)	33
My supervisor is an effective leader	33.3% (11)	**42.4% (14)**	15.2% (5)	3.0% (1)	6.1% (2)	33
My co-workers are competent at doing their job	36.4% (12)	**51.5% (17)**	12.1% (4)	0.0% (0)	0.0% (0)	33
My co-workers are satisfied with their jobs	0.0% (0)	12.5% (4)	28.1% (9)	**43.8% (14)**	15.6% (5)	32
I have confidence in the command staff to lead the department	6.1% (2)	**33.3% (11)**	21.2% (7)	30.3% (10)	9.1% (3)	33
Often times it seems like no one is in charge	24.2% (8)	21.2% (7)	**45.5% (15)**	9.1% (3)	0.0% (0)	33
					answered question	**33**
					skipped question	**3**