City of Missoula

MISSOULA FIRE DEPARTMENT

625 E Pine St. Missoula, MT 59802

MASTER FIRE PLAN

2019

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MISSOULA FIRE DEPARTMENT MASTER FIRE PLAN 2019

Acknowledgements

The following Master Plan was put together by the Administrative Division of the Missoula Fire Department. Participating parties include members of the Fire Prevention Bureau, Maintenance, and Training Divisions. They utilized data from their internal records management systems, reference from cooperating agency documents, local and state codes, and legal documents. For a complete list of references, please see references noted in the appendix section of this document as well as footnotes throughout.

- Fire Chief Jeff Brandt .....Master Plan Outline & Department Overview
- Assistant Fire Chief Gordy Hughes .....Project Details & Future Projections
- Assistant Fire Chief Brad Davis .....Operations & Current Challenges
- Administrative Staff Cheryl Schatz, Cathy Janney, Sarah Kennett .....Statistical Data & Formatting
- Training Officer Mike Thurlow.....Training Division Outline
- Fire Marshal Dax Fraser, Asst. Fire Marshal Adam Sebastian.....Fire Prevention Bureau Outline
- Master Mechanic Eric Petroff.....Apparatus & Facilities Outline

Scope of Master Fire Plan

The scope and purpose of developing Missoula Fire Department's long-term Master Fire Plan is to provide city officials, fire department personnel, and the community with a comprehensive analysis in which to base decisions on providing fire related service to the City of Missoula. This report is intended to provide education, information and recommendations for a strategic direction for the future of the Missoula Fire Department. This report will include information about Missoula Fire Department's organization, staffing, overtime, workload indicators, training, fire prevention and education, facility and vehicle maintenance, emergency communications with Missoula County 911 and other mutual aid agencies, response plans, and strategic planning for current and future needs. At the end of the report, there will be a section dedicated for future planning with stated goals and objectives, and Management Decision Points (MDP). These objectives and MDPs are made on the basis of data collected and projections to meet the fire service needs of the community.

Key areas addressed in this document:

- Fire Department Organization and Management
- Financial Analysis
- Staffing and Personnel Management
- Training for Fire and Emergency Medical Services
- Fire Prevention and Education
- Capital Assets and Infrastructure
- Service Delivery and Performance
- Fire Planning and Deployment of Resources
- Workload for Fire and EMS Operations (Emergent and Non-Emergent)
- Future Planning

History of the Missoula Fire Department

Missoula Fire Department's historical records prior to 1900 are incomplete, though some information can be gleaned from newspaper articles. The Missoula Fire Department was first organized in 1877. Shortly thereafter, a fire broke out in the Kennedy House Hotel. If not for the Missoula Fire Department, per our firefighter sources, "the whole town would have burned down." A few years later, in September of 1884, the Fire Department battled a fire which started at Leber's Bowling Alley and quickly raged out of hand. The fire eventually burned 22 buildings and had a recorded loss of $30,000. Three years later, the first Missoula Fire Department facility was built at the intersection of what was then Stephens and West Main Street. That building was first built as a city hall which housed city offices, fire and police department, and the city jail. It was turned over to the Missoula Fire Department for its sole use in 1912 when a new city hall was constructed.

Figure 1: Dated circa 1890. Missoula Fire Department Station 1

In the earliest days, horse-drawn engines were pulled by "fire horses", the first horse-drawn vehicle in the department was a Wayne Hose Wagon purchased secondhand in 1889. It was named "C.P. Higgins" after the man who is believed to have been the first Fire Chief. The first mechanical fire engine was placed in service in Missoula around 1910.

The earliest Missoula firefighters served primarily as volunteers until 1911 when a fully-paid department was established. Since then, MFD has evolved to become the modern department it currently is with 19 fire apparatus vehicles in service operating from five stations located throughout the community. One thing that has remained is the mission to protect Missoula's citizens and properties.

The Missoula Fire Department remains a fully career-staffed fire department that coordinates emergency fire and EMS response within the City of Missoula. MFD is always striving to keep up with an ever-growing city and ensuring safe practices and efficient response. The department always does its best to provide quality service and to operate professionally.

Vison, Mission, Goals, and Objectives

MFD mission statement:

To save lives, protect property, ease pain and suffering.

Vision statement:

To be recognized as the premier public safety organization, respected and admired by our peers and our community as the most effective, innovative, and efficient fire department in the state of Montana and the region.

Motto:

Courage, Commitment, Compassion

Core Values:

- ***Reliability*** – Our commitment to the public we serve is unwavering and consistent.
- ***Teamwork*** – Our people are the key to success. We work as a team because we value each other, our community and our commitment to the MFD mission.
- ***Dedication*** – The faithful observance of duty beckons us to fulfill our obligations professionally and honestly.
- ***Bravery*** – Courage is the foundation of our character. Bravery is the ability to overcome fear through fortitude, instinct, training and compassion for others.

Figure 2: Missoula Firefighters make a roof attack on a residential structure fire.

Current Fire Department Analysis

Organization and Management Overview:

The Missoula Fire Department (MFD) is a department of the City of Missoula, Montana. The City of Missoula is a governmental entity established under the laws of the State of Montana and granted authority to levy taxes for the purposes of providing fire protection and emergency medical services. MFD is a standalone department as established by state law for class one cities. The Department's jurisdiction encompasses all areas within the city limits of Missoula. MFD also provides automatic aid and mutual aid outside the city limits.

The current resident population served is approximately 73,340 (an increase from the 2010 U.S. Census figure of 66,788.) The city limits is an area encompassing approximately 34.23 square miles. The community is home to the University of Montana, with a student population of 12,419.

Fire service is provided from five fire stations distributed within the jurisdiction, as well as a boathouse used by the Missoula Fire Department to house two rescue watercraft. The Department maintains a fleet of vehicles which include five front line (Type 1) fire engines, with one engine at each station, three reserve (Type 1) engines, six wildland firefighting vehicles (one Type 2, two Type 3, two Type 6 and one water tender), two ladder trucks, two ambulances and a trench rescue trailer. The Department's Maintenance Division is responsible for maintaining all fire department apparatus and equipment with the exception of some staff vehicles. The Maintenance Division is also responsible for the repair and maintenance of all five fire department facilities. MFD provides Advance Life Support (ALS) and Basic Life Support (BLS) for emergency medical calls, but does not provide primary medical transport.

The Missoula Fire Department is an all career fire department comprised of 95 personnel. The Department is managed by a Fire Chief and two Assistant Chiefs, with the aid of three office support staff. The Fire Chief has the overall responsibility of managing the day-to-day operations and administrative oversight.

Figure 3: MFD Station 4 dated October, 2018

Chief Officers' Duties & Responsibilities

Dated: 10/1/2018

The following list of duties and assignments is illustrative. The duties listed are not all inclusive and assignments are subject to change.

Fire Chief

- Manage all activities of the fire department
- Provide oversight and direction to all fire department divisions
  - Department budget and contract management
  - Department rules, policies, and practices
  - Department recruitment, hiring, and discipline
  - Department planning and grants
  - Department representation and relations with labor, the community, city council, city departments, and other agencies
  - Department health, wellness, fitness, and safety

Assistant Fire Chief – Administration

- Special Operations & Programs:
  - Hazmat
  - Wildlands-ROSS-IQS
  - Incident Management Team
  - CrewSense/Scheduling
  - Pre-Plans
  - New World/Records Management System
  - Facebook/Social Media Presence Oversight
  - Light-Duty Assignments
  - Missoula County Fair
- Grants
- Fire Prevention Bureau
- Administrative Support Staff
- Fire Prevention Bureau
- Training Division:
  - Operations
  - EMS
  - Public Relations
- Video Conferencing
- Work Comp/FMLA
- Safety

Assistant Fire Chief - Operations

- Operations Programs:
  - Operations Personnel
  - Rescue Program
  - SCBA Program
  - Peer Fitness Program
  - Peer Support Program
  - Active Shooter Program
  - Thermal Imagers
- MFD Communications (MDTs, Radios and Cell Phones)
- Shift Realignment and Vacation
- 911 Communications
- Appraisals
- PPE and Uniforms
- Work Comp/FMLA
- Maintenance Division
  - Maintenance Personnel
  - Apparatus
  - Facilities
- Promotional Process and Officer Development Program
- Station Supplies
- SOGs
- JPRs
- Safety

Battalion Chief A Shift

- Rescue
- Pre-Plans
- MDTs
- Safety

Battalion Chief B Shift

- PPE and Uniforms
- Station Supplies
- Missoula County Fair
- Safety

Battalion Chief C Shift

- Hazmat
- Active Shooter
- SOGs
- 4-Gas Monitors
- Safety

Battalion Chief D Shift

- Wildlands
- SCBA Program
- Radios
- Safety

Table 1: Chief Duty Breakdown

MFD has an active management team that consists of all the aforementioned Chiefs, the Fire Service Manager, Fire Marshal, Training Officer, Master Mechanic and four Battalion Chiefs. This team has been empowered to provide leading their staff, make critical decisions regarding accomplishing the fire department's mission, and provide excellent customer service to the citizens and community of Missoula.

Missoula Fire Department has developed an organizational chart with the intent of supporting a chain of command which allows communication to flow appropriately between staff and the management team; see Figure 4 below. The chain of command and leadership allow for efficient and effective operation of the Department. Thorough job descriptions of each position ensure that each individual's specific role is clear and centered on the overall mission of the organization.

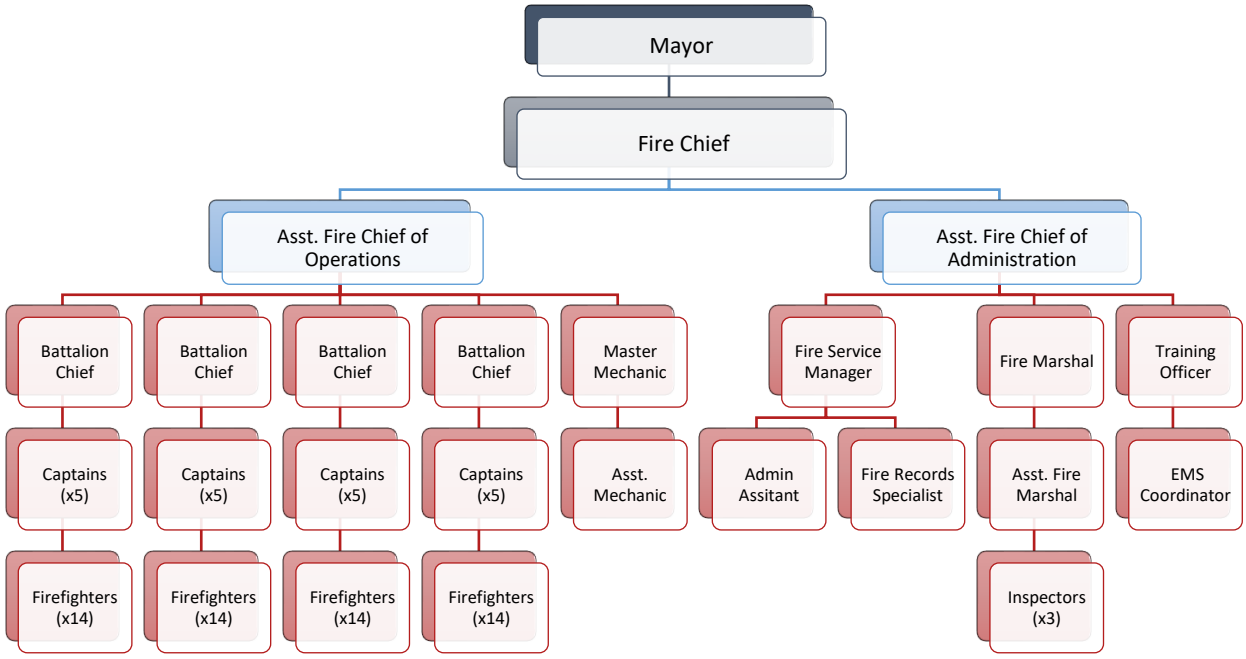


Figure 4: MFD Organizational Chart

The Missoula Fire Department operates under a set of administrative policies set by the City of Missoula Personnel Policy Manual, the Collective Bargaining Agreement with International Association of Firefighters (IAFF) Local 271 & Missoula Fire Department Standard Operating Guidelines (SOGs). The purpose of these SOGs is to provide guidance for general operations within the fire department. MFD SOGs are separated by division and are intended to cover all areas of procedure within the department. They are intended to be living documents that are reviewed and updated as needed. An internal department review and revision is made prior to publication of any SOG to ensure all SOGs are current, acceptable, and fair. The department is currently undergoing a review of all MFD SOGs. This review will be conducted by an in-house SOG committee and includes a cross section of firefighters, captains, and division personnel within the department. There will also be an annual review of all SOGs by the same committee.

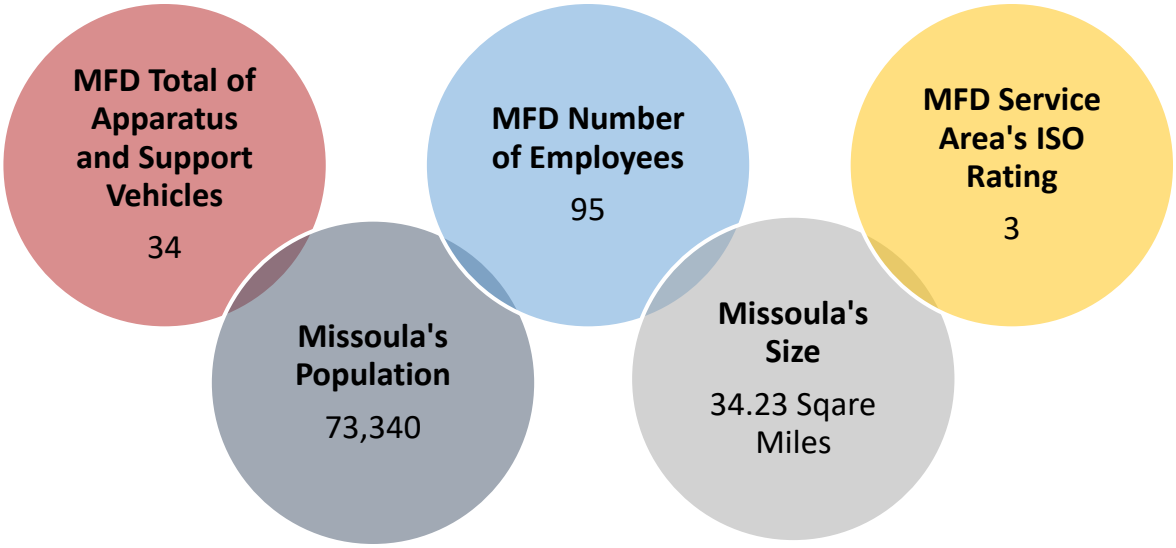


Figure 5: Missoula and MFD Infrastructure

Figure 5 references the infrastructure of the Missoula Fire Department and the city of Missoula, including population, land size, ISO rating, and fire department employee and apparatus numbers.

The fire department consists of five divisions: Administration, Fire Prevention Bureau, Training, Maintenance, and Operations. All divisions are responsible for their own management and functionality to help support one another and serve the community of Missoula.

The following are information and outlines of each division:

Administrative Division Overview

The MFD Administrative Division consists of the Fire Chief, Assistant Chief of Operations, Assistant Chief of Administration, as well as the Fire Service Manager, who oversees an Administrative Assistant and Records Specialist. This division is responsible for budget oversight, planning, recruitment, discipline and discharge, payroll, project management, public relations, and general support for the entire fire department.

The Mayor, with support of the City Council, appoints the Fire Chief. The Fire Chief has monthly meetings with the Chief Administrative Officer to help facilitate continuity throughout the City. The Chief's authority is defined by both state law and local ordinances.

Fire Prevention Bureau Division Overview

Fire Prevention Bureau (FPB) consists of the Fire Marshal, Assistant Fire Marshal, and three Fire Inspectors. The duties and responsibilities of the FPB include public education, fire origin and cause investigations, fire and life safety code inspections, and building plan and subdivision review. All members of the FPB are trained as firefighters and may be called into Operations to function as such whenever needed.

Training Division

The Training Division consists of a Training Officer and an Emergency Medical Services (EMS) Coordinator. The Training Division is responsible for providing and coordinating all training throughout the fire department. The Training Division provides oversight and record keeping of fire and medical certifications. The Training Division takes the primary role for new hire recruits during their first 18-month "rookie" training. In addition, the Training Division responds, as needed, to emergency incidents. The Training Officer fills the role as a Safety Officer on scene, and the EMS Coordinator is responsible for facilitating firefighter decontamination and rehabilitation.

Maintenance Division

The Maintenance Division consists of a Master Mechanic and an Assistant Mechanic. The Maintenance Division is responsible for the repair and maintenance of MFD's vehicle fleet and fire station facilities, as well as taking care of all MFD tools and equipment. Other Maintenance Division responsibilities include managing the division's budget, scheduling core replacement, purchasing fire apparatus and equipment, training operation personnel, and assisting with fire department operations. They are also responsible for managing all outside repairs and warranty work, completing annual apparatus testing, and developing job performance requirements (JPR).

The Maintenance Division must maintain their training and qualifications as firefighters and act in that capacity when needed. They must also obtain their Emergency Vehicle Technician (EVT) certifications to be qualified to work on emergency response apparatus.

Operations Division

The Operations Division consists of eighty personnel divided into four shifts. Each shift has twenty firefighters, consisting of one Battalion Chief, five Captains and fourteen firefighters. The Operations Division is responsible for providing the Department's emergency response functions including fire suppression, rescue, and emergency medical incidents. MFD operates from five fire stations; each station is staffed with a minimum of three firefighters, with a Battalion Chief assigned at Fire Station #1. The Department staffs an engine at each station and cross-staffs two ladder trucks (currently located at station #3 and #4). These units are operational twenty-four hours per day, seven days a week.

MFD also has wildland apparatus, two ambulances, a trench rescue trailer and other technical rescue equipment (including ice and river rescue equipment) located strategically within their stations.

Operations personnel work a four-platoon system in which personnel are on-duty for 24 consecutive hours, off for 24 hours, and back on for 24 consecutive hours, followed by 5 days off. When averaged through the calendar year, this work schedule equates to a 42-hour work week.

Uniformed personnel assigned outside of the Operations Division are considered staff personnel and work a 40-hour work week.

IAFF Local #271

The International Association of Fire Fighters (IAFF) Local #271 represents all firefighters in the Missoula Fire Department with the exception of the Fire Chief and both Assistant Chiefs. IAFF Local #271 and the City of Missoula operate under a Collective Bargaining Agreement (CBA). The CBA is a result of extensive negotiations between the employer (City of Missoula) and the organized laborers (Local 271 firefighters) regarding wages, hours, and term and conditions of employment. The current contract has an effective date of July 1, 2015, through June 30, 2019. The CBA is managed by the IAFF Local 271 Union President and Vice-President, and by the Missoula Fire Administration.

Budget and Finance

The Missoula Fire Department (MFD) primarily derives funding from the City of Missoula's general fund. Funding can come from a variety of sources including levied taxes, fees for service, donations, and grants. In the current economy, many communities, including Missoula, are searching for ways to reduce expenditures and maintain levels of service. In addition, MFD is finding it increasingly difficult to deliver the services that the community desires and are often asking for more funding to adequately supply the expected levels of services.

The following portion of the Master Plan is a discussion of MFD's operating budget. The graphs and charts illustrate the Department's total budget including salaries, supplies, and purchased services.

Figure 6 illustrates the cost of personal protective equipment (PPE) that each firefighter is assigned. (Firefighters are not assigned individual SCBAs, rather, a supply is kept on all engines and in inventory.)

Figure 6: Firefighter PPE Cost Illustration

Operating Budget

For fiscal year (FY) 2019, Missoula Fire Department's operating budget is $13,776,600. This budget does not include capital improvement projects, core replacement funding, or current grant funding.

The Missoula Fire Department is financially supported as a component of the City of Missoula's annual budget within the general fund. The Department's total operating budget from FY 2010-2011 to 2018-2019 is shown in Figure 7 (next page).

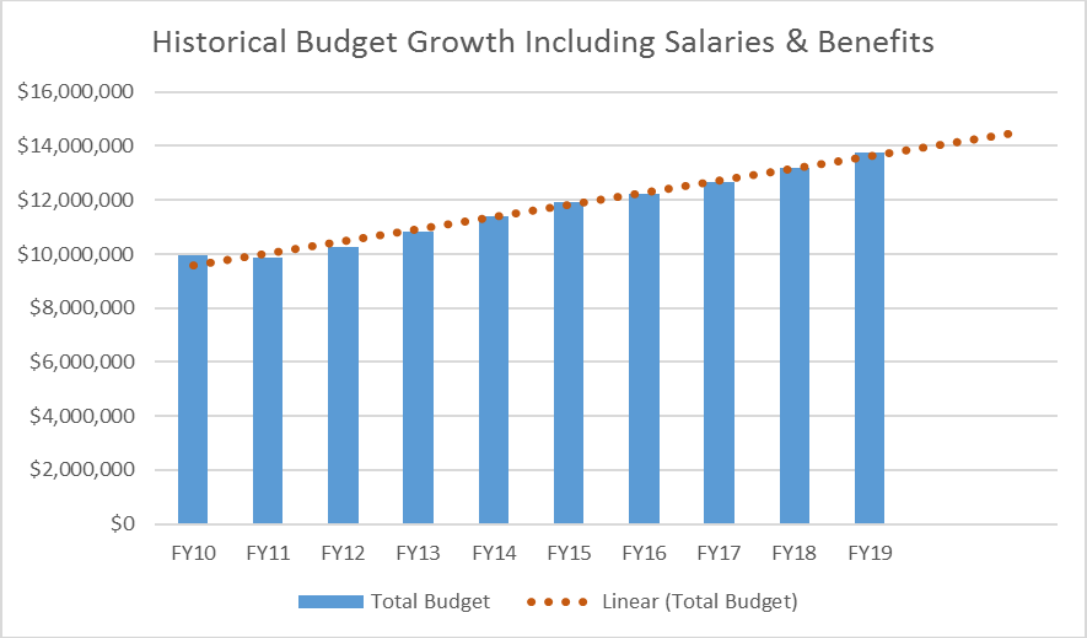


Figure 7: MFD Historical Growth Including Salaries & Benefits

The budget has increased from $9,974,535 in FY 2010 to $13,776,600 in FY 2018-2019. The increase over this time span totals $3,802,065 or 38.12%. The Department's overall budget has seen a 3.86% average annual growth since FY 2010.

Figure 8 represents the same information reported above without salaries and benefits. As salaries and benefits are pulled out of the graph/figure, a more focused view is seen that relates to the day to day costs of the fire department.

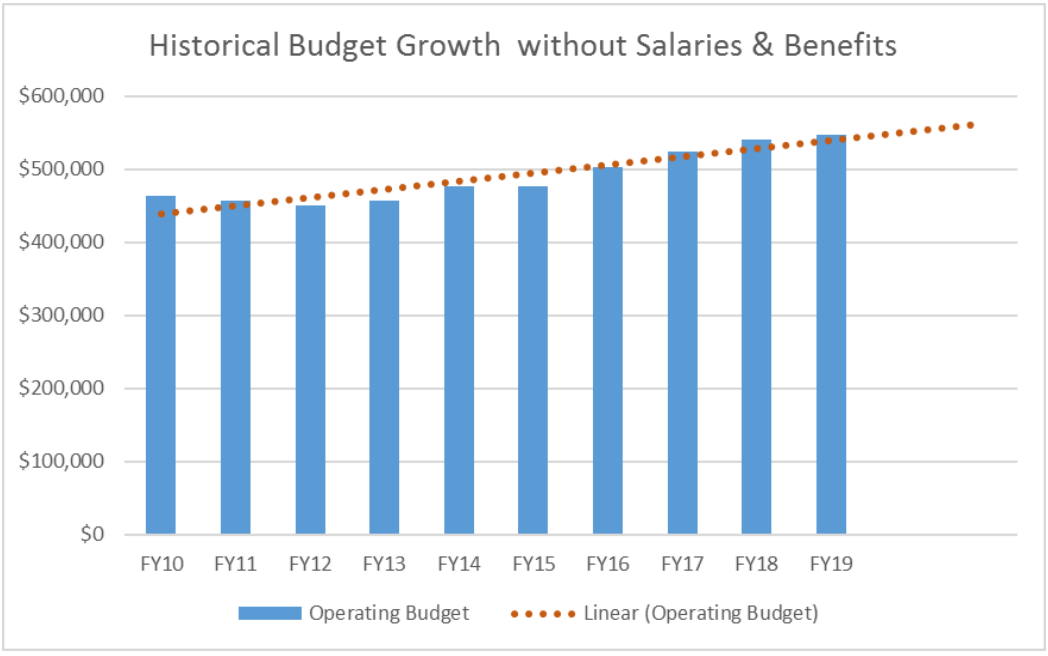


Figure 8: Historical Budget Growth without Salaries & Benefits

Figure 9 depicts the Department's annual budget compared to the annual call incident volume. Although the Department's annual incident call volume increased by 57.05%, the annual budget only grew by 38.12%. The discrepancy in call volume outpacing funding should be addressed so MFD is capable of providing the same level of service currently delivered to the community.

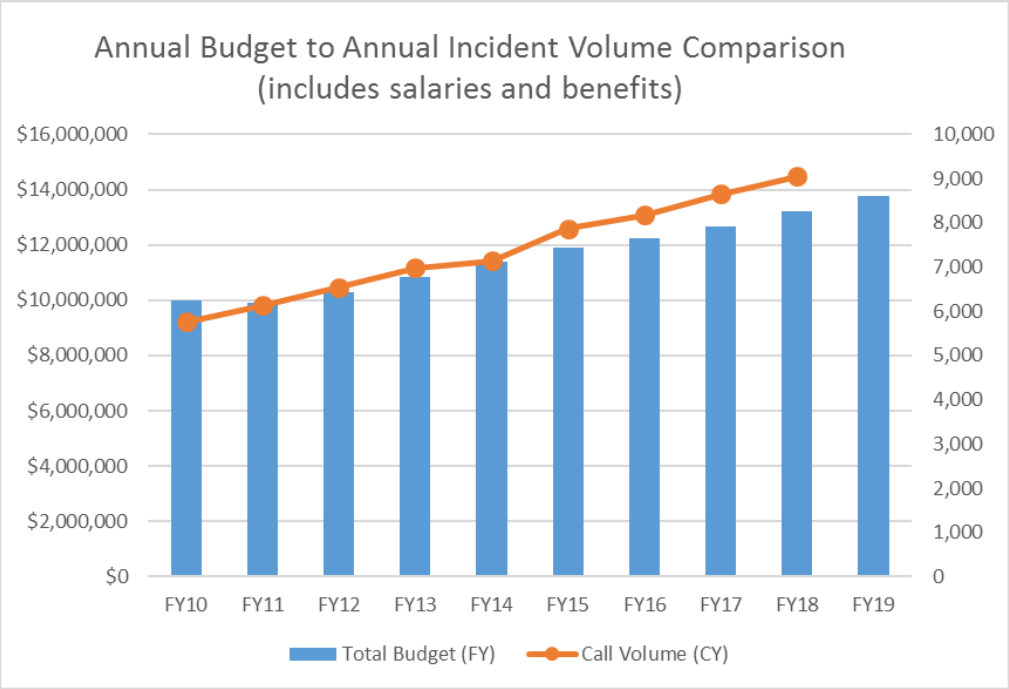


Figure 9: MFD Annual Budget to Annual Incident Volume Comparison

The Missoula Fire Department relies on a Capital Core Replacement schedule funded by the City's general fund. This replacement schedule covers major purchases such as fire response vehicles, self-contained breathing apparatus (SCBA) and other essential equipment with a cost exceeding $5,000 and an in-service life of at least five years. The Capital Core Replacement schedule is not a fixed purchasing list and is subject to the City's ability to fund each purchase. The schedule does provide for strategic planning of capital expenses.

In addition to monies from the general fund, MFD has received over $3,758,519 in funding and grants since 2003. During that time frame, MFD has applied for $12,611,570 in grants from seven different entities. It is the intent of the department to continue to take advantage of funding available from any federal, state, and local grant programs.

Goals and Objectives:

- Continue to pursue financial stability via Missoula City's Capital Improvement Fund and grant spending.

Historical MFD Projects, Acquisitions, and Costs

Table 1 below shows various historical bonds and resolutions granted to the Missoula Fire Department for the purchase of new programs, facilities and equipment. While this list does not cover all purchases made by the department, it gives a broad historical scope of the development of MFD.

Date	Project Outline	Cost/Fund
7/8/1953	New fire station (MFD headquarters previous location) and equipment to fill it	$325,000.00 bond
12/17/1958	Emergency budget established for MFD	N/A
8/16/1965	New fire station (Station 2) and equipment to fill it	$175,000.00 bond
11/6/1978	Construction of a new pool & boat ramp	$785,000.00 bond
	Acquisition of a new fire engine	$350,000.00 bond
8/10/1987	Funding for the purchase of 2 new pumper trucks	$700,000.00 bond
1992, 1993	New Fire Stations 1 and 4	$3.35 million bond
8/8/2005	Funding for the acquisition/upgrade of MFD Stations 2, 3, & 5	$5.74 million bond
2005	Installation and purchase of new video conferencing system – software and equipment	$48,000.00
2006	Addition of maintenance bay at MFD Station 4	$459,000.00
2012	Purchase of 2 new rescue watercraft and trailer, allowing MFD to improve water rescue operations	$18,500.00
2015	Purchase of fleet maintenance software	$19,000.00
2016	Addition and extension for boat house ramp	$58,000.00

Training for Fire and EMS

Training Staff

The Training Division consists of two full time employees; the Training Officer (TO) and the Emergency Medical Services (EMS) Coordinator. The TO supervises the EMS Coordinator and they work together to accomplish the training goals and objectives of the Department.

To function properly and effectively, a training program is required to be well-managed, and execution requires an effective training structure. This begins with identified goals, planning, and clear objectives. This portion of the Master Plan seeks to define the Training Division and its role within the Missoula Fire Department.

Training Competencies

The Training Division's primary goal is to provide safe and effective fire and emergency medical service instruction to the Missoula Fire Department (MFD). The Training Division utilizes a detailed current plan and schedule that serves the mission of MFD. MFD adheres to industry standards including those set by the International Fire Service Training Association (IFSTA). IFSTA states "Regardless of the particular system used, an effective training program will include: (1) the continuous training of all levels of personnel in the department; (2) a master training plan; (3) a system for evaluating the scope, depth, and effectiveness of the program; and (4) revising the program, as required, to include advances in equipment, products, and techniques." Continually working on a well-constructed and highly educated training program transfers to response efforts. If proper training is not provided and encouraged, IFSTA indicates the Department's response preparedness and efforts could be compromised, thus resulting in a potential liability risk for both the Department and its City representatives. The Training Division holds much of the responsibility for the success of the Missoula Fire Department.

Figure 10 MFD Night Ops Training at Station 4's Burn Tower

Training Standards

It is important to use up-to-date training standards to provide a comprehensive and effective training program. MFD's Training Division uses current fire information, technology, and industry standards of National Fire Protection Association (NFPA) and IFSTA. MFD follows the State of Montana requirements[1] and standards for Emergency Medical Technicians and Paramedics.

[1] Montana State Dept. of Labor and Industry EMT requirements (http://boards.bsd.dli.mt.gov/med/ecp)

Training Division Programs and Responsibilities

Figure 11 outlines the structure and programs overseen by the Training Division, including the Training Officer and EMS Coordinator.

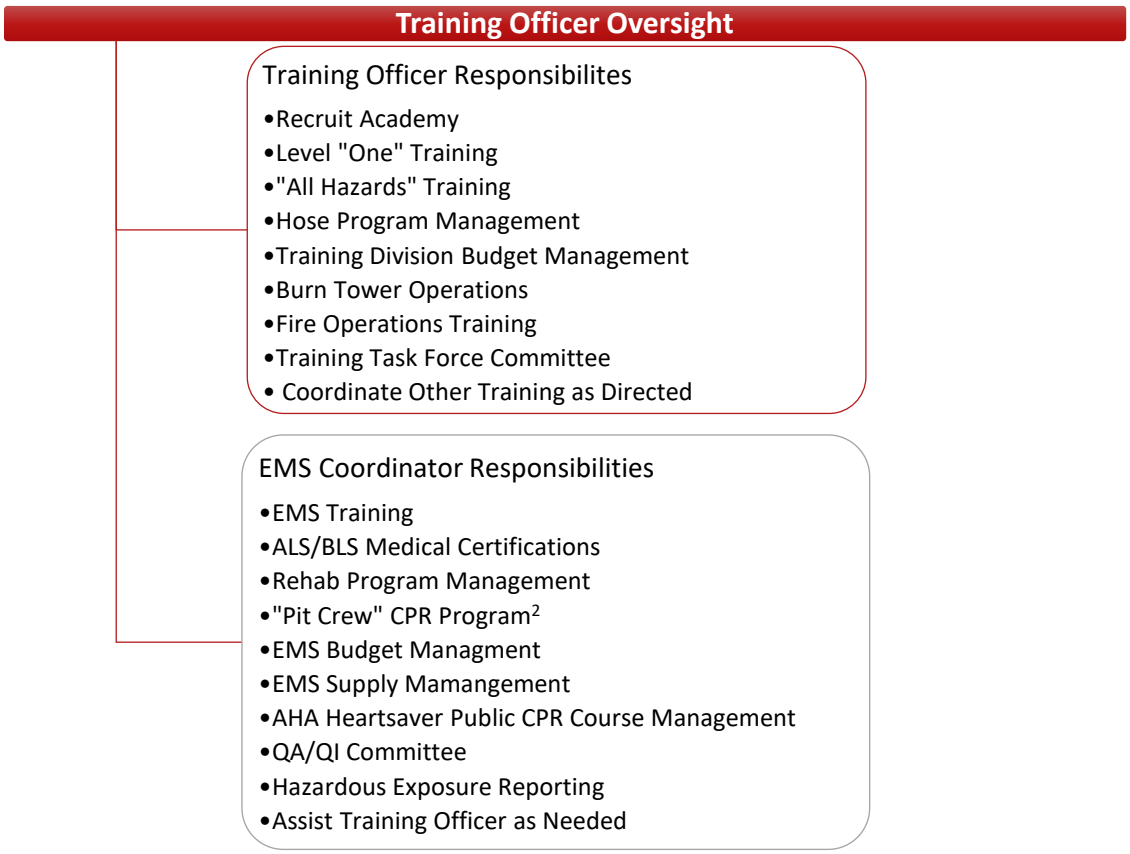


Figure 11: Training Division Role Responsibility Chart

Training and EMS Program Management

To ensure MFD has competent and qualified personnel to carry out its mission, the Training Division has created a Training Task Force Committee. This Committee meets quarterly to set training priorities and review current policies and procedures. The Training Division is in the process of creating a training program manual, which will help guide decisions about priority training and additional needs of the fire department.

[2] "Pit Crew" CPR is a program that seeks to greatly improve a patient's survivability rating following a cardiac event. MFD has seen great success with this program. You can watch a training video of it here: https://www.youtube.com/watch?v=bwGkd0Duq6I

Training and Programs

The TO schedules, coordinates, and often provides instruction for training for the Department. Table 2 illustrates the required Level One training[3] for all MFD firefighters. Level One training is delivered over a two year period by the training division and accounts for approximately 282 hours of training.

MFD "LEVEL ONE" Training

Topic	Days Per Shift	Est. Hrs./Yr.
EMT-B Refresher	*4*	*24*
Paramedic Refresher (in addition to EMT-B)	*4*	*24*
Rescue Topics		
Water	*4*	*24*
Rope/ Confined Space	*4*	*24*
Trench	*2*	*12*
Collapse	*2*	*12*
RIC	*2*	*12*
Extrication	*2*	*12*
Wildlands		
Basic/ Standards	*2*	*12*
Driver Training	*4*	*24*
HazMat Ops	*2*	*12*
Fire/Live Burns	*4*	*24*
SCBA/Air Supply	*1*	*6*
IFSTA Fire Essentials	*12*	*72*
Night Operations	*2*	*12*

Table 2: MFD "Level One" Training Requirements

Current Priority Training and Programs

MFD is continually reevaluating and modifying our training program due to the growth of Missoula and the changes which occur in the fire service over time. Some of these changes are driven by social and cultural changes. The growth of Missoula and the surrounding area also help dictate what trainings should be added. Some examples to additional training we have implemented include:

- ***Active Shooter/Attack Response NFPA 3000:*** A critical change in multi-agency trainings has become Missoula's most recent priority need. Missoula County first responders are attending a 24-hour Active Attack Integrated Response (AAIR) course put on by local firefighters and law enforcement officers.
- ***Wildland Urban Interface Firefighting NFPA 1051:*** While the community expands into the Wildland Urban Interface (WUI) it is important that MFD's training reflects the challenges associated with WUI. MFD's firefighters completed more than 500 additional hours in wildland training in 2018 from the 2010 statistics.

[3] "Level One" training is the NFPA standard for firefighting basics; it is found in NFPA 1006 (Personnel Professional Qualifications) and 1670 (Training and Technical Search & Rescue).

- ***Peer Support Mentors:*** Firefighters are not impervious to the stressors of day to day emergency response. Post-Traumatic Stress Disorder (PTSD) from exposure to routine traumatic incidents is becoming an increasingly prevalent issue, to the extent of legislation[4]. Peer support mentor training places a focus on the health and wellbeing of members of the fire department.
- ***Peer Fitness Trainers NFPA 1583:*** MFD has implemented four peer fitness trainers to help guide members through fitness evaluations yearly. Tracking these standards confidently is one of the trainer's tasks. A full medical physical is provided every other year for each MFD member.
- ***Airport Response:*** Due to the recent annexation of the airport, we are now called to respond to airport property. Cooperation and coordination with the airport authority will be critical to determine the best method of response to this newly included entity.

Training hours

Figure 13 illustrates the overall training hours per year completed by MFD's operations. Figure 12 shows that Level One training and EMS training account for 67% of the training hours yearly. MFD's current call volume limits the amount of time that Operations personnel are able to dedicate to on-shift training.

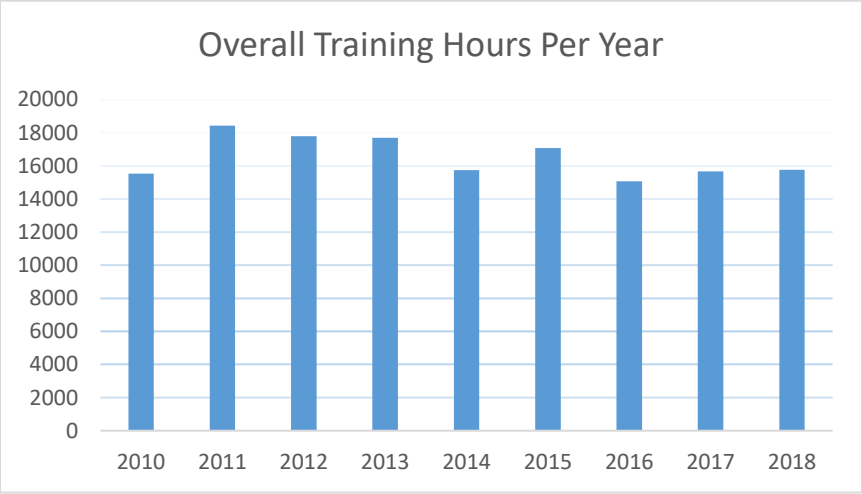


Figure 13: Overall Training Hours per Year

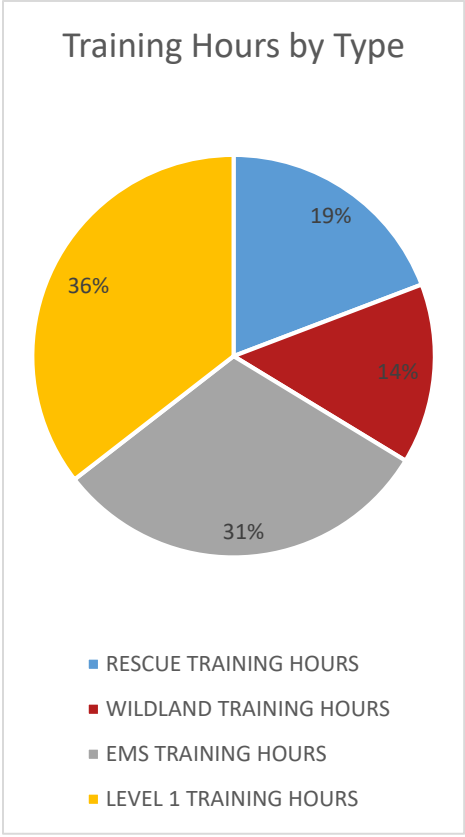


Figure 12: Training Hours by Type for 2018

Future Training Enhancements

The Training Division's ability to provide day-to-day quality training has become very challenging due to the increasing call volume MFD is experiencing. The training division is also challenged by limited training space and location of certain training props. Fire crews are required to rotate to one specific

[4] At the time of creation of this Master Plan, Montana State legislation is reviewing Firefighter Health and Wellness bills to become state law. Montana is one of three states to not incorporate such laws. Federal legislation regarding firefighter health can be viewed here: https://www.congress.gov/bill/115th-congress/house-bill/931/text

location for training, which reduces the level of service in other parts of the city when multiple fire crews are required to train together.

Enhancing Fire Stations 3 and 4 would assist with mitigating limited space, the distribution of engine company challenges, and the decrease in available training hours. Enhancing these stations will greatly reduce the challenge and liability of finding appropriate off-site training locations for specialized training opportunities in structural collapse, extended fire ground operations, hazardous material operations, search and rescue procedures, high and low angle rescue, and driver training.

- MFD Station 3 has City owned land available to build additional training facilities on the existing property. Creating a viable training site on the south side of the city would allow firefighters to expand training to the south side of the city while keeping resources closer to neighborhood fire districts and reduce response times to incidents.
- MFD Station 4 is the primary location for fire department training. The training grounds at Station 4 have functional areas for auto extrication, trench/confined-space rescue training, and a two-story burn building with a tower. A future expansion and enhancement of the training facilities at Station 4 would be a solution to meet the needs of the Fire Department's growing training needs

Although the Training Division currently utilizes a video conferencing platform to provide shift training, the current system is in need of upgrades. The department is currently in the process of finding funding to upgrade the current system. The new technology is intended to help keep firefighters and response vehicles in their districts and able to respond to calls. The video conference system also allows for uniformed training across all stations and the department.

Regional Training Facility Funding

The Missoula Fire Department is interested in creating a Regional Training Center in Missoula. MFD is currently conducting and hosting regional training sessions with other cooperative agencies, such as the National Fire Academy, Montana State Fire Service Training School, Missoula Fire Science Academy, and smaller fire departments around Montana. The vision of the regional training facility is to draw firefighters from all regions to accomplish training goals on a larger scale with less cost to them and little to no cost to MFD.

Goals and Objectives:

- Allow priority training programs to be implemented across the department.
- Enhance MFD Station 3 training grounds.
- Utilize land at MFD Station 4 for training program expansion.

EMS and EMT Training and Expansion

The Missoula Fire Department currently provides a Basic Life Support (BLS) and Advanced Life Support (ALS) service to the community based on staffing care provider levels. If the department is planning to implement 24/7 ALS service throughout the community, the department will have to address the shortage of Paramedics.

Goals and Objectives:

- Recruitment of Paramedics (EMT-P). Develop/fund in-house sponsored EMT-P class, or establish funding to send firefighters to an outside agency to receive training.

Fire Prevention Bureau

The Fire Prevention Bureau (FPB) was established in the Missoula Fire Department under the supervision of the Fire Chief for the purpose of ensuring safety practices and fire prevention throughout the City of Missoula. The Fire Marshal, Assistant Fire Marshal and three inspectors [one rotating position of line personnel] staff this division. In addition, one Fire Records Specialist is assigned to records management, data entry/analysis, project coordination, and assignments within the bureau. This portion of the Master Plan covers the FPB and how it is used to effectively serve the Missoula community.

A cross-trained FPB staff serves as a benefit to the administration, allowing inspectors to be redirected to a fire engine during staffing shortages or on large incidents. Additionally, they may be utilized during fires to provide support and assist as needed. This operational knowledge and understanding of how the apparatus functions allows them to prioritize more efficiently for repairs and routine maintenance.

Fire prevention includes any fire service activity that decreases the incidence and severity of uncontrolled fire. The National Fire Protection Association (NFPA) recommends a multifaceted, coordinated risk reduction process to identify the community's highest priority risks and then developing and implementing strategies designed to mitigate those risks. The FPB utilizes an aggressive community risk reduction program consisting of 3 components: code enforcement, public education, and fire investigation. Figure 14 outlines the components of these methods.

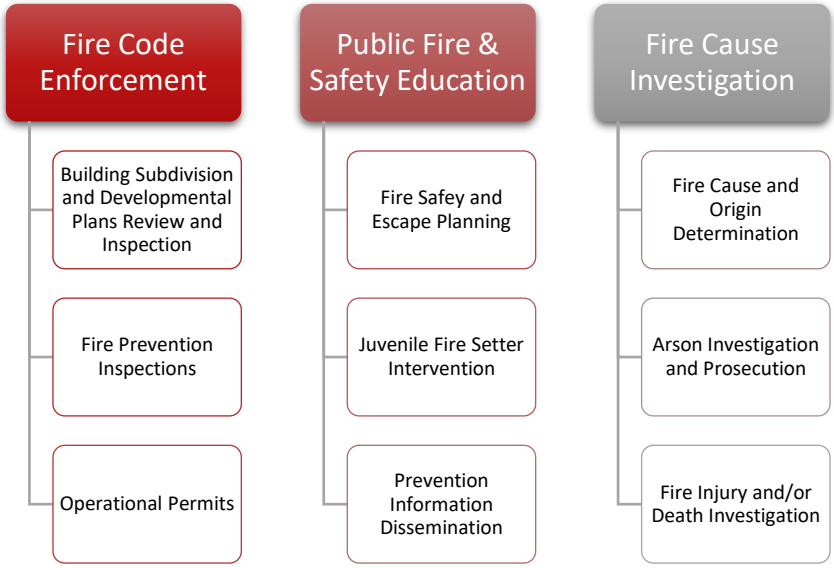


Figure 14: Fire Prevention Bureau Programs

Code enforcement, by way of inspections, serves the purpose of discovering and eliminating deficiencies that pose a threat to life and property. In addition, involvement in the plans review process ensures compliance with codes and standards prior to construction. Public fire and life safety education informs and instructs the community about fire dangers and fire-safe behaviors. Finally, fire cause investigation identifies problem areas requiring corrective education endeavors, inspection emphasis, or litigation.

Fire Code Enforcement

Historically, fire prevention efforts have only been encouraged following a large disaster or fire incident[5]. Exploration of more effective and progressive fire prevention efforts was not realized until fire departments began to compile information on the causes and circumstances surrounding fires. The gathered information validates that increasing efforts toward fire prevention measurably benefits a community's survivability.

Effective fire prevention is dependent upon the adoption of current fire and life safety codes and standards and the personnel to support the enforcement of these model codes and standards. The adoption of these codes and standards form the foundational components of a fire prevention program.

A well-developed code enforcement program provides a fire department with a road map of where public education efforts should be focused and improves the efficiency of emergency responders in mitigating a variety of incidents.

The 2012 International Fire Code (IFC) has been adopted by the City of Missoula through local ordinance and is enforced by the FPB. The Montana Code Annotated [MCA] and Missoula Municipal Code [MMC] serve to supplement the above model code. As designated by Montana Code Annotated and the City of Missoula Ordinance 2.36.010, "The Bureau of Fire Prevention is hereby established in the city fire department and shall be operated under the supervision of the chief of the fire department for the purposes of enforcing the fire code adopted pursuant to Chapter 15.04.016." The State of Montana Department of Labor and Industry plans the adoption of the 2018 IBC/IFC in the spring of 2019.

[5] Historical data based on information found in the Fire Protection Handbook 20th Edition, Vol. 1, Chapter 5, Section 1: Fire Prevention and Code Enforcement.

New Construction Plan Review

Plans review is a code enforcement process to ensure compliance with the fire protection and life safety provisions of the building code, as well as the fire code prior to installation or construction. When new construction is proposed, the FPB ensures code compliance via the plans examination process. Additionally, the FPB reviews and approves fire alarm and fire sprinkler system design plans and subdivision development infrastructure proposals (specifically those referencing fire apparatus access roads and fire protection water supplies). The FPB is responsible for other fire and building code related plans examinations for three-unit and greater residential properties and all commercial projects. Figure 15 shows the number of plans reviews completed between 2012 and 2018 with an implicated trend representing the fees assessed each corresponding year. The FPB works closely with the City Development Services Department to meet the requirements of fire and building code.

Fire fees are collected at the time building permits are released for the associated projects. These fees are inclusive of the plans review process and subsequent inspections, relative to the occupancy class and size of the project.

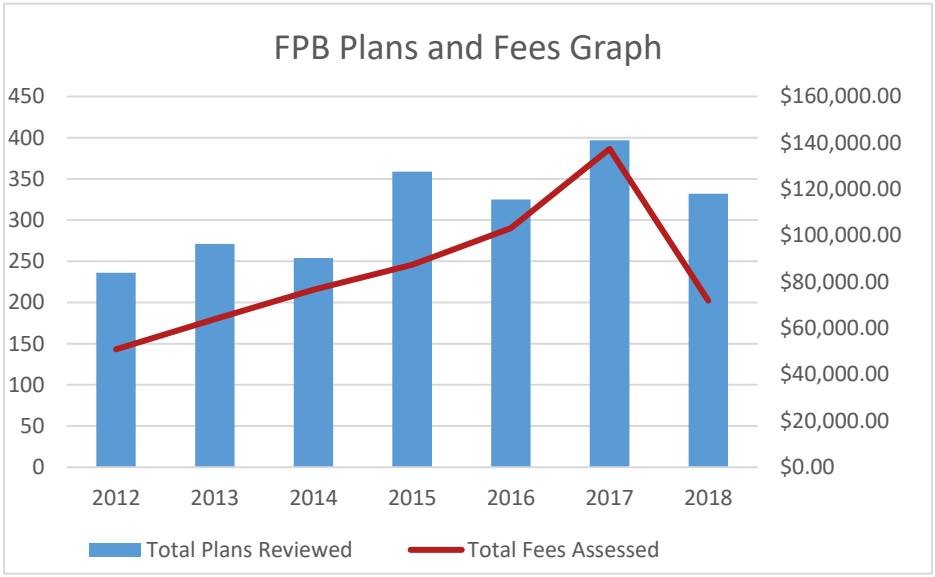


Figure 15: FPB Plans and Fees Graph, 2012 - 2018

Goals and Objectives

- Lobby for the inclusion of residential sprinklers with the state's next code adoption.
- Seek avenues to require or incentivize the installation of residential sprinklers.
- Review the International Wildland-Urban Interface Code for potential amendments to City fire code.
- Support continuing education and certification for plan & fire protection system review to meet industry standards.

Fire Prevention Inspection

The Bureau currently conducts two types of fire inspections: new construction and ongoing compliance inspections. New construction inspections may be performed throughout the construction process until project completion and final inspection to grant issuance of a certificate of occupancy. These inspections ensure code compliance and assist in avoiding unsafe conditions prior to occupancy.

Ongoing compliance inspections and re-inspections are performed throughout the year to ensure that previous approvals remain in place. Inspections may be performed through state or federally mandated

requirements of select occupancy classifications by random selection. They may be identified as needed based on a list of occupancies who have not been visited in the past one to five years. They may also come as a request for follow-up on a noted issue or complaint from a concerned citizen. These inspections serve as an essential part of the overall fire protection system to ensure that unsafe conditions or noted fire and life safety violations are adequately corrected in a timely manner.

Operational Permits

The FPB is also responsible for issuing and/or approving various permits; for example, pyrotechnic permits are only available to licensed and authorized firework pyro-technicians. In addition, the FPB authorizes permits for the use of outdoor burning and bonfires, street closures, and outdoor alcohol consumption. Exploring additional operational permits may be a viable option for increasing revenue.

The FPB's inspection program is dynamic and under constant review and revision. As the community continues to build and grow, so too will existing occupancy inspection demands. The FPB works to inspect all commercial buildings within the city every five years. Time constraints do play a role in these inspections, as they fall to a lower priority over other responsibilities of the Bureau. Figure 16 indicates the number of inspections completed in blue between 2010 and 2018. It also notes the number of noted violations per year in red.

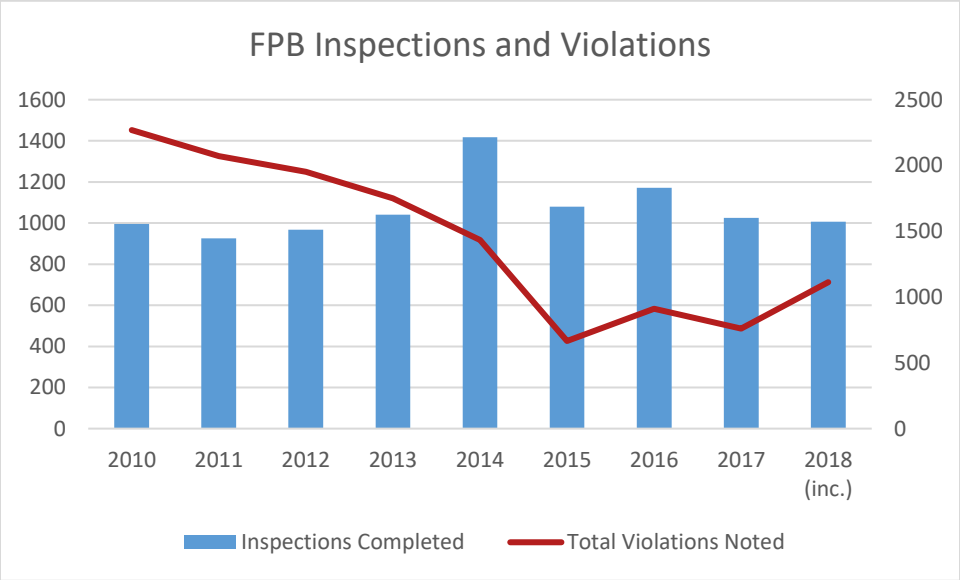


Figure 16: Total Inspections Complete and Violations Noted

The FPB is also responsible for the inspection of all new and updated city business licenses. The current licensing fees, set by the City of Missoula Development Services Office (DS), are dependent on the building size and the number of full-time employees. These fees are currently placed in the City's general fund. There may be an opportunity during the budget process to identify fees from inspections and reallocate that revenue to the Missoula Fire Department (MFD). There is an opportunity for additional income for the FPB from fines related to code violations. Businesses that repeatedly fail to comply with inspection correction requirements are subject to fines administered by the court.

Currently, the FPB does not fine businesses for noted violations, they instead work in coordination with the City's legal offices to resolve noted and unaddressed issues.

Table 3 illustrates the implemenation of code enforcement programs and annotates areas for further improvement. Any status marked "x" is not a current practice of the MFD FPB and represents a program they would like to expand upon. A checkmark or notation of frequency indicates a program currently in operation and the regularity which that line item occurs.

General Inspection Program	***Status***	***Comments & Objectives***
Assess Cost Recovery for Code Enforcement on UM Campus	X	Explore MSU model of cost recovery for Bozeman Fire Department.
Perform Existing Occupancy Inspections	✓	Priority schedules established by the department.
Residential Inspections (R-1, R-2 & R-4)	✓	Lack the authority to inspect R-3 occupancies.
Special Risk Inspections	✓	
Key-Box Entry Program in Place	✓	
Hydrant Flow Records Maintenance	✓	Maintained by Public Works.
Frequency of Inspections	12 months – schools 12 months – state liquor licensed facilities 12 months – state institutions DPPHS for state institutions (nursing homes, 24 care facilities, daycare centers)	Montana Code Annotated 2017, Part 1. General Provisions: Fire Chief and Fire Inspector to make inspections.
Citation Process in Place and Formally Documented/Adopted	✓	Violation of fire code Is misdemeanor.
Court-Cited To	✓	City court.
Field Inspections Computerized	X	Implement devices for FPB staff.
Storage Tank Inspections	X	Explore operational permit for plan review and inspection.

Table 3: Code Enforcement Program Components

Goals and Objectives

- Review business licensing fees. While full cost recovery may not be attainable, reasonable inspection costs may be recovered and reinvested to enhance the fire prevention division.
- Identify and inspect high-risk occupancies (e.g., institutional, assembly, hazardous materials and high-rises) annually with certified fire inspectors.

Public Education: Fire and Life Safety Programs

Effective public fire and life safety education focuses on three facets: fire prevention education, fire reaction education, and other risk hazards. Public awareness and participation in these areas can alter the public's opinion of fire and other hazards and encourage their adoption of fire and life safety

practices. Education programs implemented by the FPB include fire safety and escape planning, smoke alarm installation, fire extinguisher demonstrations, juvenile fire-setter education/counseling, and wildfire home risk assessments. An educated and motivated public, through proactive education programs, can prepare and minimize the dangerous effects of fire should one occur. In the past five years, the data collected by MFD shows that the FPB completed an average of 255 public education events each year. This data is believed to be insufficient due to a new records system incorporated in the middle of that timeframe, which brought a change in process for recording these events.

Partnering with the Missoula County Fire Protection Association (MCFPA)

The core of the FPB's public education program is the MCFPA school education programs; these are presented in the months of April and October. The MCFPA-sponsored "Match Safety" program is offered every April to all Missoula County Public first grade classes. The MCFPA sponsored "Puppet Show" program is offered every October and is available to all kindergarten classes in Missoula County. These programs together reach over 3,000 students annually. The FPB also provides fire and life safety educational outreach at a number of large community events annually with the use of a fire education safety trailer. When requested, the FPB will present fire safety talks to businesses, home owner associations, and community/civic groups.

Figure 17: MCFPA Puppet Show, 2018

Wildland Fire Prevention and Risk Assessment

Missoula County adopted its first Community Wildfire Protection Plan (CWPP) in 2005, and updated it in 2018. Taking a cohesive strategy approach, the program works with cooperative agencies to reduce wildfire risks in the wildland urban interface by identifying local priorities for wildfire risk reduction and resilience. The FPB supports the program through wildfire risk assessments and education promoting reduction of hazardous fuel areas and strategies to reduce the ignitability of structures.

Fire and Life Safety Public Education Programs

For the fire service, public education and outreach are frequently high profile, resource intensive, and typically impactful programs. The FPB dedicates staff and efforts to ensure the successful implementation and effectiveness of these programs. However, the time limitations imposed on the staff tasked with code enforcement and fire investigation duties compromise the level of attention that can be paid to these programs.

MFD offers a smoke alarm installation program that has proven to protect lives. The program offers replacement smoke detectors and/or batteries to any Missoula city homeowner in need. Due to the limited availability of FPB staff and locality of stations spread across the city, MFD Operations crews are outfitted with detectors and may step in to perform the installations when FPB staff are unavailable. In addition, Operations crews participate in public education through station tours, engine visits, and other outreach activities.

The FPB's public education programs share a goal of reaching all Missoula's demographics while placing an emphasis on those most susceptible: youth and elderly. Though the education programs are robust, higher priority components of the FPB, construction plans review, inspections, and fire investigations, continually require increasing amounts of time.

The public education program is in need of additional staff time. This may be achieved through restructuring the delivery of existing programs and building efficiency into program organization. Table 4 illustrates the supported fire and life safety education programs currently in place.

Fire Safety and Public Education	*Status*	*Comments & Objectives*
Public education/information officer in place	Informally	Commit BUREAU staff member to PIO officer
Missoula County Fire Protection Association (Puppet Show & Match Safety Programs)	✓	Facsimile of "Learn Not to Burn" program. In collaboration with MCFPA partner agencies
EDITH (exit drills in the home)	✓	
Smoke alarm program	✓	Provide alarms/batteries as requested and appropriate
Fire safety and pub. education	✓	Chimney brush loan program
Fire extinguisher demo use	✓	Active participation live fire demo
Elderly care and safety	✓	Facsimile of "Risk Watch and Remembering When" programs
Juvenile Fire Setter program	✓	By order of Juvenile court or as requested by caregiver
Wildland Interface education	✓	Community Wildfire Protection Plan-Determine your Wildfire Risk (Operation Standalone)

Table 4: Fire & Life Safety Public Education Program Components

Goals and Objectives

- Optimize time management and scheduling of MCFPA school education programs.

Fire Origin and Cause Investigation and Incident Information Analysis Program

Thorough investigation of fire incidents which MFD has responded is a critical role of FPB. Fire cause is typically determined to fall under two main categories: criminal or accidental. Accurately determining origin and cause of fire is important in gathering information that leads to the establishment of a fire prevention program for the public's safety. As information and data become available, trends in the region's fire risk can be identified and corrective action can be implemented to tackle these priorities.

The FPB's five inspectors are also cross trained as firefighters and fire investigators. Member certifications include International Association Arson Investigator (IAAI) – Certified Fire Investigator (CFI) and IAAI-Fire Investigation Technician (FIT).

Figure 18 represents the cause of fires investigated by the FPB between 2011 and 2017. The results of fire investigations, if used appropriately, identify public education focus areas, the need for code modifications, and adjustment of fire deployment and training.

The FPB, in cooperation with the Missoula Police Department Detective Division's efforts in interrogation and surveillance recovery, has proven effective in the prosecution of numerous arson cases.

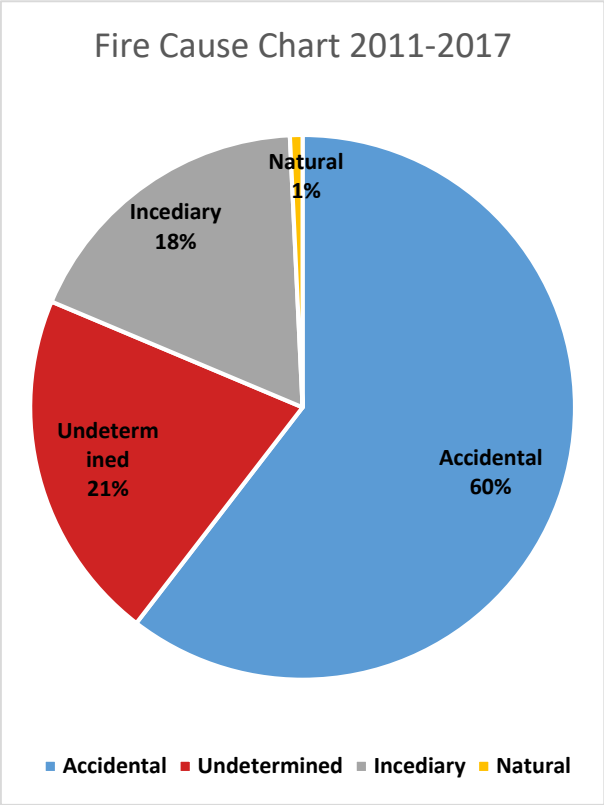


Figure 18: Fire Cause Chart 2011-2017

Incident Information Analysis Program:

Well-maintained and organized record keeping on all actions taken by the FPB staff is an essential part of code enforcement. The effectiveness in accomplishing fire prevention goals can only be measured when records are complete and accurate. The FPB is the primary record management entity for the Missoula Fire Department. The record management system houses incident reports, investigation summaries, occupancy information, and inspection records. The Fire Marshal submits response data to the National Fire Incident Response System (NFIRS) database. The data is utilized as a foundation for the analysis of department activities service demand and is typically subject to public Information requests.

Table 5 reviews the programs currently in operation by the FPB for the use of fire cause investigation and determination.

Fire Investigation	*Status*	*Comments & Objectives*
Fire Origin and Cause Determination	✓	*Qualified IAAI Certified Fire Investigator or Fire Investigation Technician levels.*
Arson Investigation and Prosecution	✓	
Arson Investigation Training Provided	✓	IAAI member and state chapter.
Person Responsible for Investigations	FPB	
Local FIT Membership (Fire Investigation Team)	Informally	Missoula Police Department
Process for Handling Juvenile Suspects	✓	Referred to law enforcement and/or Juvenile Fire Setter program.
Liaison with Law Enforcement	✓	Fire Marshal (primary)
Scene Control Practices in Place	✓	
Photographer Available	FPB	
Investigation Equipment Issued-Supplied	✓	
Evidence Collection Process	✓	IAAI Evidence Collection Technicians
Reports-Records of All Incidents Made	✓	
File, Record, and Evidence Security	✓	
Pre-Incident Planning	✓	
Frequency of Review	✓	As necessary or requested
Accessibility of Pre- Incident Plans	✓	Mobile Data Terminals in fire apparatus
Statistical Collection and Analysis	✓	
Records Kept by PC (Software)	✓	New World/Aegis record management system.
Information Collected in Following Areas: Fire Incident; Time of Day & Day of Week; Method of Alarm; Dispatch Time; Response Time	✓	
Information Analyzed & Used for Planning	✓	Aggregate data of all incidents should be Regularly reviewed for trends and benchmarking

Table 5: Fire Investigation Program Component

Goals and Objectives

- Identify standard length of service by which investigators will become IAAI Certified Fire Investigators.
- Maintain existing pre-plan program and seek opportunities for enhancing end-user utility.

Capital Assets and Infrastructure

Missoula Fire Department (MFD) currently has five fire stations located strategically within the city limits of Missoula. In these stations, there are five frontline fire engines, two frontline ladder trucks and one frontline command vehicle. Other first response vehicles include five wildland fire engines, one water tender and one ALS ambulance. MFD also maintains three reserve fire engines, a reserve ambulance, a trench/collapse trailer, a cataraft with a trailer, and multiple staff vehicles. There are also two rescue watercraft located at the McCormick Park boathouse and a training tower located at Station 4. This portion of the Master Plan will outline the placement and condition of these assets to MFD and the role they play in fire service to the city of Missoula.

Facilities

Missoula Fire Department has seven structures: five stations, a training tower, and a boathouse. The facilities were built between 1975 and 2008; many adaptations have been made to aide in renewable energy. The fire stations must provide a safe and secure place to house on-duty crews and apparatus.

Stations provide for office use and dispatch, crew accomodations, training, fitness, secure apparatus parking, and vehicle maintenance/repair. Although extensive remodels and new construction have occurred, many of the stations have deficiencies and are in need of repair. Some of these deficiencies include HVAC system upgrades, roof repairs, parking lot improvements, elevator repairs, and energy efficient updates. Upgrades and repairs to the stations will provide for extended service life well into the future.

Table 6 depicts the Royal Melbourne Institute of Technology (RMIT) Optimizing Asset Management of Community Buildings Conditional Rating Scale (Royal Melbourne Institute of Technology (RMIT), 2015). Table 7 applies that scale to display an overview of each building.

RMIT Condition Rating Scale

Condition Status	General Description	Rating
Excellent	Asset has no defects; condition and appearance are as new.	5
Good	Asset exhibits superficial wear and tear, minor defects, minor signs of deterioration to surface finishes; but does not require major maintenance; no major defects exist.	4
Fair	Asset is in average condition; deteriorated surfaces require attention; services are functional, but require attention; backlog maintenance work exists.	3
Poor	Asset has deteriorated badly; serious structural problems; general appearance is poor with eroded protective coatings; elements are defective, services are frequently failing; and a significant number of major defects exist.	2
Very Poor	Asset has failed; is not operational and is unfit for occupancy or normal use.	1

Table 6: RMIT Condition Scale

Missoula Fire Department Facility RMIT Rating

Station	Year Built	Square Footage	Condition	Appearance
Station 1	1995	15,445	Fair	Fair
Station 2	2008	7,987	Good	Good
Station 3	1975	7,667	Fair	Fair
Station 4	1994	11,230	Fair	Fair
Station 5	2007	9,017	Good	Good
Training Tower	1996	1,583	Fair	Fair
Boat House	1978	1,583	Good	Good

Table 7: MFD Facility RMIT Rating

Figure 19: MFD Fire Station #2 with Engine and Wildland Truck

MFD Station 1 (Headquarters) 625 East Pine St.

This station was built in 1995, has four apparatus bays and crew quarters. This station houses Fire Operations, Administration, Training Division, and Fire Prevention Bureau staff.

Design:	Architecturally compatible to surrounding neighborhood.
Environment:	Some crowding and/or lack of space is apparent in Fire Prevention and support staff offices. A need for expansion may be forthcoming.
Staff Facilities:	The facility combines Operations and Administration personnel and will require expansion to continue efficiently.
Square Footage:	15,445 sq. ft.
Deficiencies	• Windows are in poor to very poor condition. • Domestic Hot Water system will require replacement in near future. • Crew living quarters are in very poor condition; needs remodel. • Elevator is non-functional and requires control system replacement to meet ADA requirements. • Parking becoming crowed due to neighboring businesses. • HVAC control system needs upgrading.

MFD Station 2
247 Mount Ave

This station was built in 2008 and has three apparatus bays and crew quarters. This station houses fire operations.

Design:	This station is aesthetically designed to fit the surrounding neighborhood community.
Environment:	Space, storage and crew quarters are adequate at this time.
Staff Facilities:	Crew quarters are well designed and existing space is utilized efficiently.
Efficiency:	This station should serve well into the future given the current space and systems. This station is partially solar powered.
Square Footage	7,987 sq. ft.
Deficiencies	• Roof has several leaks and needs replaced due to poor installation. • 1 of the 2 AC units not functional. • HVAC control system needs upgrading..

MFD Station 3
1501 39th street

This station was built in 1975 and consisted of two apparatus bays, crew quarters, and a training classroom. It was remodeled in 2008 to upgrade the living quarters to more modern standards. The apparatus bays were extended to accommodate today's larger apparatus and create a third "back-in only" bay.

Design:	This station is aesthetically designed to fit with the surrounding neighborhood community.
Environment:	Storage space may become an issue with continued growth.
Staff Facilities:	With 2008 remodel, crew quarters are better designed for continued utility of use.
Efficiency:	The remodel addressed space and gender concerns.
Square Footage:	7,667 Sq. Ft.
Deficiencies	• Aging galvanized piping is corroding and creating leaks throughout the old side of the building. • Overhead bay doors need to be resealed. • HVAC control system needs upgrading.

MFD Station 4
3011 Latimer St.

This station was built in 1994 and consists of three apparatus bays, crew quarters, and a large training classroom. As of 2007, the station also houses a maintenance bay, an office and tool/supply room for the Master Mechanic. The property also includes a burn tower/high rise training structure.

Design:	The station is aesthetically designed to fit the surrounding community.
Environment:	There is an obvious lack of storage space throughout the station.
Staff Facilities:	Due to increasing call volume there is an anticipated need for additional personnel at this station. The crew facilities will need to be upgraded and expanded to accommodate growth.
Efficiency:	This station is partially solar powered and stores energy in a battery backup to be used in the event of a power outage.
Square Footage:	11,230 sq. ft.
Deficiencies	• Overhead doors need to be resealed. • Training Room HVAC needs replacement. • Bay heating system needs to be updated. • Parking lot is in need of significant repair due to settling. • HVAC control system needs upgrading.

MFD Station 5
6425 Lower Miller Creek Road

This station was built in 2007 and consists of three bays, crew quarters and a training classroom.

Design:	This station is aesthetically designed to fit the surrounding neighboring community.
Environment:	There are some roofing issues that will need to be addressed.
Staff Facilities:	Crew quarters are well designed and should remain adequate into the future.
Efficiency:	This station should serve well into the future given the current space and systems.
Square Footage:	9,217 sq. ft.
Deficiencies	• Living quarters roof needs to be replaced. • AC unit redesign. • Boiler recirculation replacement. • HVAC control system needs upgrading.

MFD Training Tower

Constructed in 1996
Located at MFD Station 4.

Square Footage	1,583 sq. ft
Deficiencies	• Needs recertification. • Water supply is broken. • Lights and photocells need replaced. • Door and window latches need replacement.

MFD Boathouse

Constructed in 1978. This structure houses two Sea-Doo rescue watercraft. It is located at McCormick Park on the banks of the Clark Fork river with an attached boat ramp.

Square Footage	468 sq. ft
Deficiencies	No major deficiencies.

Future Space Needs Assessment

According to the City's Space Needs Assessment project, which was completed in November of 2018 by MMW Architects, the emphasis was placed on office space needs. The fire department has a projected short term need of approximately 301 sq. ft. This space was for maintenance staff and for an IT tech person and work area. The longer projected 20-year outlook is expected to be 15,078 square feet. This calculation is for, or equates to, one large fire station or two small stations. Actual annexation and growth will significantly influence the space needs.

Renewable Energy and Energy Efficiency within MFD

Station 2 and Station 4 both have solar systems in place to capture renewable energy. MFD is working to convert to LED lighting at all stations.

Station 4's system is dated and is underutilized. It is designed to power and charge a battery system so when the power goes out it will power a few select items. Station 4 also has a back-up generator so the only time the solar batteries get used are when both the main power and generator power are down.

Station 2's system is a newer system and works in two ways. It is connected to the power grid so it puts power back into the system to create a lower monthly electric bill. It also heats the domestic hot water and stores the heated water in a tank to be utilized any time of the day.

MFD is also slowly making the conversion to all LED lighting. The bays at Stations 3 and 5 have LED lighting, as well as many of Station 1's administrative offices. Switching lighting systems to LED is saving money in two ways: LED uses less power to create the same amount of light and the bulbs have a longer life than conventional ones. The bay at Station 2 will be converted next.

MFD has also been replacing old heating systems with new Lochinvar boilers. Lochinvar commercial boilers are 94.6% efficient and require less maintenance. These boilers are in all Stations with the exception of Station 4. Station 4 has two newer furnaces that supply heat to the dispatch office and crew living areas that are 95% efficient. The training room and apparatus bay are heated with older gas fired units that are only 80% efficient. The combination heating/air conditioner unit in Station 4's training room is becoming problematic and will need replacement in the next few years.

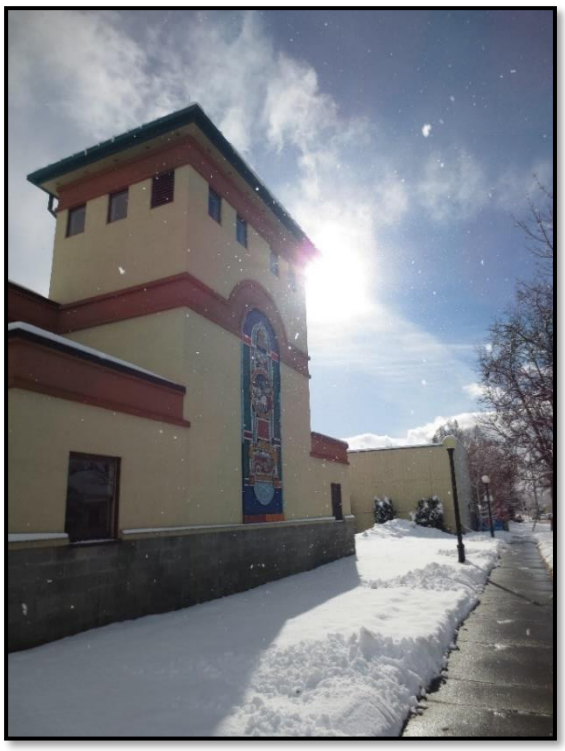


Figure 20: MFD Station 1 During Snow in 2014

Utilizing renewable energy and replacing old lights and heaters with energy efficient units is one of the ways that MFD pursues and reflects the goals within the community of Missoula.

Station Overcrowding

Currently MFD is struggling with overcrowding[6] in many of the fire stations. Equipment and apparatus have filled the majority of open bay space at each of the stations. There are several reasons why this is occurring, all of which have a focus on serving the community in the best possible way.

All Type 1 and Type 8 vehicles used for initial emergency response currently have pull through bays, however many of the other vehicles are back in only. The two most severe cases of apparatus overcrowding occur at Stations 1 and 4. This occurs at Station 1 because it has the ability to double stack vehicles. This occurs at Station 4 primarily due to the Maintenance Division's office and bay being located within Station 4. Vehicles and trailers are constantly shuffled around due to repairs, maintenance, or special projects. The Maintenance Division is often required to expand into the operations bays of the station due to overflow of repairs.

Overcrowding has taken place because MFD's service has expanded into more than just fighting fire, requiring more specialized equipment. Additional duties and responsibilities within the community include hazmat operations, trench rescue, structure collapse, water rescue, ice rescue, high and low angle rope rescue, and many more. These specialized disciplines require additional apparatus, trailers, and tools to manage and mitigate all incidents. This equipment also requires routine maintenance and repair.

Fire station overcrowding can be reduced by placing a cold storage building on-site at Station 3 or Station 4. A cold storage building could be used to house specialized trailers like the trench/collapse trailer, reserve apparatus, and winterized wildland rigs. Crews could quickly retrieve a trailer or reserve apparatus in the event of an emergency. The building would need to have six to seven parking spots and be enclosed on a least three sides.

The current MFD maintenance bay is adequate for a single large vehicle. Working on as many as two smaller apparatus within that bay can be done when space allows, however it becomes overcrowded and difficult to complete projects without a delay in repairs. When a ladder truck is in for maintenance or repair, there is no room for any additional apparatus. Adding an additional bay for large equipment and tools would remedy this issue and allow the Maintenance Division to work on multiple vehicles whenever necessary.

Goals and Objectives

- Build a cold storage facility at Station 3 or 4.
- Add an additional bay for the Maintenance Division to expand their repair space capabilities.

[6] "Overcrowding" as mentioned in this section, refers to the capacity of vehicles and fire apparatus in the stations.

Apparatus

The Missoula Fire Department's (MFD) Maintenance Division has approximately 30 vehicles to maintain and repair. The majority of the emergency response fleet is in good working condition with the exception of a ladder truck and an aging wildland fleet. MFD has made it a priority to adhere to a replacement schedule for these vehicles to better serve the community. If the Maintenance Division were ever unable to follow this replacement schedule, the fleet would quickly deteriorate.

Table 8 shows each apparatus' life expectancy, year it needs to be replaced, and estimated cost.

Unit	Unit Type	Unit Year	Year to be Replaced	Life Expectancy	Replacement Cost
110 (3330)	Command	2016	FY2024	8	$40,000
111 (8008)	Pumper	2017	FY2032	10	$918,596
121 (4461)	Pumper	2014	FY2029	10	$804,680
131 (9974)	Pumper	2009	FY2024	10	$645,718
141 (8009)	Pumper	2017	FY2031	10	$878,731
151 (1073)	Pumper	2010	FY2025	10	$674,773
161 (6664)	Pumper	2006	FY2021	10	$565,839
171 (3227)	Pumper	2003	FY2020	10	$541,372
181 (2341)	Pumper	2002	REPLACED	10	N/A
142 (8685)	Wildland	2000	FY2020	20	$453,157
113 (4002)	Wildland	2012	FY2022	10	$120,000
133 (3885)	Wildland	2015	FY2024	10	$120,000
126 (7237)	Wildland	2006	FY2021	10	$60,000
156 (9098)	Wildland	2000	REPLACED	10	N/A
127 (4197)	Tender	2001	FY2022	20	$402,250
138 (9021)	Ladder	1999	FY2020	20	$1,258,315
148 (4747)	Ladder	2015	FY2034	20	$2,330,000
119 (3503)	Ambulance	2018	FY2038	20	$350,000
149 (4947)	Ambulance	1994	N/A	N/A	N/A
* Type 1 Fire Engines have a 10-year front line life then generally get moved to reserve status for 5 years ** On average fire apparatus cost increase 3%-6% per year. Replacement cost is based on 4.5%					

Table 8: Apparatus Life Expectancy

Apparatus Condition Rating Definitions

Table 9 reviews in-house apparatus condition ratings.

Excellent:	Like new condition. No body or paint defects. Clean compartments. Interior cab complete and in full working order with no modifications. No significant defect history. Age is less than 25 percent of life expectancy.
Good:	Body and cab have good appearance with no rust and only minor cosmetic defects or dents. Clean compartments with no visible rust or corrosion. Interior cab is in full working order and good appearance. Normal maintenance history with no significant defect or high downtime. Age is less than 75 percent of life expectancy.
Fair:	Body and cab have weathered appearance with minor surface rust and some cosmetic defects or dents. Unimpeded compartments with only surface rust or corrosion. Interior cab is in reasonable working order and appearance. Only repairable tank or plumbing leakage. Showing increasing age-related maintenance, but with no major defects or unreasonable downtime. Age in less than 100 percent of life expectancy.
Serviceable:	Body and cab have weathered appearance with surface corrosion, cosmetic defect or dents, and minor rust-through of non-structural metals (body panels). Unimpeded compartments with significant surface rust or corrosion and/or minor rust-through (not affecting use). Interior cab is in rough, but working order, often with local repairs or modifications to compensate for problems. Occasional or intermittent tank or plumbing leakage. Showing increasing age-related maintenance, but with no major defect or unreasonable downtime. Most service parts still available. Age is greater than 100 percent of life expectancy
Poor:	Body and cab have weathered appearance with surface corrosion, cosmetic defects or dents, and visible rust-through of non-structural metals (body panels). Significant rust or corrosion is present in structural or support members. Use of compartments is impeded with significant corrosion and rust-through. Interior cab is in rough condition with defects impeding safe and proper use. Non-repairable tank or plumbing leakage. Problematic age-related maintenance, major defects or unreasonable downtime are evident. Service parts difficult or impossible to obtain. Age is greater than 100 percent of life expectancy. Vehicle exceeds its GVWR.

Table 9: MFD Apparatus Condition Table

	**Command Vehicle 110** 2015 Ford F250 Condition: Good NFPA Compliant: Yes
	**Engine 111** 2017 Pierce Impel 500 Gallon Tank 1250 GPM Pump Condition: Excellent NFPA Compliant: Yes
	**Ambulance 119** 2018 Ford F450 Condition: Excellent Triple K Compliant: Yes

	**Engine 121** 2014 Pierce Impel 500 Gallon Tank 1250 GPM Pump Condition: Fair NFPA Compliant: Yes
	**Engine 113** 2012 Ford F550 500 Gallon Tank 500 GPM pump Condition: Good NFPA, NWCG Compliant: Yes
	**Engine 126** 2006 Ford F450 300 Gallon Tank 250 GPM Pump Condition: Fair NFPA Compliant: Yes

	**Water Tender 127** 2000 International 2000 Gallon Tank 500 GPM Pump Condition: Fair NFPA Compliant: Yes
	**Engine 131** 2009 Pierce Impel 500 Gallon Tank 1250 GPM pump Condition: Fair NFPA Compliant: Yes
	**Engine 133** 2015 Ford F550 500 Gallon Tank 500GPM Pump Condition: Good NFPA, NWCG Compliant: Yes

	**Aerial Ladder 138** 1999 Smeal Aerial 100 Foot Ladder Condition: Serviceable NFPA Compliant: Yes
	**Engine 141** 2017 Pierce Impel 500 Gallon Tank 1250 GPM Pump Condition: Excellent NFPA Compliant: Yes
	**Engine 142** 2000 International 4900 500 Gallon Tank 500 GPM Pump Condition: Fair NWCG Compliant: Yes

	**Aerial Quint 148** 2015 Pierce Arrow 300 Gallon Tank 2000 GPM Pump Condition: Excellent NFPA Compliant: Yes
	**MFD Ambulance** 1994 K3500 Condition: Fair Compliant: Not Applicable
	**Engine 151** 2010 Pierce Saber 500 Gallon Tank 1250 GPM Pump Condition: Fair NFPA Compliant: Yes

	**Engine 156** 2000 Ford F450 300 Gallon Tank 250 GPM Pump Condition: Serviceable NWCG Compliant: Yes
	**Engine 161** 2006 Pierce Saber 500 Gallon Tank 1250 GPM Pump Condition: Fair NFPA Compliant: Yes
	**Engine 171** 2003 Pierce Saber 500 Gallon Tank 1250 GPM Pump Condition: Fair NFPA Compliant: Yes

	**Engine 181** 2002 Pierce Saber 500 Gallon Tank 1250 GPM Pump Condition: Serviceable NFPA Compliant: Yes
	**Rescue Watercraft** 2011 Sea- Doo Condition: Good NFPA Compliant: N/A
	**Rescue Cataraft 1115** 2011 Sea- Doo Condition: Fair NFPA Compliant: N/A

Trench Trailer 5422

2017
Condition: Excellent
NFPA Compliant: N/A

Figure 21: A hose truck from circa 1912. MFD apparatus has come a long ways.

Maintenance Division

Missoula Fire Department (MFD) Maintenance Division personnel are cross-trained in firefighting/EMS, vehicle/facility repair and maintenance. Maintenance Division positions are filled by Operations Division firefighters that transfer into the division. Maintenance Division personnel are considered firefighters first, but their primary duty is to keep the fire apparatus response ready.

A cross-trained maintenance staff serves as a benefit to the administration, allowing mechanics to be redirected to a fire engine during staffing shortages or on large incidents. Additionally, they may be utilized during fires to provide support and assist as needed. This operational knowledge and understanding of how the apparatus functions allows them to prioritize more efficiently for repairs and routine maintenance.

The Maintenance Division is responsible for repair and maintenance of fire department apparatus, equipment, buildings, logistics of outside repair, vehicle procurement, driver training, pump classes, and assist with job performance review of staff. In addition, they also complete annual testing and track and manage budgets. The Maintenance Division completes all preventative maintenance, minor to major repairs, and contracts out repairs as needed.

The department completed a staffing/work load analysis in 2018 for the Maintenance Division. Two resources were used to evaluate: the Chatham Consulting System for Vehicles[7] and the International Facility Management Association for Facilities. The completion of this study stated that 2.84 FTEs were needed to complete the required work. This study does not take into account the management duties (budget oversight, management team meetings, vehicle procurement, special projects assigned) of the Master Mechanic. He also supervises/mentors the Assistant Mechanic, assists in Operations training, and provides logistics for outside repairs. The Assistant Mechanic is routinely assigned special projects in addition to his regular duties. This study does not account for hours when the mechanics are called away from normal duties to staff a fire engine or respond to other emergency calls.

Based on calculations (see Appendix B at the end of this Master Plan) the Maintenance Division seeks to obtain one addition full time employee (FTE) to meet the current required workload.

Goals and Objectives:

- Addition of one FTE for the Maintenance Division.
- Implement more efficient repair tracking practices with the use of existing software.
- Continue to maintain and improve all MFD facilities, equipment, and apparatus.

Maintenance Division Tasks

Figure 22 visualizes tasks performed by the Maintenance Division.

[7] "How to Calculate Technician-to-Vehicle Ratios" published by Sal Bibona, President of Chatham Consulting, inc.: https://www.government-fleet.com/146908/how-to-calculate-technician-to-vehicle-ratios

Figure 22: Maintenance Division Tasks

Apparatus Maintenance, Diagnoses, and Repair

- Preventative Maintenance
- Oil and Filter Changes
- Fuel Filter Changes
- Air Filters
- Brake Pin Cleaning
- Tires
- Annual Pump Testing
- Biennial Aerial Testing
- Apparatus Lubrication
- Aerial Lubrication
- Scheduled Repairs
- Minor/Major Engine Repairs
- Drivetrain Repairs
- Pump Rebuilds
- Brakes/Abs
- Electrical
- Communication Equipment
- Heating and Air Conditioning
- Suspension
- Mobile Data Terminals (MDT)

Building Maintenance, Diagnoses, and Repair

- Preventative Maintenance
- Grease HVAC Bearing
- Change Belts
- Air Filter Changes
- Air Duct Cleaning
- Generator Maintenance
- Belt Change
- Pump Motor Replacement
- Bearing Replacement
- Motor Replacement
- Plumbing Repairs
- Electrical Repairs
- Garage Door Repairs
- Lawn Irrigation Repairs
- Exhaust Removal System Repairs
- Communication
- Snow Removal

Unscheduled repairs/emergency call-ins And Education & Training

- Unscheduled Repairs
- Emergency Repairs
- Other Duties as Assigned
- Apparatus Training and Education

Maintenance Training and Certifications

MFD follows National Fire Protection Association (NFPA) 1071, Standard for Emergency Vehicle Technician (EVT) Professional Qualifications. The Master Mechanic is currently Fire Apparatus EVT II qualified, working towards EVT III and Ambulance EVT I certifications. The newly appointed Assistant Mechanic is beginning work on these certifications. The EVT certification track combines two separate testing agencies, Automotive Service Excellence (ASE) and EVT. Table 10 outlines both certification tracks. To fulfill NFPA standards, both the Master and Assistant Mechanic(s) must take a total of 21 tests and must recertify every 5 years to maintain these certifications. Funding to maintain the mechanics' certifications is critical. Currently the budget does not adequately support the annual training needs.

Fire Apparatus Technician Level Requirements

Level I	
ASE Exams: T4-Truck, Brakes T5-Truck, Suspension and Steering	EVT Exams: F1-Maintenance, Inspection, and Testing of Fire Apparatus F2-Design and Performance Standards of Fire Apparatus
Level II	
ASE Exams: T2-Truck, Diesel Engines T3-Truck, Drive Train T6-Truck, Electrical Systems	EVT Exams: F3- Fire Pumps and Accessories F4- Fire Apparatus Electrical Systems
Level III	
ASE Exams: T1-Truck, Gasoline Engines T7-Truck, Heating and Air Conditioning	EVT Exams: F5- Aerial Fire Apparatus F6- Allison Automatic Transmissions

Ambulance Technician Level Requirements

Level I	
ASE Exams: A4-Automobile, Suspension and Steering A5-Automobile, Brakes	EVT Exams: E0-Maintenance, Inspection, and Testing of Ambulance E1-Design and Performance of Ambulance
Level II	
ASE Exams: A9-Automobile, Diesel Engines T3-Truck, Drive Train T4-Truck, Brakes	EVT Exams: E2-Ambulance Electrical Systems E3-Ambulance Heating, Air Conditioning, and Ventilation
Level III	
ASE Exams: T1-Truck, Gasoline Engines T2- Truck, Diesel Engines T5-Truck, Suspension and Steering	EVT Exams: E4-Ambulance Cab, Chassis, and Powertrain

Table 10: Fire Apparatus Technician Level Requirements

Goals and Objectives

- Support continuing education and certifications for EVT mechanics.

Service Delivery and Performance

The delivery of fire suppression, rescue, and emergency medical services is no more effective than the sum of its parts. It requires efficient notification of an emergency rapid response, from well-located facilities, appropriate apparatus, well-trained personnel, and a well-practiced plan of action. This section of the Master Plan provides an analysis of the current service delivery components of the Missoula Fire Department (MFD). National Fire Incident Records System (NFIRS) data, incident response data, and apparatus response data collected by the Department is used in this section of the report.

Service Demand

In the demand analysis, MFD reviews current and historical service demand by incident type and temporal variation for MFD. Figure 23 displays historical service demand from 2014 through 2018.

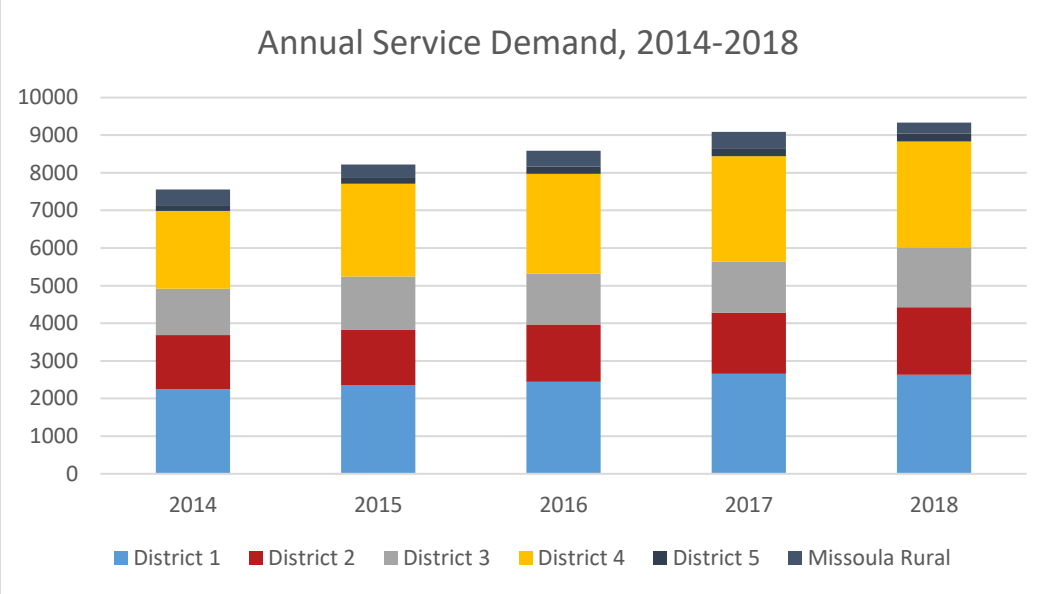


Figure 23: Annual Service Demand

During the period displayed, MFD service demand increased by over 30% (30.6%). The data shows that annual service demand has increased at all five MFD stations. District 5 experienced the greatest increase at 38.5%, District 4 35.8%, District 3 29.6%, District 2 24.8%, District 1 16.7%. Note: demand analysis includes Missoula Rural Fire District's (MRFD) single engine responses into the city. This more accurately captures the service demand inside the city's jurisdiction. In 2018 the service demand inside the City's jurisdiction was 9,333 calls for service: District 1 (2,630), District 2 (1,797), District 3 (1,591), District 4 (2,813), and District 5 (212). Missoula Rural Fire District (MRFD) responded into the city with a single engine response under automatic/mutual aid 290 times.

Figure 24 summarizes the five year average service demand into fire, EMS, or other categories from January 1, 2014 to December 31, 2018.

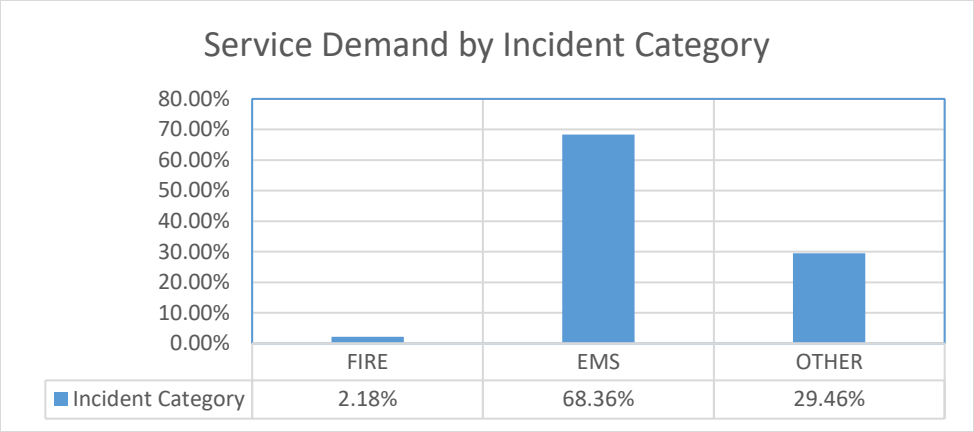


Figure 24: Service Demand by Incident Category

Using the National Fire Incident Reporting System (NFIRS) incident type definitions, MFD categorizes incidents as "Fire" (structures, vehicle, brush, any 100-series incident in NFIRS), "EMS" (all calls for medical service including MVA"s and rescues, any 300-series incident in NFIRS), and "Other" (false alarms, hazmat incidents, service calls, all other NFIRS incident series).

Temporal Variation

Service demand is not static and MFD's workload varies by temporal variation. Figures 25 & 26 illustrate how service demand varied by month, day of week, and hour of day during calendar years 2014-2018 in order to identify any periods of time that pose significantly different risks and hazards. This analysis begins by evaluating service demand by month.

Looking at a five year average overall service demand varies throughout the year, with the lowest demand in February (7.6%) and the highest percentage (9.6%) of incidents in August. The range is small at approximately 2%.

Again looking at a five year average as with monthly service demand, service demand by day of the week varies within a narrow range throughout the week. Friday displays the highest demand (14.9%), with the lowest service demand on Sunday (13.2%).

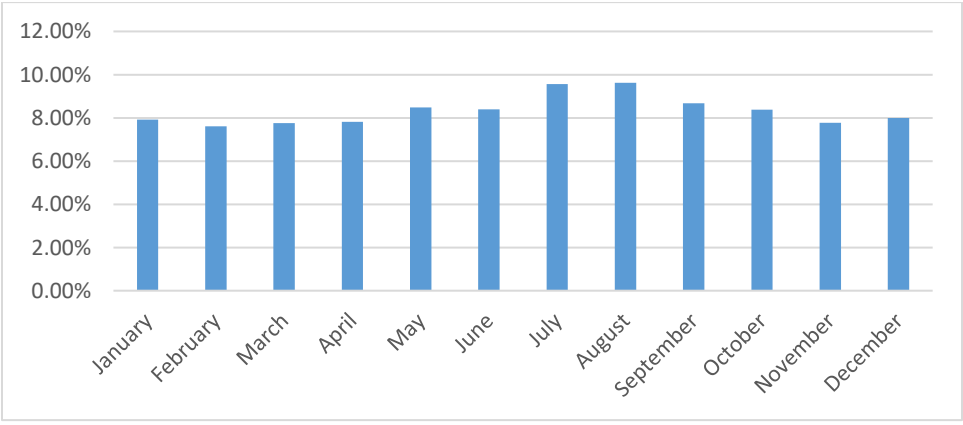


Figure 25: 2014-2018 Averages of Incident Response by Month

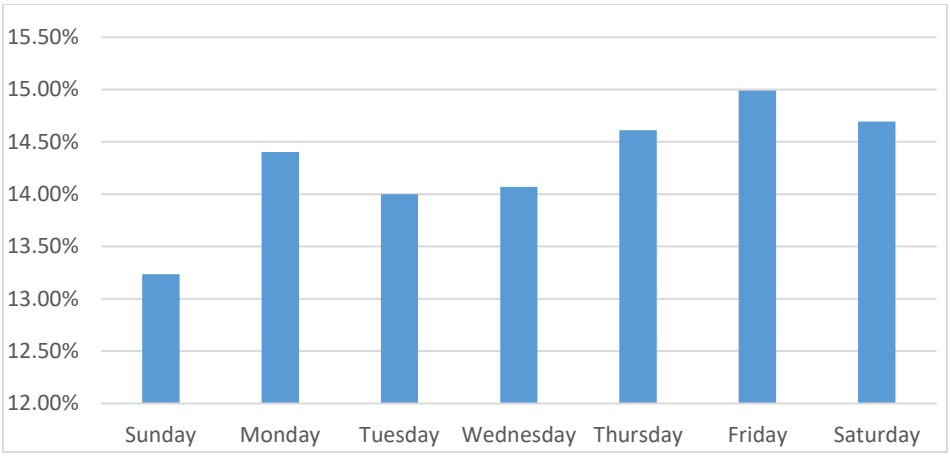


Figure 26: Incident Data by Day of the Week, 2014-2018 Average

Service demand directly correlates with the activity of people, with workload increasing during daytime hours, and decreasing during nighttime hours as shown in Figure 27. 41% of MFD service demand over the last five years occurred between 3:00 PM and 11:00 PM. The increase in service demand during the day is significant and predictable. There is an opportunity to anticipate increased workload and improve response performance by deploying additional apparatus or personnel during the busiest times of the day.

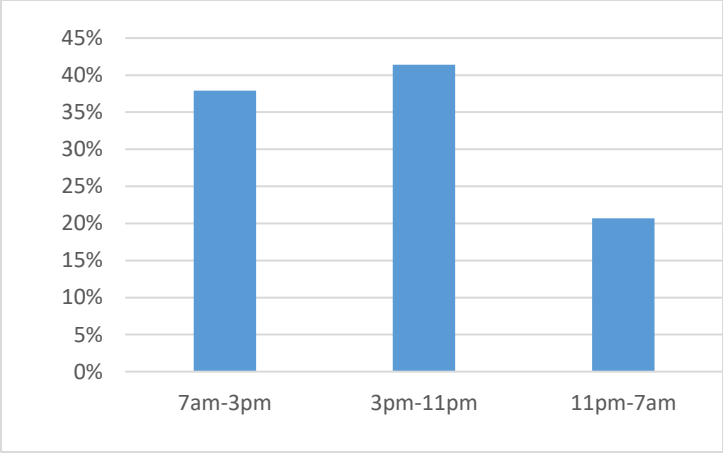


Figure 27: 2014-2018 Average Incident Data by Time of the Day

Figure 28: Smoke billows from home as crews battle residential fire on 4th St from aerial ladder. September 9, 2016.

Geographic Service Demand

In addition to the temporal analysis of service demand, it is useful to examine the geographic distribution of service demand. Figure 29 uses dispatch center data to calculate the MFD 2018 service demand by district.

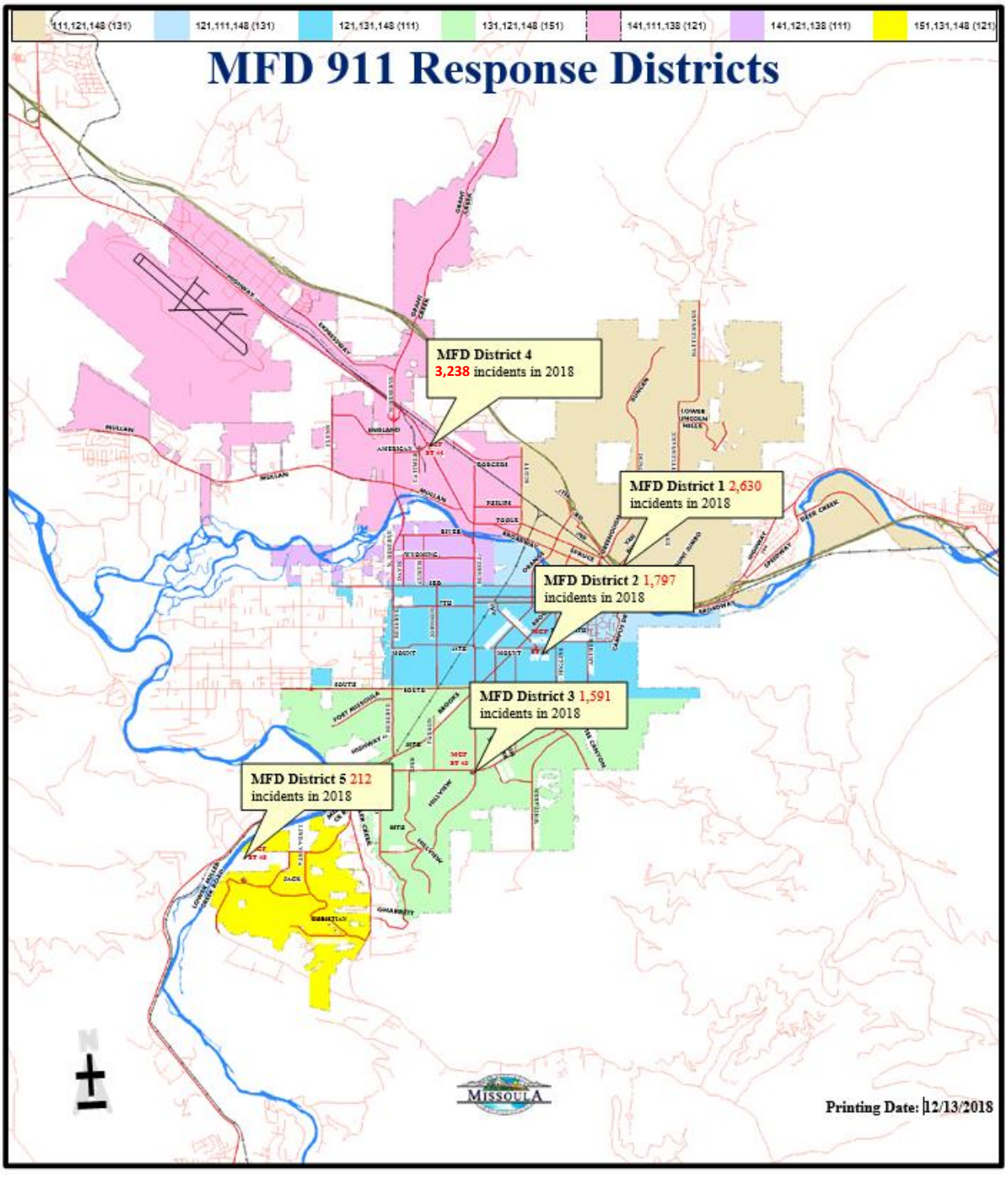


Figure 29: 2018 MFD Number of Incidents by District

The highest service demand in the MFD service area is concentrated in the area roughly bounded by Districts 1, 2, and 4. District 5 experienced the greatest increase in service demand over the last five years based on percentage of calls. However, overall incident density is still relatively low compared to the core of Missoula. District 4 is the busiest with 2,813 incidents in 2018. Station 4, which serves District 4, contains a cross staffed crew in either an engine or a ladder truck, resulting in 3,238 responses from Station 4. District 1 is not far behind with 2,630 incidents in 2018. Often engines are called to respond outside of their Station's District, which increases each station's work load.

Figure 30: MFD Firefighter Silhouette Inside a Fire Scene with SCBA, 2018

Resource Distribution

The analysis of resource distribution presents an overview of the current deployment of fire department facilities, equipment, and personnel within the MFD service area. Individual Districts are represented by color coded areas. Each MFD Station is responsible for housing a primary response unit in their respective District. The following Figures (31-34) are for visualization purposes only to define areas for resource distribution, station placement, and determining response capabilities for future planning.

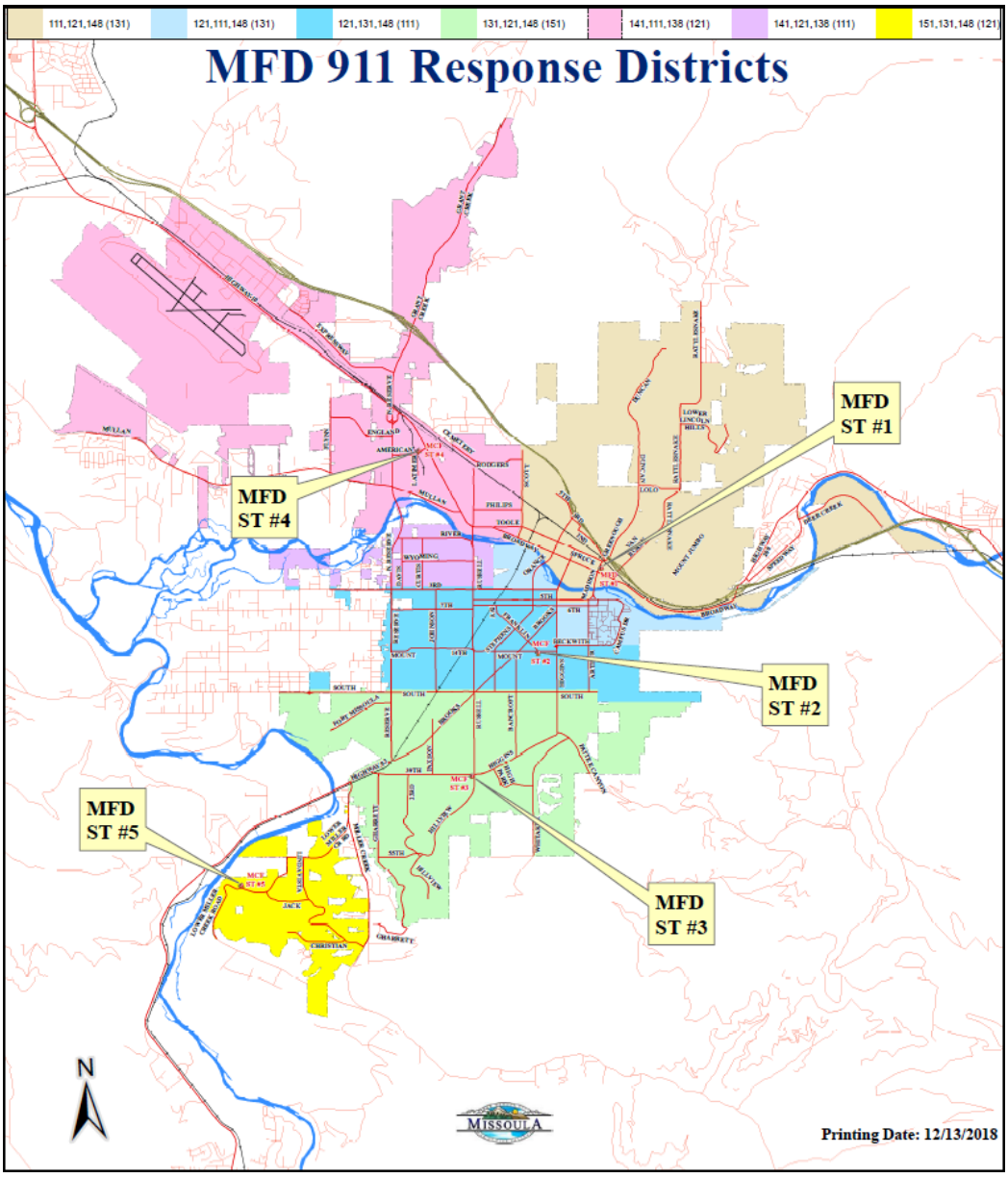


Figure 31: MFD Response Area

Figure 31 depicts the MFD response area. The City of Missoula encompasses approximately 34.23 square miles. MFD currently provides fire protection, emergency medical first response, rescue services, and hazardous materials response within the city of Missoula from five stations distributed throughout

Missoula. The current estimated population of Missoula is approximately 73,340. This represents an increase of 9.18% since 2010. The overall population density of the city is approximately 2,142 persons per square mile.

The Insurance Services Office (IS0) is a national insurance industry organization that evaluates fire protection for communities across the country. A jurisdiction's IS0 rating is an important factor when considering fire station and apparatus distribution since it can affect the cost of fire insurance for residents and businesses. To receive maximum credit for station and apparatus distribution, IS0 recommends that all developed portions in a community be within 1.5 road miles of an engine company and serviceable by a hydrant. Additionally, a structure should be within five miles of a fire station to receive a fire protection rating that may result in a reduction of insurance cost. Figures 32 and 33 examine current station and apparatus distribution based on credentialing criteria for the IS0.

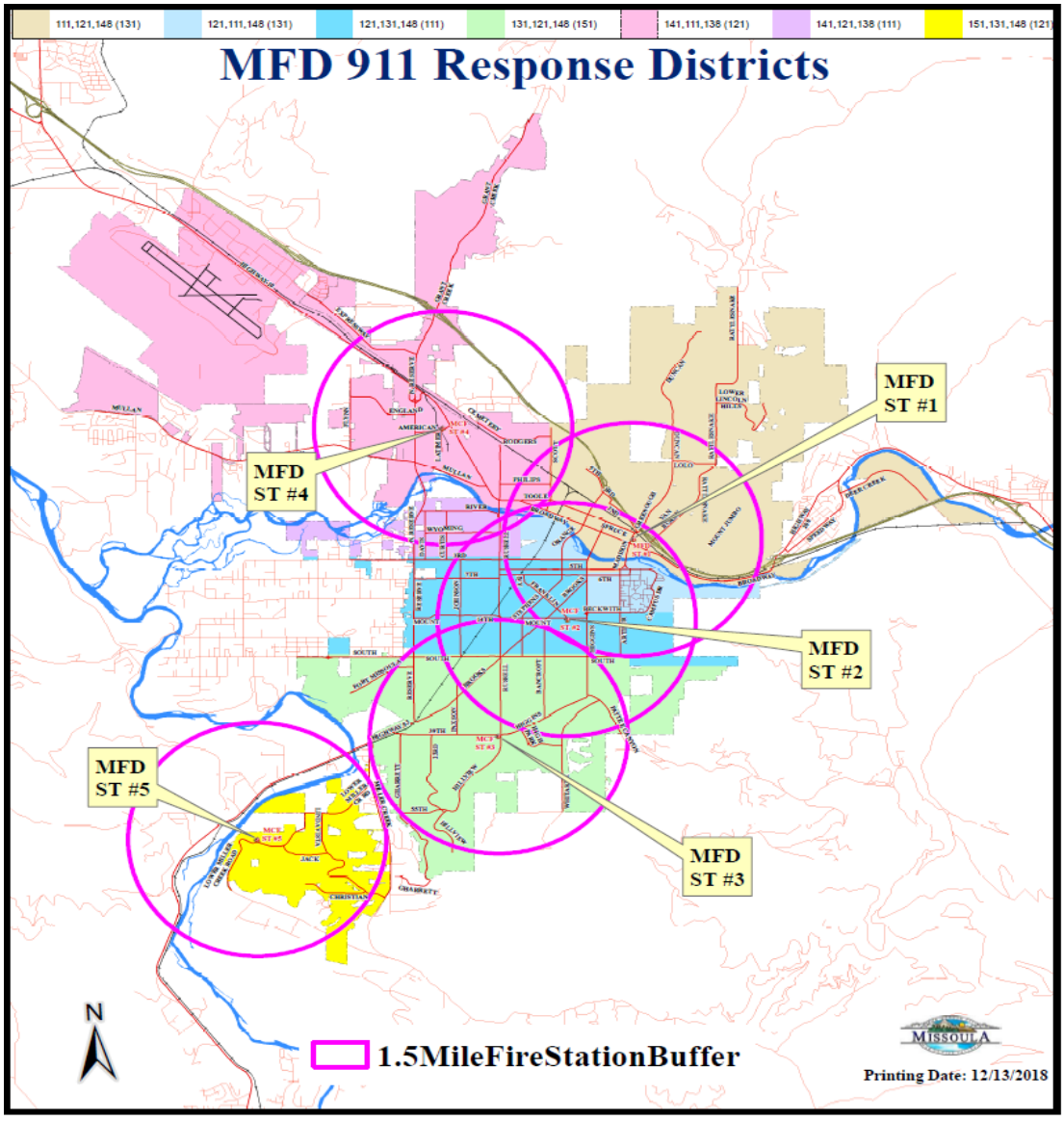


Figure 32: MFD Response Area with 1.5 Mile Response Buffers

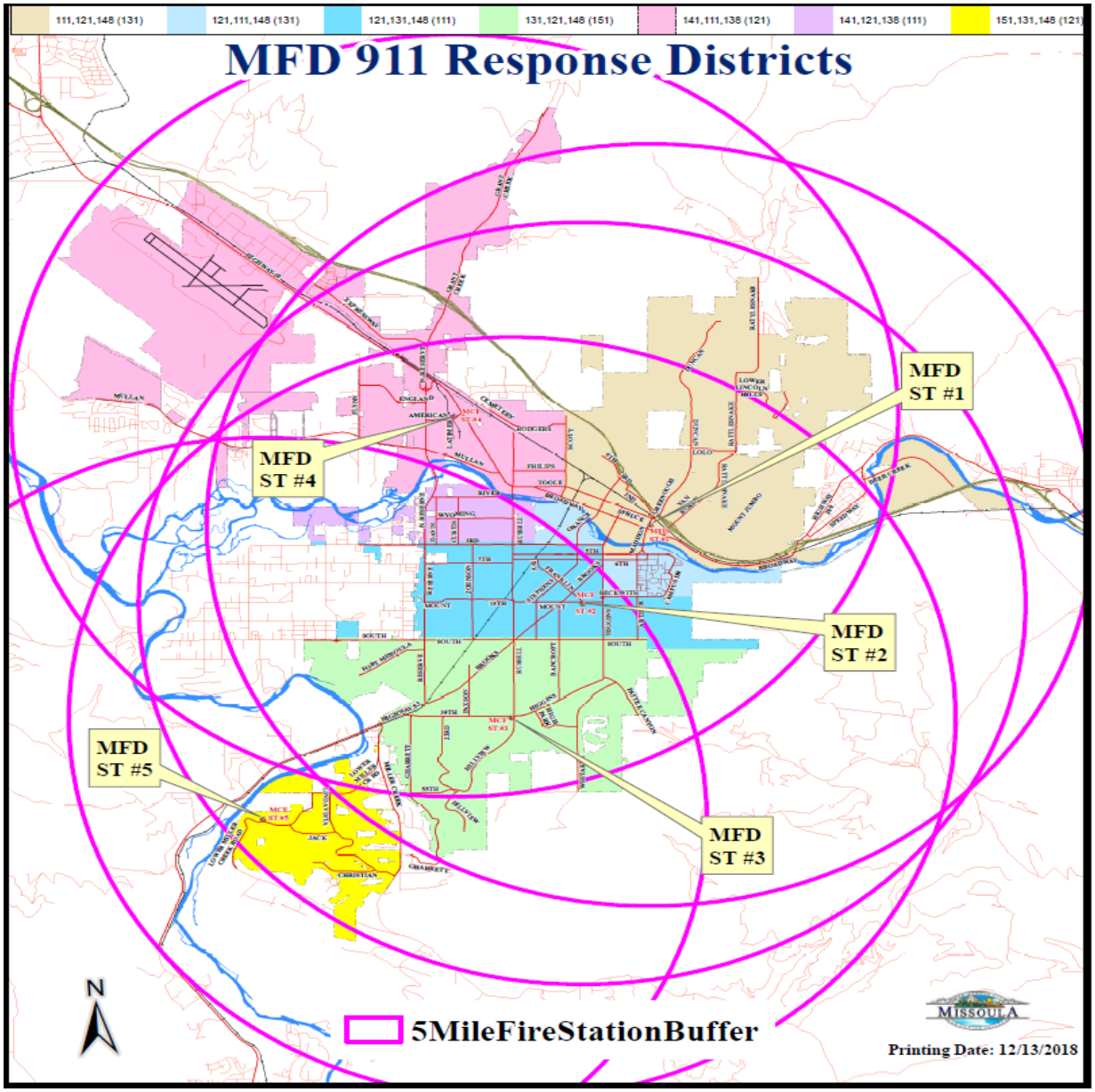


Figure 33: MFD Response Area with 5 Mile Response Buffers

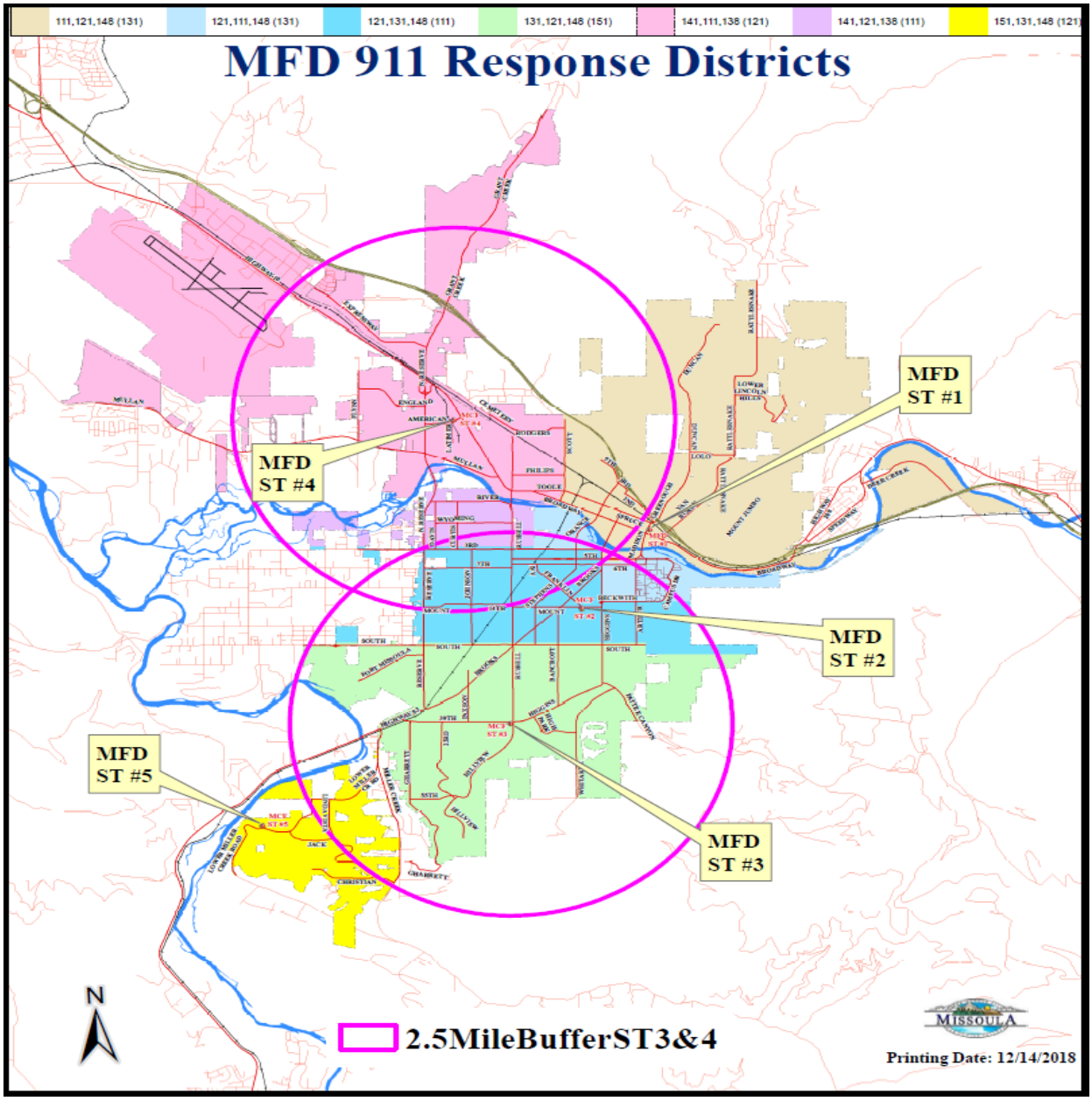


Figure 34: MFD Ladder Coverage at 2.5 Miles

Similar to engine company criteria, IS0 recommends that ladder companies be placed at 2.5 mile intervals in areas with buildings over three stories in height as shown in Figure 34.

MFD operates ladder companies at Station 4 and Station 3. The ladder companies are cross manned with the engine companies. MFD does not currently have a dedicated ladder company.

Insurance Services Office Classification (ISO Rating)

The Insurance Service Office (ISO) recently assigned Missoula a Public Protection Classification (PPC) of 3 in June 2015. Classifications range from 1, which represents exemplary fire protection, to 10, which represents limited to no fire service.

FSRS Item	Earned Credit	Credit Available
Emergency Communications		
414. Credit for Emergency Reporting	2.55	3
422. Credit for Telecommunications	2.78	4
432. Credit for Dispatch Circuits	3.00	3
440. Total Credit for Emergency Communications	**8.33**	**10**
Fire Department		
513. Credit for Engine Companies	3.58	6
523. Credit for Reserve Pumpers	0.50	0.5
532. Credit for Pumper Capacity	3.00	3
549. Credit for Ladder Service	3.92	4
553. Credit for Reserve Ladder and Service Trucks	0.26	0.5
561. Credit for Deployment Analysis	5.02	10
571. Credit for Company Personnel	9.98	15
581. Credit for Training	6.78	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	**35.04**	**50**
Water Supply		
616. Credit for Supply System	24.15	30
621. Credit for Hydrants	3.00	3
631. Credit for Inspection and Flow Testing	6.40	7
640. Credit for Water Supply	**33.55**	**40**
Divergence	**-2.76**	---
1050. Community Risk Reduction	**4.05**	**5.50**
Total Credit	**78.21**	**105.5**

Table 11: Fire Suppression Rating System for Missoula from June 2015

The IS0 evaluates three primary areas to arrive at a community's PPC: emergency communication and dispatch system, the fire department, and the community's pressurized hydrant or tanker-based water supply.

The emergency communications function includes the capabilities of the call receipt and dispatch system along with the quality and redundancy of communications systems between dispatchers and response units. The IS0 gave the Missoula Emergency Communications Center 8.33 points out of a possible 10 points; minor deficiencies are noted as displayed in Table 11.

A fire department is evaluated on its ability to provide needed apparatus within specified distances of developed property, the pump capacity and equipment carried on those apparatus, and the number of personnel staffing each. In addition, a fire department is evaluated on its training programs and facilities. MFD received 35.04 points out of a possible 50 points for this element. In Table 11, deficiencies are noted in items 513 Engine Companies, 553 Reserve Ladder and Service Trucks, 561 Deployment Analysis, 571 Company Personnel, and 581 Training. MFD will continue to work with IS0 representatives to mitigate deficiencies which may result in further improvement in the department's IS0 PPC and a reduction in the cost of fire insurance for the department's constituents.

A water system is evaluated on the amount of storage, size of water mains, distribution and condition of fire hydrants, and the ability of the system to deliver needed quantities of water based on specific risks within the service area. Missoula's water system received 33.55 points out of a possible 40 points.

The IS0 PPC program only addresses fire suppression activities and is primarily concerned with the geographic coverage of property. MFD responds to all types of emergencies. The travel time required to respond from a fire station to all emergencies is of equal importance. The national consensus standard NFPA 1710 provides travel time goals for fire, EMS, and special operations emergency responses. The NFPA 1710 standard calculates travel time using the posted speed limit and adjusted for negotiating turns and intersections. One-way street network directionality is also respected.

Figure 35: Hydrant Frozen After Fire Attack at Yandt's Drug Store.

Goals and Objectives

- Establish an ISO rating of 2

NFPA Standards Relative to Resource Distribution

The NFPA 1710 standard specifies that career staffed fire departments deploy resources such that 90 percent of emergency service demand can be reached in four minutes travel time or less. Figures 36-40 demonstrate MFD's travel time capabilities from the currently staffed fire stations.

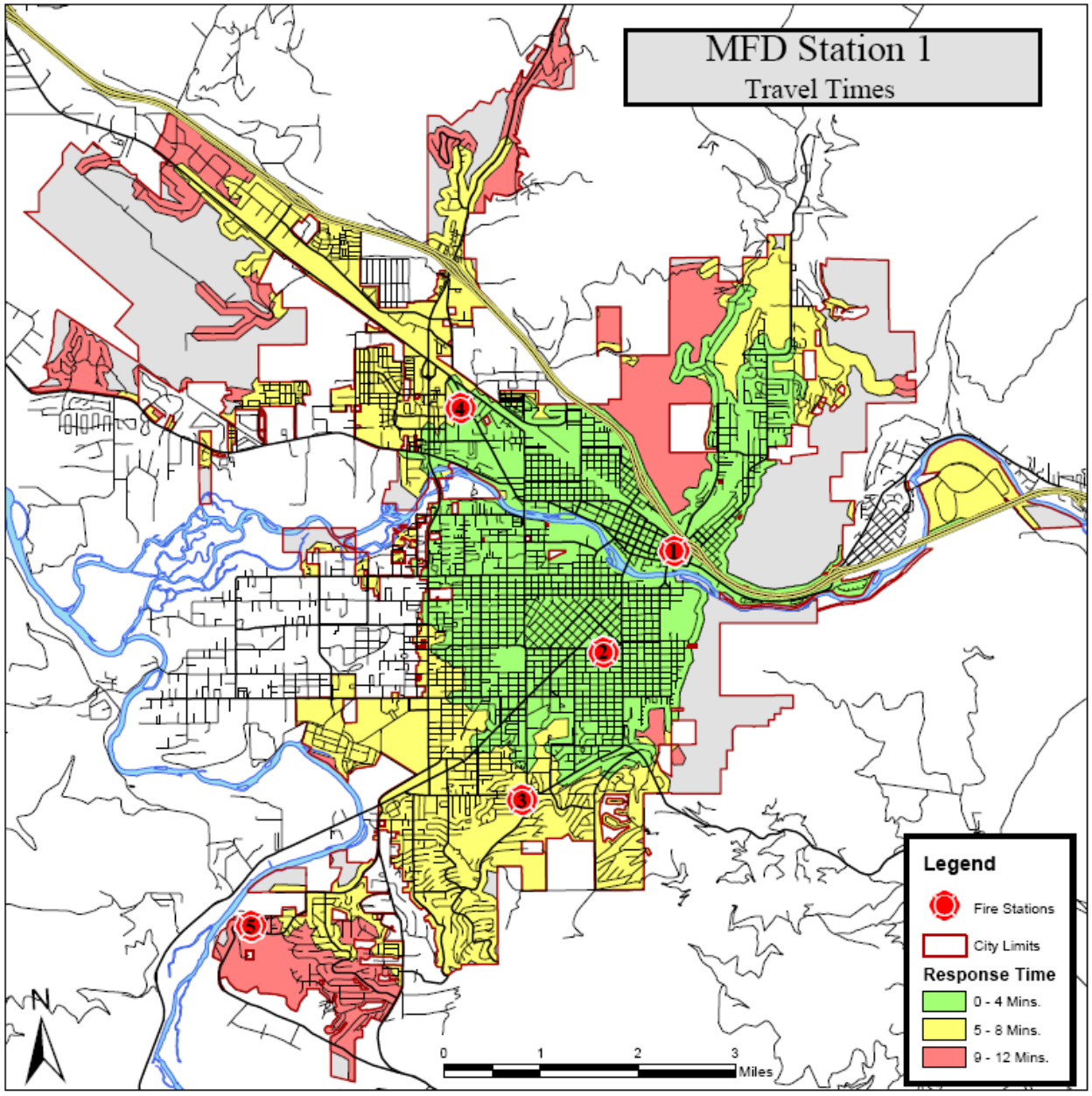


Figure 36: MFD Station 1 Travel Times

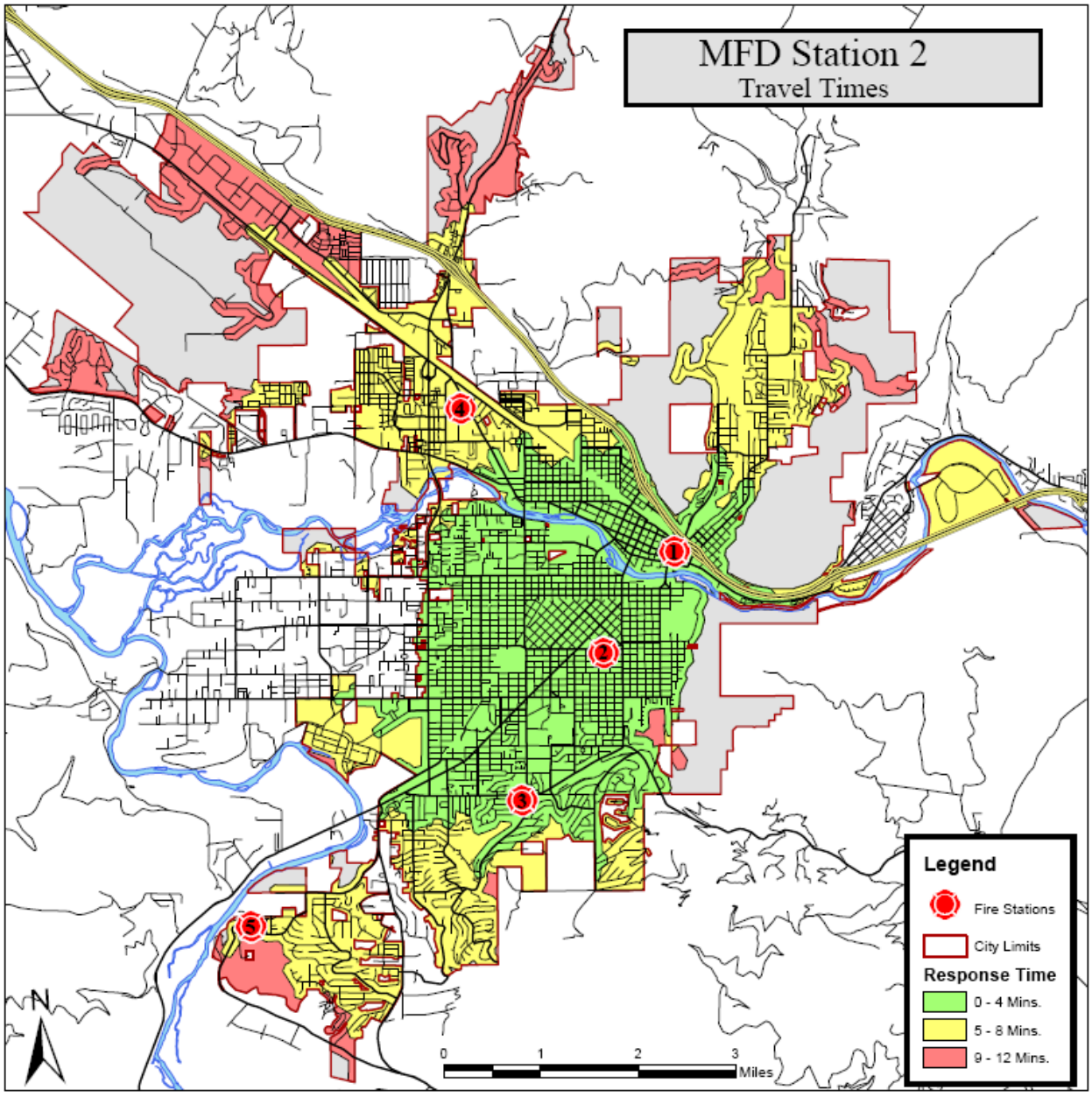


Figure 37: MFD Station 2 Travel Times

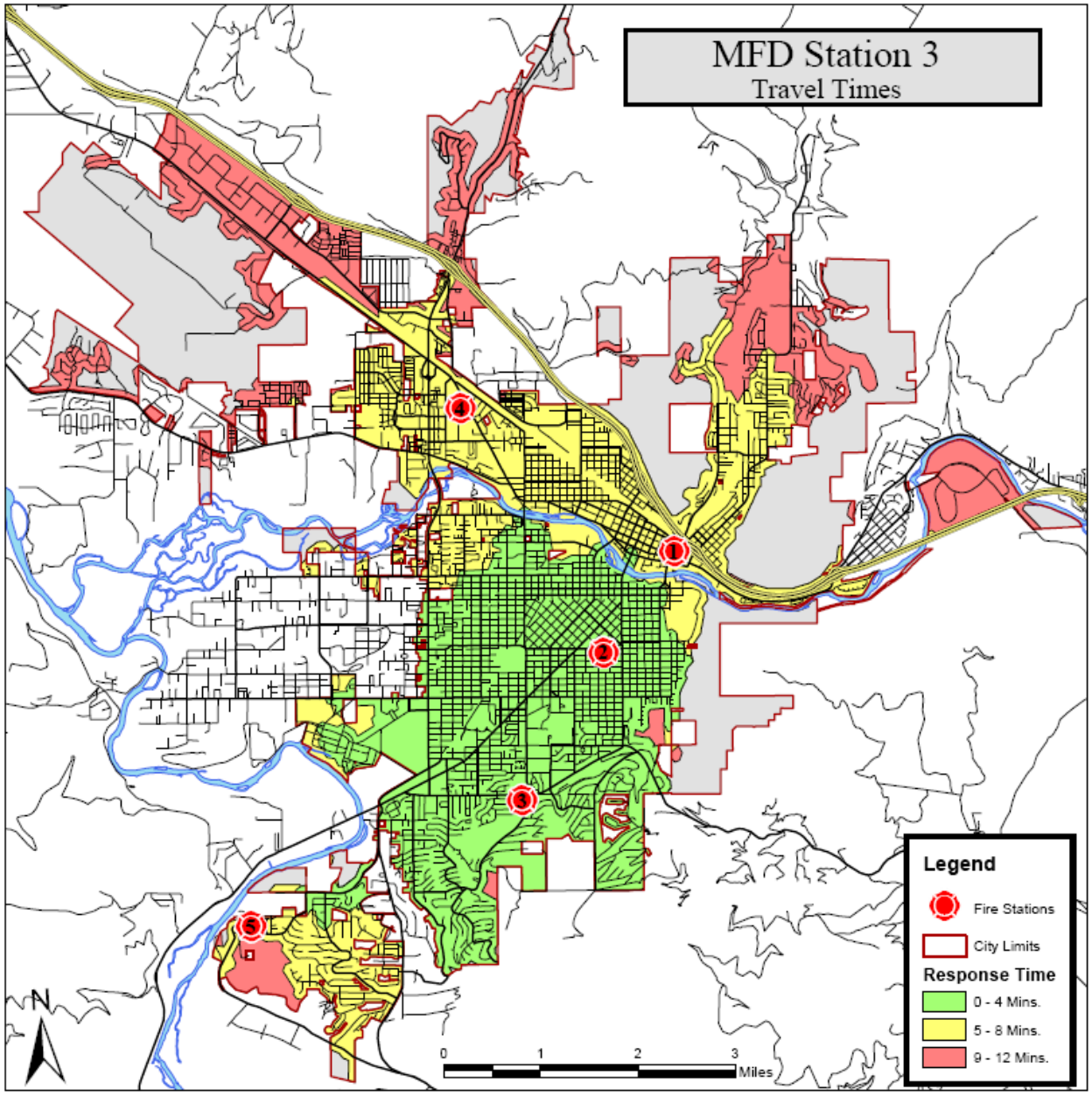


Figure 38: MFD Station 3 Travel Times

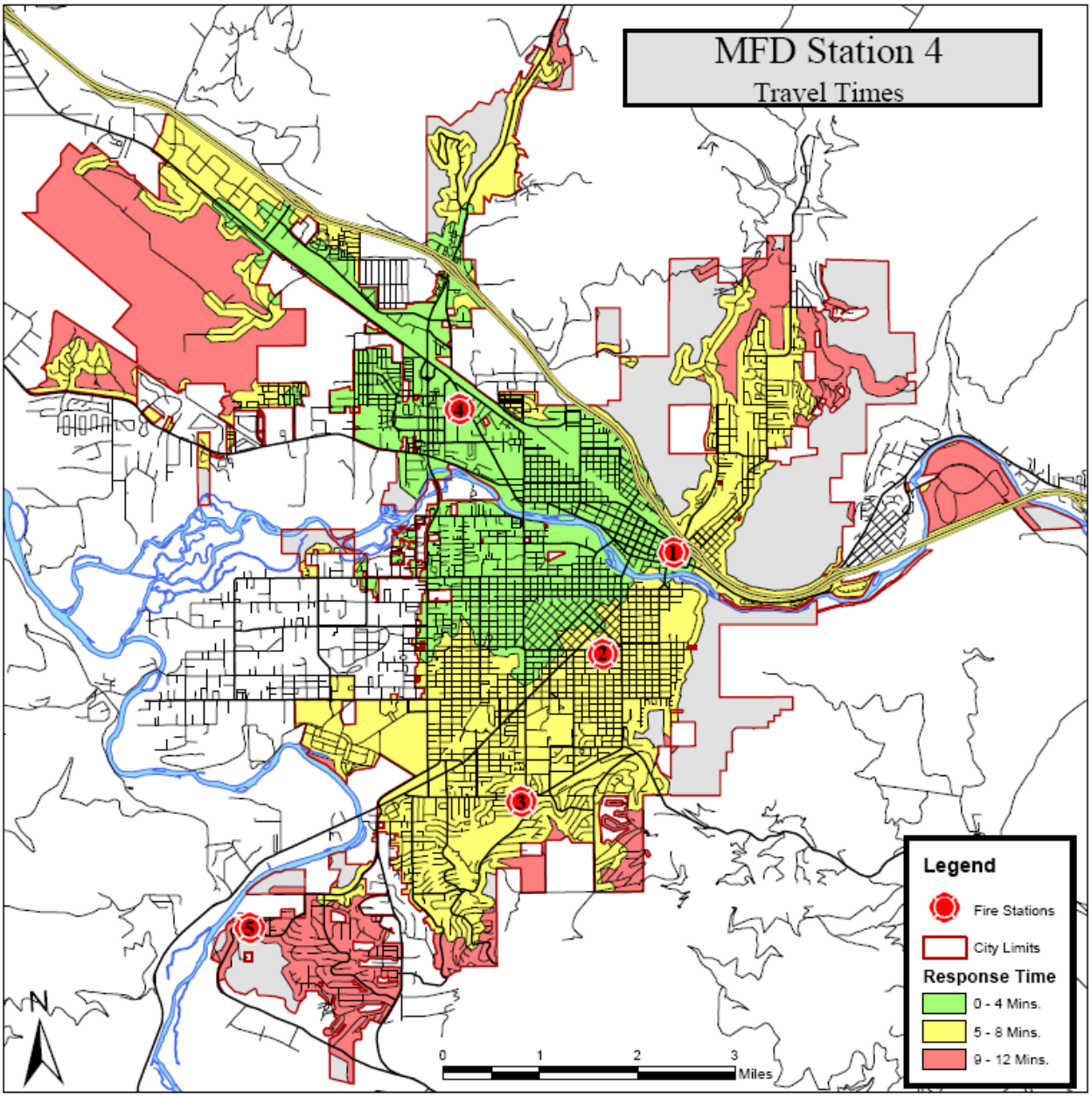


Figure 39: MFD Station 4 Travel Times

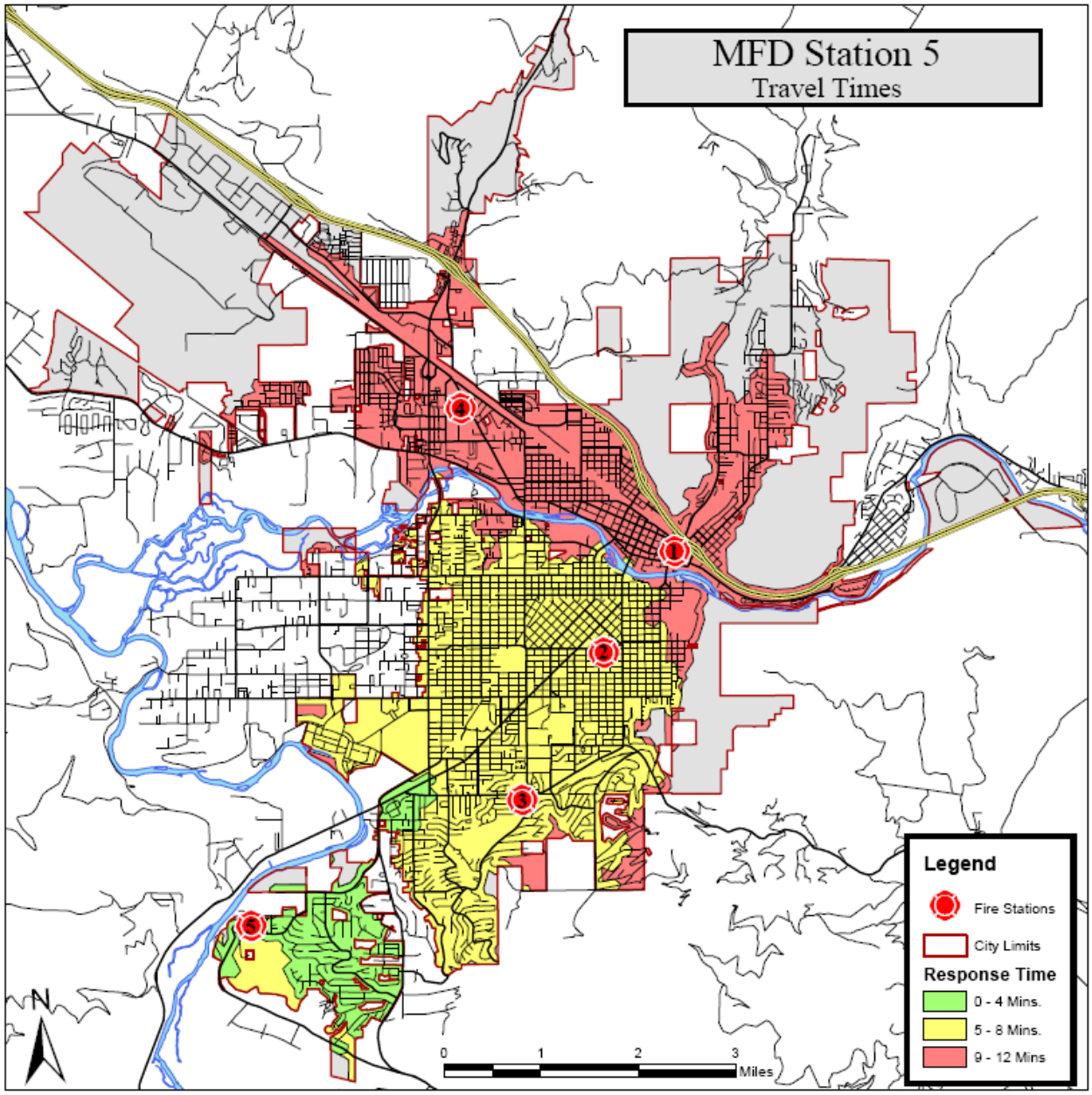


Figure 40: MFD Station 5 Travel Times

The quality and connectivity of the street network, traffic, geography, road conditions, and barriers can all affect potential travel time performance.

Resource Concentration

The concentration analysis examines the ability of MFD to assemble sufficient resources (apparatus and personnel) to safely and effectively mitigate an emergency and arrive in a timely manner. The eight-minute travel time criteria used for this analysis is based on the National Fire Protection Association (NFPA) 1710 Standard. The NFPA 1710 standard specifies that the full first alarm assignment for a moderate risk structure fire (single story residential structure) should arrive within eight minutes. Figure 41 demonstrates the area of MFD's service area that can achieve a full first alarm within eight minutes travel time or less.

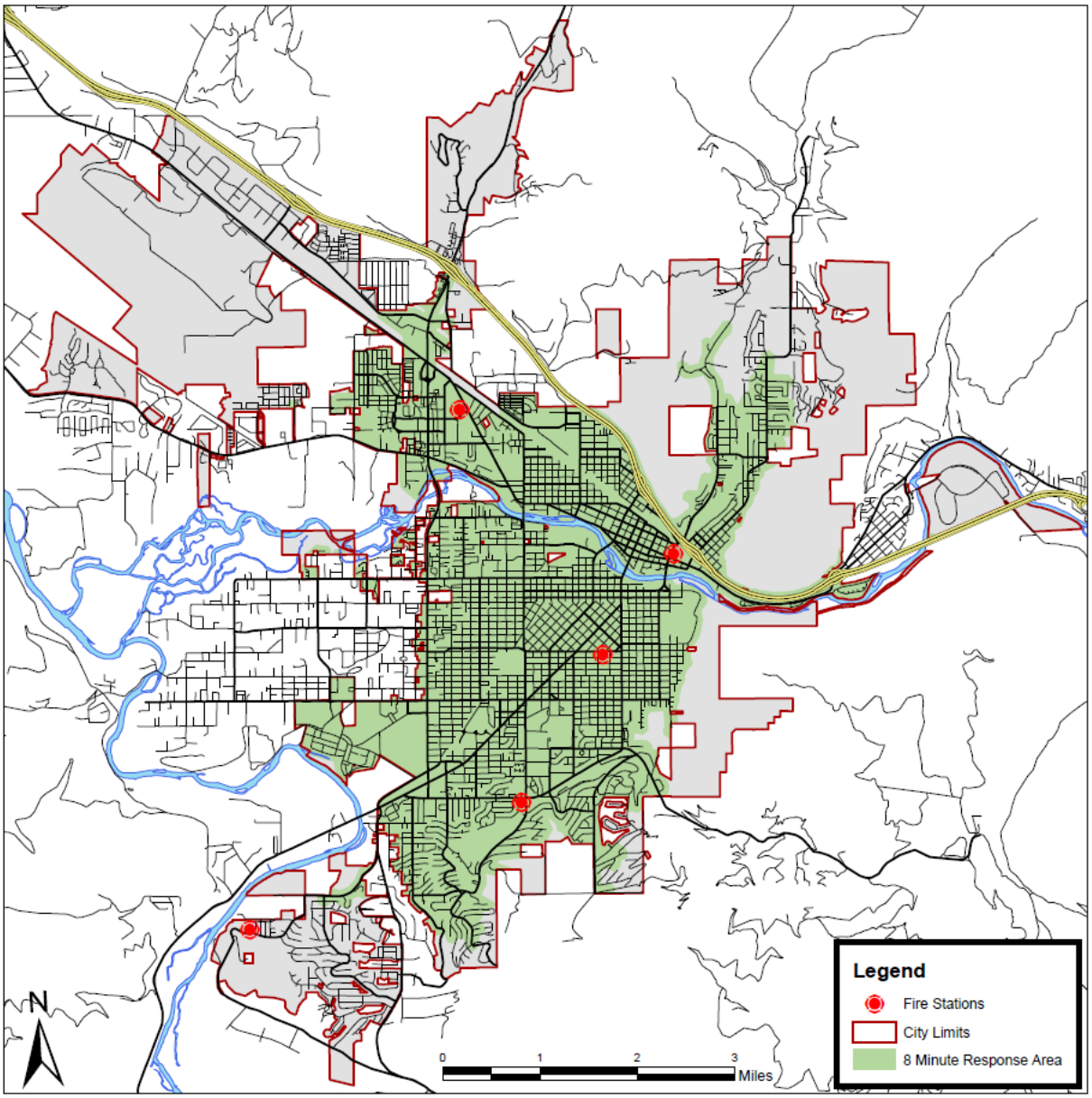


Figure 41: Full First Alarm 8 Minute Travel Time Map

MFD identifies three engines, one aerial apparatus, and one command unit as the full first alarm assignment for a structure fire.

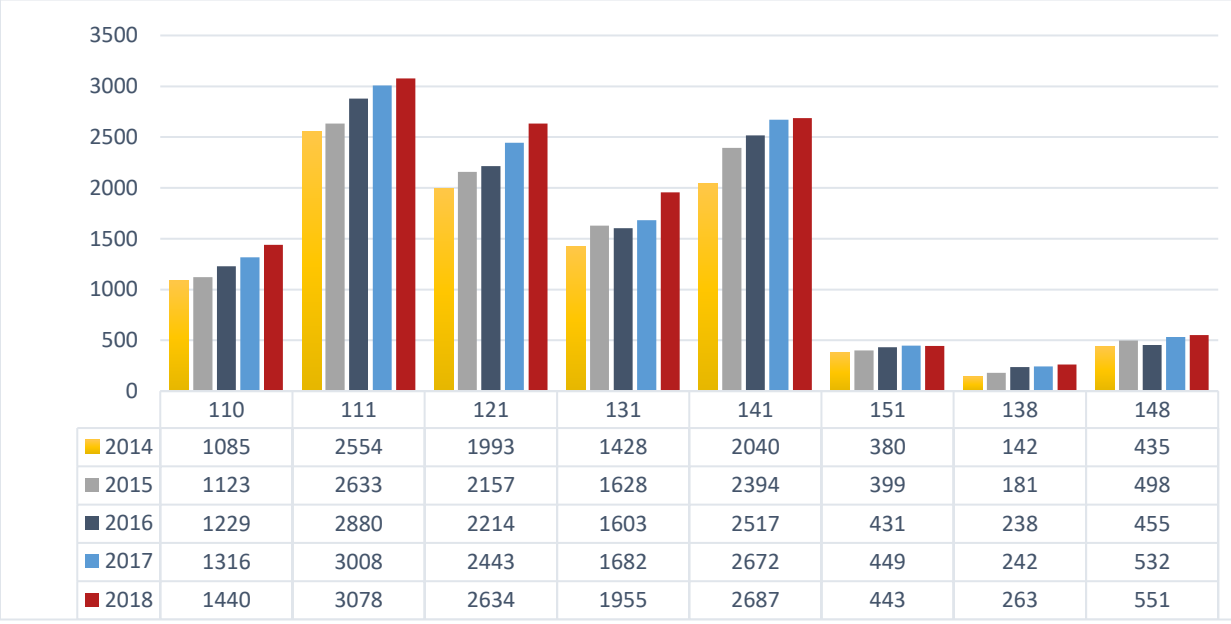
Portions of Missoula, including the central business district, are within eight minutes travel of a full first alarm assignment for a moderate risk structure fire. Fire service best practice documents recommend that 14 to 16 personnel are needed to safely and effectively mitigate a moderate risk residential structure fire.

At minimum staffing levels, MFD's response of a full first alarm will provide 13 personnel on scene within the eight minute travel time area. If MFD increased to 4-person engine companies, the number of personnel would increase to 17 on scene in the eight minute travel time area.

Figure 41 depicts large areas of the MFD service area that are not within the eight minute travel time of a full first alarm. If MFD were to staff a full-time ladder company out of Station 4, the area not within the eight minute travel time could be greatly reduced. A dedicated ladder company would also allow for MFD to meet the recommended 14 to 16 personnel on the scene of a moderate risk residential structure fire.

Response Reliability

The workload of emergency response units can be a factor in response time performance. The busier a given unit, the less available it is for the next emergency. If a response unit is unavailable, then a unit from a more distant station must respond, increasing overall response time. Although fire stations and response units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area.



	110	111	121	131	141	151	138	148
2014	1085	2554	1993	1428	2040	380	142	435
2015	1123	2633	2157	1628	2394	399	181	498
2016	1229	2880	2214	1603	2517	431	238	455
2017	1316	3008	2443	1682	2672	449	242	532
2018	1440	3078	2634	1955	2687	443	263	551

Figure 42: Responses per Apparatus, 2014-2018

Figure 42 displays the number of responses per apparatus from January 2014 through December 2018. Specialty apparatus such as brush engines, tenders, etc., that are usually cross-staffed and dispatched on "as needed" basis are not included in this analysis.

This analysis differs from the service demand analysis in that total workload for each apparatus is measured, which includes instances of multiple apparatus responding to the same incident. Three of the MFD frontline engines (Engine 111, Engine 121, and Engine 141) exceeded 2,000 responses in 2018. Truck 138 experienced the lowest number of responses in the data displayed.

Unit hour utilization (UHU) analyzes the amount of time that a unit is not available for response because it is already committed to another incident. The larger the number, the greater its utilization and the less available it is for assignment to subsequent calls for service. Figure 43 displays the total time MFD primary response apparatus were committed to an incident using a five year average, and expresses this as a percentage of the total time in a year (based on a five year average).

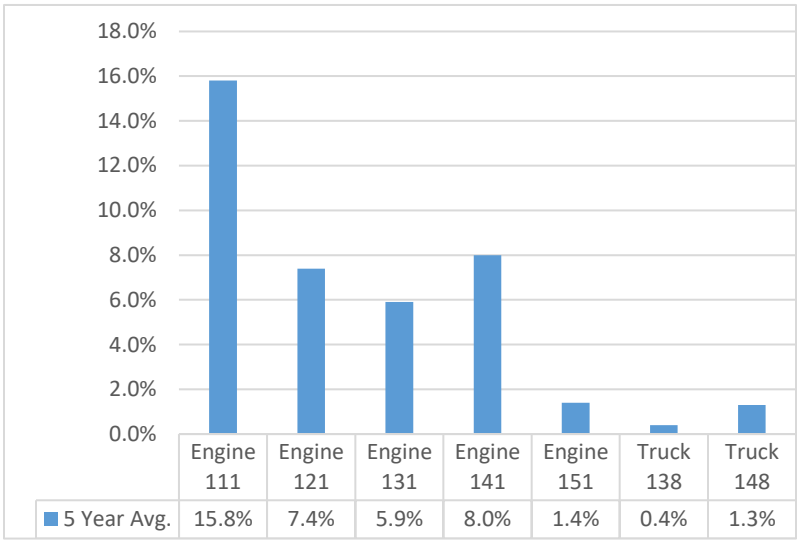


Figure 43: Time Committed to an Incident

UHU is an important statistic to monitor, especially when a jurisdiction follows industry best practices and measures response performance using percentile-based performance standards. Where response performance is measured at the 90th percentile, unit hour utilization greater than 10% means that the response unit will be less likely to provide on-time response to its 90th percentile target even if response is its only activity. Currently, only one MFD apparatus exceeds the 10% threshold. Engine 111 had a higher than average year in 2014 for time committed. It does exceed the 10% but should continue to be monitored in the future. Several of the other first out engine companies are approaching 10% UHU rates. Note: Engine 141 and Truck 148 are crossed staffed out of Station 4. The UHU rate for Station 4 is 9.3%. The same holds true for Engine 131 and Truck 138. The UHU for Station 3 is 6.3%. Also note that as unit hour utilization increases, not only are units less available for emergency responses, but less likely to complete other duties; such as inspections, training, public education, and routine station duties. MFD will monitor UHU to ensure that response performance and other duties are not negatively affected by increased unit hour utilization.

Figure 44 illustrates the average time a primary response apparatus was committed to an incident from initial dispatch until the apparatus cleared the scene or was cancelled.

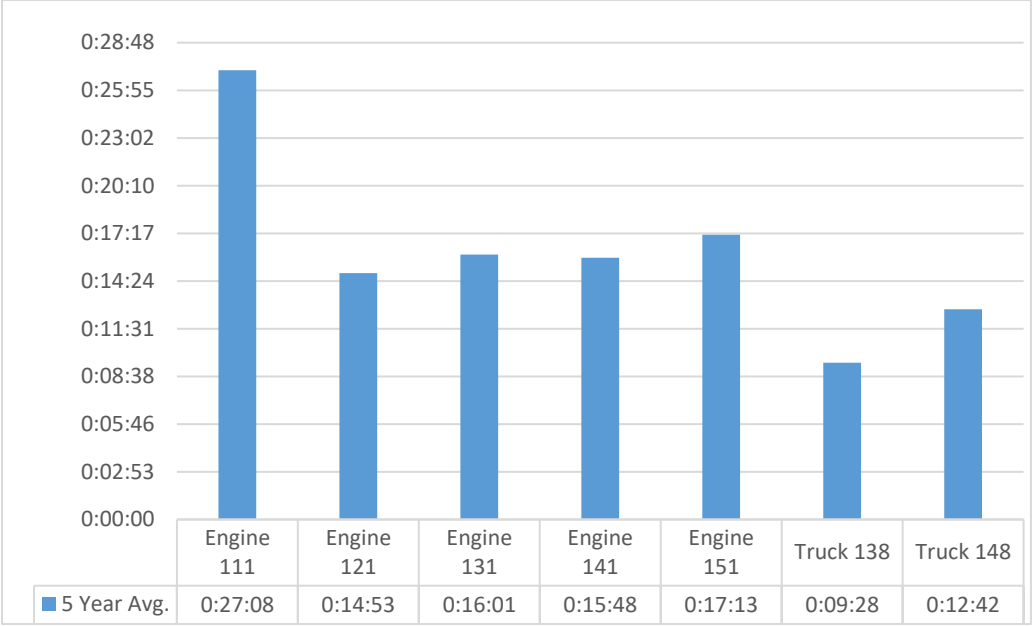


Figure 44: Average Primary Unit Time Committed

In general, the time an engine company is committed to an incident ranges from 15 to 27 minutes. The average time committed is similar to comparable all hazard fire jurisdictions that provide EMS first response service. Engine 111 displayed the longest average time committed. It should be noted that Engine 111 had an above average year of time committed in 2014. MFD will continue to monitor time committed to ensure that response performance and other duties are not negatively affected by increased UHU.

Concurrent incidents can affect a fire department's ability to muster sufficient resources to respond to additional emergencies. Table 12 depicts the percentage of the time that MFD resources were committed to more than one incident at the same time in 2018

Over 33% of 2018 service demand occurred while another incident was in progress. Peak Activity Units (PAU) are additional response units that can be strategically placed, and staffed during predictable times of peak activity. PAU's are an effective method for mitigating the effect of concurrent incidents on station reliability and emergency response performance.

2018	
CONCURRENT INCIDENTS	PERCENTAGE
Single Incident	66.78%
2	27.68%
3	4.87%
4	0.53%
5 or more	0.13%

Table 12: Time Committed to Multiple Simultaneous Incidents

The ability of a fire station's first-due unit(s) to respond to an incident within its assigned response area is known as unit or station reliability. Figure 45 demonstrates the percentage of incidents that a first-due apparatus for each of the MFD station areas was the first apparatus on scene in their particular station area during 2018.

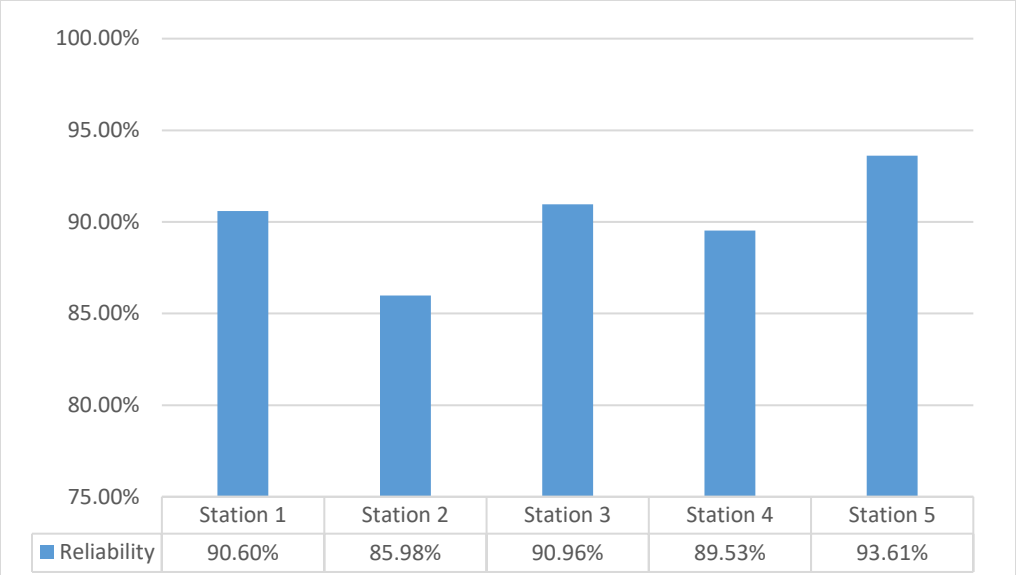


Figure 45: Percentage of Incidents a First-Due Apparatus was First on Scene for 2018

Response performance can be negatively affected by apparatus from a more distant station responding into another station's response zone due to the commitment of assigned apparatus to a different incident. To meet a 90th percentile response goal, the optimum station reliability rate should be 90 percent. As seen in the Figure 45, station reliability within the MFD service area varies between approximately 85.98% in the Station 2 response zones to 93.61% in the Station 5 response zone in 2018. Actual response performance by station area is discussed in the Response Performance analysis that follows.

Goals and Objectives

- Review Peak Activity/Alternate Response Units as a way to improve station reliability and response performance.

Response Performance

Perhaps the most publicly visible component of an emergency services delivery system is that of response performance. Most citizens and policymakers want to know how quickly they can expect to receive services. In the performance summary, Missoula Fire Department (MFD) examines emergency response performance for the MFD service area using incident data from the Missoula County 911 Center from 2018. Non-emergency incidents, mutual aid incidents outside the MFD service area, data outliers, and invalid data are removed from the data set whenever possible.

MFD measures total response time performance from the time the alarm is received at the Missoula County 911 Center to when the first apparatus arrived on the scene of the emergency. Both average and 90th percentile response performance are calculated for these emergency incidents. The use of percentile measurement of total response time performance follows the recommendations of the NFPA standards and the Center for Public Safety Excellence (CPSE/CFAI) Standards.

Fire department leaders and policy makers often use "average" response performance measures since the term is commonly used and widely understood. The most important reason for not using average for performance standards is that it may not accurately reflect the performance for the entire data set and can be easily skewed by data outliers. Percentile measurements are a better measure of performance since they show that the majority of the data set has achieved a particular level of performance.

Figure 46 displays overall emergency response time frequency throughout the MFD response area.

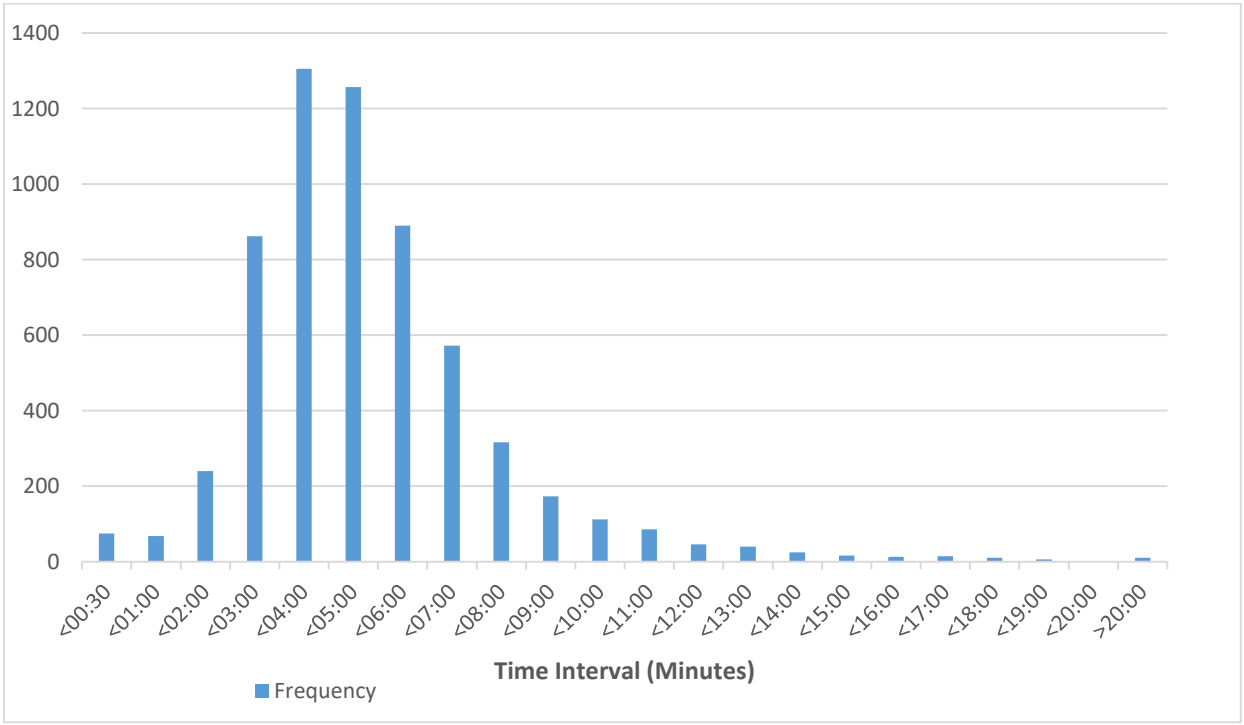


Figure 46: Overall Emergency Response Time Frequency

The most frequently recorded response time for emergency incidents is between 0:04:00 and 0:05:00 minutes; overall average is 0:04:54. The first unit on scene at the 90th percentile of emergency incidents

is 08:27. Figure 46 measures dispatch to on scene time (Turnout Time and Travel Time). Total response time is composed of the following components:

- ***Call Processing Time*** - The amount of time between when a dispatcher answers the Missoula County 911 call and resources are dispatched.
- ***Turnout Time*** - The time interval between when units are notified of the incident and when the apparatus begins travelling to the incident.
- ***Travel Time*** - The amount of time the responding unit spends travelling to the incident.
- ***Total Response Time*** - Total response time equals the combination of "processing time," "turnout time," and "travel time."

Tracking the individual pieces of total response time assists with identifying deficiencies and areas for improvement. Industry best practice documents such as the Center for Public Safety Excellence (CPSE) Community Risk Assessment: Standards of Cover document and the national consensus standard NFPA 1710 recommend that fire departments track and report all the components of total response time. Table 13 displays the emergency response performance recommendations from the NFPA 1710 standard.

Response Element	***NFPA Recommendation***	***MFD 90th Percentile***
Call Processing	60 Seconds @ 90th Percentile	0:03:50
Turnout Time	60 Seconds @ 90th Percentile for EMS 80 Seconds @ 90th Percentile for Fire	0:01:48 0:01:49
Travel Time	4 Minutes @ 90th Percentile	0:06:37
Travel Time – Full First Alarm (Fire Suppression Incident)	8 Minutes @ 90th Percentile	0:12:05

Table 13: Emergency Response Performance Recommendations per NFPA 1710 Standard

Table 14 illustrates MFD CY 2018 response performance for the various components of total time.

	Call Processing	***Turnout Time***	***Travel Time***	***Total Response Time***
NFPA 1710 Rec.	0:00:60	0:00:60	0:04:00	0:06:00
MFD Average	0:02:27	0:00:54	0:04:00	0:07:35
MFD 90th Percentile	0:03:50	0:01:50	0:06:37	0:12:17

Table 14: MFD Response Performance

MFD has not developed or adopted formal response performance goals, however the department reports that the NFPA 1710 Standard for Career Fire Departments is used as the informal guideline for measuring response performance. Comparing the NFPA 1710 recommendations in Table 13 to the MFD 2018 response performance in Table 14 demonstrates that while our total response times are sufficient, currently MFD does not meet the NFPA criteria for Emergency Response at the 90th percentile.

Call Processing Time

MFD call processing time exceeds the NFPA 1710 goal for emergency call processing by nearly 0:03:00, measured at the 90th percentile. The Missoula County 911 Center is the primary public safety answering point (PSAP) for Missoula County. The center dispatches police, fire, sheriff's office, and EMS agencies throughout Missoula County. MFD continues to work cooperatively with Missoula County 911 Center to reduce call processing time. Many high volume, high performance dispatch centers such as Missoula

have discovered that call processing and turnout time performance can be improved by immediately notifying response personnel as soon as the location and general nature of the emergency call is determined.

Turnout Time

The second component of the response continuum, and one that can be directly affected by response personnel, is turnout time. Turnout is the time it takes personnel to receive the dispatch information, move to the appropriate apparatus, and proceed to the incident. The NFPA 1710 performance standard for turnout time is within 0:01:20 90% of the time for fire and special operations incidents and within 0:00:60 90% of the time for EMS incidents.

As displayed in Table 14, MFD personnel required 54 seconds on average to assemble and begin travelling to an emergency in 2018.

Figure 47: MFD Engine 111 Arrives to a Night Training at Station 4, 2018

While MFD turnout time performance does not meet the NFPA 1710 standard, it is MFD's experience that the NFPA standard is difficult to achieve and turnout time standards of 0:01:30 to 0:02:00 for career staffed fire jurisdictions are more realistic and achievable. This is affirmed in a study published in 2010 by the NFPA Research Foundation. With this in mind, there is room for MFD to improve response performance by reducing turnout time. Turnout time is an area of total response performance that field personnel have some ability to control, given adequate information and facilities that allow for rapid and efficient movement of personnel.

Travel Time

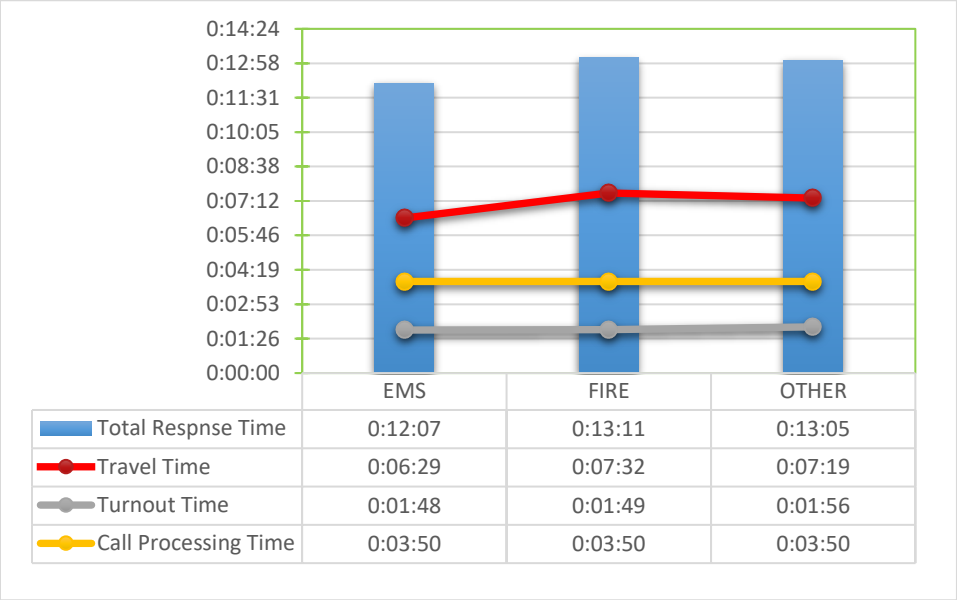
The NFPA 1710 standard calls for a travel time of 0:04:00 for the arrival of the first arriving unit to an emergency incident (fire, special operations, or EMS). Travel time is typically the longest component of total response time.

Again, comparing Table 13 to Table 14 reveals that MFD emergency travel time performance does not meet the NFPA 1710 standard. From January 2018 to December 2018 travel time for the first MFD unit to arrive at an emergency incident was 0:06:37 90% of the time.

Factors that can affect travel time performance include traffic flow during morning and evening peak traffic periods, concurrent incidents which call for units from a more distant station to respond, or inadequate distribution of resources to cover the geographic service area. All these factors potentially affect travel time performance in the MFD service area.

Total Response Time- First Unit on Scene

The NFPA 1710 standard does not specify a performance goal for total response time. Combining the components of response time cited in NFPA 1710 results in a total response time of 0:06:00 or less (90th percentile) for EMS emergencies, and 0:06:20 seconds (90th percentile) for fires and all other emergency incidents. Figure 48 displays total response time summarized as EMS, fire, and other emergencies in 2018. In this figure "fire" refers to any incident coded as a fire in the MFD data. The "EMS" category includes emergency calls for medical service, motor vehicle accidents, and rescue calls. The "other" category includes hazmat incidents, alarms (no fire), gas/odor investigations, and any other miscellaneous emergency incident. MFD's 90th percentile call processing time was used in this figure for all categories.



	EMS	FIRE	OTHER
Total Respnse Time	0:12:07	0:13:11	0:13:05
Travel Time	0:06:29	0:07:32	0:07:19
Turnout Time	0:01:48	0:01:49	0:01:56
Call Processing Time	0:03:50	0:03:50	0:03:50

Figure 48: 2018 Total Response Time Summary, Code 3

Figure 48 depicts that MFD's total response time performance exceeds the implied NFPA total response time goal for EMS incidents by over 00:06:00. Total response time performance for fire suppression incidents also does not meet the NFPA goal of 0:06:20. The first unit on scene arrived at 90% of emergency incidents categorized as other in 0:13:05. Note: travel time performance seems to be the primary factor affecting total response time performance in this figure.

Travel Time – Full First Alarm (Structure Fire)

The NFPA 1710 standard calls for the arrival of the full first alarm assignment to arrive at a fire suppression incident in eight minutes travel time or less, 90% of the time. MFD's full first alarm assignment for a structure fire calls for four apparatus plus the Battalion Chief. Figure 49 displays MFD's response performance dispatch to arrival (turnout time and travel time) for the first through the fifth apparatus to arrive at a structure fire in 2018. The blue bar represents the average dispatch to arrival for structure fires. The red bar represents to 90th percentile dispatch to arrival for structure fires.

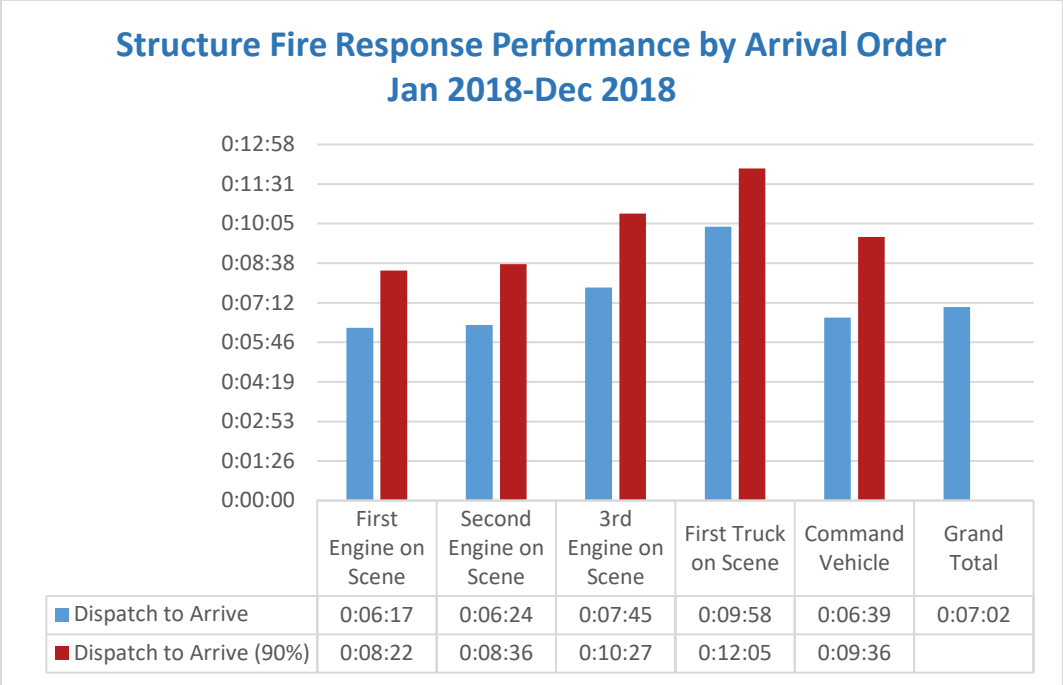


Figure 49: Structure Fire Response Arrival Order

Figure 49 demonstrates that MFD required 0:12:05 for the fifth apparatus to arrive at a MFD structure fire from time of dispatch, measured at the 90th percentile. This results in a total response time of just under 0:16:00 for the fifth apparatus. This represents a difference of approximately 0:04:00 between the arrival of the first apparatus and the fifth fire unit (total response time). Similarly, there is an approximately 0:04:00 difference in travel time between the first apparatus and the fifth apparatus, measured at the 90th percentile.

MFD travel time performance does not meet the NFPA 1710 benchmark of 0:08:00 travel for the arrival of a full first alarm assignment at a structure fire. As discussed in the concentration analysis there are large portions of the MFD service area that are beyond 0:08:00 travel of sufficient resources to assemble full first alarm assignment, i.e. effective response force. The travel time required to assemble multiple resources and lack of availability due to concurrent incidents are most likely the two factors that negatively affect the assembly of multiple resources in the MFD service area.

While MFD response performance does not meet the NFPA 1710 emergency response performance goals, MFD does not believe it is performing poorly. However, it is important that fire department leaders and governing bodies be aware of the jurisdiction's current performance. The NFPA 1710 standard is not codified or mandated; but does represent an industry best practice that is based on current research that is periodically reviewed and updated.

Response Performance by District

Table 15 summarizes MFD emergency response performance by first due district, from January 2018 to December 2018.

	Average			90th Percentile		
	Turnout Time	*Travel Time*	*Total Response Time*	*Turnout Time*	*Travel Time*	*Total Response Time*
MFD Station 1	0:00:58	0:04:06	0:07:31	0:01:59	0:06:52	0:11:53
MFD Station 2	0:00:57	0:03:53	0:07:18	0:01:35	0:06:01	0:11:09
MFD Station 3	0:00:47	0:03:53	0:07:07	0:01:39	0:05:59	0:10:57
MFD Station 4	0:00:51	0:04:04	0:07:23	0:01:43	0:06:35	0:11:33
MFD Station 5	0:01:03	0:05:57	0:09:26	0:02:07	0:09:18	0:14:14

Table 15: Response Time Including Call Processing

Table 15 includes call processing time in total response time, but call processing time is not displayed. Measured at the 90th percentile, turnout time varies slightly in a range of 0:00:32. Station 3 and Station 2 demonstrate the lowest travel times at 0:05:59 seconds (Station 3), and 0:06:01 (Station 2). Station 5 demonstrates the longest travel time performance. Total response performance at all the MFD stations correlates with travel time performance; Station 5 demonstrates the longest response time performance and Stations 3 and 2 experience the shortest total response times.

Medical Priority Dispatching

MFD believes there is an opportunity to enhance the current dispatch/response system. A system known as Medical Priority Dispatch System (MPDS) is being utilized by many communities to more effectively manage limited resources. From 911 call taking and processing to deployment of fire/medical units, the ability to triage emergent and non-emergent calls can greatly increase efficiency in the fire department. Implementing MPDS will require buy in from all local emergency providers.

MFD currently responds to all medical calls regardless of acuity. Through an appropriate screening process and cooperation with the local ambulance provider, the ambulance could potentially handle lower acuity calls, allowing MFD crews and apparatus to remain available for high acuity calls.

Alternate Response Units

The Alternative Response Unit (ARU) model is a method of alleviating workload and focuses on non-emergency, lower acuity emergency medical calls. Its purpose is to keep the primary fleet of emergency response vehicles and crews in service and available for the higher acuity, true emergency calls.

One of the potential benefits of the ARU is to reduce the expensive staffing and vehicle response to likely non-life-threatening calls for service. The units are typically sport utility vehicles, staffed by one Firefighter/Paramedic.

Automatic and Mutual Aid Systems

State law[8] provides for response upon request by neighboring jurisdictions. MFD has mutual aid and automatic aid agreements with Missoula Rural Fire District (MRFD). Automatic aid agreements between MFD and MRFD include only a small area of the total MFD response area. MFD also has mutual aid agreements with East Missoula Fire District, Missoula Airport Authority, and the Department of Natural Resources and Conservation (DNRC).

Incident Control and Management

MFD uses the Incident Command System (ICS) for tactical incident management and the National Incident Management System (NIMS) as their standard management protocol. These methodologies for managing emergency incidents are widely accepted industry standards and are incorporated appropriately into the emergency and daily operations.

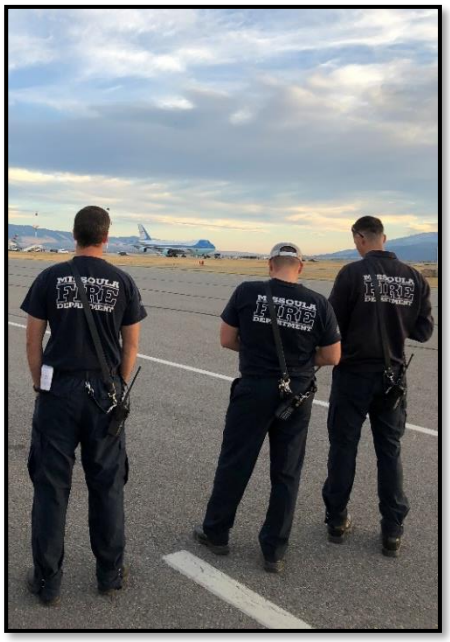


Figure 50: MFD on Standby for Air Force One Arrival at Missoula International Airport, 2018

MFD Standard Operating Guidelines (SOGs) address the use of the ICS on emergency scenes. ICS training is included in the annual training schedule. An emergency scene accountability system is used to ensure firefighter safety and accountability. MFD effectively utilizes the ICS and NIMS for emergency and non-emergency operations.

Goals and Objectives

- Continue to monitor call volumes and concurrent calls in all MFD response districts and work to mitigate concurrent calls to ensure MFD's resources are available to respond to emergencies within their district.
- Implement medical priority dispatch system (MPDS)
- Work towards improving MFD's response times to better meet the NFPA 1710 standard.
- Continue to update contracts and mutual aid agreements with local response agencies.
- Work with 911 dispatch center to improve internal alerting to assist call processing time, turn-out and response times.

[8] For State Law see Montana Code Annotated, 7-33-4112: Mutual Aid Agreements

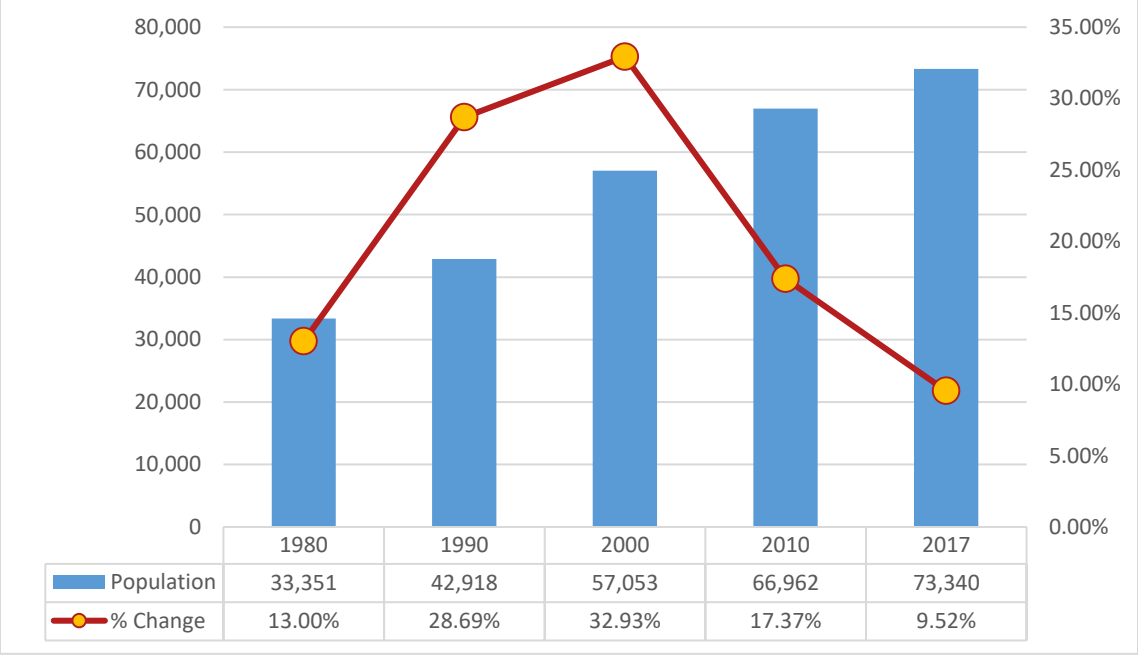
Future System Demand Projections

There is no doubt that the City of Missoula and the adjacent urban zone is experiencing growth, evidenced by the release of building permits, continual annexations, high traffic volumes, and a glance out the window of most buildings within these areas. Although these are noticeable barometers to economic growth, they may also indicate associated workload on essential services. System demand is largely dependent on changes over time to population and their related demographics, economics, and local factors such as transportation and housing. A number of resources were utilized in this portion of the Master Plan including: U. S. Census data, the City of Missoula 2015 Growth Plan, the 2016 Missoula Urban Area Long-Range Transportation Plan (LRTP), and the City of Missoula Fire Protection Master Plan (2006 Master Fire Plan), prepared by Emergency Services Consulting Inc. (ESCI).

Population Growth Projections

Population History

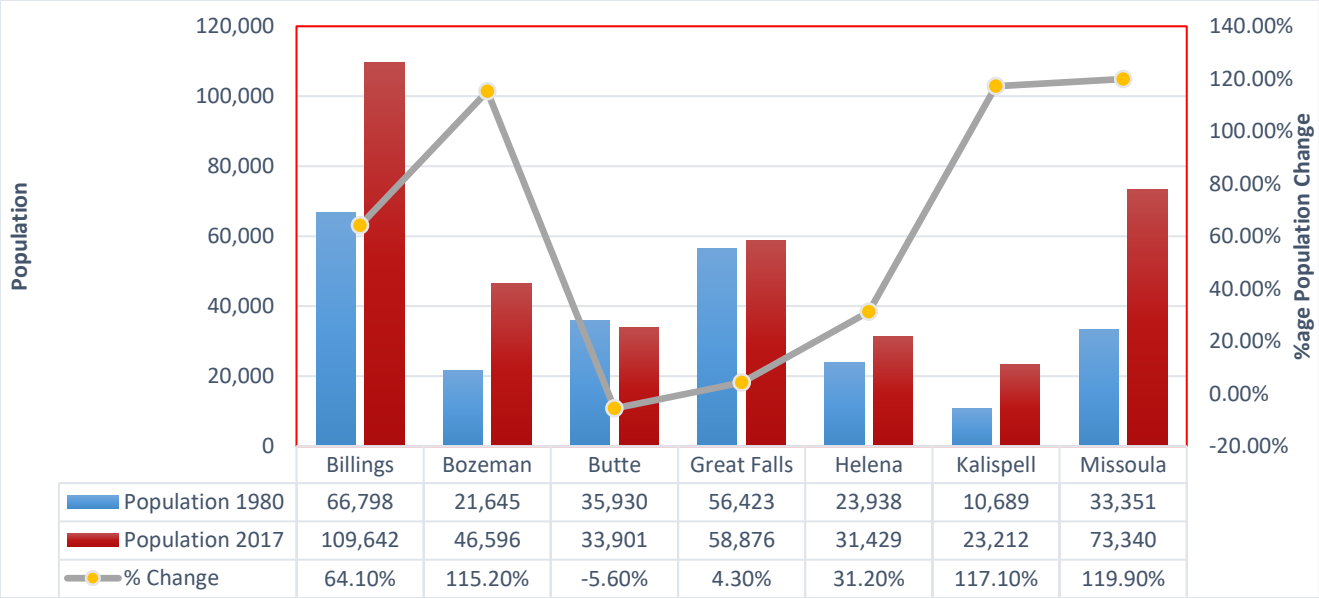
The official U.S. Census Bureau 2017 estimate (most recent available) for Missoula is approximately 73,340 as of July 1, 2017. Figure 51 illustrates the historical population change in Missoula from 1980 through 2017. Missoula's population grew by nearly 120% over this 37 year period, which equates to a 2.39% annual increase.



	1980	1990	2000	2010	2017
Population	33,351	42,918	57,053	66,962	73,340
% Change	13.00%	28.69%	32.93%	17.37%	9.52%

Figure 51: Missoula Historical Population

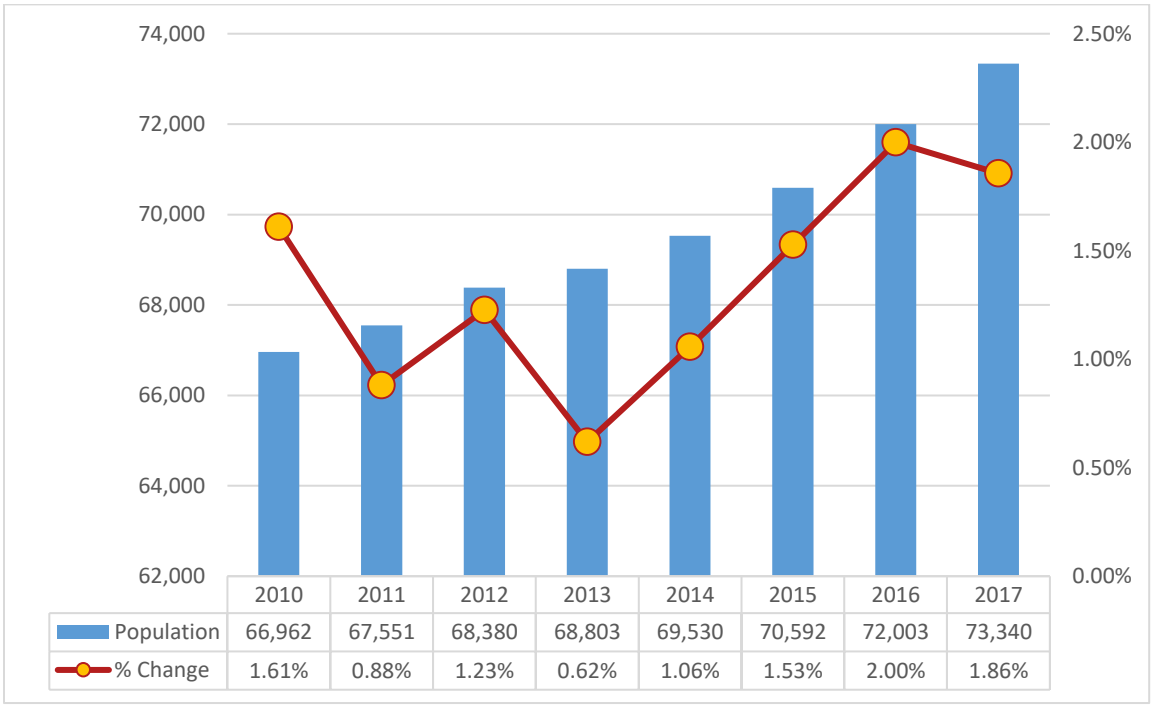
Compare this growth to the remainder of Montana's first-class cities (cities with a population of 10,000 or more) and it is evident that Missoula out paces them all as shown in proceeding Figure 52.



	Billings	Bozeman	Butte	Great Falls	Helena	Kalispell	Missoula
Population 1980	66,798	21,645	35,930	56,423	23,938	10,689	33,351
Population 2017	109,642	46,596	33,901	58,876	31,429	23,212	73,340
% Change	64.10%	115.20%	-5.60%	4.30%	31.20%	117.10%	119.90%

Figure 52: Montana's First-Class Population

Missoula's average growth rate over the last seven years has slowed to approximately 1.3% per annum; however, the population still grew nearly 10% between 2010 and 2017. Figure 53 represents that data, as provided by the U.S. Census Bureau.



	2010	2011	2012	2013	2014	2015	2016	2017
Population	66,962	67,551	68,380	68,803	69,530	70,592	72,003	73,340
% Change	1.61%	0.88%	1.23%	0.62%	1.06%	1.53%	2.00%	1.86%

Figure 53: Missoula Annual Population Change

Population Projection

Missoula has long been a desirable Montana city to live, with the Western-style feel of the surrounding open spaces. The outdoor opportunities, cultural events, natural sites, and the high quality of life bring many people to the community hoping to lay down roots. Based on the historical census data and the 2015 Missoula Growth Plan, a 1.5% annual growth rate is projected for several years to come.

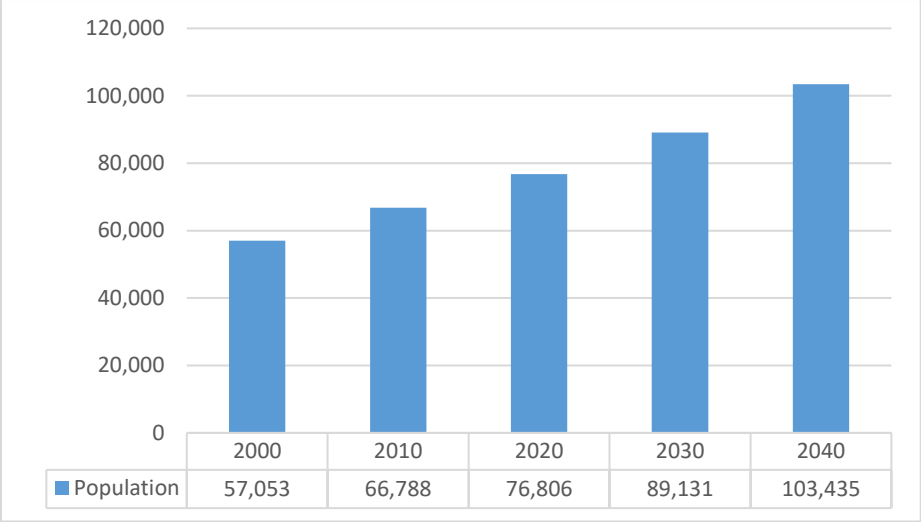


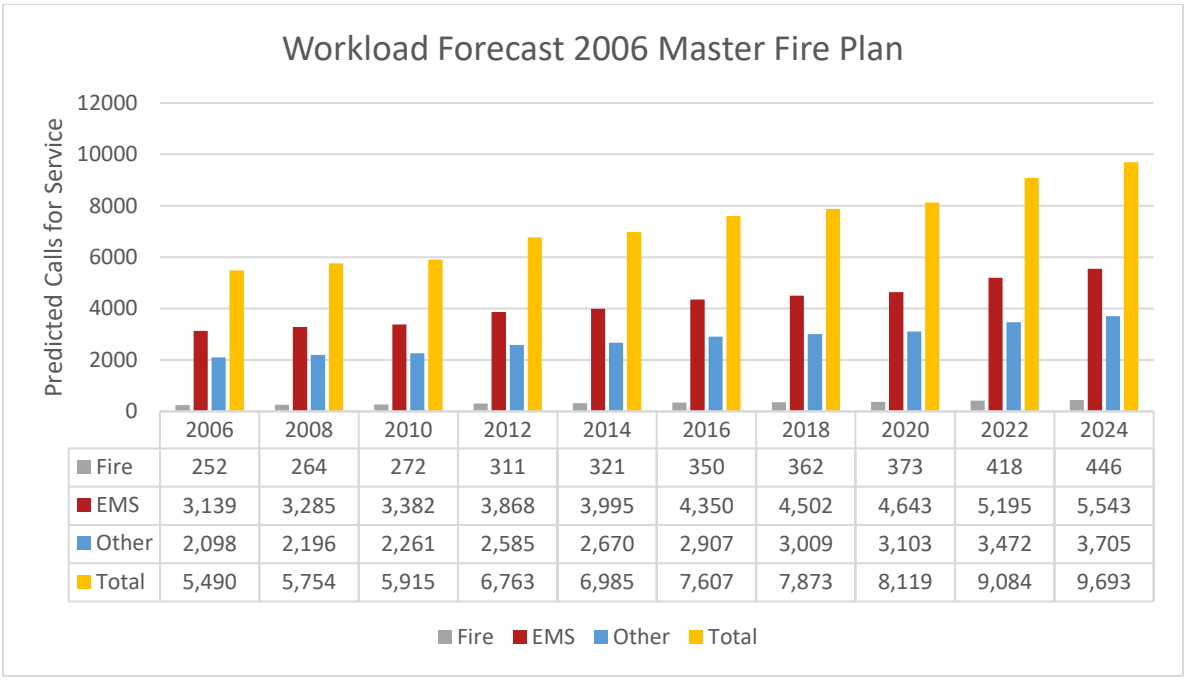
Figure 54: Missoula Population Projection

Figure 54 illustrates the projected 1.5% annual growth rate and what that looks like through 2040. The prediction equates to a 52.1% increase above the 2010 actual census data. What this prediction doesn't factor in is the annexation of the Missoula Industrial Park and airport properties. Nor does it consider the potential for future substantial annexations such as East Missoula.

It has been 12 years since the completion of the initial 2006 Master Fire Plan. In comparison, the difference between the 2006 projected data and what the factual statistical data turned out to be reveals several elements. In the 2006 plan there were two population growth models presented. The first model was a census-based growth projection that utilized decades of census experience, while the second was based on a developmental growth projection that utilized trends in redevelopment, annexations, and changes in employment capacity. Of these two growth models the one that is most compatible to factual data is the census-based projection, which missed the actual population prediction in 2016 by only 1.6%. This supporting evidence adds validity to the 2006 Master Fire Plan, however, that document missed the mark on predicted demand for service.

Service Demand Predictions

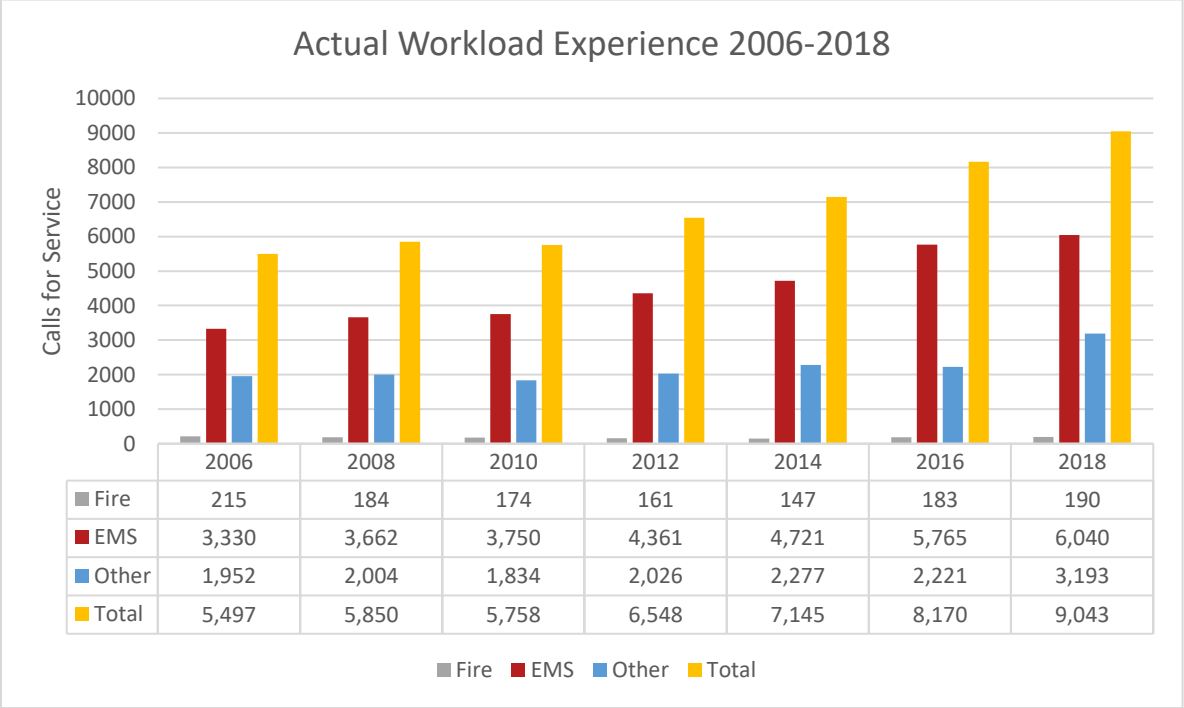
The single most significant predictor of future incident workload is population. Since people continue to move to and reside in Missoula, evaluation of trends must be utilized to predict that demand. The comparison of the predicted workload from the 2006 Master Fire Plan and what the factual data is for those selected years present a noticeable trend. Figure 55 is the predicted workload from the 2006 Plan.



	2006	2008	2010	2012	2014	2016	2018	2020	2022	2024
Fire	252	264	272	311	321	350	362	373	418	446
EMS	3,139	3,285	3,382	3,868	3,995	4,350	4,502	4,643	5,195	5,543
Other	2,098	2,196	2,261	2,585	2,670	2,907	3,009	3,103	3,472	3,705
Total	5,490	5,754	5,915	6,763	6,985	7,607	7,873	8,119	9,084	9,693

Figure 55: 2006 Master Fire Plan Workload Forecast

Figure 56 indicates the actual workload experience during those time periods.



	2006	2008	2010	2012	2014	2016	2018
Fire	215	184	174	161	147	183	190
EMS	3,330	3,662	3,750	4,361	4,721	5,765	6,040
Other	1,952	2,004	1,834	2,026	2,277	2,221	3,193
Total	5,497	5,850	5,758	6,548	7,145	8,170	9,043

Figure 56: Workload Actual Numbers

The predicted workload from the 2006 Master Fire Plan is quite similar to the actual data found in years 2006 and 2008. During years 2010 and 2012 MFD experienced lower than predicted call volume. However, since 2012 the actual workload has been increasing at a much faster pace than the predicted

trend. Experience with fires has decreased from predicted values, mirroring the national trends for fire incident rates per capita. This is a direct result of local building and fire codes and their enforcement, coupled with aggressive fire prevention education. While fire experience has declined, EMS response has risen dramatically. This trend also reflects what is happening at the national level[9] and can be directly linked to the aging populace.

The Census Bureau data and MFD workload experience from the last five years (2014-2018) can be used to calculate a utilization rate for fire service, basing this rate per 1000 people of Missoula's historic population. MFD's per capita call rate has had an increase for each of the last seven years (2012-2018). Looking at the last known data for 2018 of 122 calls per 1000 population, a future call volume can be projected. By increasing calls per capita annually by 3.5%, which reflects the last five year average annual increase, and applying this new per capita number to the projected population increase of Missoula, a projected service demand (population based) can be determined and is reflected in Figure 57.

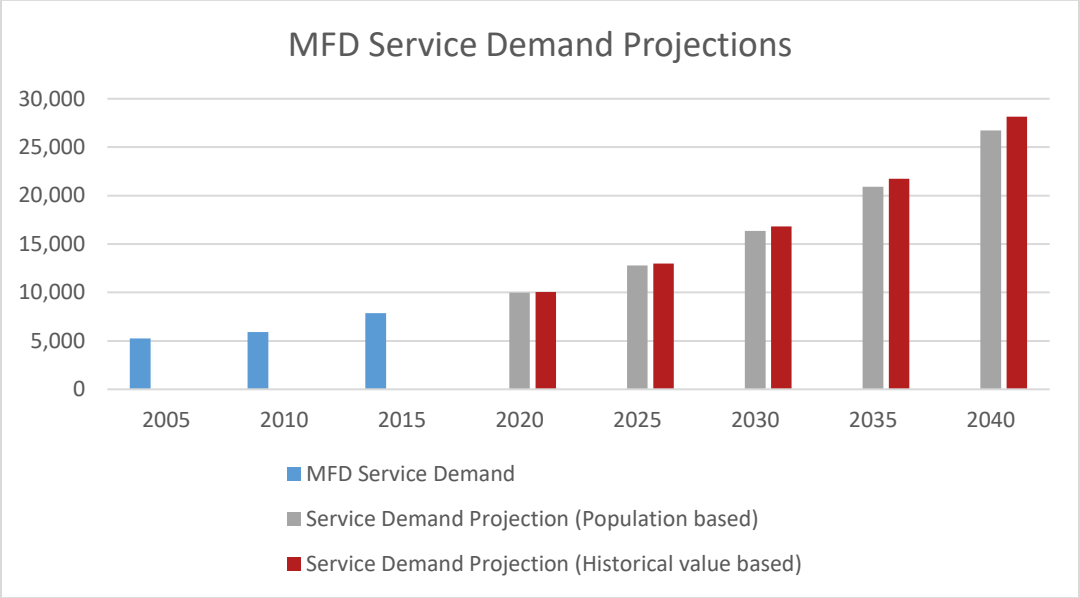
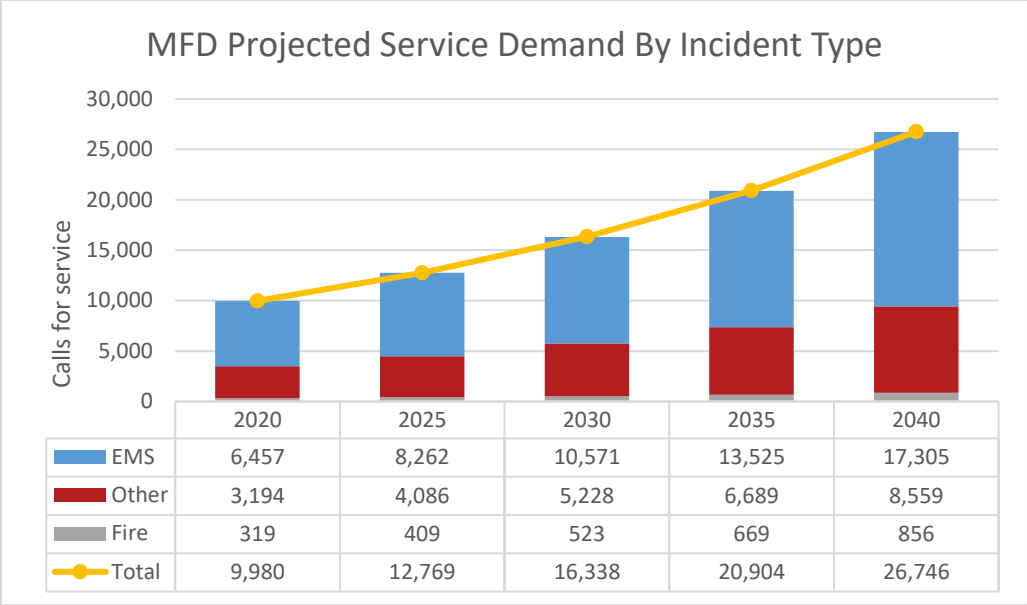


Figure 57: Projected Service Demand

This service demand projection, based on population, is a rather conservative prediction. However, when comparing historical call volume increases based on actual trends, a much steeper rate of demand growth (historical value based) can be seen. Service demand between 2006 and 2018 increased 64.5%, this equates to an annual increase of 5.4%. Utilizing this annual increase in calls MFD projects this trend through year 2040 in Figure 57.

These service demand predictions can be broken down even further to project trends more specific to incident types. Figure 58 provides insight as to the general break down of fire, EMS, or other incidents utilizing the population-based predictions of demand.

[9] National trend related to an aging populace derived from an article published by The Society for Academic Medicine: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1553-2712.2007.tb01804.x



	2020	2025	2030	2035	2040
EMS	6,457	8,262	10,571	13,525	17,305
Other	3,194	4,086	5,228	6,689	8,559
Fire	319	409	523	669	856
Total	9,980	12,769	16,338	20,904	26,746

Figure 58: Projected Service Demand by Incident Type

Actual data (as opposed to predicted) from 2006 to 2017 indicate that fire incidents accounted for an average of 3.25% of all incidents over those periods. While EMS incidents were 64.75% and incidents termed other made up the difference at 32%. As mentioned previously, fire incidents should remain on the lower end of incident experience, reflective of national trends. Incidents categorized as other include such calls as false alarms, hazardous situation responses, and public assistance calls with no injured parties involved. These calls make up a large percentage of overall call volume, largely in part due to the increased use of fire protection systems (i.e. fire alarm systems and automatic fire sprinkler systems) in the built environment. Another incident type increasing in occurrence, at least in the Missoula Community, is public assistance. Since the advent of the cell phone, access to the 911 system is more readily available and citizens are well equipped to dial 911 for assistance. At times a true emergency may not exist; however, once dispatched, a welfare check is required to follow. That brings us to EMS incidents and their exponential growth. This growth can be attributed to the aging community, impoverished individuals, accidents, and general recklessness.

Since human activity is a primary driver of emergency service demand, it is important to have a population-based projection of the future size of the community. Although it is difficult to predict the future, it is quite clear that the Missoula Fire Department will be an emergency service provider to a growing population. Planning for the continued growth of the Missoula community and how best to deploy and maintain the resources needed to meet that demand is essential.

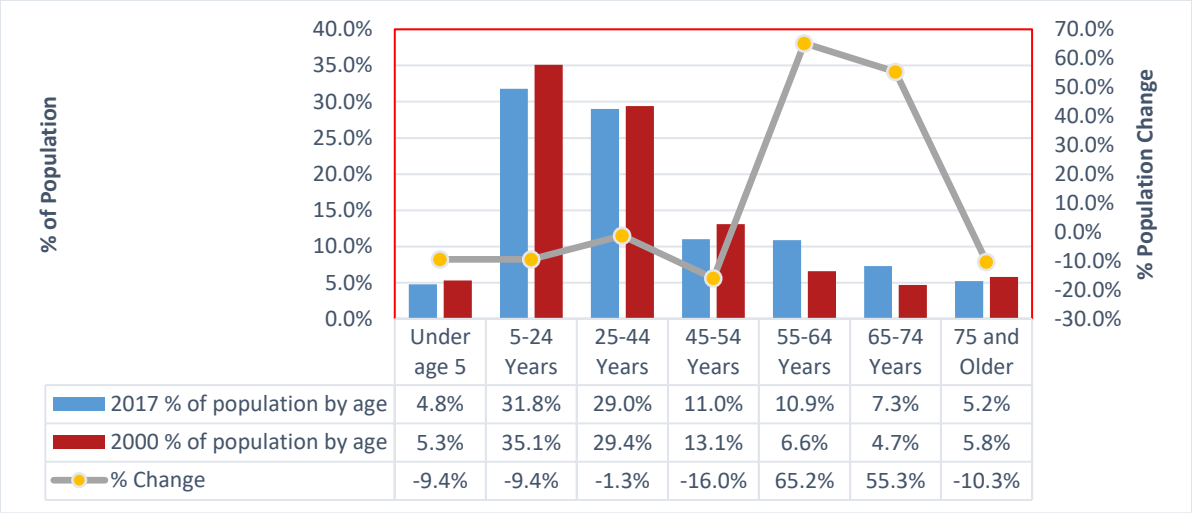
Community Risk Analysis

The evolution of the fire service reads like an "*if-then* statement"; *if* a fire should occur, *then* extinguish said fire. *If* an individual should be injured, *then* provide prehospital treatment to said individual. *If* a natural disaster should occur, *then* stabilize the scene, assist the victims, and mitigate hazards. It would be challenging to find a fire department today that strictly deals with fire suppression. Rather, fire departments have expanded their missions and capabilities to reflect the changes in society. The Missoula Fire Department (MFD) has developed an "all-risk" mission to address the potential array of emergencies. MFD has taken a proactive approach in emergency preparedness and hazard mitigation; from the development of a hazardous materials response team to a technical rescue team, and most recently all-hands training for an integrated response to an active attack event. MFD continually evolves to address new threats or new hazards and implements an associated prevention mission.

The majority of actions taken by MFD are responses, either active or passive, to a real or perceived emergency. An active response involves the deployment of personnel and apparatus to a request for service. A passive response may involve many actions including preparation, planning, training, and public education. Thus, a constant vigil must take place when assessing community risk in order to determine how business is to be conducted. This assessment considers many factors within the service area, factors such as population and population density, demographics of the population served, local land use and development, also the geography and natural risks present within the community. MFD staff utilizes these tools in turn to address a particular hazard or threat to the community, either as a whole or a specific demographic of the community.

Demographics

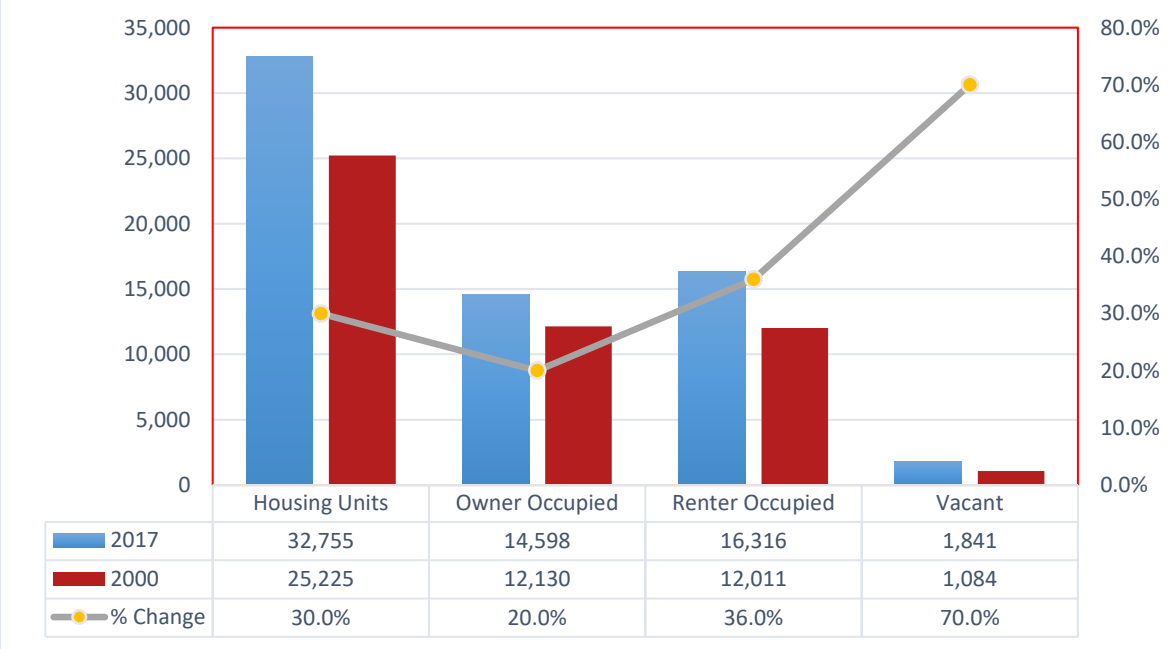
Analyzing the makeup of the Missoula community may shed light on the future demand for fire department services. Figure 59 displays the percentage of population in Missoula by age for the years 2000 and 2017.



	Under age 5	5-24 Years	25-44 Years	45-54 Years	55-64 Years	65-74 Years	75 and Older
2017 % of population by age	4.8%	31.8%	29.0%	11.0%	10.9%	7.3%	5.2%
2000 % of population by age	5.3%	35.1%	29.4%	13.1%	6.6%	4.7%	5.8%
% Change	-9.4%	-9.4%	-1.3%	-16.0%	65.2%	55.3%	-10.3%

Figure 59: Missoula Population by Age

As a comparison, one thing to note is the percentage of aging adults within the community. Although Missoula has a median age of 32.7 years, the fastest growing sector of population is between the ages of 55 and 74. Nationally, the population group over 65 years is the fastest growing age sector. In Missoula this age group accounts for 12.5% of the population. Medical studies suggest that persons over 65 years of age are three times more likely to access local emergency services than any other age groups. Additionally, NFPA studies indicate that adults 65 and older are roughly twice as likely to die in a fire and adults 75 and older have nearly three times the risk. Another at risk age demographic are preschool aged children; 4.8% of Missoula's overall population. Statistical data reports[10] that children under the age of five are 74% more likely to die in a house fire than the average person. Fortunately, Missoula and the United States as a whole has been trending downward in the overall experience of fire. However, recent wildfire experience around the US has increased along with fatalities attributed to those types of fires. There will be a closer look at that potential a little later under the geographic and natural risks portion of this Master Plan. Figure 60 compares the most recent housing census data in the city of Missoula with that of 2000.



	Housing Units	Owner Occupied	Renter Occupied	Vacant
2017	32,755	14,598	16,316	1,841
2000	25,225	12,130	12,011	1,084
% Change	30.0%	20.0%	36.0%	70.0%

Figure 60: Housing by Occupancy

Home ownership is an economic indicator that generally equates to wage earners' willing to invest in the community. It is also an economic indicator of disparity. The 2015 Missoula Growth Policy identified affordable housing as the top community concern. Citing wages, or lack thereof, as the largest contributor to the homeless population in Missoula. This population group is identified as a frequent user of fire department EMS services across the country. Nearly 20% of Missoulians meet the federal poverty standard, placing them at greater risk of homelessness and with little or no health insurance for proper medical coverage.

[10] Statistical data referenced from NFPA 20th Edition of the Fire Protection Handbook, Vol. 1.

Table 16 compares Missoula's demographics to the national average.

Demographic Average	City of Missoula	National Average
Median household income	$43,602	$57,652
Persons without health insurance	10.1%	10.5%
Personal income below Federal Poverty level	19.8%	12.3%

Table 16: Missoula Demographic

Land Use

A risk assessment map based upon land use was developed utilizing parcel data and current zoning classifications in the MFD service area; it is displayed in Figure 61. A risk category was assigned based on the following attributes:

- ***Low Risk*** – Areas zoned and used for agricultural purposes, open space, low-density residential, and other low intensity uses.
- ***Moderate Risk*** – Areas zoned for medium-density single family properties, small commercial and office uses, low-intensity retail sales, and equivalently sized business activities.
- ***High Risk*** – Higher intensity business districts, mixed use areas, high-density residential, industrial, warehousing, and large mercantile centers.

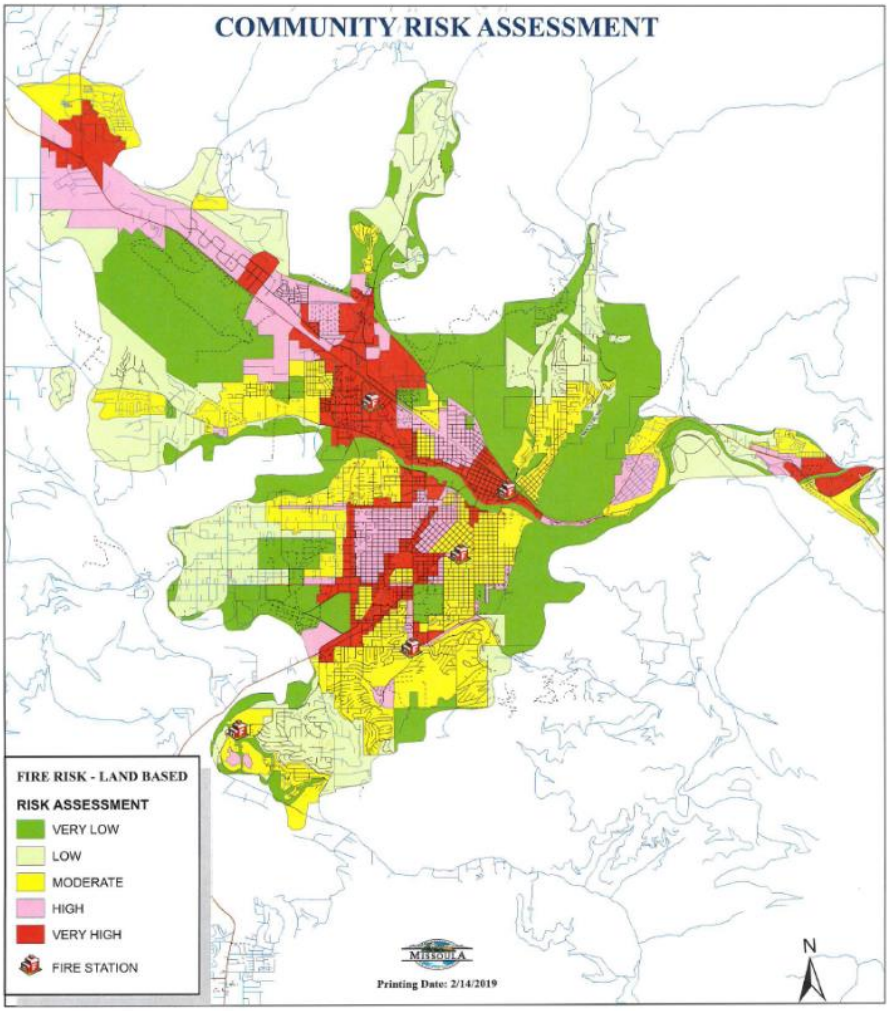


Figure 61: Community Risk Assessment Map

The Missoula community contains large portions of low and moderate risk properties. The current growth policy focused on the model of infill and maximizing space within the urban core, higher-density means higher risk. The majority of high-risk properties are located within the City's core, along the intermodal transportation routes and in the newly annexed industrial park; these

properties include industrial, heavy commercial, mid-rise, mixed-use, institutional, and multi-family occupancies. In the past the city's land use patterns had generally contributed to an efficient fire resource deployment model. With the larger demand of services towards the core of the city, there exists a higher incidence of call causing resources to respond out of district. Thus, creating longer response times and large isolated portions of the municipality without adequate initial response or back-up support.

It is also helpful when discussing community risk to examine incident data to determine the types of properties that actually generate the demand for fire department services. Table 17 uses National Fire Incident Reporting System (NFIRS) data provided by MFD to display the actual property use associated with 2018 incidents.

NFIRS Property Use Category	Percent of 2018 Incidents
1 – Assembly (Restaurant, Bar, Theater, Library, Church, Gymnasium)	8.22%
2 – Educational (Private/Public School, Daycare Center)	2.21%
3 – Health Care, Detention & Correction (Nursing Home, Hospital, Jail)	5.91%
4 – Residential (Private Residence, Hotel/Motel, Residential Board and Care)	54.12%
5 – Mercantile, Business (Grocery Store, Service Station, Business Office, Retail)	10.97%
6 – Industrial, Utility, Agriculture, Mining	0.67%
7 – Manufacturing	0.39%
8 – Storage	0.49%
9 – Outside Property, Highway, Residential Street	17.03%

Table 17: MFD Incidents and Property Use, 2018

With over 54% of all calls occurring in residential properties, primarily single-family dwellings and multi-family residences, significant thought must be given to these locations for future delivery of fire service. Just over 17% of calls took place on outside properties, with most of these incidents occurring on the transportation network; streets in commercial area, residential streets, parking areas, highways or divided highways. Mercantile and business properties comprised nearly 11% of 2018 service demand. Assembly properties represent 8.22% of service demand, primarily eating or drinking establishments. Nursing homes, doctor's offices, clinics, and hospitals represent the majority in the health care/detention category; within those properties MFD resources responded to 5.91% of 2018 calls. The remaining incidents were distributed at various other property types as displayed above.

Transportation Risk

In some ways the city of Missoula is not unlike many US cities and in other respects, it harbors its own uniqueness. The transportation network in Missoula is one such unique case. Often referred to as the "*hub of five valleys"*, Missoula sits nearly at the epicenter of three major valley convergences. Each of these valleys contain large roadways that bring people and commerce either to Missoula or through Missoula. Four of the valleys contain railways, with three of those experiencing large volumes of rail traffic. These transportation routes increase the level of risk present to the MFD service area; based on the chemical products, flammable liquids, and toxic materials that move through the service area.

Additionally, these routes produce increased service demand due to traffic related emergencies. This is indicative of the 17% of 2018's overall call volume.

Geographic, Natural, and Other Risks

Some risks just come with the territory and are naturally inherent to a particular area. Missouula County and the City itself has had its share of natural emergencies. The Missoula County Pre-Disaster Mitigation Plan (PDM) has identified several "real" threats that have occurred in some capacity within the region. Topping this list of threats is the ever-present wildfire risk that generally begins in July and runs through the month of September. There have been numerous wildfires on the landscape in and around the city of Missoula. Fortunately, there hasn't been the impact of significant structure losses or life loss. The Missoula Fire Department deploys an aggressive initial attack sending numerous personnel and apparatus as quickly as possible to the majority of wildland dispatches. This approach has limited the growth of these types of fires over the years. However, with the ever-increasing call volume, available MFD resources may find themselves committed to other emergency calls. With inadequate resources to mount an aggressive attack, the upper hand will be lost to these fires; results may translate to larger and more destructive fires. Adequate staffing and reliable equipment is an absolute must. The drainages spilling into the Missoula valley - Rattlesnake, Grant Creek, Pattee Canyon, and Miller Creek to name a few - are choked with abundant vegetation interspersed with residential properties. Emergency response times to the upper reaches of these drainages are quite significant even with the initial attack apparatus. All subsequent engines responding have much further to travel.

Floods have been identified as the next "real" threat; appropriately so following Missoula's 2018 flooding event. The actual impact of the Milltown Dam removal may have been felt with the results of the devastation experienced in a large portion of Missoula County. Without the ability to provide regulation of spring snowmelt, the Clark Fork and Blackfoot River basins flow unchecked for significant distances, creating high velocity/high volume flows. This risk may become more frequent in coming years.

Figure 62: 2018 Missoula Flood Event

Severe weather events have become somewhat common across the US including the Missoula area. High wind events and late spring snowstorms have created havoc and spread emergency services quite thin when they've occurred. Downed power lines, trees and subsequent natural gas related calls keep resources busy. You could add the risk of avalanche under this larger header. Missoula experienced a significant urban avalanche in 2014, killing one woman and completely demolishing a single-family residence.

Other risks that may have significant impact include hazardous materials incidents, communicable disease outbreaks, earthquakes, and acts of terrorism. With the network of roadways and railways, the likelihood of a significant hazmat release presents a moderate to high risk - depending on location specifics and type of chemical. MFD is a partner in a regional hazmat response team, one of six around the state. Recently, state funding for these hazmat teams was cut in an attempt to balance the State's operating budget. Teams relied upon this funding to replace aging equipment, purchase new state-of-the-art monitoring equipment, and provide the participating fire departments with backfill funding so team members could receive specialized training (generally out of state). Without the restoration of this funding, teams will be forced to either disband or seek funding streams from within their own operating budgets. The Missoula Regional Hazardous Material Response Team is a very valuable asset to the citizens of Missoula and the majority of Western Montana. Losing the team has significant consequences and restoring the funding is top priority.

Goals and Objectives

- Mitigate concurrent calls to ensure MFD's resources are available to respond to emergencies within their district.
- Develop a Community Risk Assessment Plan to identify current and future risks within the MFD response area.

Short and Mid-Term Goals and Objectives

The department's short and mid-term goals and objectives are summarized below from the previous sections of this document. Most division recommendations are action-based and therefore can be measured to gauge project and program success. However, some recommendations are ongoing and will require constant attention each year. Accomplishing short and mid-term goals and objectives will continue to create a strong building foundation which will help to ensure that long-term strategies are successful.

MFD Division	*General Program Goal and Objective*	*Anticipated Timeline*	*Recommendations*	*See Page(s):*
Administration	Continue to pursue financial stability via Missoula City's Capital Improvement fund and grant spending	Ongoing	Apply for grants and assess the need for a separate fire levy. Look for all funding opportunities (locally and at the state and federal levels.)	……p 13
	Establish an ISO rating of 2	3-5 years	Review current ISO classification rating, convey need to constituents and implement an action plan.	……p 63
	Improve call processing time, turn-out and response times	Ongoing	Collaborate with 911 dispatch center and improve internal alerting/paging.	……p 80
	Continue to update contracts and mutual aid agreements with local response agencies	Ongoing	Solidify cooperative agreements with partners in the community.	……p 80
	Develop a Community Risk Assessment Plan to identify current and future risks within the MFD response area	1-2 years	Utilize Missoula/County Disaster Mitigation Plan of 2017 and update Community Risk Assessment Plan accordingly.	……p 92
Training	Allow priority training programs to be implemented across the department	Ongoing	Complete a training guide and implement identified training.	……p 19
	Expansion of MFD Station 3 training grounds	3-5 years	Secure funding to enhance the training ground at station 3.	……p 19
	Acquire land at MFD Station 4 for training program expansion	1-3 years	Secure purchase or long-term lease behind station, or identify other properties that would meet the needs of the department.	……p 19
	Recruit and train additional EMT-Paramedic personnel to achieve 24/7 ALS service throughout the city	1-5 years	Recruit and hire EMT-Paramedics. Provide training for MFD personnel to attain EMT-Paramedic Certification through in-house training, or provide funding for outside training.	……p 20

Fire Prevention Bureau (FPB	Lobby for the inclusion of residential sprinklers within the state's next code adoption	2 years	Create a bill and submit to Legislation in 2021.	……p 23
	Review the International Wildland-Urban Interface Code for potential amendments to City Fire Code	1-3 years		……p 23
	Support continuing education & certification within the FPB to meet industry standards	Ongoing	Review current budget and request appropriate funding.	……p 23
	Review business license fees	1-3 years	Review licenses and request cost recovery for work completed and future enhancements.	……p 25
	Identify and inspect high-risk occupancies on an annual basis	1-2 years	Create an inventory of high-risk occupancies and implement inspection program.	……p 25
	Optimize time management and scheduling of MCFPA school education programs	1-2 years	Implement new one-time assembly program per school.	……p 27
	Provide the FPB opportunity to become IAAI Certified Fire Investigators	1 year	Have each inspector create a plan that maps their certification process.	……p 29
	Maintain pre-plan program and seek opportunities for enhancing end-user utility	1-3 years	Implement Mobile Inspections for New World.	……p 29
Maintenance	Build a cold storage facility at Station 3 or 4	1 year	Secure funds for construction of a new cold storage facility.	……p 39
	Add an additional bay for the Maintenance Division to expand their repair space capabilities	3-5 years	Secure funding for land expansion and building construction of additional space for Maintenance Division expansion.	……p 39
	Locate funds for a third FTE mechanic	1 year	Provide data and justification to City Council and Administration.	……p 50
	Implement efficient repair tracking practices with the use of existing software	1-3 years	Provide in-house training protocols to all firefighters.	……p 50
	Continue to maintain and improve facilities, equipment, and apparatus	Ongoing	Continue to prioritize needs and repairs.	……p 50

	Support continuing education and certifications for EVT mechanics	Ongoing	Allocate funds for additional training and certifications.	……p 52
Operations	Review Peak Activity Units and/or Alternate Response Units as a way to improve station reliability and response performance	1-3 years	Implement and evaluate a PAU program.	……p 73
	Implement medical priority dispatch system (MPDS) at 911 and/or internally	1-3 years	Revise SOGs to reflect the triage of emergent and non-emergent medical calls.	……p 80
	Continue to monitor call volumes and concurrent calls in all MFD response districts	Ongoing	Adjust district boundaries or add additional stations or staffing to accommodate service demand.	……p 80
	Mitigate concurrent calls to ensure MFD's resources are available to respond to emergencies within their district	1-3 years	Identify and address areas that need improvement and allocate resources and staffing.	……pp 80/92
	Work towards improving MFD's medical aid and structure response times to meet NFPA 1710 standards	1-3 years	Identify and address areas that need improvement and allocate resources and staffing to meet the NFPA Standard..	……p 80

Long-Term Strategies

The continued success of the Missoula Fire Department (MFD) will depend on a comprehensive commitment to planning, organizing, and leading all levels of the organization toward stated goals.

The completion of the short and mid-term goals and objectives will continue to move the organization forward. A long-term, high-level view of future intentions and mind-set is also important in providing a guide of how the organization continues with further initiatives. Primarily, long-term strategies are centered on community growth, annexation, related workload, increased responsibilities, and how those factors influence future deployment of fire stations and personnel.

MFD will need to base their decisions moving forward on solid data and metrics in hiring personnel, building additional fire stations, and planning for future growth and development.

As the city continues to grow internally and externally, and as the population increases, it is critical that MFD is adequately staffed, with adequate equipment, to meet the challenges and expectations of the community. MFD should be proactive vs. reactive with their planning and decision-making.

By utilizing data and technologies, MFD can continue to make well-informed decisions that provide improved service to its citizens. One potential method to help MFD with continued efficacy is the utilization of Peak Activity Units (PAU) and Alternate Response Units (ARU). Instituting community-based medicine could greatly enhance the efficiency and delivery of medical services currently being provided. Long-range success must include regional training opportunities and community-based partnerships.

MFD's continued success will be reliant on their ability to recruit, hire, and retain quality personnel. To ensure that the long-term health, safety, resiliency, and well-being of personnel will be sustained, it is critical that innovative training opportunities and support are provided that address the professional and personal growth of its members.

Growth and future forecasting

Future Staffing

The ability to deploy enough firefighters and equipment to a scene, in a timely manner, to stabilize an incident is how a department is measured for efficiency.

The addition of new fire stations requires appropriate levels of staffing. The need to hire additional firefighters or personnel will be directly related to call volume, workload indicators, and annexation by the city. As calls-for-service increase and the service area expands, additional staff will need to be hired.

Fire Apparatus/equipment

Reliable source of funding for Capital Improvement is an absolute necessity.

The Capital Improvement Program (CIP) currently utilized by the City of Missoula is the primary strategy for acquisition, replacement, and maintenance of public infrastructure and other major assets. The CIP can use up to 10% of the general levy for infrastructure maintenance or for purchases that exceed

$5,000 and has a life expectancy of five years or more. By setting up a Capital Improvement Fund, the City can systematically plan, schedule, manage, monitor, and finance capital projects over five years with annual revisions that reflect changing needs and priorities. This allows financial planning to extend four years beyond the annual budget with the intent of creating a more coherent and cost-effective city-wide fiscal policy.

Annexation

Over the past decades, several established areas surrounding Missoula became subject to inter-local agreements between the City and the County in order to utilize municipal sewer, with postponed annexation dependent on meeting certain conditions. This includes a majority of the land between Highway 10 West (West Broadway) and Mullan Road, west of Reserve Street (RSID 8474). This area is eligible for annexation under sewer petitions by January 1, 2016 or if 50% plus 1 of the existing plumbed units in the RSID changes ownership. A portion of East Missoula is eligible for annexation as of January 1, 2024, dependent on certain conditions. An area on Orchard Homes, west of Reserve, between Third Street and Seventh Street, is also eligible for annexation under sewer petitions as of July 11, 2011, in accordance with the Addendum to Sewer Excavation Permit filed in Book 72, Page 728.

It should also be noted that some development continues to occur in unincorporated areas of the urban fringe, without benefit of central sewer or water services.

Land and open space acquisition

As the city continues to annex and acquire land and open space, funding will need to be allocated to mitigate that land so it is not a fire danger. It is also important to recognize the liability and cost of utilizing other agencies for fire suppression - tankers, helicopters, crews, etc., as well as the importance of establishing and maintaining proactive inter-agency agreements and positive working relationships.

Future Station and Facility Plan

Missoula Fire Department (MFD) is looking to expand its boundaries to accommodate potential annexations that the city makes in the coming years. As part of this initiative, MFD is continually seeking opportunities for new stations to cover our expanding borders.

The long term growth plans for Missoula call for annexation of areas mostly on the periphery of the current city limits. The large annexation areas extend the service delivery area of the Missoula Fire Department and land use plans will cause an increase in service demand. This can be seen in the Wye-Mullan area with the recent large annexation (Dec. 2018) and within the Target Range area. Development within the City and the annexed areas will also increase demand in areas that are currently reachable only with extended response times. As such, changes in facilities, apparatus, and staffing will be necessary.

Because these annexation areas extend the service delivery area outside the present capabilities in terms of response time objectives, new facilities should be considered.

In each strategy, specific locations are described for future fire station construction. It should be noted that these specific locations provide a point at which the performance projection data was achieved and

represent our recommended location. It is understood that additional factors such as land availability, zoning, road networks, and traffic patterns will also impact any decision on a specific fire station site.

Station 6: One potential location for a sixth station is at Deschamps Lane and Roller Coaster Road; this will allow access to the Wye area in the northwest corner, the airport, and points south of the airport if the proposed road west and south of the airport is completed. The following map depicts the potential location for MFD Station 6.

Figure 63: MFD Station 6 Map

Station 7: In the Fort Missoula/Target Range annexation area, none of the current facilities are able to reach into this area within response time goals. High service demand is projected for 28th Street near 37th Avenue, along with moderate demand to the north of Third and Preston. These areas can be served by the new station, as well as the rest of the area, which has limited access due to being bound by rivers on three sides. The recommended location for optimal response capability is Spurgin Road and Tower Street. Figure 64 illustrates this potential location for MFD Station 7.

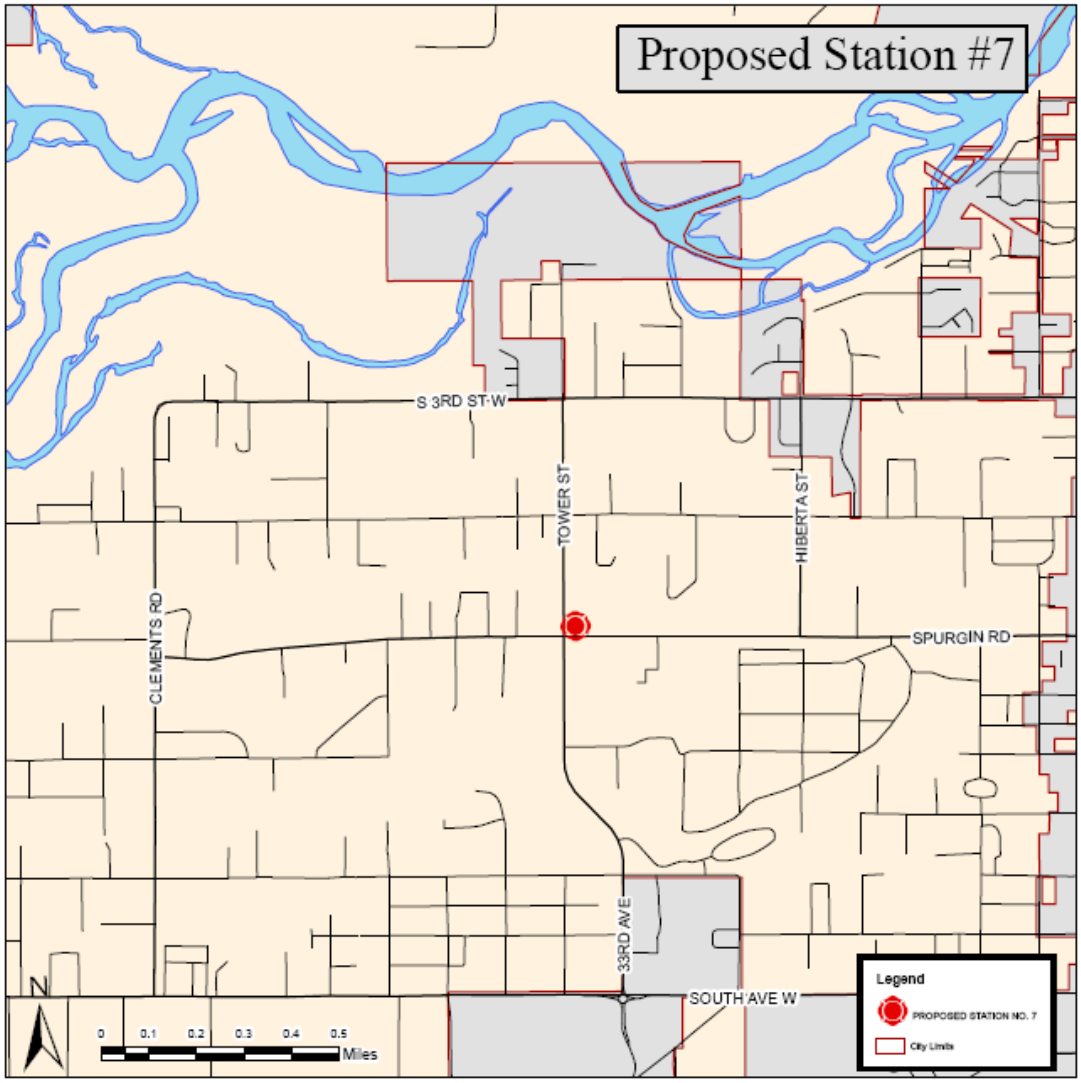


Figure 64: MFD Station 7 Map

Conclusion

Overall, MFD will continue to invest in its people, ensuring that personnel have the tools, time, and training to complete their work both safely and efficiently.

MFD will continue to build a strong and active management team. Empowering the members of the organization to affect positive change will lead to providing excellent customer service to the citizens and community. The success of the Missoula Fire Department is not only measured within the fire department, but also throughout the city of Missoula. MFD is steadfast in maintaining and fostering strong working relationships throughout the community and with cooperating agencies. The members of the MFD are committed to their jobs and their community. At all levels, dedication is seen throughout each program and service provided by the department.

For the Missoula Fire Department, the ability to serve the community is an ongoing process. MFD has continued to meet the challenges of providing emergency services to a growing population and service area. To be able to adequately meet the growing needs of the community, budget shortfalls will need to be addressed. MFD is committed to serving the community with fiscal responsibility in mind.

The true test of an organization's long-term success depends on how quickly it recognizes and responds to change. MFD is committed to the success and safety of all its members and the people they serve. They will continue to formulate decisions based on the needs of the community and its organization.

The Missoula Fire Department (MFD) began this Master Plan in November, 2018 and concluded the document in May of 2019. MFD sends their thanks to all responsible parties who helped develop this plan and to those who will make the goals and strategies a reality. MFD also extends their thanks to all cooperating agencies who make emergency response within the city of Missoula possible.

Appendices

Appendix A1: Table of Figures

Appendix A2: Table of Tables

Appendix B: Full Time Maintenance Employee Requirement Calculation

Full Time Maintenance Employee

Currently, Missoula Fire Department has 125 pending apparatus repair orders and 104 pending building repair orders. Despite adding a second FTE position in 2007, the maintenance division cannot keep up with the workload.

Scheduling the routine/preventative maintenance and annual testing of the fire department fleet fills all but two work weeks a year for the current full-time employees. This does not account for apparatus procurement, breakdowns, station repairs, vacation time, sick leave, training, or special projects. Because of this, the maintenance division only sees apparatus once a year for preventative maintenance. They fall behind on documentation and have no choice but to put small non-critical repairs and scheduled maintenance on the back burner.

To gain an understanding of how many staff members are needed to maintain the department's fleet is by using Chatham Consulting's system. This calculates a technician-to-vehicle ratio by using Maintenance and Repair Unit Factors (MRU) and the number of vehicles to determine how many technicians are needed to maintain and repair a fleet. Using the Direct Ratio approach, one technician can typically handle 78 MRUs.

Class	MRU Factor	# of MFD Vehicles	Total MRUs
Fire Truck	7.6	12	91.2
Brush Truck	3.9	4	15.6
Ambulance	3.4	2	6.8
Pickups	1.5	6	9
Trailers	.6	4	2.4
Water Craft	.6	2	1.2
Mowers	1	12	12
		Total	138.2

Table 18: Maintenance Repair Unit Calculator

Missoula Fire Department currently has 138.2 MRU's. This means the Department needs 1.77 FTEs to maintain its fleet. This does not include smaller equipment, tools, special projects, administrative duties, or, perhaps most time consuming, facility and station repair and maintenance.

The easiest and most common way to calculate the number of FTEs needed for facilities is using International Facility Management Association (IFMA)'s ratio. The IFMA's most current study, done in 2017, states that there should be one FTE per 50,000 square feet of building. MFD has 53,397 square feet of building. This means they need 1.07 FTEs to attend to building maintenance and repair.

This data shows that MFD maintenance division needs 1.77 FTEs for apparatus repair and maintenance and 1.07 FTEs for building maintenance and repair; a total of 2.84 FTEs. These numbers only indicate what is needed to maintain and repair MFD's fleet and buildings. It does not take into account any of the responsibilities of the Master Mechanic. The Master Mechanic is also responsible

for administrative duties, supervising the assistant mechanic, vehicle procurement, assisting with training, logistics of outside repairs, and budget management.

One additional FTE is needed to adequately meet the current and future needs of this division.

Appendix C: List of References

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