Bend Fire & Rescue
Deployment Plan
Standards of Coverage for
Emergency Response

2009

City of Bend Fire & Rescue Deployment Plan
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Bend Fire & Rescue Deployment Plan

PURPOSE & OVERVIEW

In 2001, the National Fire Protection Association (NFPA), the agency responsible for creating national standards for all matters related to fire protection and safety, promulgated **NFPA 1710; Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.** NFPA 1710 was updated in 2004, and the current 5 year revision process for review of 1710 was recently completed at the national level. The first revision for public review was scheduled for February 20, 2009, and final revision adoption occurred on June 15 of 2009. Any references to NFPA 1710 in this document will refer to the current 2010 edition.

The Oregon Fire Chiefs Association (OFCA) and Oregon Fire District Directors Association (OFDDA) developed a process for implementing such a plan in Oregon communities, known as the **Oregon Fire Service Deployment Standard Process**. This plan allows for local jurisdictions to implement standardized fire, emergency medical service and special operations deployment plans based on local and regional safety mandates, laws, rules, and regulations. Creating this plan requires the consideration of the diverse fire and life safety risks that exist in the jurisdiction, response performance standards, and emergency scene operations. Specifically, smaller communities and many larger cities have expressed concern in adopting NFPA 1710 in its entirety and adherence to the standard. The Oregon process recognizes this concern and allows communities to adopt standards that can be locally validated by the Authorities Having Jurisdiction (AHJ) as the national standard requires. Certainly, all communities must understand that when national standards are promulgated there are reasons to adhere to them, particularly when

they affect public safety. Standards represent the minimum level of compliance and what the public can come to expect from its governing agencies.

In an effort to increase validity to this process the most recent Comparative Performance Measurement Data Report (2007 data) published by International City/County Management Association (ICMA) will also be utilized. For FY 2007, 145 jurisdictions provided fire/EMS data. Of these, 60 have populations of 100,000 or higher, and 85 have populations below 100,000. The Oregon cities participating in the comparative analysis are: Portland, Eugene, Salem, Corvallis, and Albany.

In developing the deployment plan, the methodology used requires the assumption that it is reasonable, fiscally sound, based on factual data, and safe in dictating the staffing, deployment, training, and equipping of emergency responders. The plan must also adhere to all related Oregon OSHA laws, rules, regulations and requirements. Also taken into consideration are all local, regionally, and nationally adopted standards, such as those promulgated by the National Fire Protection Association and the American Heart Association, as examples.

Inherent to successful implementation of this deployment process is the recognition of need for annual review of the plan and changing it to meet the needs of the jurisdictions protected by Bend Fire & Rescue. BF&R will provide the AHJ with an annual written report as required by NFPA 1710. A truly successful plan is a work in progress; it is designed to be a “live” plan.

In general, the purpose of this Standard of Cover document is to address the following:

- What are the primary risk factors within the protection area of BF&R?
- What is our current response performance for the major risk factors?
- Are there areas of performance inadequacies, what are they, and how can we effectively address them?
- How does BF&R performance compare with local expectations, ICMA, state, and national standards?
- Are there operational/technical inadequacies impacting response performance?
- Does the infrastructure of the local jurisdictions adequately provide for the emergency operations of BF&R?
- What are reasonable and obtainable response performance goals?

SECTION ONE: Introduction

OVERVIEW & LEGAL JURISDICTION

The City of Bend and Deschutes County Rural Fire Protection District No. 2 (DCRFPD #2) are served by Bend Fire & Rescue. The City of Bend is an incorporated city and falls under those laws pertaining to cities in the State of Oregon. DCRFPD #2 is organized as a Special District governed by a five member Board of Directors, who serve and are elected by the patrons of the fire district.

DCRFPD #2 contracts with the City of Bend for emergency services of its citizens and property.

City of Bend Fire & Rescue is a Civil Service Commission employer which adheres to all rules and regulations adopted by the City of Bend ordinance pertaining to the function of the Civil Service Commission. Bend Code 1.400-1.438 Civil Service – Firefighters and Ambulance Personnel.

The Bend Firefighters Association and the City of Bend maintain a working contractual agreement for negotiation of wages and benefits.

FUNDING

Funding is provided through the dedicated Fire Fund within the City of Bend and the current adjusted budget is approximately $13,570,200. Funding sources are multi-layered and include property tax revenues from both the City of Bend residents and patrons of the DCRFPD #2. The current contract with the rural fire district is for $1.185 per thousand of assessed valuation and represents approximately 17% of the total fire department budget, with the other 83% from City property tax and other revenue.
Included in the City revenue portion are the following funding sources:

- Fire protection contracts with Mt. Bachelor Corp., High Desert Museum, and multiple private property owners not within the City or Fire District.
- Revenue from the ambulance transport service and FireMed memberships

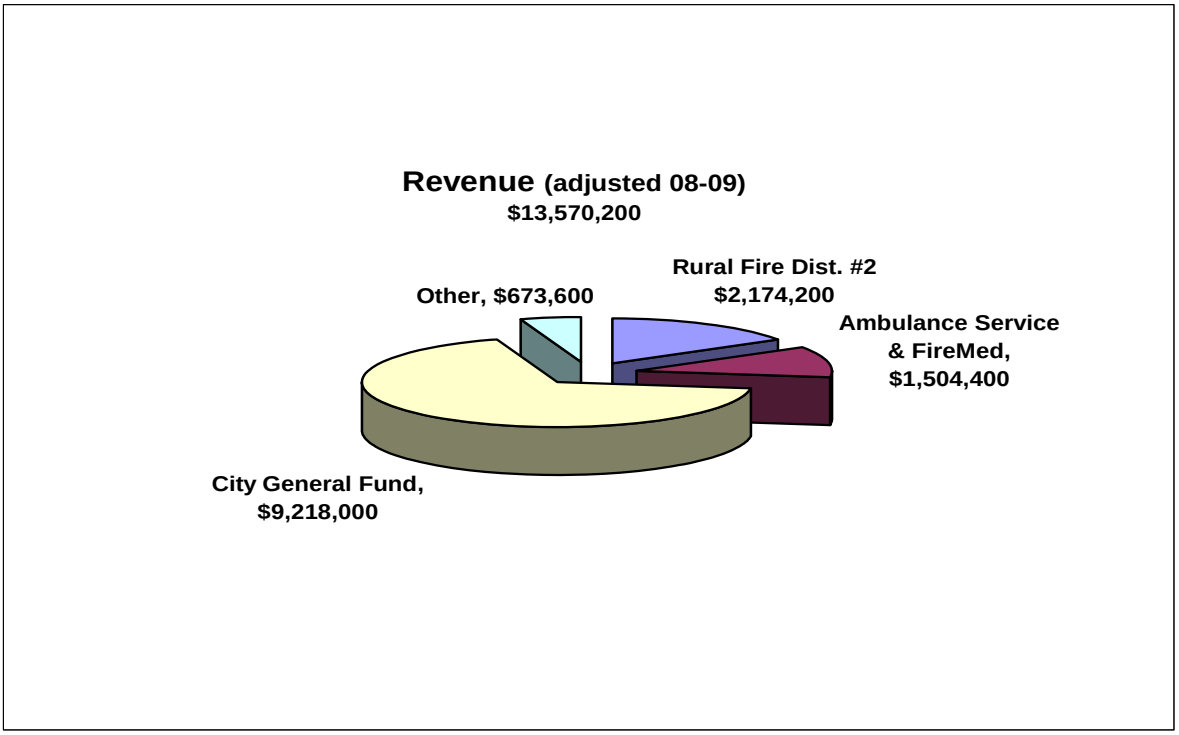


Figure 1: Revenue Chart

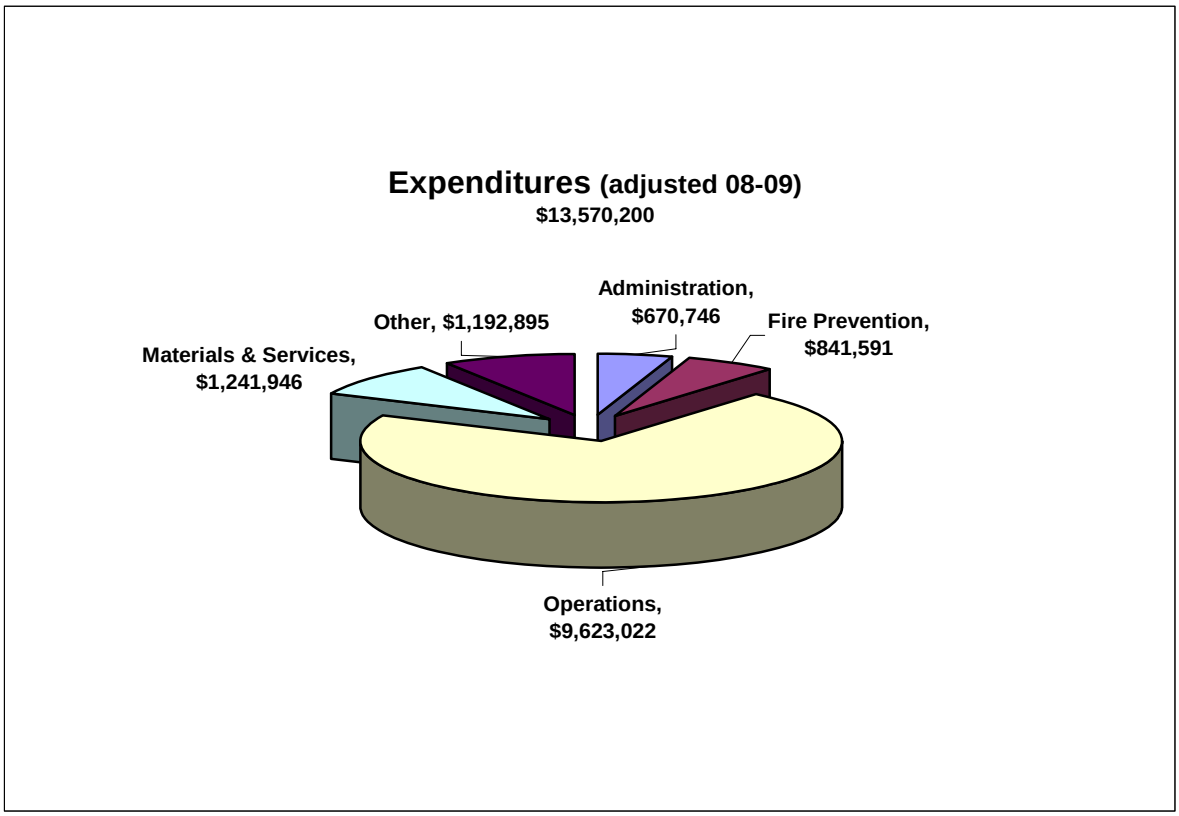


Figure 2: Expenditure Chart

The City of Bend and DCRFPD #2 have made a significant capital expenditure investment over the last 15 years to build 4 new fire stations, an administration building, a training facility and tower, a warehouse, and replacement of the entire apparatus fleet (fleet replacement occurred approximately 15 years ago and fire engines are again getting close to replacement schedule). These improvements amount to over $13,000,000 of capital improvements.

International City/County Management Association (ICMA) Comparison
Total Fire Personnel & Operating Expenditures per Capita

BF&R service pop. 102,500	$132.39
Jurisdictions > 100,000	
Mean	$152.66
Median	$141.99
Jurisdictions < 100,000	
Mean	$146.77
Median	$130.45

Figure 3: ICMA Comparison - Expenditures per Capita

SERVICE AREA

We protect approximately 32 square miles in the City of Bend, 132 square miles for our fire district, and approximately 1450 square miles for our ambulance service area. The approximate current population of the City of Bend is 82,500 and this makes Bend the seventh most populous city in Oregon. DCRFPD #2 adds another 20,000, for a total protected population of 102,500. Bend Fire & Rescue responded to 7686 calls for assistance during calendar year 2008.

The following maps give an overview of regional ambulance service areas, DCRFPD #2, and the City of Bend. The maps show gradients of shading to indicate the density of alarms during 2008.

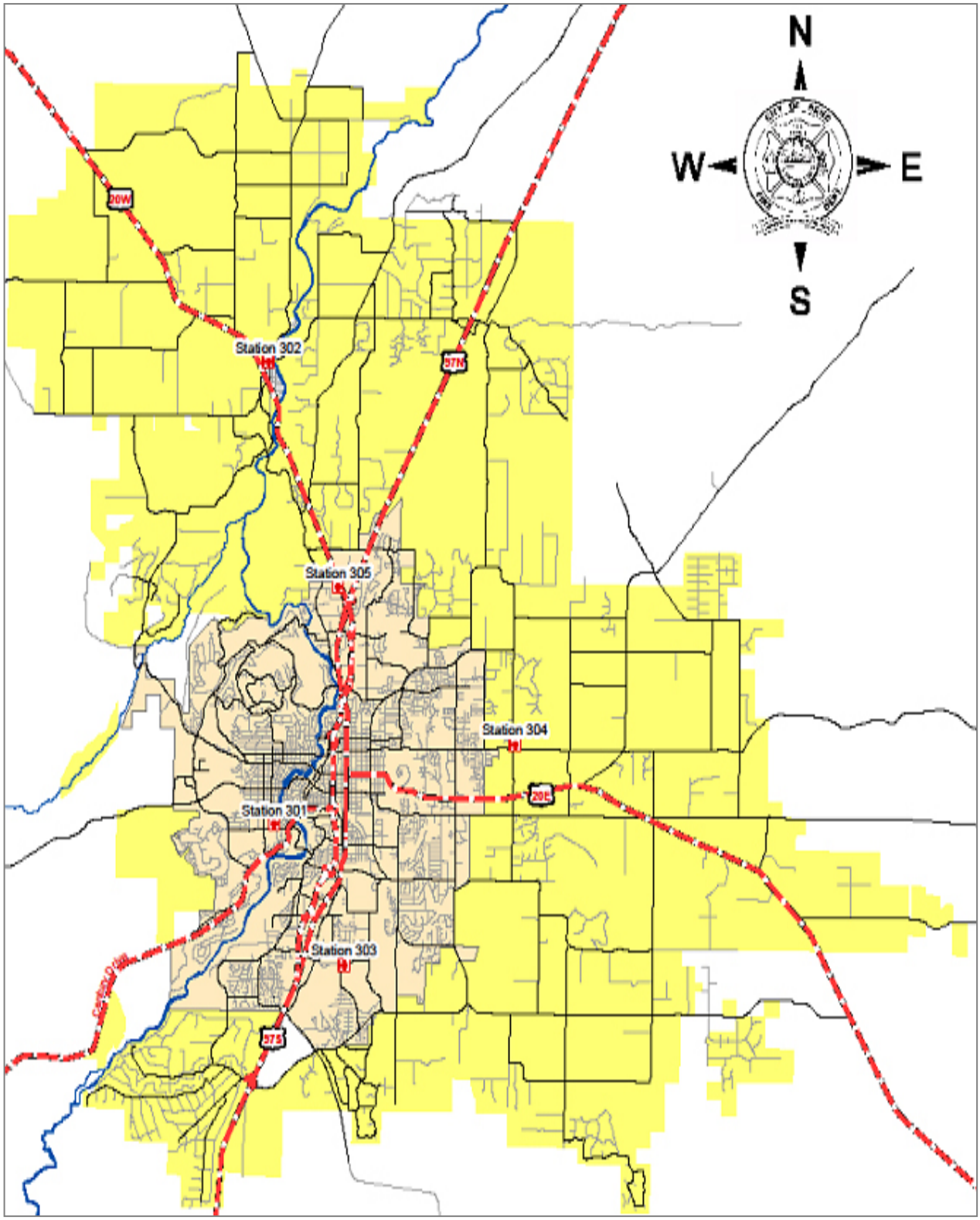


Figure 4: Fire Response Area

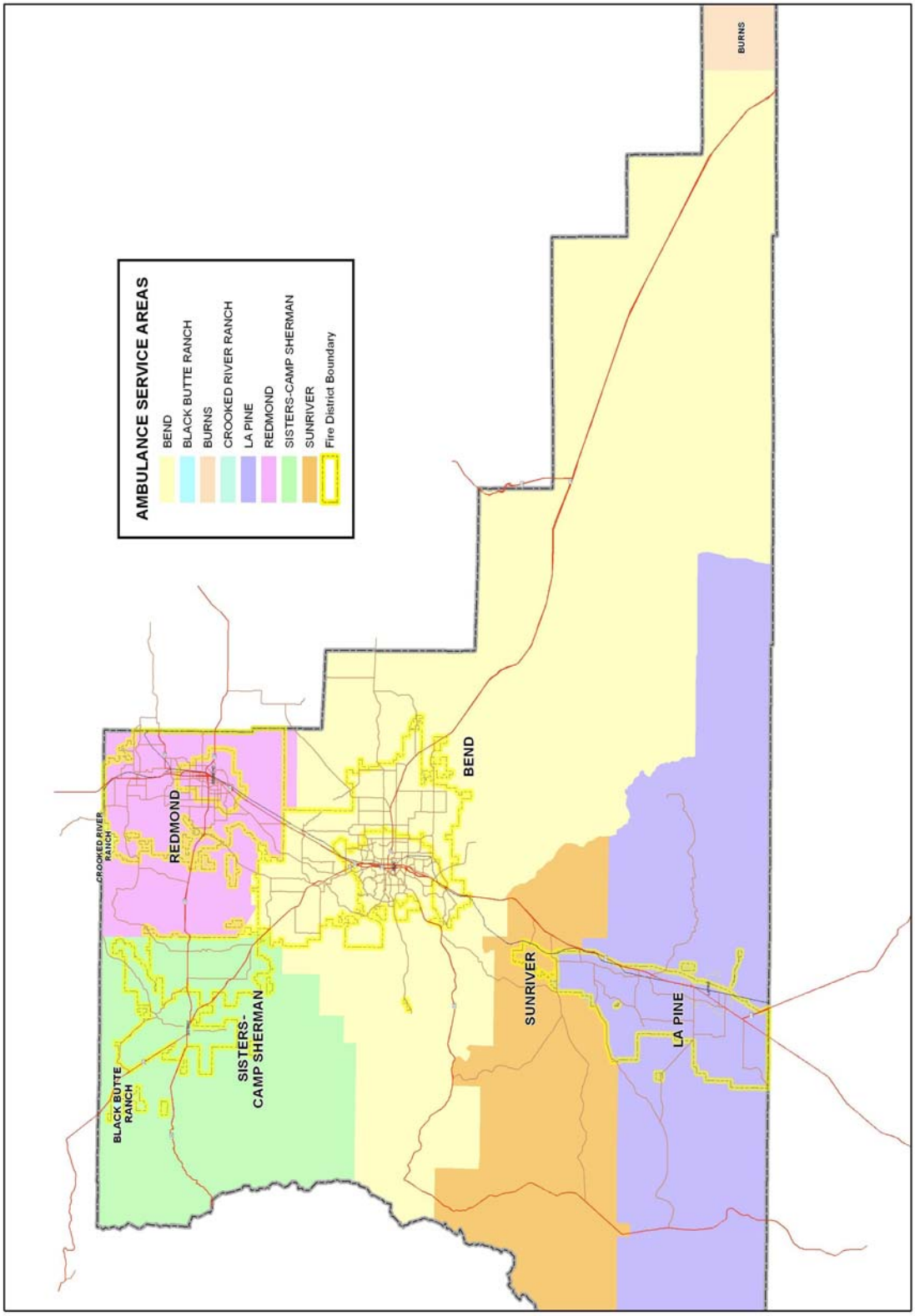


Figure 5: Ambulance Service Area Map

PERSONNEL

85 paid career, 5 part time, and approximately 5 volunteers. Career personnel consist of a Fire Chief, 5 Deputy Chiefs responsible for Logistics, Fire/EMS operations, EMS, Training and Fire Prevention, a Logistics Technician, 6 Deputy Fire Marshal/Inspectors, 3 Administrative Assistants, and 69 firefighting line personnel.

Each of the three Battalions, or shifts, consists of a Battalion Chief, five Captains, six Engineers, and Firefighter/Paramedics.

All fire stations have a complement of fire apparatus, which includes Fire Engines, Water Tenders, Brush/Interface Engines, and Ambulances. The Tumalo Station lacks a water tender due to station size restriction. A Rescue Truck and Ladder/Pumper (Quint) Truck are also part of the fire fleet. All Personnel respond from their assigned station based on the type of call that occurs in their response area. In other words, they choose the equipment based on the type of call, cross-staffing to the required fire/EMS apparatus for the incident type. Personnel are cross-trained for both fire and medical: each company has advanced life support trained paramedics.

International City/County Management Association (ICMA) Comparison
Fire Staffing per 1,000 Population Served, 56 hr. Work Week

BF&R service pop. 102,500	0.67
Jurisdictions > 100,000	
Mean	1.05
Median	1.02
Jurisdictions < 100,000	
Mean	1.12
Median	1.09

Figure 6: ICMA Staffing Comparison

Oregon Fire Departments Population & Firefighter Per Thousand Population Served Comparison Oct 2009

Department	Pop. Served	Firefighters	FF/Thousand
Albany	55,300	64	1.1
Bend	**102,500**	**69**	**0.67**
Corvallis	70,000	57	0.81
Eugene	153,000	162	1.1
Gresham	135,000	87	0.64
Hillsboro	94,436	80	0.85
Klamath #1	52,000	60	1.1
Medford	88,641	68	0.76
Pendleton	19,000	18	0.94
Portland	575,931	573	0.99
Redmond	41,555	36	0.86
Salem	155,311	144	0.93
Springfield	73,252	78	1.1

Figure 7: Population & Firefighter Per Thousand Comparison

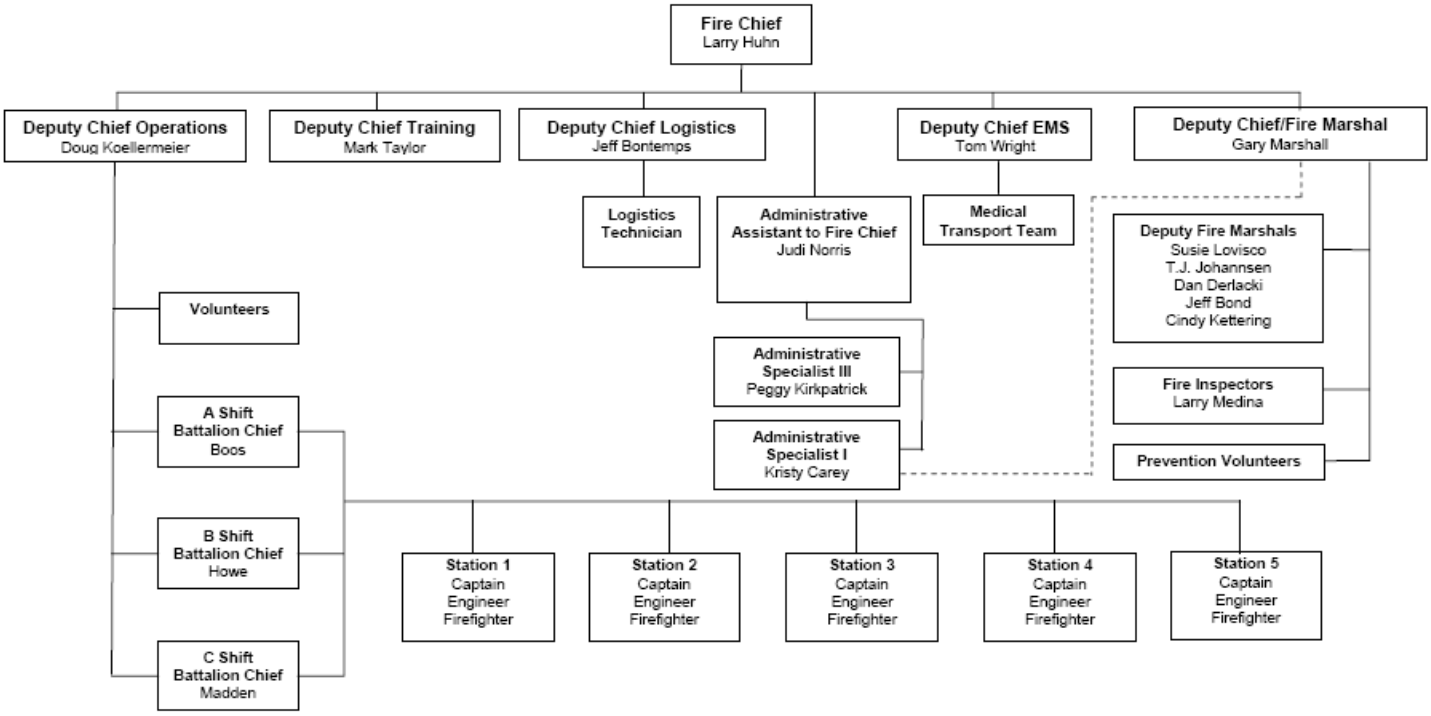


Figure 8: BF&R Organization Chart

FIRE STATIONS

The City operates five stations: West Station on Simpson (301) Tumalo (302), South Station on Country Club Dr. (303), East Station on Hamby (304), and North Station on Hwy 20 (305). Additionally, there is a training facility and warehouse facility located on the North Station Property. The Administration Building is located on Simpson Ave. behind the West Station.

International City/County Management Association (ICMA) Comparison
Number of Fire Stations

	No. of Stations	Avg. Sq. Miles Served per Station
BF&R service pop. 102,500	5	26.4
Jurisdictions > 100,000		
Mean	17	14
Median	14	9
Jurisdictions < 100,000		
Mean	4	13
Median	4	7

Figure 9: ICMA Comparison - Fire Stations

International City/County Management Association (ICMA) Comparison
Fire Equipment and Minimum Staffing per Apparatus

ICMA Comparison - Fire Equipment and Minimum Staffing per Apparatus																
			Ladders		Pumper/ Engine		Quints		Ambu-lances		Total In-service Apparatus	Minimum Staffing				
			Regular/ in-service	Standby/Reserve	Regular/in-service	Standby/Reserve	Regular/in-service	Standby/Reserve	Regular/in-service	Standby/Reserve		Ladder Trucks	Pumpers/Engines	Quints/Comb.	Ambulances	Minimum Staffing - Daily Total
BF&R service pop:	**100,000**	0	0	5	1	1*	0	5	1	**6****		3	3	2	**18**
Jurisdictions > 100,000															
	mean	**362,269**	4	1	17	6	2	1	13	8	**31**	3	3	3	2	**106**
	median	**198,338**	2	1	12	4	1	0	9	4	**23**	3	3	3	2	**76**
Jurisdictions < 100,000																
	mean	**49,235**	1	0	4	2	1	0	4	1	**9**	3	3	3	2	**20**
	median	**49,296**	1	0	3	2	1	0	3	1	**7**	3	3	3	2	**18**

*BF&R Station with Quint also has Engine, only one can be staffed per incident. Quint apparatus has a ladder (like ladder truck) and pump.

**Based on staffed apparatus, BF&R can staff 6 apparatus at minimum staffing, more apparatus is available but not staffed.

Figure 10: ICMA Comparison – Fire Equipment and Minimum Staffing Per Apparatus

MUTUAL AID AGREEMENTS

BF&R maintains mutual aid intergovernmental agreements with all surrounding communities which include: Fire/EMS agencies, US Forest Service (USFS), Bureau of Land Management (BLM), and Oregon Department of Forestry (ODF). Automatic mutual aid is in effect for USFS, BLM, and ODF. Limited automatic aid occurs with adjacent Fire/EMS agencies.

Automatic aid with adjacent fire districts occurs in several areas to complement initial response to motor vehicle accidents on Hwy 97 North and South, Cline Falls Road, Hwy 20 West, and for fires in the Whispering Pines Subdivision North of Bend. Within these designated areas both BF&R and the adjacent Fire/EMS district are dispatched at the same time automatically. This combined resource response ensures the quickest arrival of personnel and equipment to mitigate the incident. Unified incident command is utilized to designate authority for communication and chain of command.

Currently, aside from the previously discussed automatic aid areas, mutual aid from adjacent communities is manually requested at the time of need, most commonly for larger fires and EMS incidents with multiple patients. This configuration may create a slight delay in responses for those incidents that occur near response boundaries when more than one resource is needed to mitigate the incident adequately. This particular challenge has been discussed over the years and the creation of the automatic aid areas is the result. The remaining areas not serviced by automatic aid are manually activated. Because small communities have few immediately available resources for their own communities and sending them to adjacent communities can create deficiencies, mutual aid is used judiciously. Also, for the larger communities, automatic/mutual aid can be a drain on resources because they have more depth and fear they could be called more often – depleting their community resources. The result of years of experience is a well defined coordinated automatic/mutual aid system utilized to the benefit of all communities in a judicious manner for the benefit of all citizens.

NFPA 1710 requires mutual aid and automatic aid to be established through intergovernmental agreements that provide for the deployment of personnel and equipment to another jurisdiction when an incident exceeds a jurisdiction's resources, when the jurisdiction has no resources available, or for expertise in a specified manner.

The 2010 edition of 1710 now specifies that intergovernmental agreements for mutual aid shall address issues such as liability for injuries and deaths, disability retirements, cost of service, authorization to respond, staffing, and equipment, including the resources to be made available, availability of interoperable communications, and the designation of the incident commander. Also, procedures and training of personnel for all fire departments in mutual aid, automatic aid, and fire protection agreement plans shall be comprehensive to produce an effective fire force and to ensure uniform operations.

COMMUNICATIONS

BF&R is dispatched by the Deschutes County Communications Agency (DCCA), located in the Deschutes County Sheriff's building. This 9-1-1 center dispatches for 13 emergency services in the county. NFPA 1221 – Public Emergency Service Communications, sets the national standards for emergency communication centers. It provides standards for all aspects from building construction to personnel requirements and time standards for handling 9-1-1 calls. DCCA is overseen by the Deschutes County Board of Commissioners and has an Executive Board of Directors made up of agency department heads or designees by all serviced departments.

Communications from vehicle to vehicle and from vehicle to dispatch (i.e. DCCA) is via VHF radio system for BF&R. A system of repeaters is used to relay communications within the entire City and District. There remain areas of poor radio reception due to the diverse geographical features. Cellular communications are used within the greater Bend area. However, cellular coverage is poor to nonexistent in portions of the ambulance service area.

BF&R is continuing the implementation of mobile data terminals (MDT) for the future goal of documenting response times, dispatch information, mapping, and other information currently kept in paper format. Five apparatus are equipped with recycled mobile computer terminals, and 7 more new computers are currently being acquired through a federal grant and will be installed in apparatus. Primarily, personnel use voice communication to dispatch to announce their status as a call progresses. As the installation of mobile computers progresses the goal is to do all incident time documentation via the mobile terminals.

A large survey/study conducted by the Center for Public Safety Excellence (CPSE) and the National League of Cities during 2005 through 2007[1] showed clear significant decrease in turnout times for agencies utilizing (MDT). Some of this decrease is a result of the efficiency of MDT, and some is a result of more accurate documentation of times by allowing personnel in the field to send a digital signal verifying their status rather than relaying this by voice radio communication to a dispatcher who may be managing multiple emergencies at the same time. Human errors occur and the resulting documentation errors can cause large data errors resulting in the misrepresentation of performance standards data.

All stations are part of an interdepartmental computer network. The fire records system 24/7 is used for documentation and reporting functions, as well as receipt of dispatch run reports for personnel when beginning a response. BF&R is also part of the City of Bend's interdepartmental network.

[1] Data analysis of CPSE survey attached to appendix.

TRAINING

The training program is overseen by a Training Officer and is accredited by the State of Oregon Department of Public Safety Standards and Training (DPSST). All personnel are Oregon-certified Emergency Medical Technicians EMT-Basic, EMT-Intermediate, or EMT-Paramedic. The department has the most complete training facilities east of the Cascades.

Currently in process for training are creation, updating, and implementation of a complete set of performance standards. In tandem with this is the development of skill sheets. Skill sheets are a compilation of tasks that are also performance standards but are put together to make a fire ground evolution. For example, we may have a single performance standard on power saws, self contained breathing apparatus (SCBA), and ladder use. A skill sheet on vertical ventilation of a structure's roof would combine those performance standards (and others) into a fire ground evolution – in this case a company evolution.

A long term goal for training is to have a video catalog of all performance standards and skills sheets. We envision retaining this catalog on a *YouTube*™ type of system that could be easily accessed by anyone during training on the drill ground.

Formation of the Training Advisory Committee has been a key to the Training Division's success. This committee uses subject matter experts in 15 different fields to help identify training needs and set the annual training calendar.

Also very note worthy are our instructors, the vast majority of whom are from within the department. These instructors are men and women who have gained an expertise in one or more subject areas and have passed that knowledge along to department members via formal training sessions. Our biggest training success is the continued dedication of our line personnel and their desire to master their craft.

We are challenged every day to conduct training with on duty crews without interruption. Our staffing level does not allow us to conduct training without facing a high likelihood of losing one or more companies to answer calls for service. We are working to decentralize the training of our personnel in two ways. We are working to electronically link the Training Center classrooms with the individual station classrooms. This will allow crews to remain in quarters for lecture type of training

(e.g. physician case reviews). This also involves our increased commitment to record our training and to make the video readily available. Secondly, we are designing props that can be used at substations for crews to use rather than having to come to the drill grounds to do the same training.

Maintaining a continued high level of community support is possible only through a well trained work force. To that end, the department has been very supportive of the Training Division, and with that support, we will continue to provide the citizens of the protected jurisdictions the high level of service they receive.

FIRE PREVENTION

The Fire Prevention Division provides the community with several services to enhance public safety. These services include:

- Community fire safety awareness and educational programs geared toward changing behaviors and attitudes in an effort to promote fire safety;
- Review of development plans for commercial buildings and residential subdivisions to ensure conformity with fire prevention codes and local fire protection ordinances;
- Conducting periodic fire safety inspections to meet the minimum requirements of the Oregon Fire Code;
- Investigation of all uncontrolled fires to establish where the fire originated and to determine the cause.

SECTION TWO: Mission, Goals, and Objectives

MISSION STATEMENT

"To protect our community through excellence in service"

Our Credo

- Honorable in our conduct
- Loyal to our mission
- Trusted by our community

MAJOR ACCOMPLISHMENTS – FISCAL YEAR 2007 – 2009

- Completed 100% of accessibility modifications to all departmental facilities (ahead of schedule)
- Improved emergency response times for Fire and EMS calls for service
- Continued four year project to update the two-way radio communication system to meet new federal standards and enhance "interoperability"
- Placed in service two wildland interface fire engines and six replacement Ambulances
- Implemented electronic field reporting for Fire & Life Safety Inspections

- Implemented wireless mobile data system for first line emergency apparatus
- Continued partnership with AirLife of Oregon (now AirLink) to increase FireMed revenue
- Completed and adopted the City's Emergency Response Plan revision

CURRENT GOALS FOR THE 2009 – 2011 BIENNIAL BUDGET

- Maintain and improve the City's standards for the delivery of emergency services
- Maintain Fire Prevention and Life Safety services
- Promote and protect the safety, security, and health of the Bend Community
- Maintain the department's physical plant and equipment
- Maintain and enhance efficiencies and relationships with cooperating agencies and jurisdictions
- Complete implementation of wireless mobile data system for first line emergency apparatus
- Complete upgrade of radio system to meet mandated FCC changes
- Maintain a high level of customer satisfaction
- Maintain sufficient reserves in the Fire Fund

KEY OBJECTIVES FOR 2009 – 2011 BIENNIAL BUDGET

- Maintain the current Insurance Services Office (ISO) insurance rating in the City and the DCRFPD #2
- Maintain fire training, performance standards, and operational accountability
- Maintain staffing to meet critical task requirements for all incident types
- Maintain or improve current emergency response times in the City of Bend and DCRFPD #2
- Inspect new and existing low hazard businesses as needed and continue to support businesses through training for self inspections
- Inspect all hotels, motels, large apartment buildings and all fire sprinklered buildings for fire code compliance
- Inspect night clubs on a routine basis to ensure fire safety for patrons
- Maintain customer service to our constituents through program collaboration and partnerships with the City of Bend Building, Planning, Engineering and Public Works Departments
- Offer alternative methods for the removal of vegetation from a homeowner's property
- Maintain the Bend Fire Department Smoke Alarm Program to offer free specialized smoke alarms to those who are hard of hearing
- Fill vacant positions
- Begin plans for engine fleet replacement
- Stabilize funding sources

SECTION THREE: Risk Assessment

A risk assessment traditionally consists of an analysis of key elements described below. In addition to the traditional elements, establishment of response performance standards must include consideration of the topography and the transportation network over which emergency responders must travel in order to meet the demands for service, the nature of emergency response activity, and patterns of future property development and population growth.

Through a methodical analysis of the risk dynamics present in a given community, a risk assessment makes it possible to develop rational resource deployment strategies. The goal of the risk assessment process is to determine the ***probability*** of an event occurring, as well as the ***potential consequences*** (hazard assessment) of that event. From this analysis, the agency defines their ***level of response*** to these events.

The resources that are ***available*** to respond, and the ***safe deployment*** of those resources, are described in **Section Five** under "Critical Tasking" and "Establishment of an Effective Response Force".

TERMINOLOGY

Fire Flow: the amount of water required to control a fire, based on building construction type and contents.

Probability: an estimate of the likelihood that a particular event will occur within a given period of time.

Consequence: the risk to human life and the economic impact of an event (including fire, medical, and other events).

Occupancy Risk: an assessment of the relative risk to life and property resulting from a fire, inherent in a specific occupancy or in a generic occupancy class.

Demand Zones: areas utilized to analyze risk situations. BF&R utilizes several types of zones in delineating response areas.

City, DCRFPD #2, and Ambulance Service Area boundaries define the geopolitical areas which BF&R serves. The City boundary encompasses the densest population area and highest volume of calls. DCRFPD #2 is the suburban and rural area surrounding the City, and patrons' contract with the City to receive emergency services. The fire district boundary also is the dividing line between adjacent fire districts. The Ambulance Service Area encompasses nearly 1,450 square miles of Deschutes County This arrangement is a result of the State of Oregon requiring every square mile of the state to receive ambulance protection. The adjacent fire districts and cities divided up this largely frontier area and split response areas half way between services.

Dispatch Grid Zones were created to divide up the entire response area of Bend Fire & Rescue. Within the city limits these areas are made up of several block areas and in the rural areas these areas are much larger. They are defined by streets, corners, blocks, and such geographical features as the Deschutes River and bridges. The designation of dispatch grid zones facilitate response zones being subdivided these zones are then to stations that are closest to that area.

Fire Station Response Zones are a grouping of dispatch grid zones which provide a framework for the dispatch software to choose which station is closest to an address when a request for emergency service is made. These boundaries are based on driving time, traffic patterns, bridges over canals and rivers, street configurations, and other pertinent considerations. If new streets are added, this can change drive time and therefore affects response times from fire stations.

Fire station response zones include sequencing of stations for multiple alarms and responses requiring more than one apparatus, such as a fire. Newer dispatch systems include GPS units in apparatus and the closest unit geographically to the address will be dispatched. Although our system dispatch system is capable of this function, BF&R does not have the subscriber equipment needed make use of this capability.

The following map illustrates our fire station response zones.

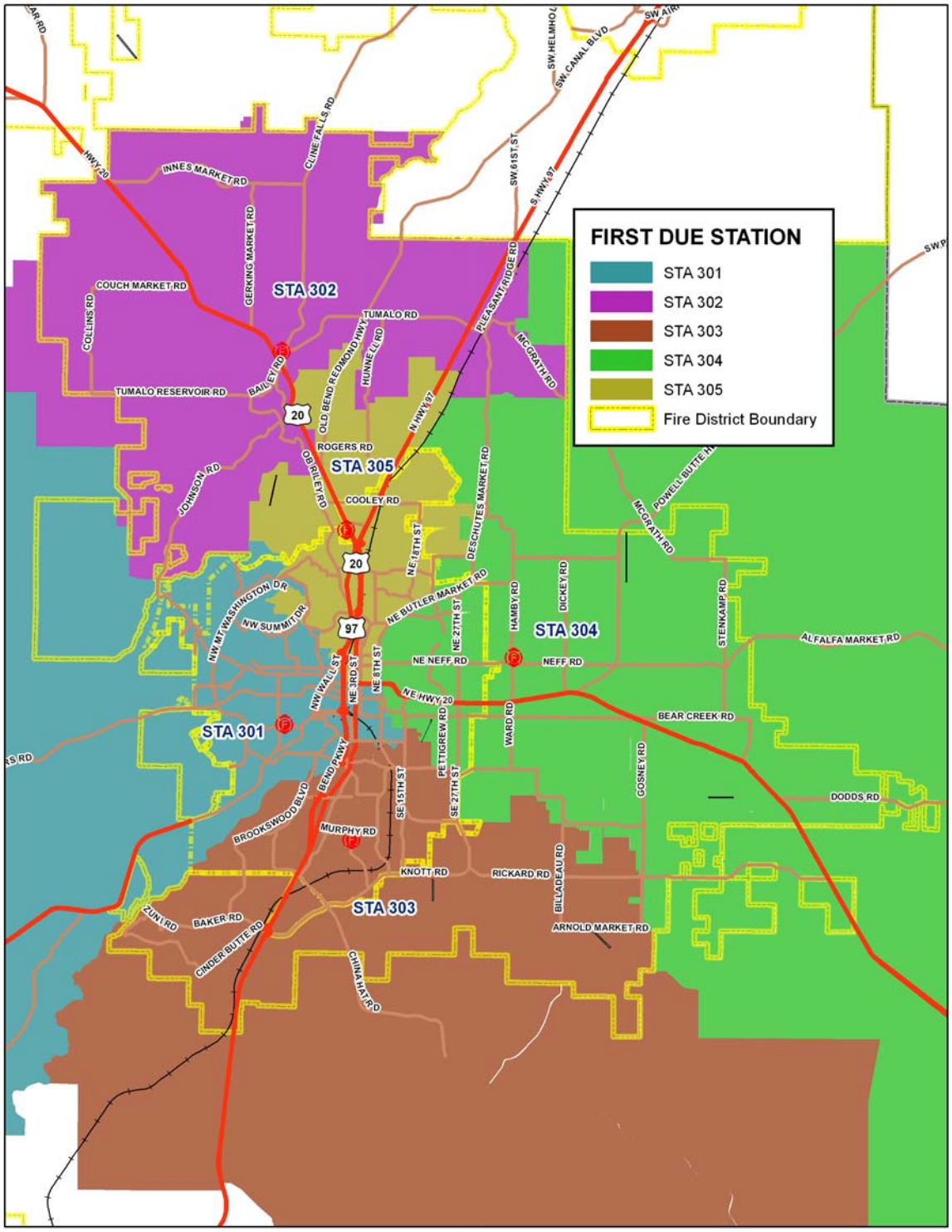


Figure 11: Bend Fire & Rescue Station Response Zones

Demand Zones are created for the purpose of establishing planning and goal setting for future changes in response areas based on need. The needs may be based on a variety of reasons such as: industry related demographics, occupancy risk, etc. One of the purposes of the deployment process is to identify these through risk assessment and to develop strategies to deploy resources in the most effective manner to mitigate the potential consequences.

Deschutes County boundary is the delineation in the ambulance service area between adjacent counties. There are minor exceptions to this geopolitical boundary where BF&R can respond quicker due to the location of roads and therefore is for the good of the public.

Community Profile: an analysis of the attributes of the community based on the unique mixture of demographics, occupancy risk, demand zones, and levels of service currently provided.

COMMUNITY RISK ASSESSMENT COMPONENTS

Growth Boundaries: The City of Bend maintains an Urban Growth Boundary as required by Oregon state law and is limited to expanding this boundary based on the projected population and the amount of land available for housing to meet the population projection. Other factors are also considered and are part of a state law process. Given the growth that has occurred in the Bend area in recent years and probable continued growth, a proposed UGB expansion is currently being studied and may soon be adopted.

Deschutes County Rural Fire Protection District No. 2 is a geopolitical entity and may only increase in size upon the petition of residents who desire addition to the Fire District. The City of Bend must approve petitions as the provider of the fire and EMS service: if approval is made, the petition is submitted to the Deschutes County Commissioners, and public hearings are held. Based on the outcome of the hearings, the parcel of land is added to the Fire District and is taxed at the current rate for fire protection.

Construction Requirements and Limits: City of Bend Fire & Rescue uses the following resources as it pertains to construction requirements and limits within its fire district.

- 2007 State of Oregon Fire Code (based on the 2006 International Fire Code), authorized by ORS 476.030 and adopted by OAR 837 Division 40
- 2007 Oregon Structural Specialty Code (based on the 2006 International Building Code (I.B.C.)
- Local Ordinances
- State Laws
- NFPA Standards that have been approved or referenced by the state code.

City of Bend Fire & Rescue does not itself have any specific construction requirements or limits other than what is found in the above resources. However, the City of Bend Planning Department and Deschutes County Community Development Department do have regulations that may affect future growth. One example is the City of Bend Planning Ordinance that restricts the height of buildings to 70 feet in the Central Business District. More detailed specifics are beyond the scope of this document, and those cited are for reference only.

Infrastructure Limitations: The area protected by the City of Bend Fire & Rescue has many different infrastructure limitations based upon location in the city or fire district. There are limitations in both the City of Bend and DCRFPD #2.

The City of Bend's future growth, with reference to infrastructure, is heavily dependent on water supply, water distribution, wastewater collection, and wastewater treatment. Our city has benefited over the years from a very stable supply of water from both ground and surface water sources. This multiple source system of water for Bend, with its inherent duplicate backup, offers considerable advantage over single source systems.

As the population in Bend grew, additional wells were drilled and made operational, and new reservoir capacity was also constructed. All of this work came at a significant cost. The limit on the amount of available water is not a topic for this document however the infrastructure such as size and number of water lines, the volume they can deliver, and the pressure they can maintain is limited and must be expanded as growth occurs. All water construction is based on water supply available vs. size of building and occupancy type. In the City of Bend it is rare to find supply for fire protection above 3000 GPM, and due to this limitation, those occupancies that require more than 3000 GPM are required to install more life safety features to their buildings (i.e. sprinkler systems, booster pumps, or more fire resistive construction). The other option to those building is to bring in additional hydrants for supply.

The area outside of the City of Bend has more limitations on water availability than does the City. The water supply for these areas varies from very stable to sources of unknown reliability. The City of Bend Fire & Rescue and the County follow water supply standards found in NFPA 1142. These standards require that the builder bring in either hydrant at correct spacing intervals, make use of a cistern system, require residential sprinkler system, or a combination of those. These factors may also limit some growth to these areas. The limited rural water supply is one factor that has impacted our ISO (Insurance Standards Organization) rating which affects insurance rates for residents in the rural fire district. This occurs primarily because of the lack of fire hydrants in many rural areas and the accompanying result of the inability to supply more than 250 gallons per minute water fire flow continuously for 2 hours to at least 85% of the built-upon areas of the community within five road miles of a recognized fire station. This results in a ISO Class 8B rating for the DCRFPD #2.

Specifics for infrastructure limitations are beyond the scope of this document, and those listed are for reference only.

Topography: The City of Bend and DCRFPD #2 are adjacent to the east slope of the Cascade Mountain range and have varied topographical features. Volcanic by nature, this area includes lava flows, cinder buttes, a major river canyon, mixed pine forest, juniper high desert plateau, and some agricultural lands. The most predominant feature is the wide variation in topographical features. This creates many obstacles/hazards – in the form of recreation-based hiking, mountain and road biking, climbing, swift-water based sports, winter sports, etc. And of course, with this comes just as many different types of rescue/EMS related types of incidents. Although the number of calls related to these types of incidents is not large, the life safety risk is quite high. These incidents require significant resource deployment in personnel, equipment, and time.

The dry east slope and varied topography also creates another kind of hazard that Bend has experienced – **wildfire**. Subdivisions in forested areas create wildland/urban interface zones. Although this problem is nothing new, the steady growth of subdivisions amplifies the high risk life and property safety problem faced by our community.

The ***Greater Bend Community Wildfire Protection Plan*** was completed and published on May 16, 2006. As a result of the Healthy Forests Restoration Act of 2003, communities collaborate with state and local fire agencies to determine priorities for hazardous fuels reduction projects on federal and private lands in the Wildland-urban interface. This Act also allows communities to develop and list priorities that affect their ability to survive a wildland fire in their area. Egress, education, and water availability are some of the other issues that communities may address in their plans. Across Central Oregon, each community has been collaborating with forest and fire management agencies to identify risks and outline strategies to address them.[2]

The Bend community has historically experienced the immense destructive force of wildfire that enters our community from surrounding forested land and destroys homes and property in subdivisions in the wildland-urban interface.

As a result of adoption by the City of Bend and Deschutes County as a wildfire zone by ordinance, fire resistive roofing is now required on all new building construction and remodeling over 30% of the structure.

BF&R created *Fire Free* – a homeowner educational and mitigation program for the wildland-urban interface. It has been very successful in reducing fuels and educating homeowners on how to decrease wildfire risk on their property.

[2] www.projectwildfire.org/cwpp.html

Although much as been accomplished to mitigate the wildfire-urban interface zone problem in our area, the potential for another devastating fire is very real. The *Greater Bend Community Wildfire Protection Plan* is in its infancy and the real work has just been started. As long as we continue to expand our presence into the surrounding forest areas this problem will continue to multiply and create hazardous conditions. Maintaining a high awareness level for this problem may be one of the toughest challenges: when we go a few years without a major fire, the public's attention and awareness dissipates and complacency may occur.

Transportation Networks

Major Thoroughfares: The City of Bend Fire Department has two major state highways within its response area. Hwy 97 runs North and South through the entire city and fire district; Hwy 97 North towards the City of Redmond, Hwy 97 South towards LaPine/Sunriver and Hwy 20 West towards Sisters, Hwy 20 East towards Burns. The Bend Parkway, running through the middle of Bend and Business 97/3rd street is the portion of Hwy 97 that runs through the center of Bend.

Airport: The Bend Airport is the primary local airport and is home to aircraft charter companies, aircraft manufacturing companies, aircraft schools, public and privately owned aircraft, and AirLink Critical Care Transport. The airport has been growing steadily with the increased population base of the area and expanding businesses. Although private commuter jets utilize this runway, no public jet service is available in Bend. The regional commercial airport is located in Redmond at Roberts Airfield.

Waterways: There are several water hazards within the City of Bend's response area. Due to these areas, there is a need for properly trained personnel in areas of Water and Rope Rescue. Crews are called out more frequently to rescue people in the summer months when the attraction of the cooling river through Bend lulls people to relax their awareness and attention to the hazards.

The Deschutes River runs through the entire city and fire district from the SW corner to the NE corner. Along the river there are several areas of rapids, areas of difficult accessibility due to canyons or housing along the river, spillways, and increased use during summer time. The public has quickly become familiar with the attributes of floating the Deschutes River on our hot summer days. Fatalities have occurred, as well as multiple rescues on what appears to be a placid and harmless section of the river. Of particular concern is the spillway at the Colorado Ave. dam where the river backs up and spills over a very precarious and rocky drop.

There are several irrigation canal systems that run through the city and rural district for agricultural water distribution. These canals pose different seasonal threats. During the summer they are similar to risks associated to the river. During the winter or any other time that they do not have water in them, they

pose a risk more similar to low or high angle rescue risks. Canals also create access issues similar to bridges due to limited options for routing.

Shevlin Pond, as an example, located in Shevlin Park and adjacent to Aspen Hall, as well as many ponds throughout the district and ASA, become a more substantial hazard in the winter when it freezes over and can cause dangerous ice situations.

All of the rivers and canals create delays and/or hazards to responses because of limited access and bridges to cross these water sources. In some cases the bridges are not constructed well enough to allow apparatus to cross, due to weight restrictions. This is more common in the rural areas where old private bridges exist.

Rail Lines: The Union Pacific and Burlington Northern/Santa Fe rail line run through the city and fire district. The rail winds its way through the entire fire district and city from north to south via the center of the city. This causes several hazards; the trains carry many types of hazardous materials, these rail lines cause response difficulties going east to west with a very limited number of controlled intersection crossings and very few overpasses, there is a large rail yard in the center of the city, and there are many overpasses for these lines. The primary fuel depots for Bend are located very close to downtown Bend on NE 1st Street, adjacent to the rail line. Additionally, as rail line traffic becomes busier, the percentage of time that intersections are blocked increases, slowing emergency vehicle response.

Other Transportation Risks: There are several other issues that relate to transportation within the City of Bend Fire & Rescue response area.

Street issues: Our most unique risk in the district is the recent creation of many roundabouts (with possibly more coming) that cause fire apparatus response difficulties. These traffic devices are designed to allow a more fluid movement of normal traffic than conventional methods (i.e. 4 way stop). However, due to their design with single lane divided approaches, if the device reaches its failure point there is no place for traffic to yield, the intersection can become gridlocked. If the device becomes partially or completely obstructed the ability of traffic to yield or pull over is minimal thereby preventing our apparatus from bypassing the traffic until the roundabout empties. Emergency apparatus are permitted to enter opposing lanes of traffic when we enter traditional intersections, thereby avoiding any backed up traffic at the intersection. This is not possible in a roundabout; it can prevent drivers from exiting and clearing the roundabout to permit our apparatus to proceed. Roundabouts are successfully used in many countries and in cities in the US. However, they are usually notably larger and often times have multiple lanes, thereby allowing more traffic to proceed and giving better access and egress for larger fire apparatus.

The other issue with roundabouts is when they are only somewhat congested by traffic, it is still difficult for our large apparatus - engines or the ladder truck - to navigate quickly and safely. We have documented a variable amount of seconds delay for each roundabout in the response route of our apparatus to fire and EMS incidents. The number of seconds of delay is dependent upon which "leg" or exit of the roundabout the apparatus is utilizing. We have documented 3 seconds for the first exit, 5 sec. for the second exit, and 7 seconds for the third exit. If there is a divided section of street leading into the roundabout, the apparatus responding may have to go completely around the roundabout and exit the same "leg" it entered to gain access to streets that are blocked for left hand turns due to the divided portion. An example of this problem is the Reed Market/Bond Street roundabout. On the east side of this roundabout there is a long section of divided street. If one of our apparatus is responding from the east they must bypass the street, go around the roundabout, and then return up Reed Market to make a right hand turn on the street they were responding to. This may sound like a small increment of time but when linked together with multiple roundabouts, the time element becomes significant to both patient care and stopping fires. With probability of more roundabouts planned for the future in all parts of the City, this problem will increase unless changes can be made to their design elements. Discussion and cooperation is and has occurred to minimize these negative impacts to traffic control devices.

It is understood new street designs and traffic control engineering is designed for normal traffic flow and not specifically for emergency vehicles.

Boulevards: A recent trend to create more boulevards (center lane obstruction) has created access problems for emergency apparatus. As previously stated, when responding apparatus must bypass the left hand turn, which is blocked by the center lane obstruction, it increases response time and emergency apparatus exposure in residential areas. Areas of reduced curb height and rounded curbs have been installed on boulevard dividers to allow emergency apparatus to safely negotiate a crossing if necessary.

Bend is certainly not unique to these traffic control devices, except perhaps for the small diameter roundabouts, and it is important the public be made aware that there are negative aspects of these devices and they do increase response times incrementally and delays in response are not a result of poor emergency service response, but rather a function of traffic control device implementation.

Historical Lack of Through Streets: There is a lack of through streets, especially those going east and west most commonly obstructed by the Bend Parkway and the railroad. Although the Bend Parkway allows better travel north and south, it is limited by the number of places it can be accessed, exited, and crossed over or under. In the areas where streets are steep there tends to be less through streets.

Narrow Streets: In an effort to make roadways safer in residential areas and to more efficiently utilize land, developers and the City have implemented narrower street designs with traffic calming devices inserted to decrease the speed of traffic. The Fire Department has actively sought to control the decrease in street widths which adversely affects the ability to perform emergency scene operations. Most notably, our trucks are full width 8' vehicles and require nearly twice that width to deploy equipment from compartments, ladders, and allow personnel to work safely around the apparatus. With the narrower street widths and on street parking, this reduces the working space for our emergency operations. Additionally, residential intersections now routinely have expanded "elephant ear" crossings which create very narrow turning radiuses – a significant problem for large fire apparatus.

Traffic Calming Devices: These devices have been installed in many parts of our community and include the following: speed bumps, speed tables, intersection "pork chops", rumble strips, traffic circles, etc. They are all designed to slow vehicle speed and successfully accomplish that goal, however, they also slow emergency vehicle response times at the same time.

Single Lane Roads With Multiple Driveways: When insufficient space or geographical features for normal streets and driveways do not exist, some developers have received variances to permit a single lane narrow street. Off this single lane street, accesses to multiple driveways are created to single family residences. Fire apparatus operations are extremely restricted in these developments, and turning apparatus around is difficult and sometimes not possible.

Clustered Multifamily Residences: Looking for more efficient use of land, some developments have clustered attached single family residences. These developments have one driveway and very limited access, with walkways to the individual units. These unique developments create significant challenges to fire operations and can increase chances of extended fires due to restricted access.

Congested Intersections: As Bend's growth increased, the street infrastructure has not kept pace with the increased traffic. Anyone driving across town has experienced intersections that have exceeded their original design capacities.

Subdivisions With Limited Access/Egress: As more subdivisions were created, the number of through streets decreased. Developers often created one street access to subdivisions. This design focused the amount of traffic to the only existing feeder arterials in the area. This problem compounds as the number of new arterials does not increase and expansion/improvement of current streets is slow. More recently, this problem has decreased with recognition of the congestion that is created by concentration of traffic to

single intersections accessing subdivisions, and developers have been required to create more through streets.

Traffic Flow Modifications to Highways & Arterials: As Bend grows and businesses increase along the major highways, traffic increases to the point where major modifications are necessary to allow traffic flow. When these modifications occur, they can significantly impede emergency vehicle passage and egress. This condition is occuring on the north end of Bend between the Highway 97 and Highway 20 "Y" and the next intersection north at Cooley (the primary access to the Juniper Ridge development). Various proposals are being considered to alleviate the traffic congestion. BF&R's north station (305) is currently located off Highway 20 West, with access to the Parkway and the major growth in north Bend. It is imperative that any changes made by ODOT and the City of Bend take into consideration the impacts to our emergency vehicle access and routing. The huge increase in traffic and control devices have already changed our response profiles to areas north of Bend and response times are now documented slower. This is a potentially significant issue and may slow our response times to the point that Station 305 might no longer be effectively located and could require relocation.

One of the modifications being considered is a physical center lane divider from Cooley Road north to Deschutes Junction. The resultant inability of our crews to respond to the south bound lane of Hwy 97 would require us to go all the way to Deschutes Junction, go over the overpass and drive back south to any traffic accidents or fires accessed from the south bound lane. Of course, the elimination of head-on and other collisions as a result of construction of a center lane divider is desirable and appropriate. This single change could create significant delays in response time and in the future, it may become necessary to locate another station at the north end of the fire district near Deschutes Junction, in an otherwise rural area with low population density.

Juniper Ridge development, with the planned industrial and community infrastructure, may eventually create the need for another station. Current plans for the development are to include a site for a fire station and an urban renewal district may be used for the construction costs. Large planned developments such as Juniper Ridge have significant impacts to emergency services and it is incumbent to plan appropriately for the growth.

Weather Issues: The City of Bend sits at approximately 3628 feet of elevation, just east of the Cascade Mountain range. This typically produces some severe winter conditions. During a typical winter temperatures tend to stay low and snow accumulations can be inches to feet. This causes many difficulties for our winter responses. In the steep areas it makes responses difficult to navigate, chains are frequently needed, which slows response times, and the low temperatures can cause many road hazards as well as freezing of equipment.

Because of the normally low precipitation rates in the Bend area, storm water drainage systems have not been built city-wide. Those that are in existence have limited capabilities and are easily inundated during heavy rains. Improvements have been made to the areas that normally flood. Some of the primary traffic routes cease to function in the underpasses several times a year. Even the most recently constructed subdivisions and roads cannot always handle the heavy rainfall that occurs periodically each year. During these times of localized flooding traffic routing for emergency apparatus can become a problem.

Recent implementation of the Stormwater Utility Fee is providing funding for improvements to mitigate the localized flooding problem.

Figure 12: SW Chandler Avenue Storm Drainage Flood

DEMAND/PROBABILITY

As seen in the chart below, BF&R's call volume has steadily increased as our population grew, in fact 2005 volume took a nearly 16% increase. Although 2007 and 2008 have seen a slowing in demand, the overall workload remains significantly high. If history is an accurate predictor of future trends we may see another growth in responses as seen in 2004, after a couple of years of slower or decreased growth.

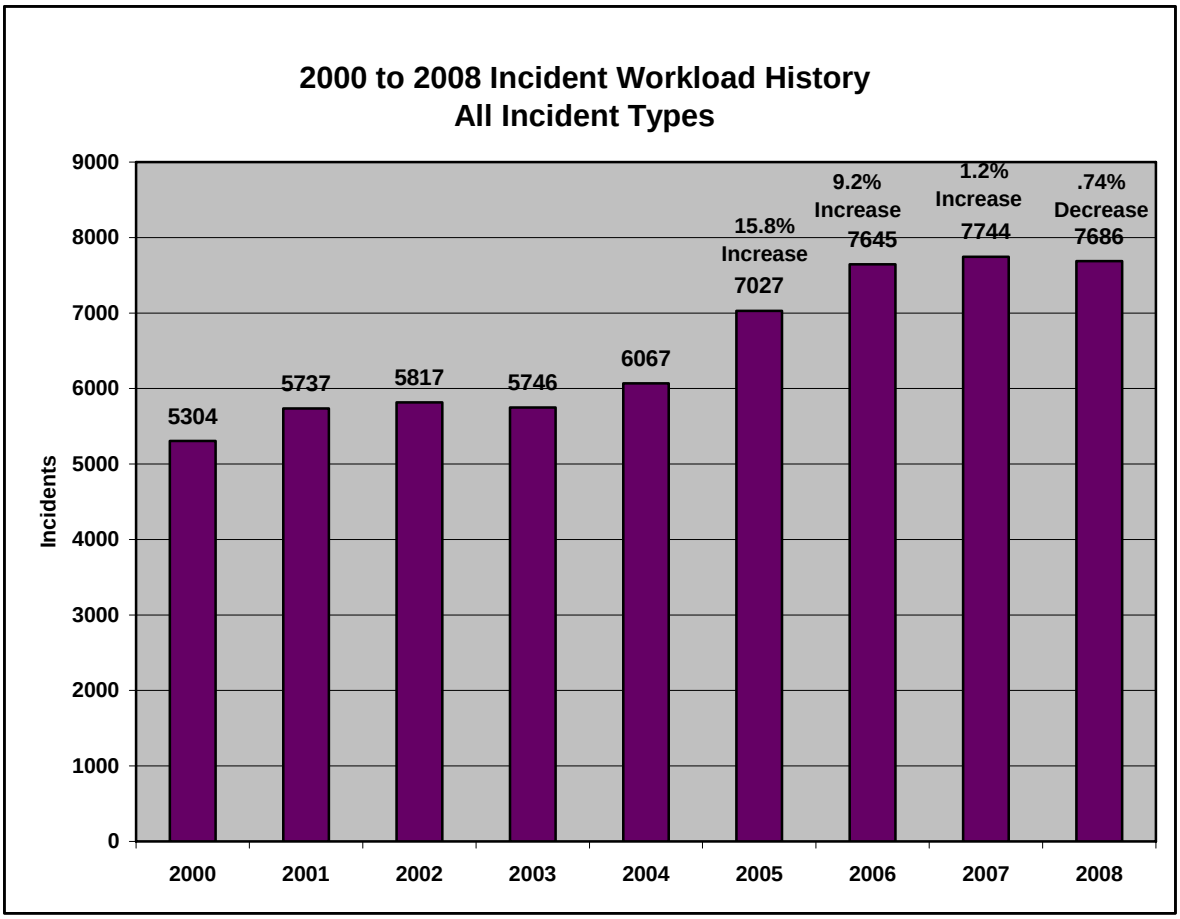


Figure 13: All Incident Workload History

In 2008 BF&R's daily average number of calls for service exceeded 21 calls per day, as seen in the summary table below.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Calls	5304	5737	5817	5748	6067	7027	7645	7753	7686
Daily Avg.	14.5	15.7	15.9	15.7	16.6	19.2	20.9	21.2	21.1

Figure 14: Historical Daily Response Average

Frequency of All Calls For Service: The probability of any type of emergency event is arrived at by looking at ***demand*** first. Demand is the total volume of all incidents, and the probability, in this analysis, equates to what ***type*** of incident will likely occur, the ***frequency*** and at what ***time*** of day the incident occurred. This is arrived at through a retrospective analysis of response data, aggregated through Deschutes County CAD system and historically downloaded to the City of Bend's HTE records system and implemented in September of 2005 the ***24/7*** fire records system.

Analyzing of call types and frequencies is conducted to assess the probability of a particular event occurring. All calls for services over the last several calendar years are evaluated based on the National Fire Protection classifications with

four main categories: Fires – NFPA classification 1, EMS - NFPA classification 3, Hazardous Materials incidents – NFPA classification 4, and all other incidents – NFPA classifications 2, 5, 6, 7, 8, and 9.

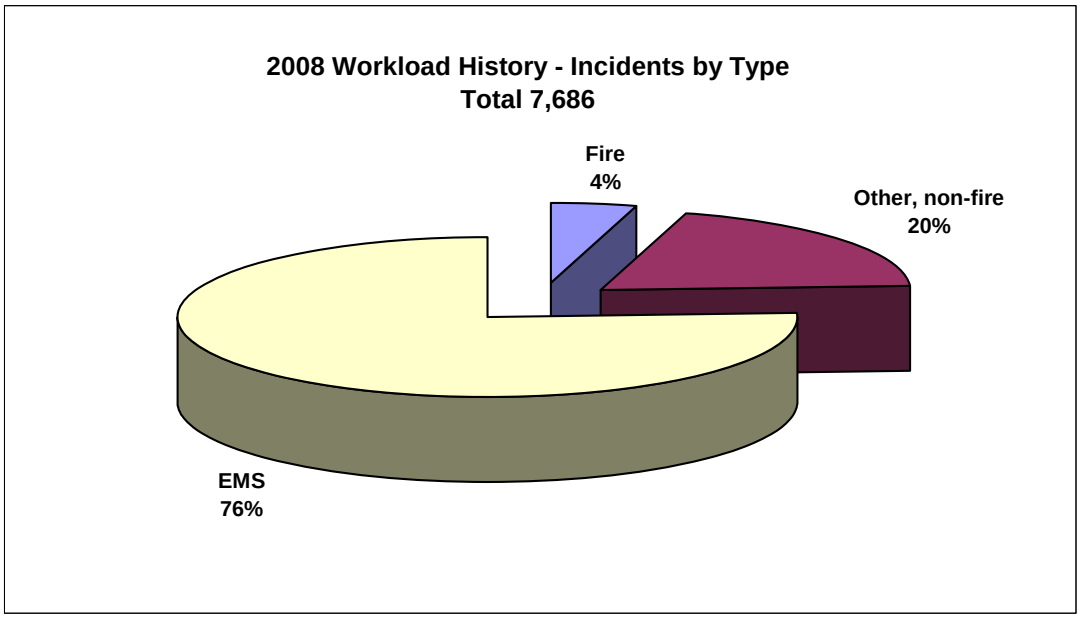
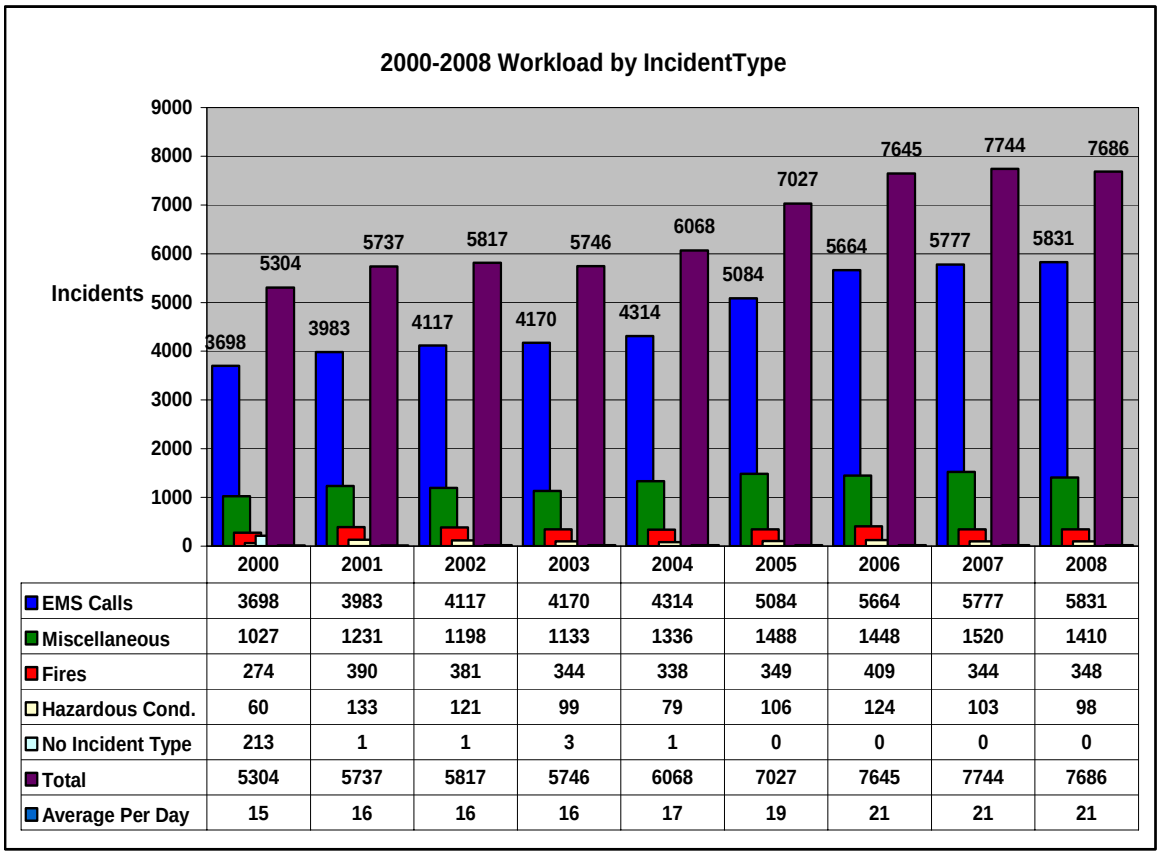


Figure 15: 2008 Incidents by Major Type



	2000	2001	2002	2003	2004	2005	2006	2007	2008
EMS Calls	3698	3983	4117	4170	4314	5084	5664	5777	5831
Miscellaneous	1027	1231	1198	1133	1336	1488	1448	1520	1410
Fires	274	390	381	344	338	349	409	344	348
Hazardous Cond.	60	133	121	99	79	106	124	103	98
No Incident Type	213	1	1	3	1	0	0	0	0
Total	5304	5737	5817	5746	6068	7027	7645	7744	7686
Average Per Day	15	16	16	16	17	19	21	21	21

Figure 16: 2000 - 2008 Incident Type History

Additionally, we evaluated when (by hour of the day) the incidents were occurring, based on the NFPA classifications. By doing this, we can establish if there is a need to concentrate resources to match the peaks of types of incidents. In the next section we discuss the four main NFPA classifications and chart the time of day when incidents occur.

The first chart is for **all responses** and illustrates the volume of responses increasing during the entire 24 hour day, with density of responses remaining at a higher level during the peak daily hours from approximately 0900hrs to 2000hrs. Historically, these peak daily hours have been shorter, but now they occur for a greater duration of time: the curve is flattening as our responses increase.

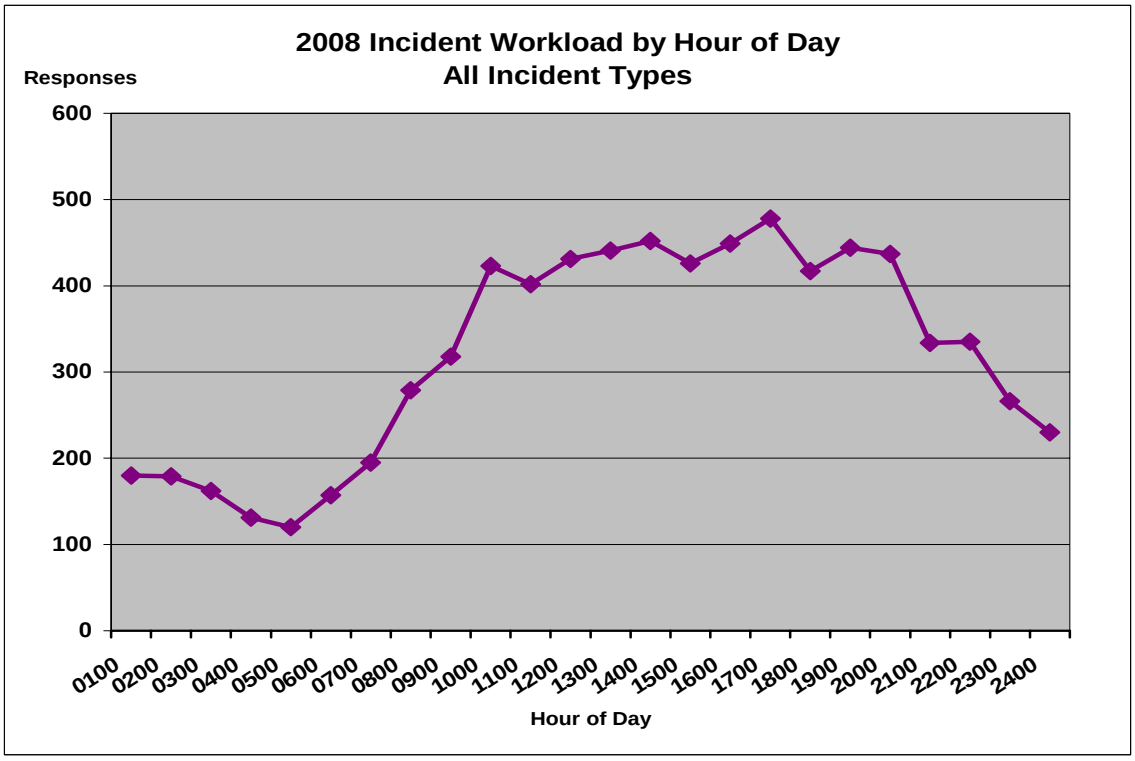


Figure 17: 2008 Incident Workload by Hour of Day

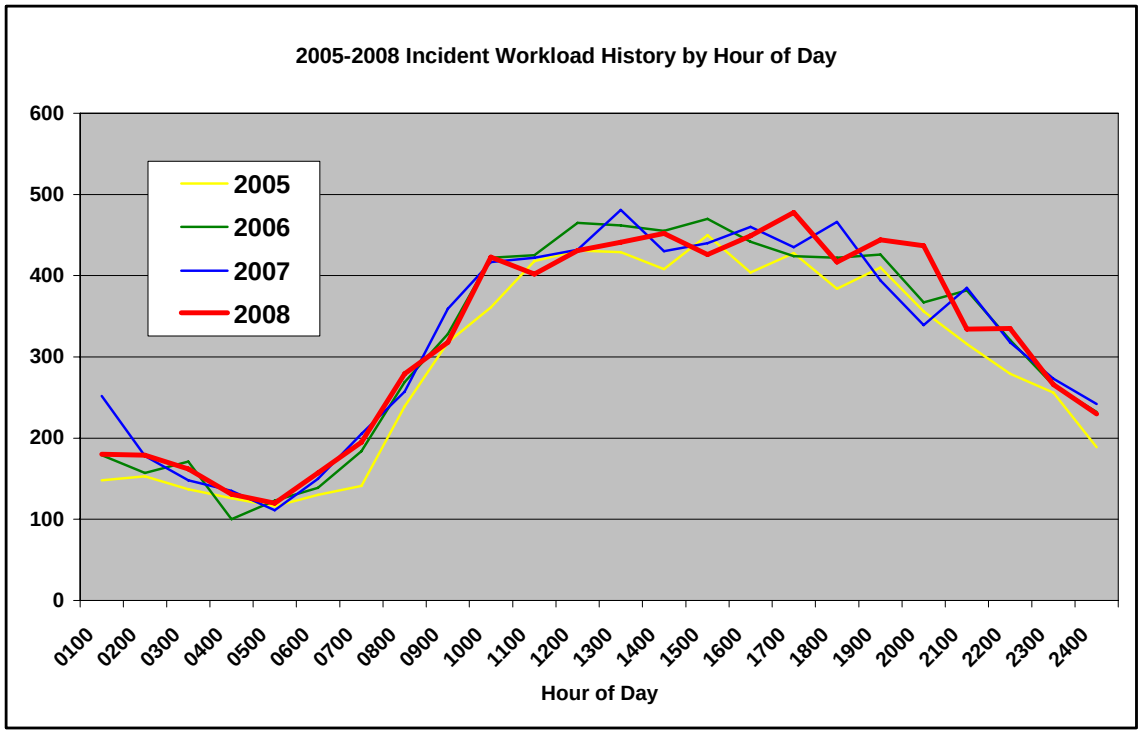
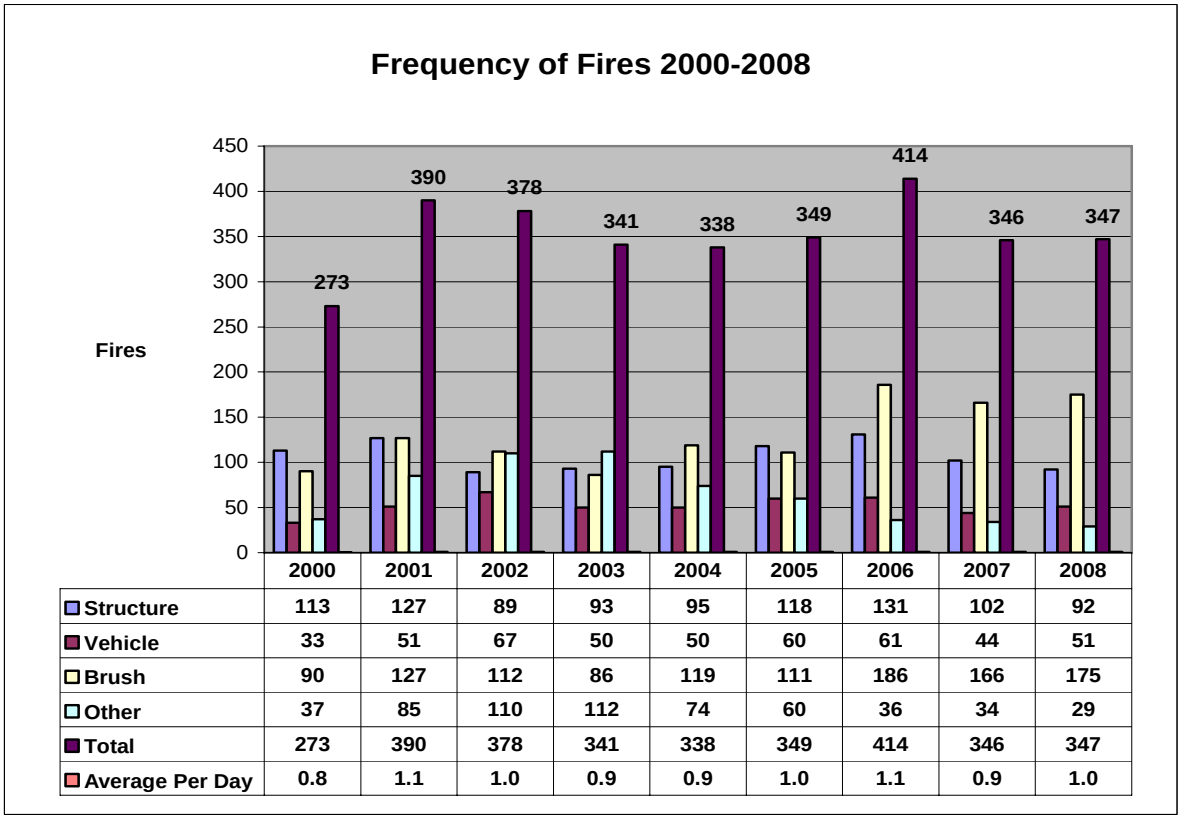


Figure 18: 2005 - 2008 Historical Workload by Hour of Day

NFPA CLASSIFICATION 1 – FIRES



	2000	2001	2002	2003	2004	2005	2006	2007	2008
Structure	113	127	89	93	95	118	131	102	92
Vehicle	33	51	67	50	50	60	61	44	51
Brush	90	127	112	86	119	111	186	166	175
Other	37	85	110	112	74	60	36	34	29
Total	273	390	378	341	338	349	414	346	347
Average Per Day	0.8	1.1	1.0	0.9	0.9	1.0	1.1	0.9	1.0

Figure 19: Historical Frequency of Fires 2000 – 2008

Structure fire numbers have remained fairly consistent over the years and given our population growth this is quite an accomplishment. This is, at least in part, the consequence of newer structures in our area and the accompanying improved construction requirements and standards. Active public education and programs that encourage awareness also contribute significantly to reducing fires.

Brush fires took a significant jump in 2006 but the past couple of years have not seen severe fire seasons and the numbers have remained consistent. Public awareness has increased, and the Fire Free Program is certainly partially responsible for this.

The "other fire" category has significantly decreased and this is most likely the result of increased open fire regulations and decreased time periods for open burning in both the City and DCRFPD #2. With recent implementation of a complete open fire ban within the City this will most probably reduce these numbers further. It is also possible that the classification of fire types may have been changing and further analysis is necessary to make a determination. It is also possible the "service calls" category will temporarily increase as a result of more responses for illegal open burning inside the city limits.

The total number of all fires has remained fairly consistent for several years and hopefully we will not see a change.

ICMA Comparison – Total Residential Structure Fire Incidents

	No. of Res. Structure Fires	Fires per 1,000 pop.
BF&R service pop. 102,500	63	0.62
Jurisdictions > 100,000		
Mean	327	0.89
Median	172	0.77
Jurisdictions < 100,000		
Mean	50	1.05
Median	37	0.81

Figure 20: ICMA Comparison - Structure Fires

ICMA Comparison – Nonstructure Fire Incidents per 1,000 Population Served

BF&R service pop. 102,500	2.55
Jurisdictions > 100,000	
Mean	2.61
Median	2.13
Jurisdictions < 100,000	
Mean	2.91
Median	2.33

Figure 21: ICMA Comparison - Nonstructure Fires

ICMA Comparison – Total Fire Incidents per 1,000 Population Served

BF&R service pop. 102,500	3.5
Jurisdictions > 100,000	
Mean	3.7
Median	3.2
Jurisdictions < 100,000	
Mean	4.2
Median	3.3

Figure 22: ICMA Comparison - Total Fire Incidents

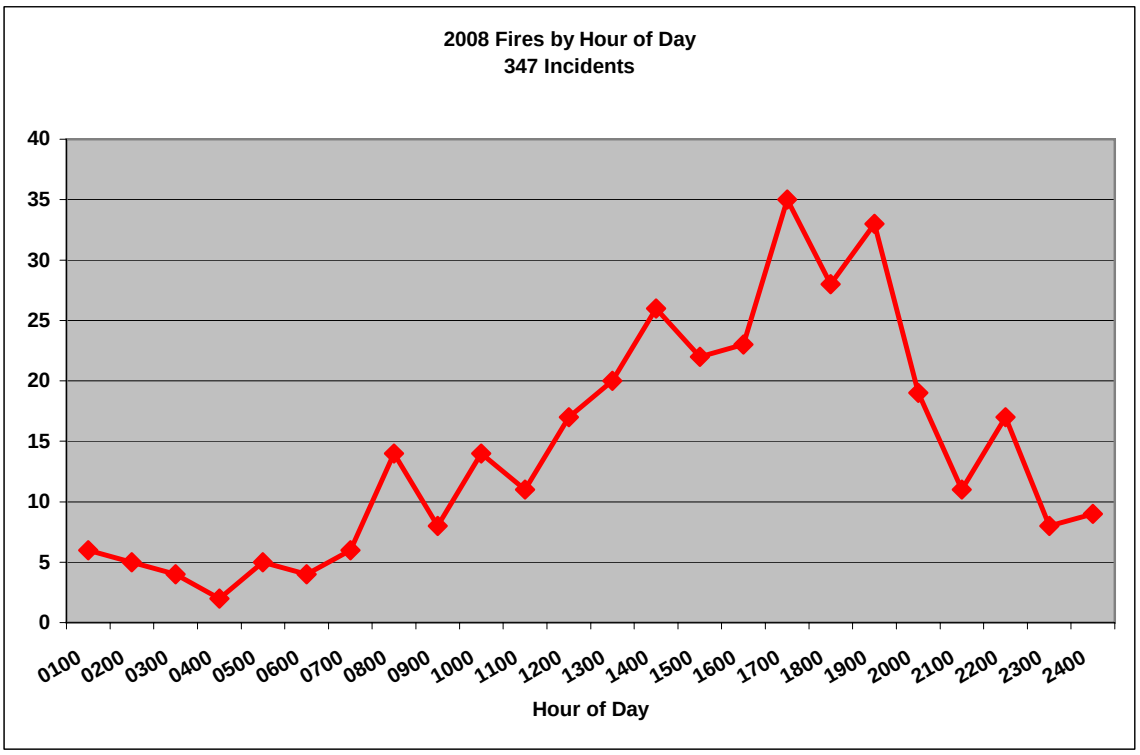


Figure 23: 2008 Fires by Hour of Day

During 2008 structure, vehicle, and brush fires primarily occurred during the day with peak activity in the late afternoon. Few brush fires occur during the middle of the night, but many significant and high value structure fires occur during the early morning hours when people are asleep and fires can grow undetected.

NFPA CLASSIFICATION 3 - Emergency Medical Service (EMS)

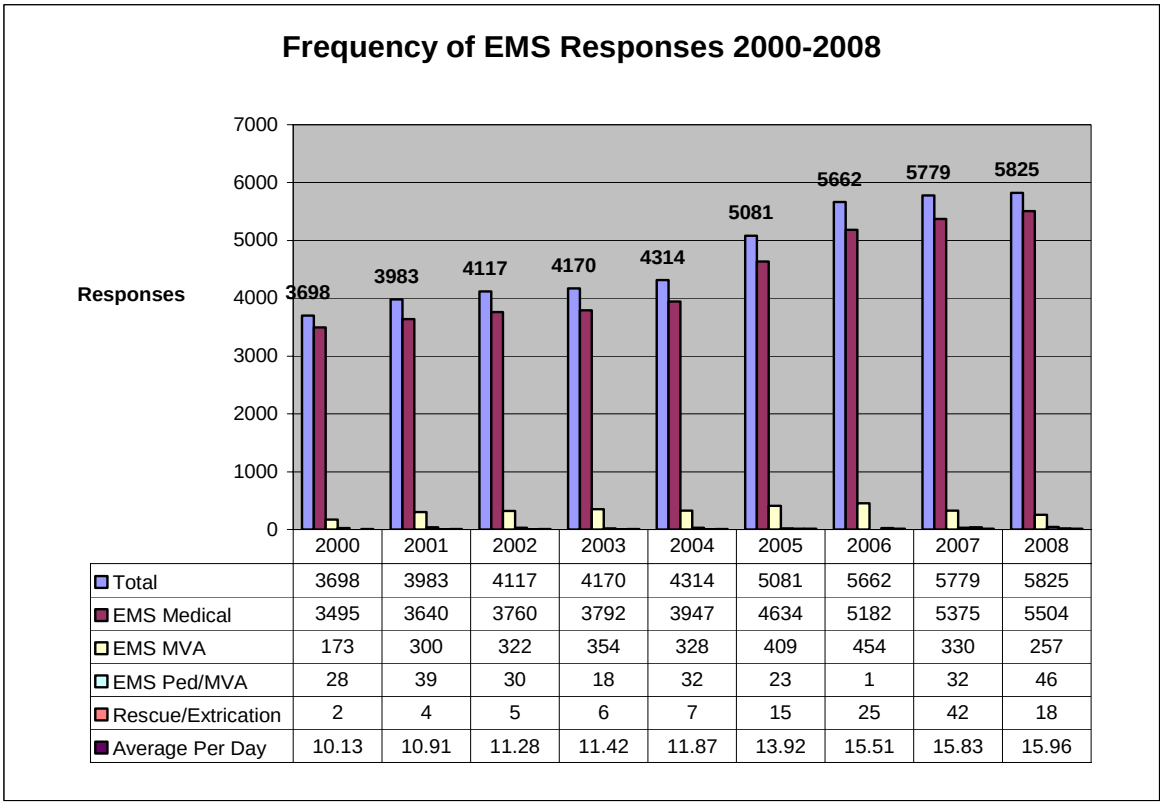
Calls for emergency medical service continue to be our largest percentage of response volume. 76% of our total call volume is EMS related: this percentage has remained fairly constant over the years. We have been able to make some general demographic conclusions from our available data with respect to the large volume of EMS responses.

- As Bend's population increased so have our responses. There is a direct correlation with population and call volume.
- Population base of retirees has increased with call volume directly related to the age of patient: the older you are the more medical problems you have.
- The number of facilities for seniors has increased dramatically in Bend over the last 5 years. Assisted living retirement facilities generate more EMS responses. Our in-house study of all facilities for the aged concluded the following:
  - Non-assisted retirement centers generate approximately 1 call per year for every 2 residents.
  - Assisted care retirement centers generate 1 call per year for every resident.
  - Nursing care centers and other medical care facilities generate 2 to 3 calls per year for every patient.

- The total of calls to facilities for the aged amounts to 20% of our current EMS response volume. This percentage will increase as these facilities multiply and the baby boomers take up residence.
- An additional 6% call volume results from primary responses to health care facilities for a total of 26% of total EMS responses.

- As our health system encounters more problems with a rising percentage of people losing health insurance due to high cost, EMS services provided to the public become the new easily accessed gateway to medical care. The primary provider of EMS Services in Bend and DCRFPD #2 is Bend Fire & Rescue. When acquiring medical assistance is as simple as dialing 911, many citizens will utilize this option as their first access to medical care.
- With reduction of Medicare reimbursements becoming more frequent this has had an adverse effect on revenue for the ambulance service.

The frequency and time of EMS responses is illustrated in the following charts:



	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	3698	3983	4117	4170	4314	5081	5662	5779	5825
EMS Medical	3495	3640	3760	3792	3947	4634	5182	5375	5504
EMS MVA	173	300	322	354	328	409	454	330	257
EMS Ped/MVA	28	39	30	18	32	23	1	32	46
Rescue/Extrication	2	4	5	6	7	15	25	42	18
Average Per Day	10.13	10.91	11.28	11.42	11.87	13.92	15.51	15.83	15.96

Figure 24: Historical Frequency of EMS Responses 2000 – 2008

ICMA Comp. – Total Nonfire Incidents per 1,000 Pop. Jurisdictions Providing EMS

BF&R service pop. 102,500	77
Jurisdictions > 100,000	
Mean	78
Median	75
Jurisdictions < 100,000	
Mean	87
Median	94

Figure 25: ICMA Comparison - Nonfire Incidents

ICMA Comp. – EMS Responses per 1,000 Population Served: Total, BLS, ALS

	BLS	ALS	Total EMS
BF&R service pop. 102,500	25.7	31.4	57.1
Jurisdictions > 100,000			
Mean	28.0	44.2	69.1
Median	24.8	42.3	70.9
Jurisdictions < 100,000			
Mean	39.2	55.2	77.8
Median	30.2	52.9	71.7

Figure 26: ICMA Comparison - EMS Incidents

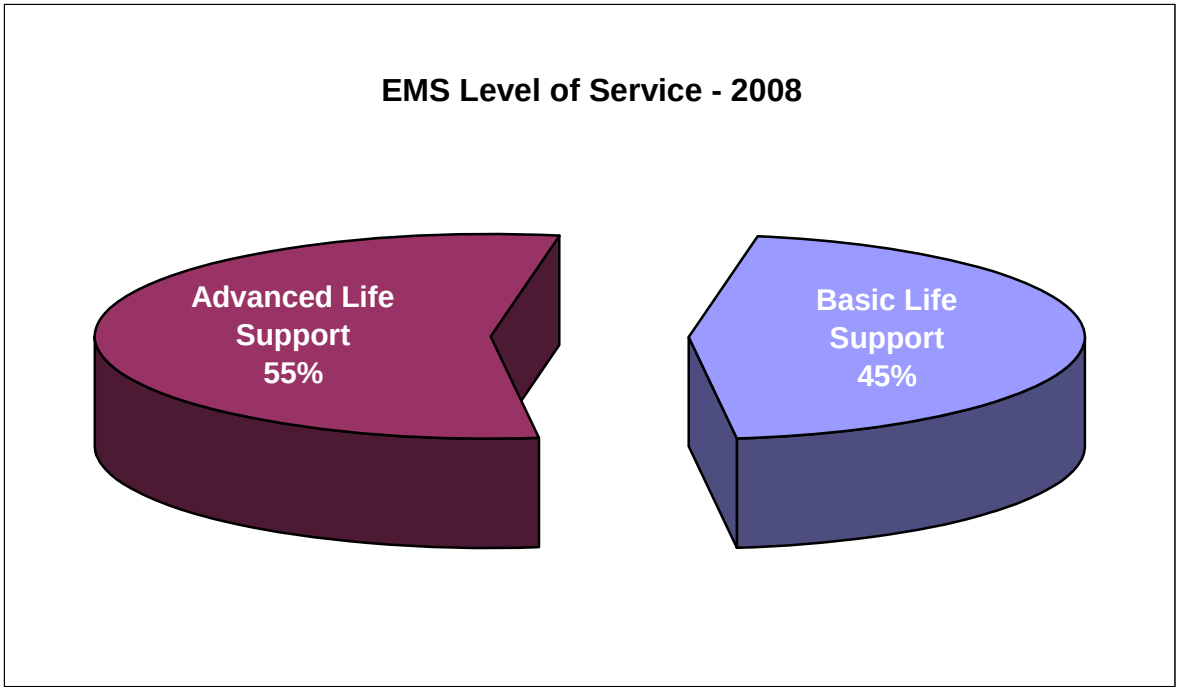


Figure 27: Level of EMS Care - 2008

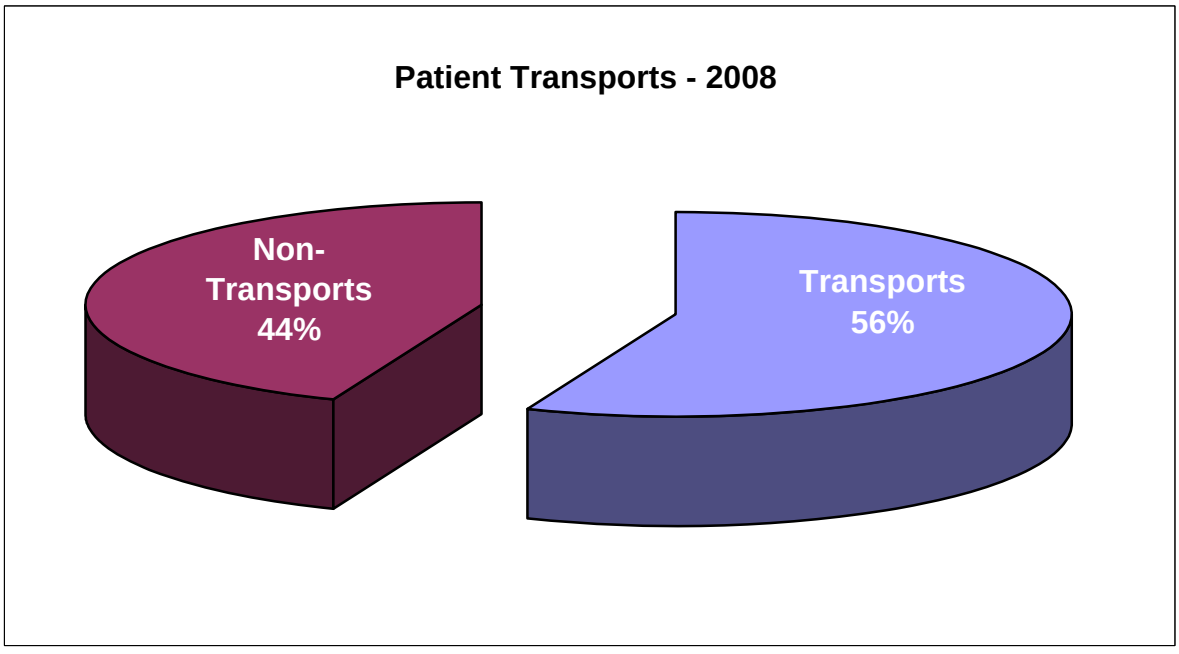


Figure 28: Patients Transported vs. Non-Transported 2008

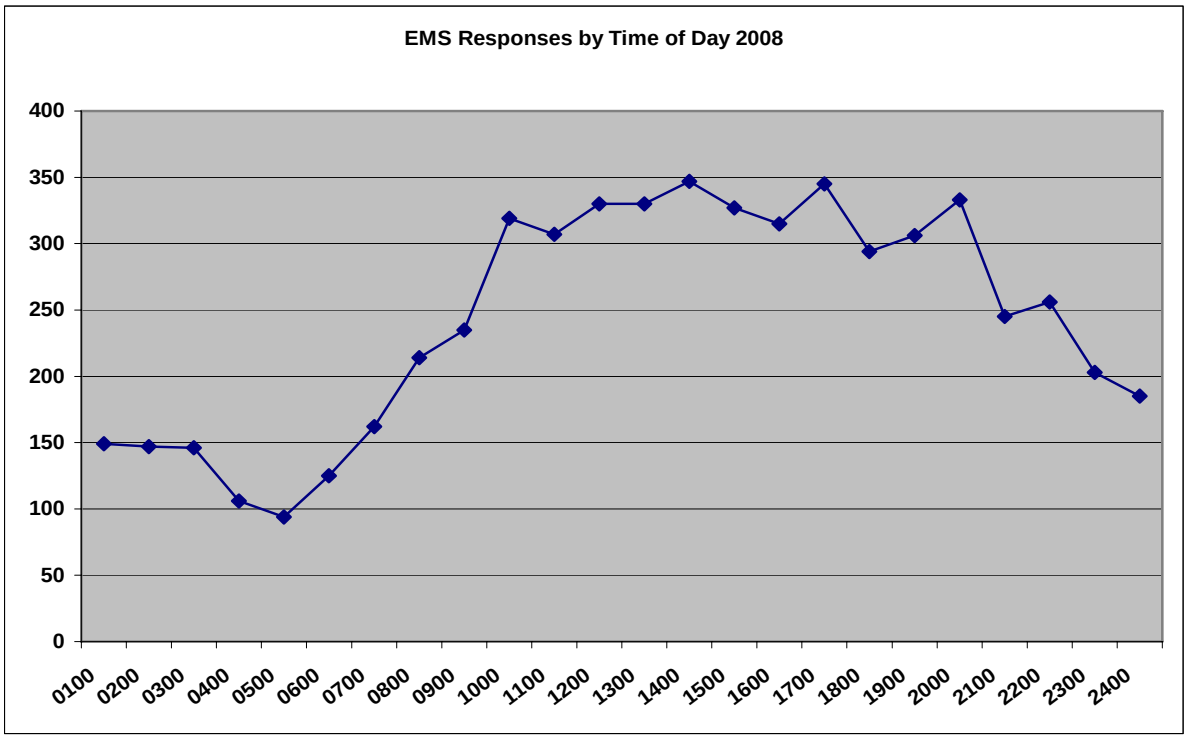


Figure 29: 2008 EMS Responses by Hour of Day

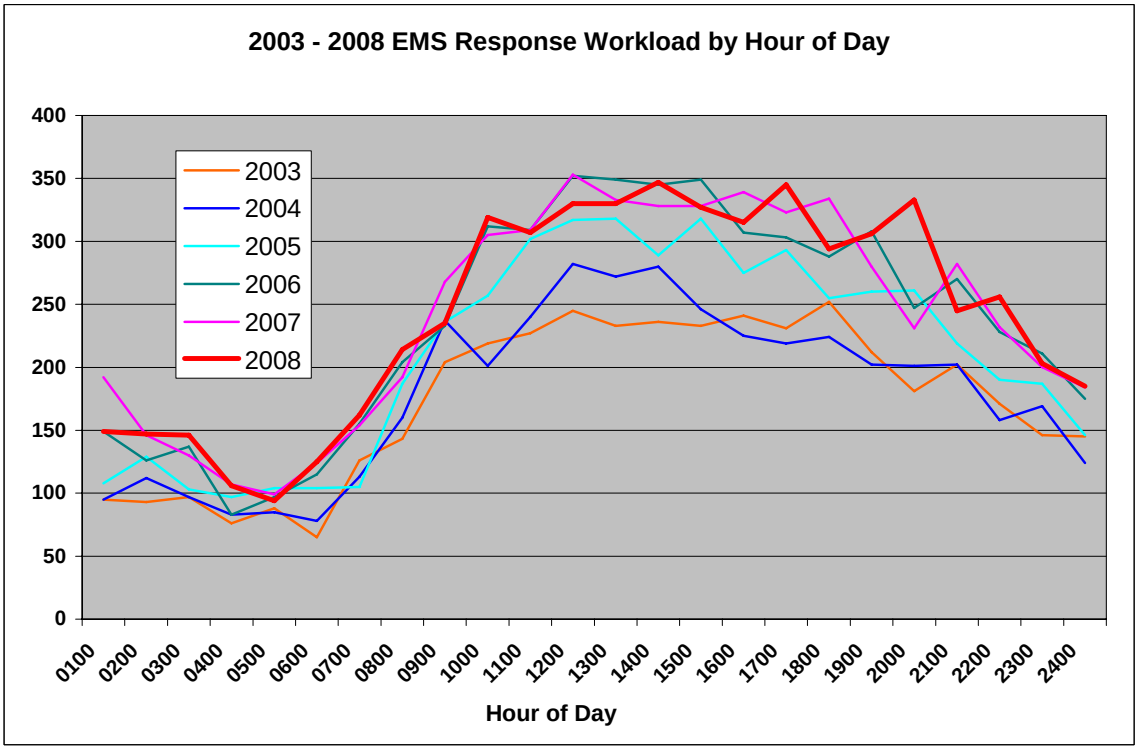


Figure 30: Historical EMS Responses by Hour of Day 2003 - 2008

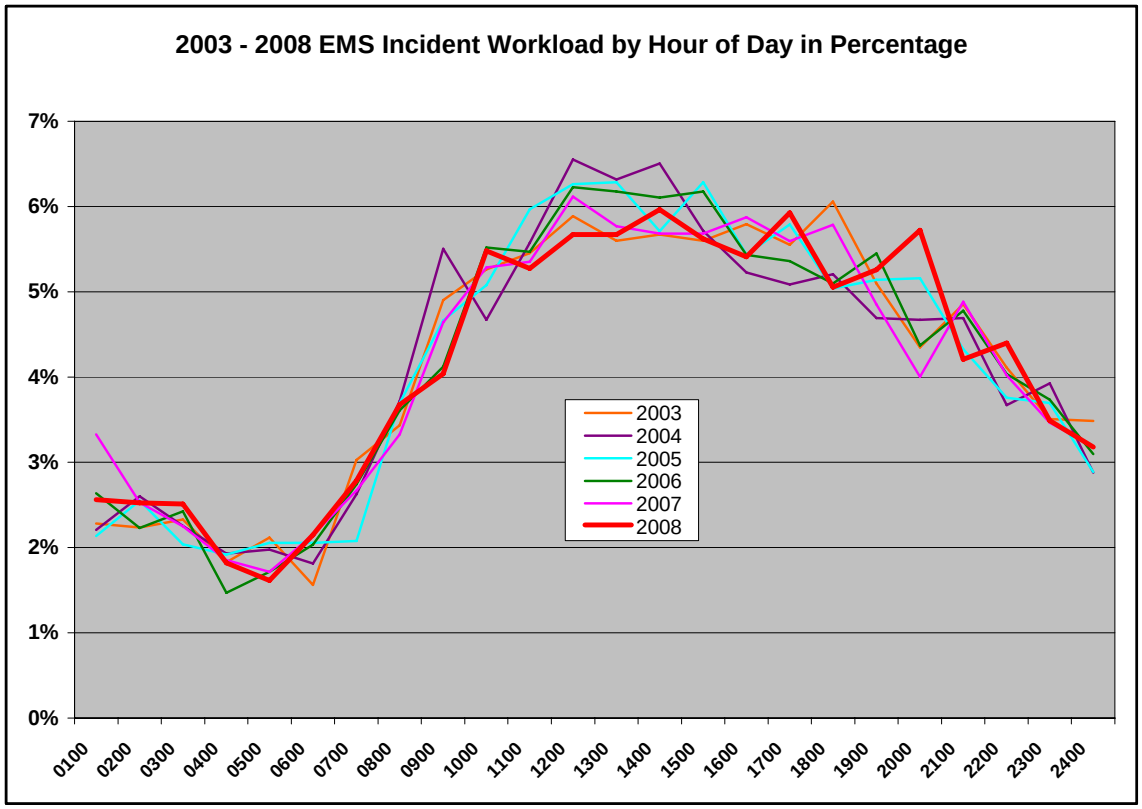


Figure 31: Historical EMS Responses by Hour of Day in Percentage

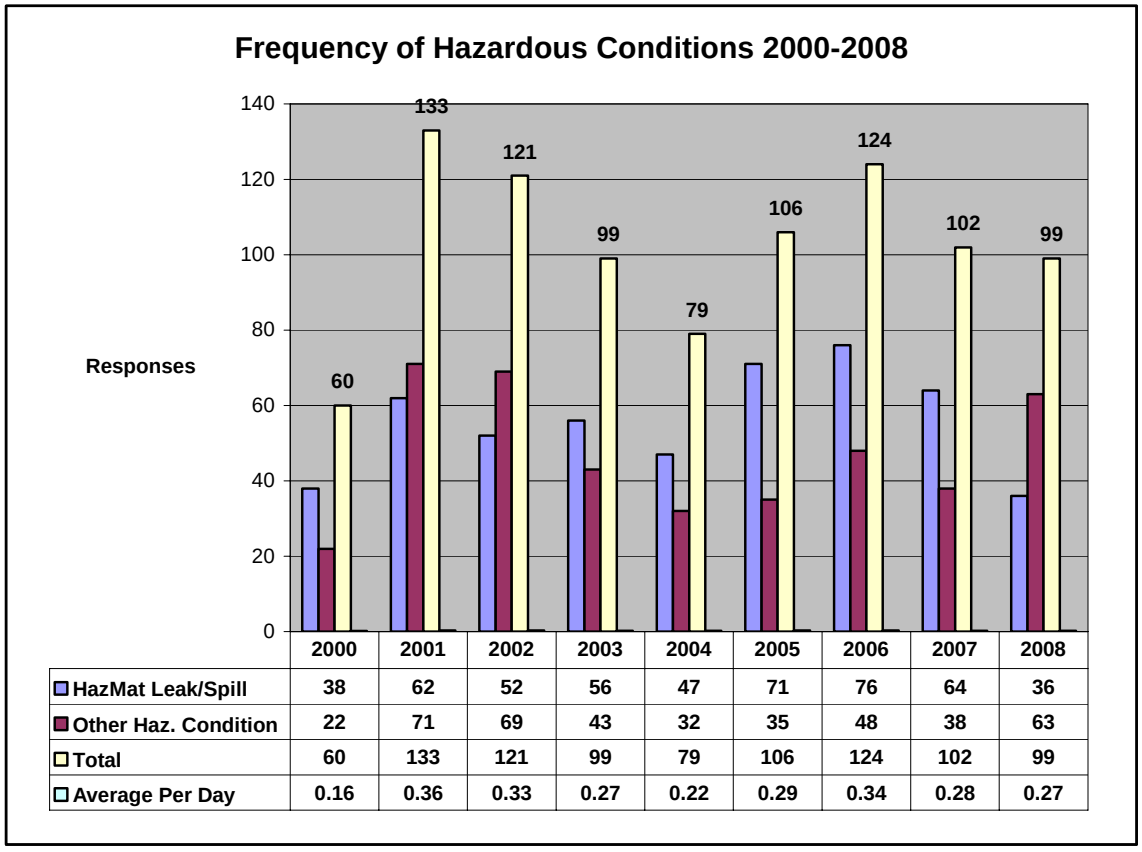
Hazardous Materials & Conditions Responses: As public awareness of the risks involved with hazardous materials increases, it appears that there is better control of them. One of the few areas of responses that had actually been declining until 2005 and 2006 has been those involving hazardous materials. There was a significant increase during those years in leaks and spills; no specific reason can be cited for this, although the increased construction during those years may be a contributing factor, if not an attributable cause. The causes of these incidents vary widely but are primarily gasoline and diesel spills from vehicles, construction-related natural gas line breaks, household chemicals, carbon monoxide, and rarely, industrial/manufacturing problems where regulations and oversight are tightly controlled.

Bend Fire & Rescue personnel are trained to the DPSST **Operations Level,** and the regional Hazardous Materials Team from Salem (previously from Redmond), is dispatched whenever significant quantities or unknown materials are spilled or released.

Also included in this category are other hazardous conditions which include incidents involving electrical related problems, overheated equipment, power lines down, etc.

The chart below illustrates the frequency of calls for this category.

NFPA CLASSIFICATION 4 – Hazardous Materials



	2000	2001	2002	2003	2004	2005	2006	2007	2008
HazMat Leak/Spill	38	62	52	56	47	71	76	64	36
Other Haz. Condition	22	71	69	43	32	35	48	38	63
Total	60	133	121	99	79	106	124	102	99
Average Per Day	0.16	0.36	0.33	0.27	0.22	0.29	0.34	0.28	0.27

Figure 32: Frequency of Hazardous Conditions 2000 – 2008

ICMA Comparison – Hazmat Incidents per 10,000 Population

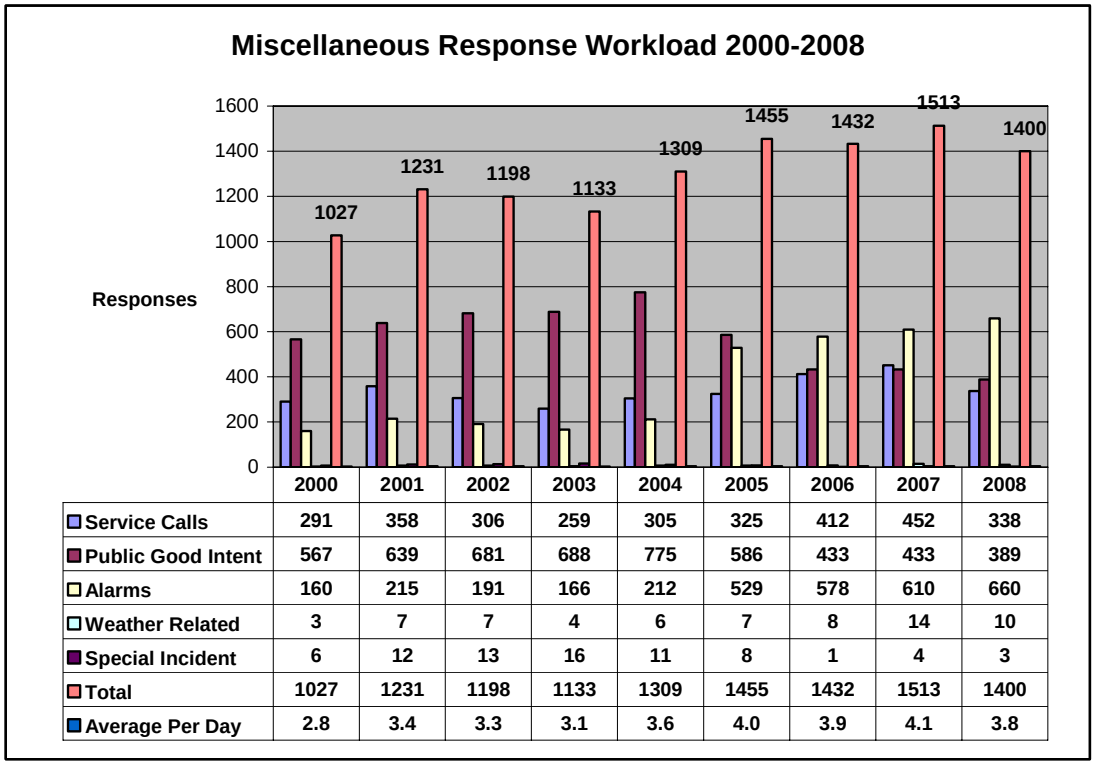
BF&R service pop. 102,500	9.7
Jurisdiction > 100,000	
Mean	9.9
Median	6.5
Jurisdiction < 100,000	
Mean	11.9
Median	6.5

Figure 33: ICMA Comparison - Hazmat Incidents

Miscellaneous Calls for Service: This category of responses encompasses the remainder of incidents and contains a wide variety: it includes calls from residents who are acting as good citizens reporting various types of problems. It also includes such incidents as: odor removal, police assistance, controlled and authorized burning, mistaken alarms, false alarms, system malfunctions, sprinkler system activations, weather related problems, cancelled responses, animal related incidents, and special types of situations.

Miscellaneous call volume has been on a steady increase over the last few years. As we experience the growth we have, more people and a variety of conditions come together to create more incidents.

NFPA CLASSIFICATIONS 2, 5, 6, 7, 8, & 9 – Miscellaneous



	2000	2001	2002	2003	2004	2005	2006	2007	2008
Service Calls	291	358	306	259	305	325	412	452	338
Public Good Intent	567	639	681	688	775	586	433	433	389
Alarms	160	215	191	166	212	529	578	610	660
Weather Related	3	7	7	4	6	7	8	14	10
Special Incident	6	12	13	16	11	8	1	4	3
Total	1027	1231	1198	1133	1309	1455	1432	1513	1400
Average Per Day	2.8	3.4	3.3	3.1	3.6	4.0	3.9	4.1	3.8

Figure 34: Miscellaneous Responses History 2000 – 2008

ICMA Comparison – Mutual Aid Responses per 10,000 Population

BF&R service pop. 102,500	5
Jurisdictions > 100,000	
Mean	32
Median	5
Jurisdictions < 100,000	
Mean	55
Median	16

Figure 35: ICMA Comparison - Mutual Aid Responses

ICMA Comparison – False Alarms by Type per 1,000 Population

	Good Intent	Malicious	Malfunction	Other	Total
BF&R serv. pop. 102,50	3.2	.14	1.5	3.3	8.1
Jurisdictions > 100,000					
Mean	8.2	.6	2.7	4.0	15.8
Median	6.8	.4	2.5	3.4	14.4
Jurisdictions < 100,000					
Mean	8.6	.6	4.2	6.2	19.1
Median	6.5	.4	3.0	4.1	16.6

Figure 36: ICMA Comparison - False Alarms

Another view of **demand/probability** is through the utilization of **Modal Distribution**. This is a look at the total number of calls per day per year and the evaluation of the highest number of calls per day that occur. This shows a trend over a period of years. The chart and following 3-D graph below clearly illustrates that the number of calls per day is trending upward.

Modal Distribution of Reponses - BF&R									
	2008	2007	2006	2005	2004	2003	2002	2001	2000
Calls Per Day	Days Occurred	Days Occurred	Days Occurred	Days Occurred	Days Occurred	Days Occurred	Days Occurred	Days Occurred	Days Occurred
5	0	0	0	0	0	0	1	1	2
6	0	0	0	0	0	0	1	0	4
7	0	0	1	1	2	1	2	1	2
8	0	0	0	3	2	1	2	9	10
9	2	0	0	2	3	5	5	4	10
10	6	2	10	4	3	9	12	13	22
11	2	2	4	6	9	11	13	23	27
12	7	4	3	7	11	9	16	20	36
13	7	9	10	17	12	24	19	26	23
14	13	11	10	16	17	18	27	22	34
15	15	17	13	26	25	29	30	25	27
16	27	22	15	23	30	34	29	37	34
17	21	18	28	47	32	36	29	28	24
18	26	28	26	28	32	31	24	29	25
19	27	17	26	25	30	28	37	26	23
20	30	31	32	24	24	26	25	20	12
21	25	35	23	23	28	23	17	10	14
22	26	26	33	19	18	18	23	12	10
23	25	36	24	18	21	20	13	14	9
24	18	27	21	17	14	15	12	12	5
25	19	20	19	20	17	8	7	4	6
26	11	13	23	16	8	7	5	6	3
27	15	11	12	7	3	2	6	5	2
28	10	7	6	6	6	5	4	6	0
29	6	13	10	3	3	3	2	3	0
30	8	3	4	1	6	0	1	2	0
31	7	3	4	1	0	1	2	3	0
32	4	2	2	2	2	0	0	1	0
33	2	2	1	0	1	0	0	0	1
34	2	0	1	1	1	0	0	1	1
35	1	1	1	0	2	0	0	0	0
36	0	1	0	0	0	0	0	0	0
37	1	1	0	0	1	0	0	0	0
38	1	2	0	0	0	0	0	0	0
39	1	0	0	0	0	0	0	0	0
40	0	0	2	1	1	0	0	0	0
41	0	0	0	0	1	0	0	0	0
42	0	0	0	0	0	0	0	1	0
43	1	0	0	0	0	0	0	0	0
44	0	0	0	1	0	0	0	3	0
45	0	0	0	0	0	1	1	0	0
46	0	1	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0
48	0	0	1	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
TOTAL	365	365	365	365	365	365	365	365	366
Average	21	21	21	19	17	16	16	16	15
*Yellow highlighting indicates highest number of days of responses.									

Figure 37: Modal Distribution of Responses

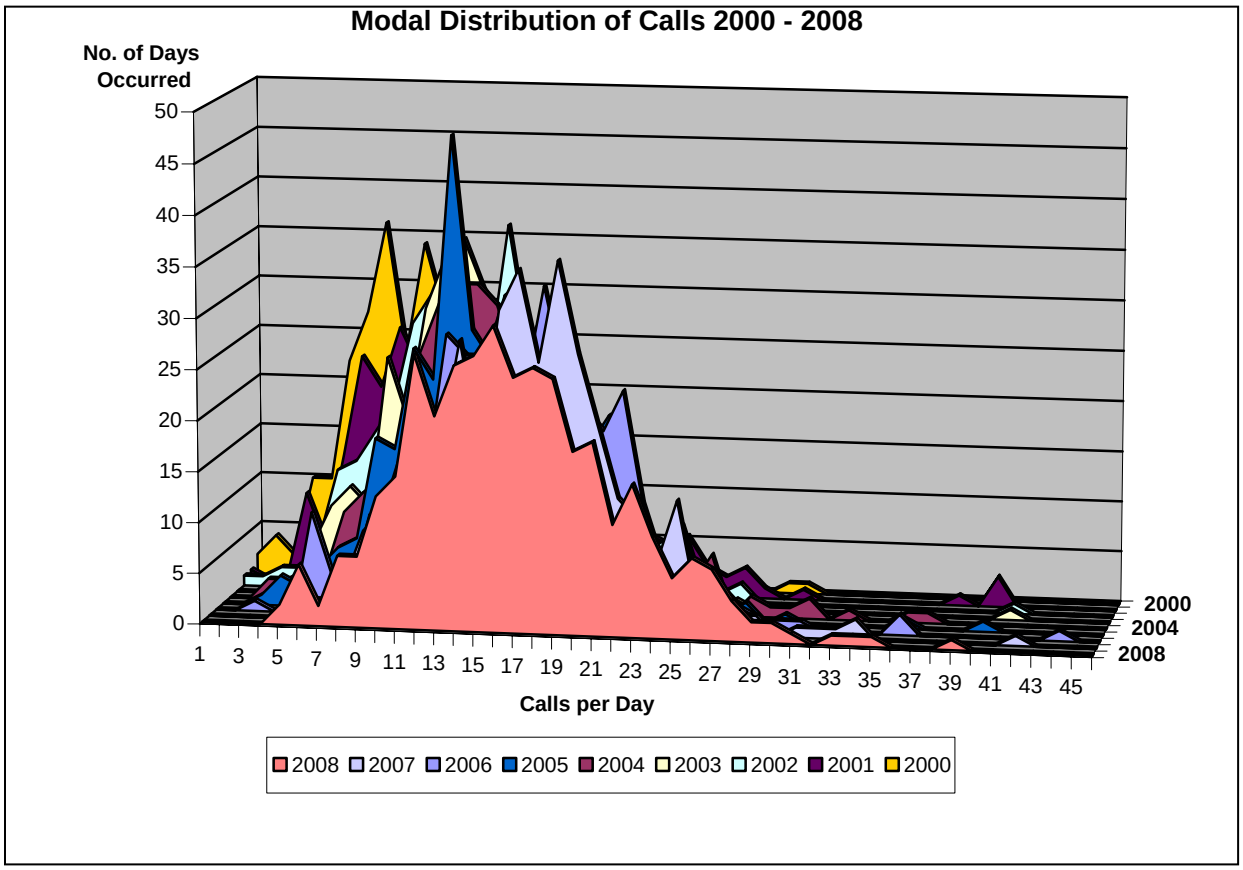


Figure 38: Modal Distribution 3-D Chart

The above chart is another view of the increasing calls per day trend.

Another way to look at demand is volume by day of week. Although the variation from day to day over a period of a year is not tremendous, there are patterns. As the chart below shows, Friday has become a busier day; historically Saturday has been the busiest day. The reason for this is not easily deduced, but it may have to do with the tourist nature of our community and more people arriving in town on Fridays. **(Figure 38)**

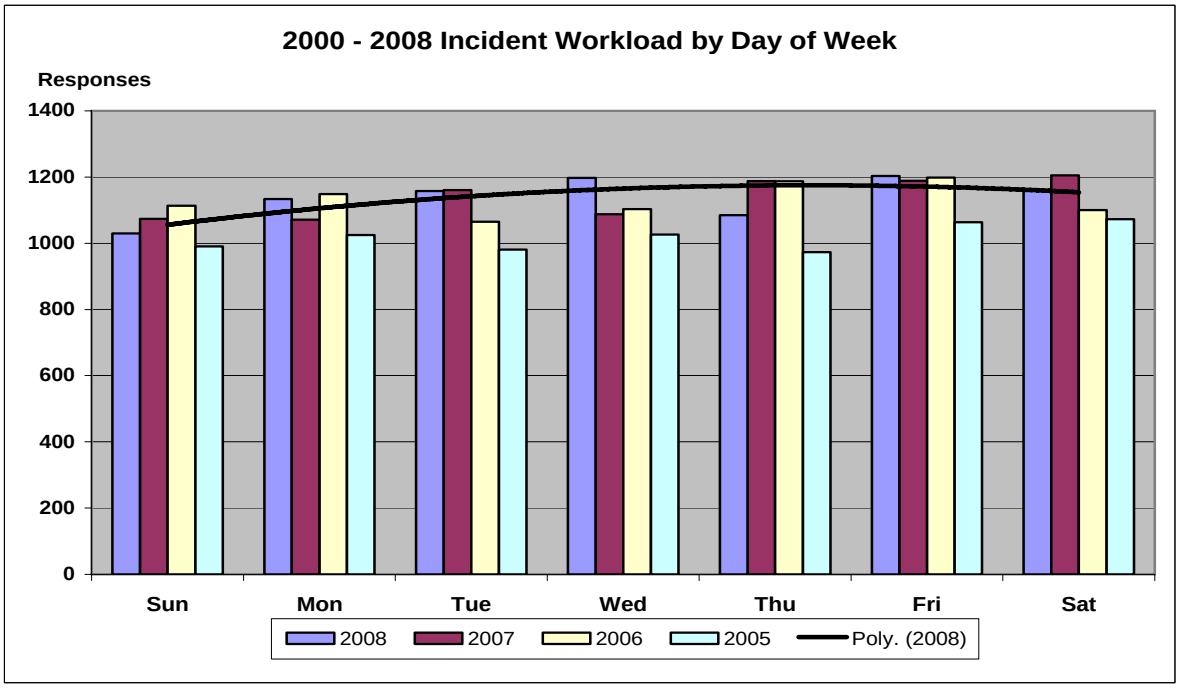


Figure 39: Historical Incident Workload by Day of Week

Annual response workload fluctuates with the seasons and can be partially attributed to environmental causes. The seasonal tourism fluctuations may also play a role here as well as the holiday season. However, this is a common sense deduction not from specific data. The following graphs illustrate these annual trends. **(Figure 39)**

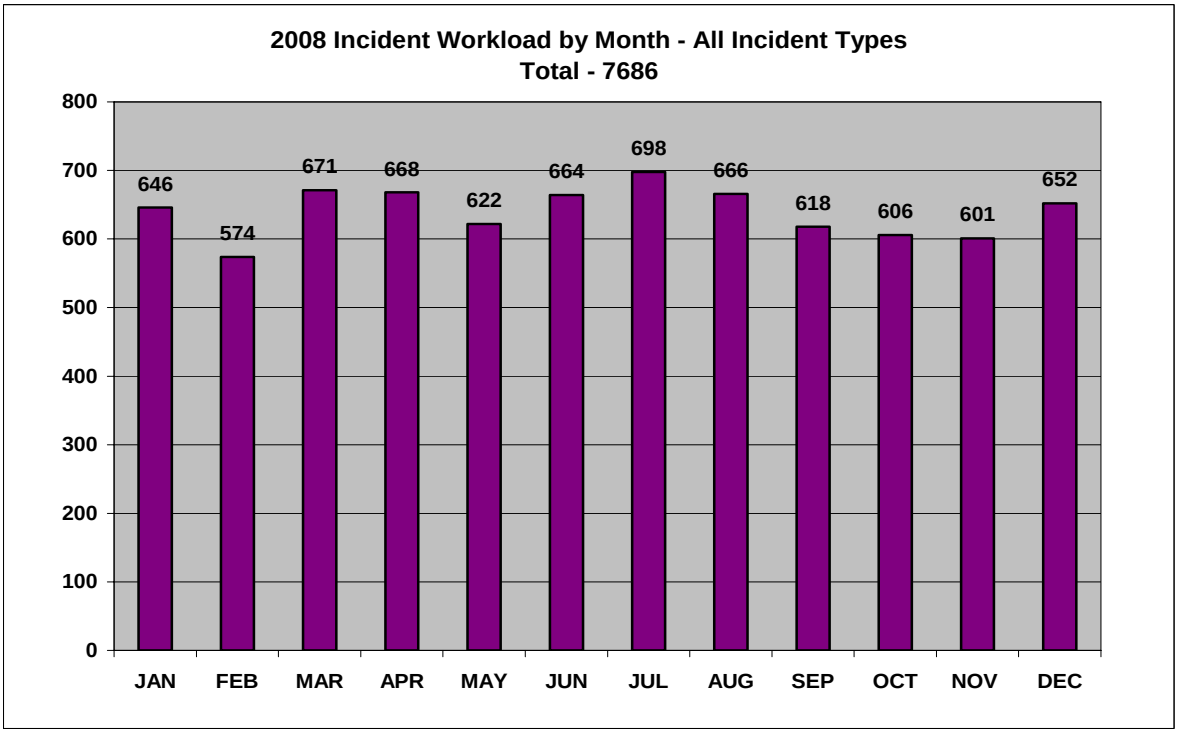
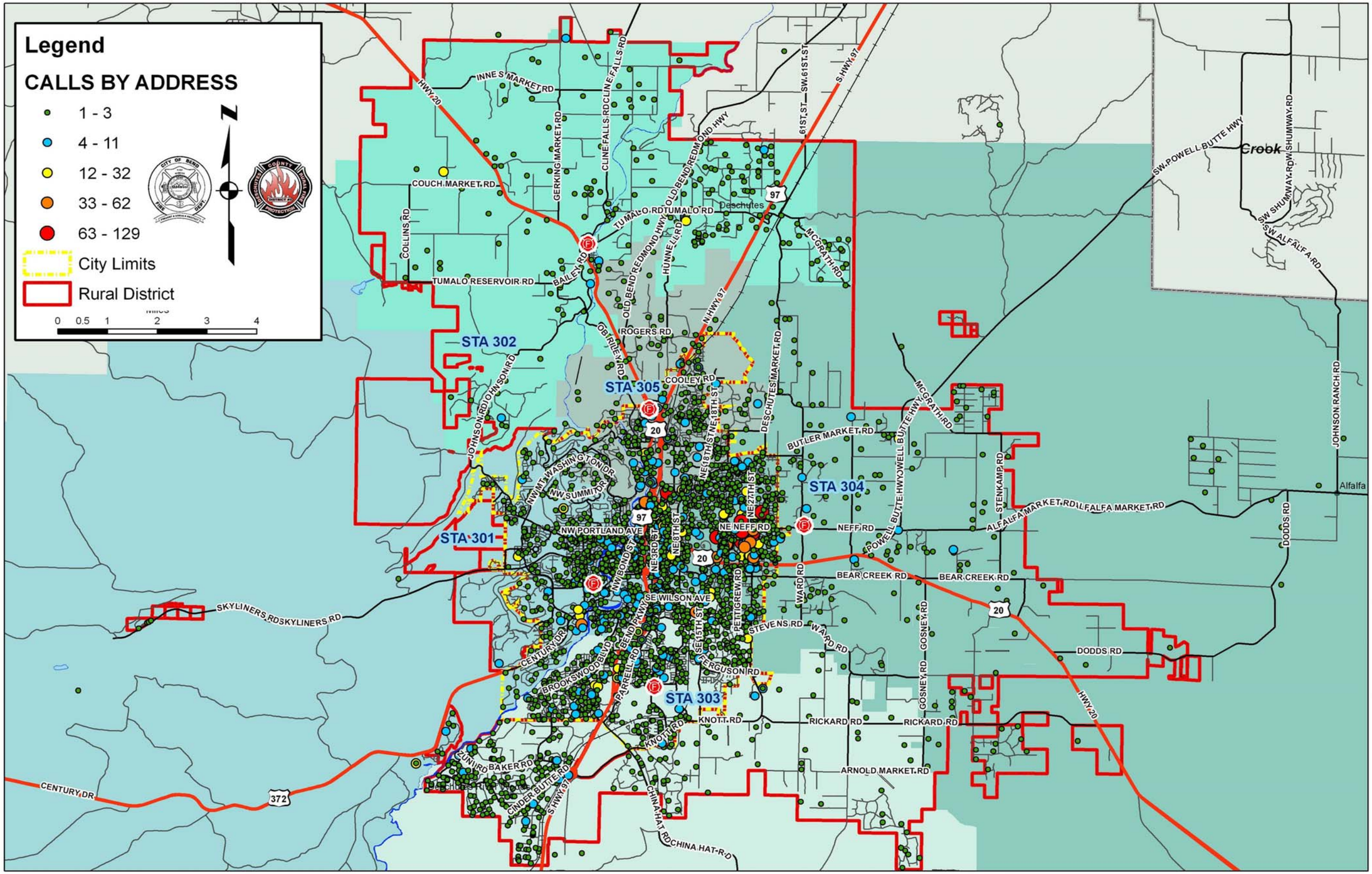


Figure 39: 2008 All Incident Workload by Month


Legend
CALLS BY ADDRESS
1 - 3
4 - 11
12 - 32
33 - 62
63 - 129
City Limits
Rural District
0 0.5 1 2 3 4
Miles
N
STA 301
STA 302
STA 303
STA 304
STA 305
HWY 20
INNES MARKET RD
CLINE FALLS RD
GERKING MARKET RD
COUCH MARKET RD
COLLINS RD
TUMALO RESERVOIR RD
TUMALO RD
OLD BEND REDMOND HWY
HUNNELL RD
BAILEY RD
O'BRIEN RD
ROGERS RD
COOLEY RD
JOHNSON RD
NW MT WASHINGTON DR
NW SUMMIT DR
NW PORTLAND AVE
NW BOND ST
NE 3RD ST
NE 6TH ST
NE 14TH ST
NE 18TH ST
NE 27TH ST
NE NEFF RD
SE WILSON AVE
PETTIGREW RD
SE 15TH ST
DESCHUTES MARKET RD
61ST ST
SW 61ST ST
S HWY 97
N HWY 97
MCGRATH RD
BUTLER MARKET RD
POWELL BUTTE HWY
NEFF RD
WARD RD
STEVENS RD
FERGUSON RD
KNOTT RD
RICKARD RD
GOSNEY RD
ARNOLD MARKET RD
ALFALFA MARKET RD
STENKAMP RD
DODDS RD
BEAR CREEK RD
SW POWELL BUTTE HWY
SW SHUMWAY RD
SW ALFALFA RD
JOHNSON RANCH RD
Crook
Deschutes
Alfalfa
SKYLINERS RD
CENTURY DR
BROOKSWOOD BLVD
PARRELL RD
CHINA HAT RD
CINDER BUTTE RD
SUNRISE BAKER RD
372
97
20

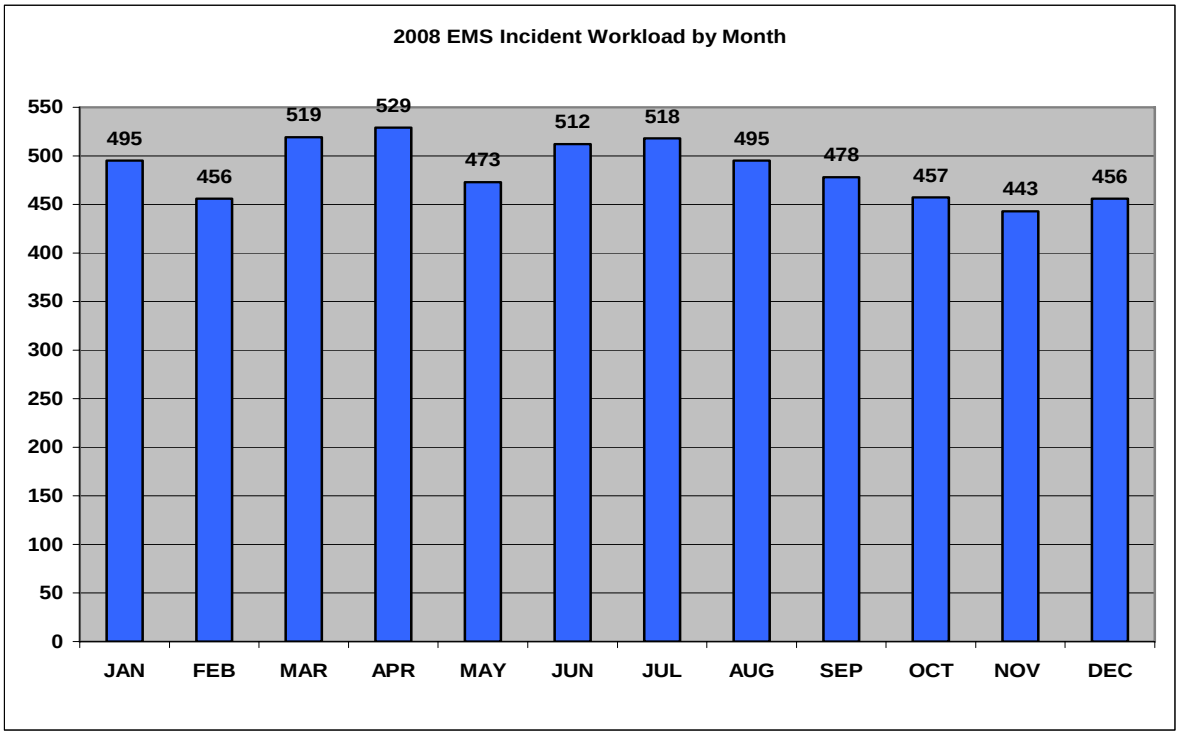


Figure 40: 2008 EMS Workload by Month

Fires spike during the summer fire season when environmental conditions make the probability of ignition higher. There is obviously a significant increase during July, and at least some of this is a result of fireworks around the July 4th celebration.

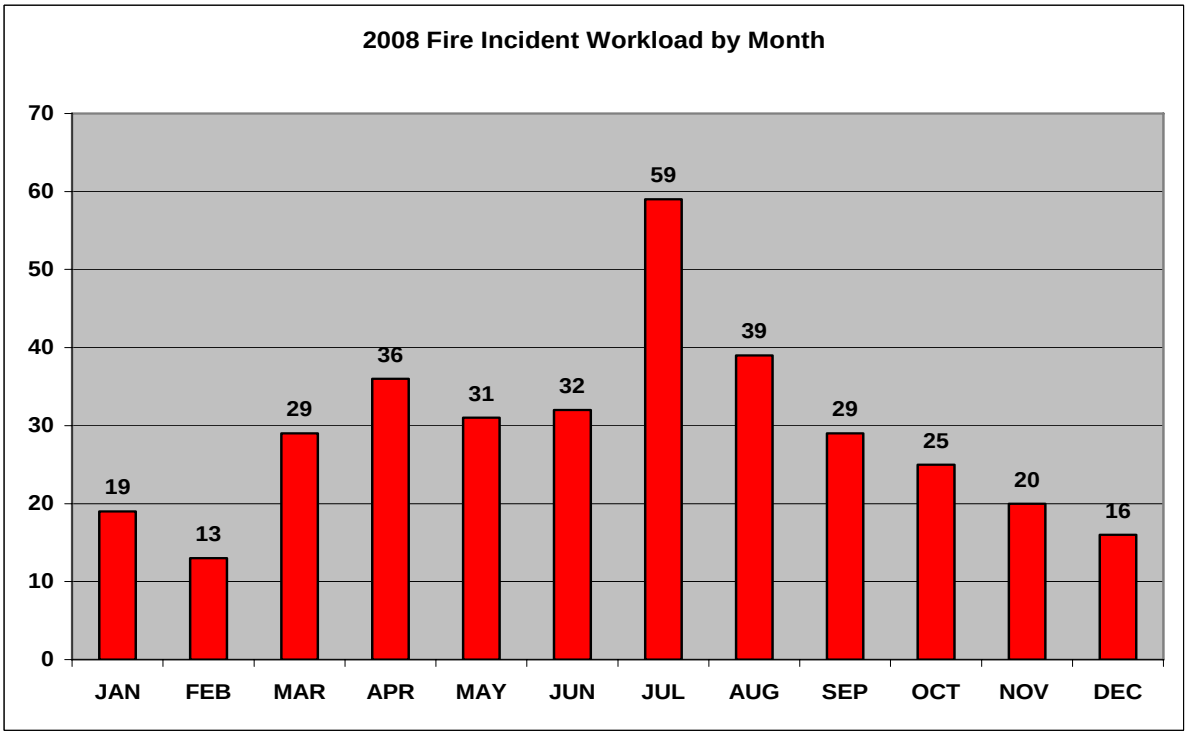


Figure 41: 2008 Fire Workload by Month

The upswing in non-fire incident responses occurs during the colder months. During severe subfreezing temperatures there is almost a predictable occurrence of cold-related problems. Frozen pipes with resultant water leaks, sprinkler system failures, alarm system malfunctions, and other miscellaneous weather related problems are common causes.

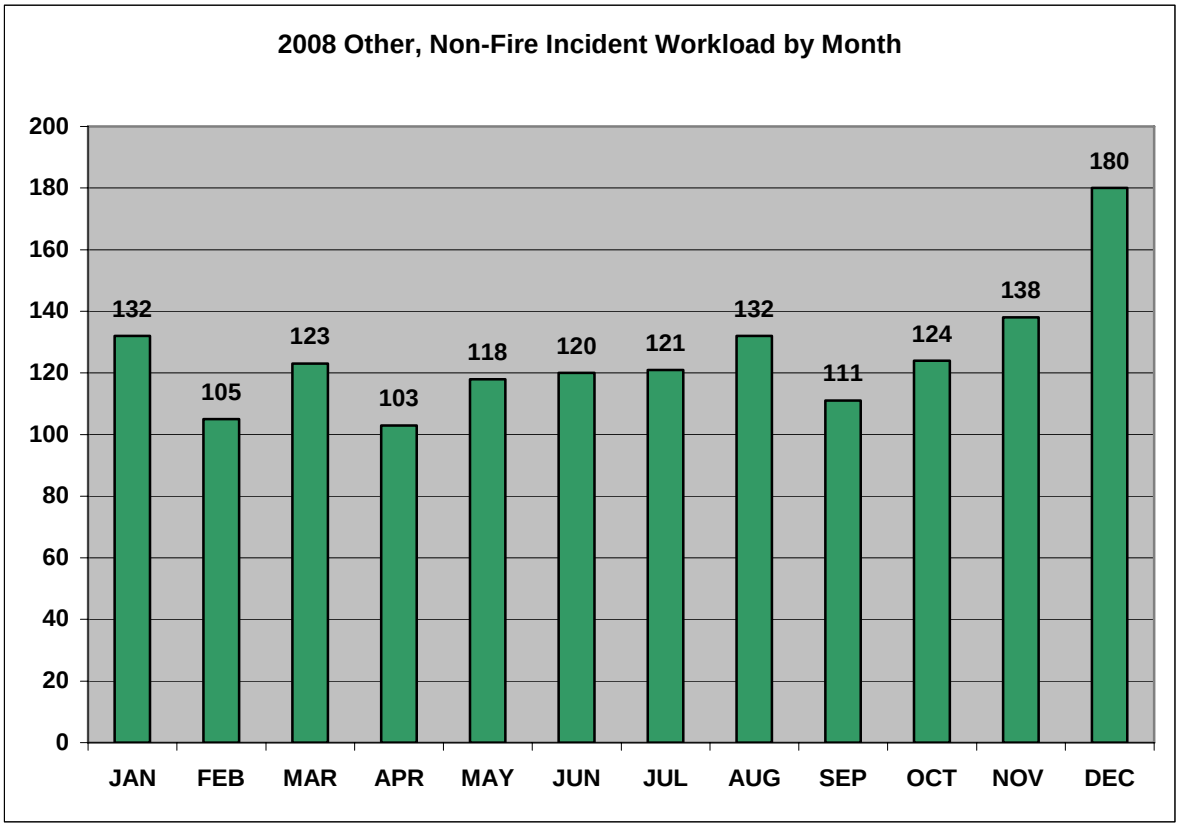


Figure 42: 2008 Non-Fire Workload by Month

Identifying where responses are geographically occurring is clearly very important to location of resources. We can analyze this by looking at locations by address within a response district established for dispatch purposes. Below is a chart illustrating our busiest areas of response. Without a doubt, the busiest area of our entire district is the northeast side of Bend within the city limits. This correlates with the high density medical community and several senior living facilities in the area. By further analyzing these responses, we can also tell that the vast majority of these responses are medical calls for our ambulances.

We suspect that medical resources will continue to concentrate in this locality and that more seniors will move to this area, because of the convenience of close-by medical facilities and other services. Subdivisions continued to expand on the east side of Bend and more space was available for residential (single & multi-family) development. With lower priced homes and property available on the east side, there seems to be no reason for this trend to change. Our East Fire Station - 304 is ideally located for the expansion of growth and reflects good planning for the future. Additional personnel is part of the formula and keeping dedicated resources close to this area minimizes response time and movement of resources from other stations.

Station 304 has a two crew minimum staffing level to accommodate the higher response load. It may be necessary in the future to place an additional ambulance in Station 304. The other current plan is creation of a sixth fire station on the eastside, possibly on existing city property near the public works facility. This will keep our response times down and may negate the need to move other resources into this zone to cope with multiple responses. As responses increase in a zone, so do the number of simultaneous or concurrent calls.

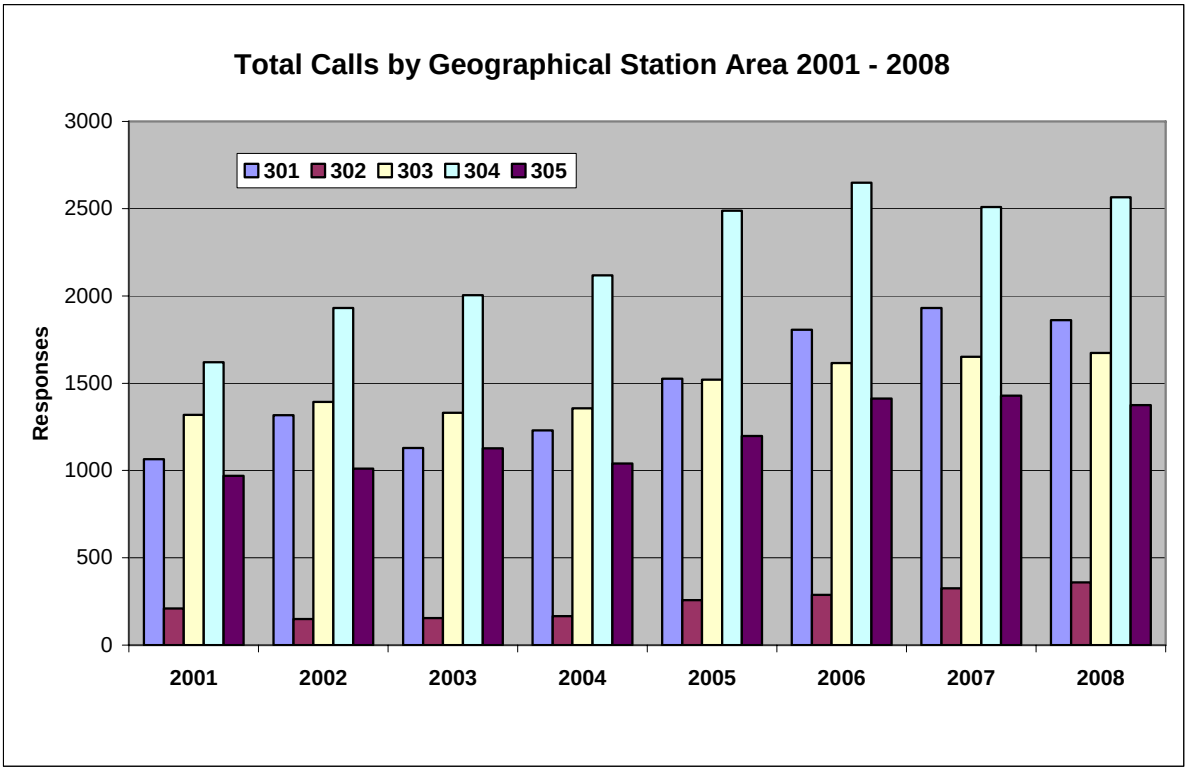


Figure 43: Historical Responses by Station Area 2001 - 2008

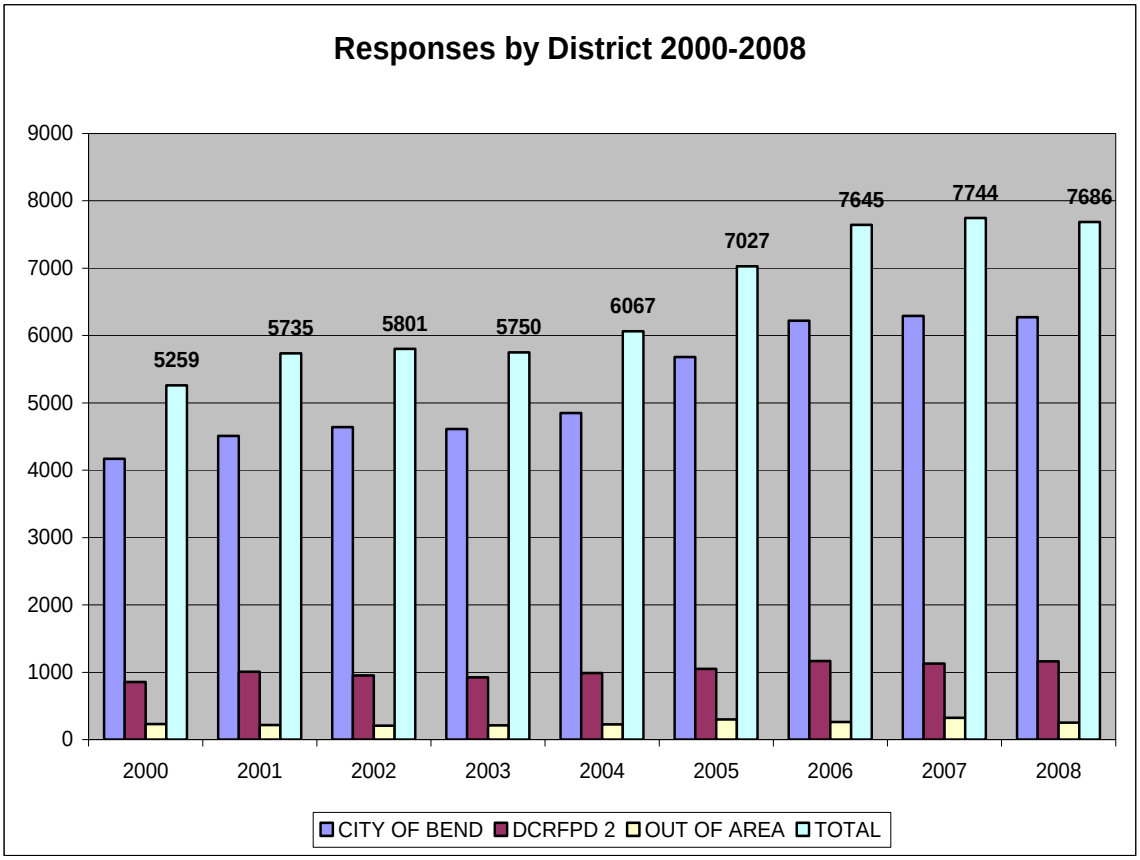


Figure 44: Historical Responses by District 2000 - 2008

CONCURRENT RESPONSES

As BF&R responses increase annually, more calls occur per day. As the number of calls per day escalates, more calls occur within the same time frame; between initial dispatch of a unit to the time that unit is available for another response. This phenomenon creates several consequences to our emergency response system. Like a domino effect, each additional call adversely effects response time, depth of resource, and ultimately, our ability to protect the community.

To illustrate this more clearly an explanation may help. Our system is built upon a 5 fire station foundation: each station houses, at minimum, one 3 person crew. The East Station has two crews, one dedicated to the ambulance and dedicated to fire apparatus. At peak manning three stations will have 2 crews, unfortunately this happens infrequently, because of vacations, illness, injury, etc.

Each call or emergency response usually requires all staff in a station, thereby leaving the other pieces of apparatus unstaffed. If an EMS response occurs, the on-duty crew from the closest station will respond with the ambulance or engine leaving the other apparatus unmanned. If another EMS response or fire call occurs in that same fire station jurisdiction the next closest fire station to that response area will answer the call. Their response time is increased because of the greater travel distance. Now, if a third call occurs in either the first or second station's response

area, another crew from a third fire station must respond with the associated delayed response time. This can happen several times per day and all stations and crews can be committed to calls. If all crews are committed the Battalion Chief on duty must consider activation of mutual aid from surrounding jurisdictions (Redmond, Sunriver, etc.) or try to break a crew free from a previous call, if at all possible. In either event the response time rises dramatically. This scenario becomes more fragile when a fire occurs, which instantly empties 2 to 5 stations, and then a medical emergency or another fire may occur. Without question, this scenario is more concerning and potentially harmful to the community than any other. How often does this occur?

Historically, we evaluated periods of time manually and the results were as follows: During the month of November 2004 all responses were tracked with respect to simultaneous occurring calls and how it affects our system. Excluded from these numbers were the Peak Demand Unit Ambulance (PDU) and 24 hour staffed ambulance (when in service).

- 1.8 times/day on average we have three stations committed at the same time
- 1.1 times/day on average we have four stations committed at the same time
- On 5 days out of each month we have all five stations committed at the same time
- On average we have three stations committed at the same time per/day for about 23 minutes
- On average we have four stations committed at the same time per/day for about 16 minutes
- During the study month we had:
  - Three stations committed at the same time for a total of 688 minutes
  - Four stations committed at the same time for a total of 487 minutes
  - Five stations committed at the same time for a total of 70 minutes
- On one day a structure fire occurred and four stations were committed at the same time for over 210 minutes

We have recently acquired (2009) the ability to do detailed measure of this by the number of minutes and hours this occurs per day, month, and annually. **(Figure 41)** By tracking this we can hopefully predict reliably when the system is more likely to fail. The graph that follows documents when we have all apparatus available in hours and percentage for 2008 and is followed by the number of times we have reduced resources and when we are completely out of resources. The picture the numbers do not show is this: when a **structure fire** occurs, it usually requires no less than **4 units and usually 5 to 6 units** to control and extinguish the fire safely and effectively. Since we have 6 units available only slightly more than 50% of the time, the impact is very significant to the complete resource picture.

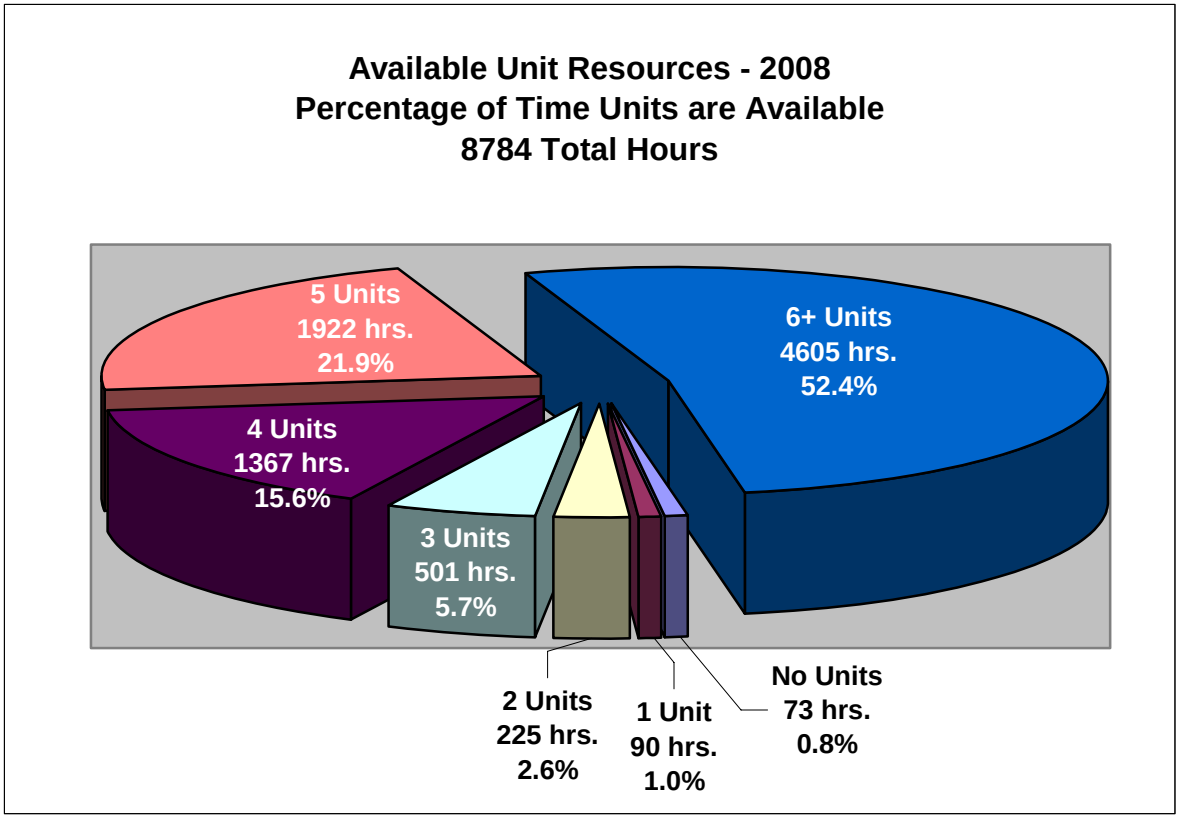


Figure 45: 2008 Available Unit Resources

BUILDINGS

We acquired a list of all properties inside the City of Bend and the DCRFPD #2 from the Deschutes County Tax Assessor's Office. From this list of properties, we identified those properties with structures and classified them with the categories of improvements used by the tax office. We then used a minimum of $50,000 value to establish a basis for entry into the building list.

This list of buildings establishes one method of identifying the type of **risks,** based on building types that exist in BF&R's fire protection area. The other method of identifying building risks is through occupancy use. When a business opens, a determination is made as to what type of occupancy it is and the risk relative to fire and life safety.

The City of Bend's newly adopted business licenses do not specify the actual use/occupancy being conducted in commercial buildings. Without this occupancy list we have little confidence in our classification system of structures related to commercial building use. Modifications to improve the data gathered from the business license application are being identified as part of the strategic planning process. The majority of cities in Oregon require a business license that maintains a current identification of occupancy and use of structures.

The list from the Tax Assessor's Office only classifies the original use of the structure; it does not maintain a change of use. This is particularly important for commercial structures, because of the obvious fire and life risk based on the occupancy.

This weakness in our occupancy identification wasidentified by the fire department some time ago and the creation of the City of Bend Business License was implemented to resolve this issue. This is important information and an update of the standardized business licensing form is currently underway.

Another traditional "tool" used by the fire service is the "pre-fire" or "pre-emergency survey". This consists of a pre-plan of a structure which identifies the major life safety risks, hazardous materials, access, and safety concerns that fire personnel may encounter upon entry during a fire or other emergency and a plan to mitigate the incident. These plans are detailed and include drawings and are very worthwhile and could be included as a file in the mobile data computers and attached to the address of the incident. They require a significant investment of time by personnel to create and maintain and this project as implemented was abandoned when personnel did not have adequate time to create and maintain the surveys.

Currently, personnel use a simplified variation of this survey – a Building Information Form. Engine company crews periodically conduct an informal simple walk through familiarization tour of various commercial structures and businesses. During this tour they verify the current information kept in dispatch files for the premise is up to date for location of fire sprinkler connections, utility shut-offs, hazards, lock boxes, alarm system information, and emergency contact names and phone numbers. These tours are not an inspection and there is no formal calendar scheduling to insure every facility is visited.

The below chart illustrates a broad category of building types from the Tax Assessor's Office. Some caution must be used here to avoid any inaccurate conclusions. The numbers are estimates and use of the information for anything other than an overview is not intended. **(Figure 46)**

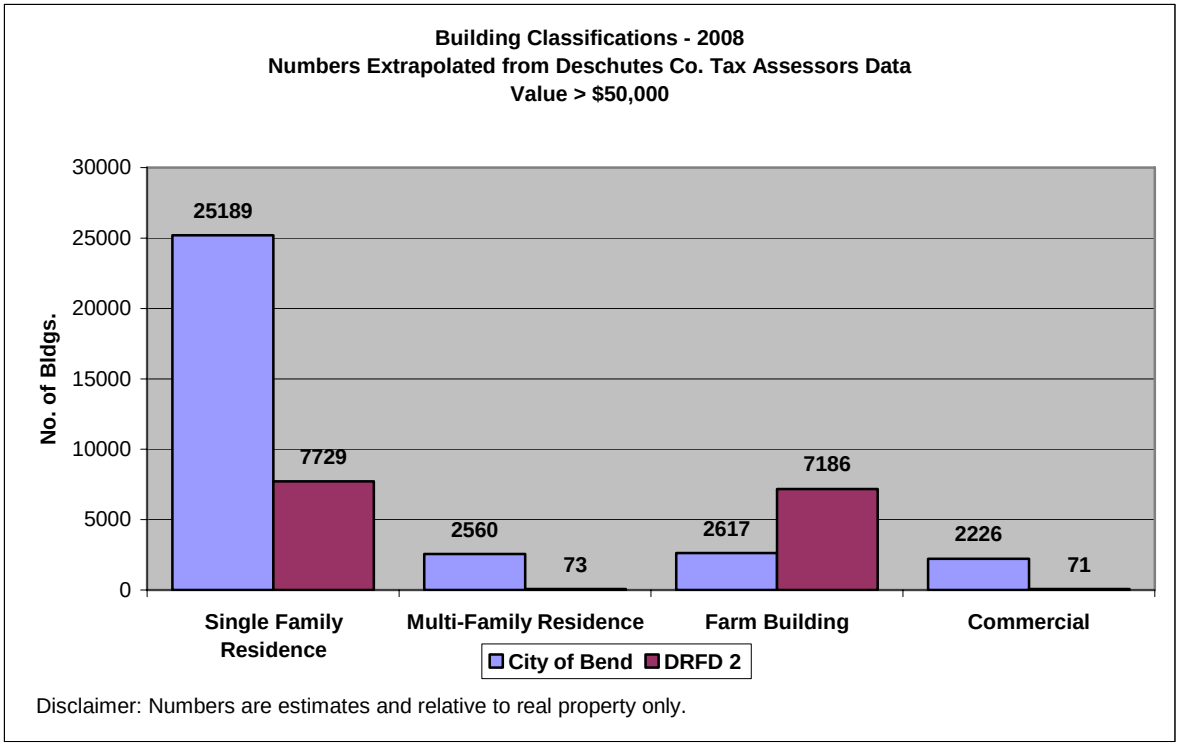


Figure 41: Number & Types of Buildings in Protection Area

The central downtown area has seen a significant increase in multi-floor larger structures in recent years and a trend that appears to be continuing. These represent a high-rise target and have very specific requirements when fires and other types of incidents occur. Because of the multiple type uses that are occurring in these buildings they represent unique challenges. The square footage is large and occurs on multiple floors, access can be challenging and life hazard evacuations can require large number of resources. Fortunately, these buildings are required to be fire sprinklered and this decreases fire risk and spread significantly. However, even small fires create smoke and hazardous atmosphere for residents.

Examples of high risk buildings are; hospitals, nursing care centers, schools, industrial manufacturing, public assembly facilities, hotels and motels, residential care facilities, and other buildings with a concentration of people or high hazard use.

BF&R does not currently have a “target hazard identification” system. There are several nationally recognized systems for identification and inventory of high/target hazard buildings or facilities. The purpose of these systems is to do a community inventory of buildings and facilities to identify where the highest risk of life loss may occur and prepare a pre-incident plan on a tactical level to address emergencies should one occur in these sites.

Risk Assessment Summary:

- EMS incidents continue to be the most significant risk for our community. While other categories of incidents are linear and even decreasing in numbers, EMS continues to see increases even in slow growth years.
- Because of increasing concurrent EMS incidents resources are being depleted which impacts the ability to protect our community.
- Although the frequency of structure fires has been decreasing in recent years, the ability to adequately provide an effective response force has been significantly impacted by concurrent responses of all types.
- Brush fires were significantly increasing a few years ago, however the past couple years have leveled off and are now more consistent in numbers; this can be highly dependent on the severity of the fire season. Although these fires are low frequency responses they potentially represent the most significant risk component for our community. Even with adoption of building ordinances, the Fire Free Program, and implementation of the Greater Bend Community Wildfire Protection Plan the risk for a catastrophic wildfire remains significant.
- With increasing high-rise large structures in the downtown core area the required personnel demands when incidents occur is beyond our current staffing levels.
- The growth of senior assisted living facilities in our community has created significant demands on EMS. These facilities create a unique demand on rescue operations as a result of the resident population and needs during evacuations when incidents occur. Locations of these facilities are primarily focused on the east side of Bend near medical facilities. Resources have been concentrated to handle this increase but may require additional interventions.
- With the increase of outdoor recreational tourism rescue operations have increased, but still remain low frequency. These types of incidents deplete personnel resources and have extended operational times.
- Implementation of new types of traffic control devices have adversely impacted our response times. This is likely to continue and the risk for more response delays is real and has life saving and fire growth implications.
- Increases in commercial structures with monitored alarm systems create more false alarms and service calls. Ordinances to prevent this have helped but needs to be monitored.
- Implementation of the new business license was an initial successful step, modification may be necessary to create a simple tracking system for occupancy use.
- The age and dependability of the fire engine fleet.

SECTION FOUR: Time & On-Scene Performance

Establishing minimum task performance standards – both individual and company - and times required to achieve these standards are a hallmark of an effective department. These performance standards should be evaluated annually through company evaluations. The basis for these standards should be those competencies established by the NFPA, the American Heart Association, the National Registry of EMT's and other organizations. However, they need not match these standards. Each agency needs to develop and explain its rationale if departing from accepted national standards.

Currently BF&R has an incomplete set of written performance standards, either for the individual or for company operations. This is a work in progress and is continually improving, especially with the hiring of a new training officer in 2005. BF&R's training standards are meeting new levels of performance, and a trend for this to continue is clearly in place. Further discussion of this occurs under the training section on page 18.

BF&R does adhere to all national standards for the American Heart Association, and personnel are required to perform to minimum standards as set by the AHA and validated by our Physician Supervisor.

THE RESPONSE TIME CONTINUUM – The Cascade of Events

Response time elements are a cascade of events. This cascade is similar to that used by the medical community to describe the events leading up to the initiation, mitigation, and ultimate outcome of a cardiac arrest. It is imperative to keep in mind that certain of the intervals described can be directly influenced by the fire service (turnout interval and travel interval) and the PSAP/911 center (call processing time), while others can be influenced indirectly (through public education, engineering initiatives, and standards).

Measures

Careful definition of terminology is essential to any conversation about response performance standards. It becomes even more critical when an organization attempts to benchmark its performance against other providers. The following definitions are standardized for discussion of response performance parameters within BF&R and also comply with the Oregon Deployment Process as well as NFPA 1710.

Time Points and Time Intervals

The response performance continuum is composed of the following time points and time intervals:

Event Initiation Point: The point at which factors occur that may ultimately result in an activation of the emergency response system. Precipitating factors can occur seconds, minutes, hours, or even days before a point of awareness is reached. An example is the patient who ignores chest discomfort for days until it reaches a critical point at which he/she makes the decision to seek assistance (point of awareness). It is rarely possible to quantify the point at which event initiation occurs.

Discovery of Event: The point at which a human being or technologic "sentinel" (i.e., smoke detector, infrared heat detector, etc.) becomes aware of conditions exist requiring an activation of the emergency response system. This is considered the point of awareness.

Alarm: The point at which awareness triggers an effort to notify the emergency response system. An example of this time point is the transmittal of a local or central alarm to a public safety answering point. Again, it is difficult to determine the time interval during which this process occurs with any degree of certainty.

Alarm Transfer Time or Alarm Transmission Interval Time: Lies between the awareness point and the alarm point. This interval can be significant, as when the alarm is transmitted to a distant commercial alarm monitoring organization, which then retransmits the alarm to the local PSAP or 9-1-1 dispatch facility.

Alarm Notification: The point at which an alarm is received by the public safety answering point (PSAP). This transmittal may take the form of electronic or mechanical notification received and answered by the PSAP or may simply be a telephone call.

Alarm Processing Interval: The interval between the first ring of the 9-1-1 telephone at the dispatch center and the time the CAD operator activates stations and/or company alerting devices. This can, if necessary, be broken down in to two additional parameters: "call taker interval" (the interval from the first ring of the 9-1-1 telephone until the call taker transfers the call to the dispatcher) and "dispatcher interval" (the interval from the time when the call taker transfers the call to the dispatcher until the dispatcher activates station and/or company alerting devices). BF&R's primary PSAP is the Deschutes County Communication Agency (DCCA). NFPA 1221 sets the following standards for call receiving and dispatching: "7.4.1: 95% of alarms received on emergency lines shall be answered within 15 seconds and 90% of alarms shall be answered within 40 seconds, 7.4.1.1: Compliance with 7.4.1 shall be evaluated monthly using data from the previous month, 7.4.2: 95% of call

processing and dispatching shall be completed within 60 seconds and 99% of call processing and dispatching shall be completed within 90 seconds, 7.4.2.1: Compliance with 7.4.2 shall be evaluated monthly, using data from the previous month."[3]

Dispatch Time: Is the time when the dispatcher, having selected appropriate units for response, initiates the notification of response units.

Turnout Time Interval: The interval between the activation of station and/or company alerting devices and the time when the responding crew activates the "responding" signal by the apparatus passing through a photoelectric beam in the opening of the apparatus bay door or notifies dispatch by voice that the company is responding (if out of station). If the apparatus has a mobile computer terminal the "responding" signal can also be sent by pressing a button on the keyboard.

During the turnout interval, crews cease other activities, don appropriate protective clothing, determine the location of the call, board and start the fire equipment or ambulance. It is expected that the "responding" signal will be given when the personnel are aboard the apparatus, properly secured, wearing the appropriate safety gear, and the apparatus begins its response. For BF&R in station this occurs automatically when the apparatus proceeds through the opening in the bay door – the Ztron system.

NFPA 1710 sets a standard of 1 minute (60 sec.) for EMS incidents and 1 minute 20 seconds (80 sec.) for fire incidents turnout interval. BF&R has been unable to obtain this goal. It has been our experience that most fire departments are unable to reach this goal, but the goal is desirable.

Many factors affect turnout time, including: time of day, size of station, security of station, type of call (donning fire protection gear takes considerably longer), activities at time of call, etc. BF&R is also somewhat unique with a true cross-staffed dual response system in each station. If an ambulance call is dispatched the crew may take the ambulance, if a fire is dispatched the crew responds with the fire apparatus. Because of this personnel must carry their personal protective equipment (PPE) with them in a large bag, which must be removed from apparatus to be donned and also moved from apparatus to apparatus as the need arises, based on type of call. This process takes more time and is responsible for increased turnout times. This system has been evaluated for simplification in an attempt to decrease turnout times. BF&R has established a goal of 1 1/2 minutes (90 seconds) for emergency responses. We are currently reaching that goal 44% time (data analysis 2008), 59% of the time we have a turnout time of less than 2 minutes (120 seconds), and 83% of the time less than 3 minutes (180 seconds).

[3] NFPA 1221 2007 Edition (current)

During August 2005, BF&R completed some turn-out time measurements to ascertain if there is need to reevaluate our standards or procedures. There are several pre-conditions to be noted:

- Location of personal protective equipment (PPE)
- Staffing configuration for the specific station
- Type of call or response
- Seasonal variation
- Location of crew at time of alarm
- Level of PPE required by the type of response

These pre-conditions result in many variations all of which affect the amount of time it takes crews to prepare for response. Because turn-out time has been highlighted as a consideration for reducing overall response time, we have appropriately investigated and researched this portion of response time. What we discovered follows.

If the crew is cross-staffing apparatus, they must place their PPE in a location from which it can easily be accessed for several types of response. If the crew is dedicated to an engine, they can place the gear next to their respective apparatus doors, thereby saving many seconds. During the wildland fire season, the crews are required to access and load a second PPE gear bag for wildland fires. If the crew is dispatched to a wildland fire, they access, carry and load their structure fire gear onto the apparatus. Both of these required actions take additional time.

The crew is not always together when an alarm is received, and at times, one member may be in such a position or location as to require additional time to respond.

If the call is for a medical response, or a non-motorized vehicle accident, the crew may respond in their house uniform. However, if the call is a motorized vehicle accident (MVA) or a fire, the crew is required to don their PPE before responding to the alarm. If the responding crew is driving at the time of dispatch they must pull over, stop and don their PPE. These activities take additional time.

There are other variables to consider when measuring turnout times. The notification and call processing system used to alert crews in their stations – are there inherent delays in the system? Is the system for transmitting the signal from the apparatus bay doors instantaneous or is there an inherent delay of the signal transmission? Are there multiple alarms in progress, and is there confusion as to which crew is closest to the call?

Enroute Time: The point at which the responding apparatus signal the dispatch center that they are responding to the alarm.

Travel Time Interval: Begins at the termination of the turnout interval, and ends when the responding unit notifies the dispatcher that it has arrived on scene (via voice or mobile computer terminal).

Response Time: Dispatch time to arrival time (turnout time plus travel time)

Total Response Time: Time from receipt of call at the first answering point to arrival of first responding unit on scene. This represents the response time from the perception of the person requesting service.

Arrival (or on-scene) Time: The point at which the responding unit arrives on scene. Arrival is determined by actual physical arrival in front of the address or at the address of the emergency, as displayed on the dispatch notification sheet.

Initiation of Action/Intervention Time: The point at which operations to mitigate the event begin. This may include size-up, resource deployment, patient evaluation, etc. This time may vary significantly depending on scene access such as malls, multi-story buildings, river canyon, etc. Tracking this time is difficult and is identified to document arrival on scene does not always indicate the time when intervention occurs.

Control and Mitigate Event: The incident is under control and mitigation takes place to bring the event back to normalcy.

Enroute to Hospital Time: The point at which the transporting ambulance departs the incident scene and is en route to the hospital with a patient.

Arrival at Hospital Time: The point at which the transporting ambulance arrives at the hospital with the patient.

Termination of Incident or Available out of Quarters Time: The point at which unit(s) has completed the assignment and are available to respond to another request for service. This occurs by voice communication to dispatch or via mobile computer terminal.

Customer Interval: It includes those factors that, in the customer's perception, reflect the performance of the fire service whether or not the fire service directly controls those elements. This interval adds the call-processing interval to the response interval.

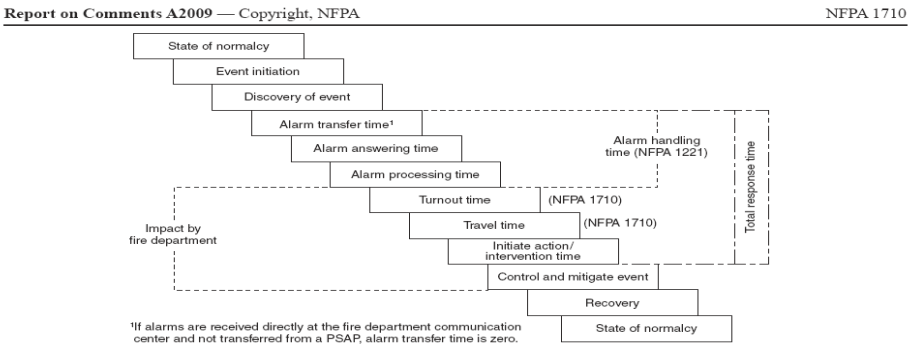


Figure 47: Cascade of Events Chart

EXTERNALLY IMPOSED STANDARDS & GUIDELINES

All applicable National Fire Protection Association standards including the following specific documents, this list is by no means all inclusive:

NFPA 1710: represents the driving force behind the deployment process. This document promulgates instructive standards for both turnout and travel time performance on a percentile basis. Most significantly, NFPA 1710 states that fire departments will have a deployment plan, and in addition, that they will address areas where response performance is deemed substandard through an explanation of the relevant factors. [4]

NFPA 1221: is the national standard for communication systems and dispatching for emergency agencies and impacts both our local communication center (911) and all fire service agencies.

NFPA 295: Standard for Rural and Forest Fire Protection

NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents

NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents

NFPA 1143: Standard for Wildland Fire Management

OTHER EXTERNALLY IMPOSED STANDARDS AND GUIDLELINES INCLUDE:

Oregon Health Division – Oregon Administrative Rules Chapter 333, Emergency Medical Services & Trauma Services

Insurance Services Office (ISO) – Leading source of information about property/casualty insurance risk. Establishes ISO rating for fire departments which determines insurance rates for constituents.

Oregon Department of Public Safety Standards and Training, DPSST ORS 181, OAR 838

The Federal Occupational Health and Safety Act (Federal – OSHA) and State of Oregon OSHA rules dictate firefighter safety and have established minimum standards for communications, safety officers, incident command, equipment, and most significantly, parameters on when firefighters can enter immediately dangerous to life and health (IDLH) environments[5]. The IDLH staffing requirements from OSHA, known in the fire service as “2-in, 2-out” is the primary reason for the

[4] NFPA 1710, 1.2.1 Purpose, 1.2.2., and 1.3 Equivalency
[5] OR-OSHA 1910.134(g)(4)

development of fire apparatus staffing that can meet search and rescue objectives with the first-due fire apparatus.

Time – Temperature Curve: The “time-temperature curve” standard is based on data from the National Fire Protection Association (NFPA) and the Insurance Services Organization (ISO), which have established that a typical point source of ignition in a residential house will “flash over” at some time between 5 and 30 minutes after ignition, turning a typical “room and contents” fire in to a structural fire of some magnitude.

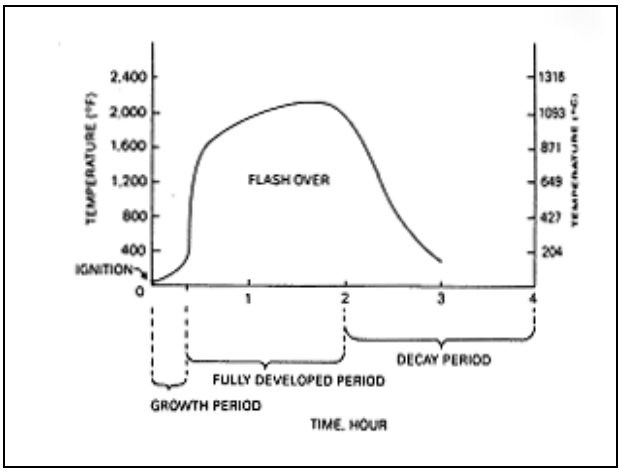


Figure 48: Time Temperature Curve Diagrams

The utility of the time-temperature curve for fire station placement is limited by a number of factors.

- It does not account for the time required for the existence of a fire to be “discovered” and reported to the fire department via the 9-1-1 system.
- The time from ignition to flashover varies widely (5-30 minutes depending on building characteristics); thus it cannot provide a valid basis for the allocation of resources.
- The curve is constantly shifting, given the numerous changes in building construction, built-in suppression systems, the increase use of fire-resistive materials for furniture and other items typically found in the interior of occupied buildings.

Although these factors are true, there is considerable evidence that early intervention is critical to limit property loss and save lives.

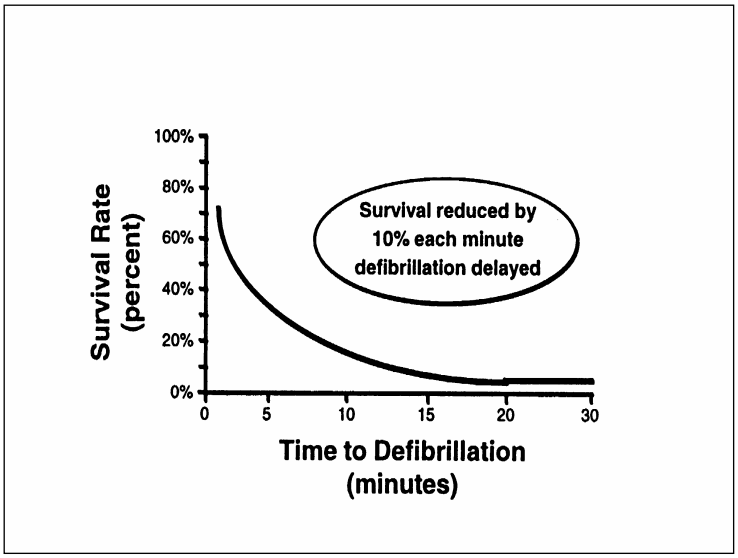


Figure 49: Cardiac Arrest Survival Rate

Cardiac Arrest Survival Data:
In most communities like Bend, where the fire service is the principal provider of EMS first response, the "chain of survival" standard developed by the American Heart Association often is used to provide guidance for response performance. The chain of survival suggests that basic life support (CPR and defibrillation) should be available to the victim of a cardiac arrest within 4 minutes of the event, and that advanced life support (paramedic service) should be available within 8 minutes or less of the event. Early notification of emergency response services is thus paramount to successful resuscitation efforts.

Area Trauma Advisory Board: The State of Oregon created a State Trauma Plan to ensure all patients having trauma injuries are scored based upon their injuries and then entered into the Trauma Plan. Based upon the criteria patients must be taken to a Trauma Hospital that can provide a definitive level of care for trauma patients.

Regionally, the state created Area Trauma Advisory Boards (ATAB), which is comprised of local physicians, nurses, paramedics, etc., to evaluate trauma care in regions of the state. We are located in ATAB Region 7, and BF&R has been an active member of that board since its inception. This board sets the local and regional standards for entry criteria into the trauma system.

Historical Decision-making: BF&R recognized the need to locate stations in growth areas many years ago. A computer program was purchased - *Fire Router* - and was implemented to determine the appropriate location for new stations and to determine if current stations needed to be moved. *Fire Router* used the road system and travel time to compute the best location for stations. With a vast amount of information and specific parameters entered, the program would "locate" stations for a balanced response area for each station.

Fire Router determined the need for the new North Station and its current location. It also determined our East and South Stations were already where they needed to be. The old downtown station was not appropriately located, due to the growth in the west side of town, and it was moved with the new administration building to its current location just off Century Dr. on Simpson. New data has continued to be evaluated and changes are currently in the works for another station on the east side of town but closer to the core area of downtown Bend.

The relevance of community expectations can best be summarized with a look at some of the more significant fires that have occurred in Bend. Certainly, the Awbrey Hall Fire is a prime example of how one fire can focus the complete attention of the community on fire protection and expectations. At the time of the fire the community understands the importance of more firefighting personnel and apparatus, but soon after the fire is extinguished the awareness level drops, and complacency may set in. The business as usual thinking is quickly readopted until the next large fire or incident. Awareness must be kept at a constant level with an eye to the past and future in order to assure that the community is protected for both the daily level of responses and for the inevitable catastrophic incidents that can and do occur periodically.

TIME & INTERVAL DESCRIPTION METHODOLOGY

The traditional fire service use of performance intervals in terms of "average" performance is no longer the preferred method to measure system times. Although the average or statistical mean has some utility, it is not a useful measure of performance unless coupled with some measure of central tendency, such as the variance or the standard deviation which described the "shape" of the performance curve.

Because many will have difficulty grasping these statistical concepts, the use of "percentile analysis"[6] is gaining favor with the operations analysis community. Using this methodology, an organization can clearly articulate its performance standards and goals in a manner that will be easily understood. For example, "The fire apparatus will leave the station within 90 seconds of alarm activation, at least 80% of the time," is a goal that can be clearly understood by most people.

In addition, any performance standards set by the AHJ through this process should include language clarifying that the stated standards are not intended to establish minimum response characteristics for every single emergency event. It should be understood and explained that 100% compliance is impossible, and that performance standards and goals are based on the rationale set forth in the agency's Standard of Coverage for Emergency Response.

[6] In the world of EMS system compliance measures, percentile analysis is also referred to as "fractal analysis."

RESPONSE ZONES, TIME STANDARDS & GOALS

As previously discussed in the terminology section, response zones are defined geographical areas of the City and Fire District that have been used to establish the fastest response from the closest station. Although each fire station has its own response zone, two larger sets of response areas have historically been used to standardize response times and provide a framework to measure by. These two areas are the City boundaries proper and the Fire District boundary outside the City. These two separate and distinct response zones have been used in the past as a way to establish a performance standard of response times.

As Bend continues to grow at a consistent rate, another zone system may need to be implemented to reflect a higher density population base. Currently being looked at and evaluated is the creation of much smaller dispatch zone grids, defined in a set area size. Dispatch zones are currently based upon random sets of street blocks created from historical dispatch systems and what worked to accommodate the computer program. The new system will be based on geospatial sizing and each zone will be close to the same size over the entire city and fire district. By using smaller and equal sized zones we can create and change response zones for the absolute fastest responses based upon growth, traffic impedance, and historical perspective and measurement. Creation of this new system is not an easy task and will be thoroughly evaluated prior to implementation. Hopefully added to this formula will be GPS based dispatching which always chooses the closest apparatus to respond. Deschutes County Communication Agency is progressing in the creation of the geomapping but a time table for completion is not set.

Below is the percentile analysis of our response times for first arriving apparatus since 2003 and through 2008.

RETROSPECTIVE PERCENTILE ANALYSIS

Retrospective Percentile Analysis of Response Time Performance
Emergency Responses Only – Dispatch to Arrival

All Incidents - First Arriving Apparatus					EMS Incidents - First Arriving Apparatus				
Zone	**Year**	**90th**	**80th**	**Avg.**	**Zone**	**Year**	**90th**	**80th**	**Avg.**
City	**2003**	10:10	**8:51**	6:54	**City**	**2003**	10:06	**8:47**	6:51
	2004	10:14	**9:02**	6:58		**2004**	10:17	**9:03**	6:58
	2005	10:01	**8:29**	6:26		**2005**	10:00	**8:25**	6:24
	2006	9:40	**8:21**	6:16		**2006**	9:37	**8:17**	6:13
	2007	9:42	**8:19**	6:13		**2007**	9:41	**8:16**	6:09
	2008	9:40	**8:24**	6:20		**2008**	9:35	**8:18**	6:16
DCRFPD #2	**2003**	15:20	**13:11**	10:16	**DCRFPD #2**	**2003**	15:06	**13:03**	10:06
	2004	15:01	**12:34**	9:42		**2004**	15:00	**12:32**	9:43
	2005	14:27	**12:35**	9:27		**2005**	14:40	**12:31**	9:20
	2006	14:28	**12:34**	9:08		**2006**	14:00	**12:13**	9:08
	2007	13:51	**12:01**	9:00		**2007**	13:44	**12:00**	8:56
	2008	13:53	**12:02**	8:57		**2008**	13:31	**11:48**	8:39

Structure Fires - First Arriving Apparatus				
Zone	**Year**	**90th**	**80th**	**Avg.**
City	**2003**	10:40	**8:55**	7:00
	2004	9:08	**8:20**	6:59
	2005	9:15	**7:58**	6:46
	2006	10:01	**8:53**	7:09
	2007	8:53	**8:21**	6:29
	2008	9:37	**8:50**	6:31
DCRFPD #2	**2003**	14:32	**12:59**	10:00
	2004	15:32	**12:11**	10:03
	2005	12:56	**10:35**	9:21
	2006	13:12	**10:54**	9:16
	2007	13:35	**11:44**	8:42
	2008	12:51	**12:11**	9:09

Figure 50: Percentile Analysis of Response Time Performance

ICMA Comparison – Percentage of Total Emergency Fire Calls (all call types) with a Response Time of **Five** Minutes and Under from **Dispatch to Arrival** on Scene

BF&R service pop. 102,500	
Entire service area	27.9%
City	31.2%
DCRFPD #2	14.6%
Jurisdictions > 100,000	
Mean	55.5%
Median	59.6%
Jurisdictions < 100,000	
Mean	64.6%
Median	71.0%

Figure 43: ICMA Comparison - 5 Minute Response Percentages

ICMA Comparison – Percentage of Total Emergency Fire (all call types) Calls with a Response Time of **Eight** Minutes or Under from **Dispatch to Arrival** on Scene

BF&R service pop. 102,500	
Entire service area	69.2%
City	75.5%
DCRFPD #2	46.0%
Jurisdictions > 100,000	
Mean	77.5%
Median	81.7%
Jurisdictions < 100,000	
Mean	84.3%
Median	88.0%

Figure 52: ICMA Comparison - 8 Minute Response Percentages

The following data is the full response time summary for structure, brush fires, and EMS incidents.

Structure Fires – Effective Response Force Response Time

City of Bend

During 2008 there were 5 structure fire incidents inside the city that met the Effective Response Force criteria of 14 personnel on scene. **The 80% response time (dispatch to arrival) for these incidents was 18 minutes.**

There were 15 structure fire incidents inside the city with 10 to 13 personnel on scene. **The 80% response time (dispatch to arrival) for these incidents was 14 minutes.**

The currently recognized method of documenting **total** response time now includes the 911 processing time to more accurately reflect the public's perception of response time. The following is our first use of this new standard and is for all emergency structure fires in the city and includes all apparatus times on individual fires.

City of Bend All Emergency Structure Fires - 2008				
	911 Processing	Turnout	Travel	**Total Response**
80%	0:03:28	0:03:27	0:08:57	0:15:52
Average	0:01:43	0:02:17	0:06:33	0:10:33

Deschutes County Rural Fire Protection District # 2

During 2008 there were 3 structure fire incidents inside DCRFPD #2 that met the Effective Response Force criteria of 14 personnel on scene. **The 80% response time (dispatch to arrival) for these incidents was approximately 18 minutes.**

There were 8 structure fire incidents inside the DCRFPD #2 with 10 to 13 personnel on scene. **The 80% response time (dispatch to arrival) for these incidents was approximately 20 minutes.**

The currently recognized method of documenting **total** response time now includes the 911 processing time to more accurately reflect the public's perception of response time. The following is our first use of this new standard and is for all emergency structure fires in DCRFPD #2 and includes all apparatus times on individual fires.

Deschutes Rural Fire District 2 All Emergency Structure Fires - 2008				
	911 Processing	Turnout	Travel	**Total Response**
80%	0:00:57	0:03:42	0:14:35	0:19:14
Average	0:00:37	0:02:25	0:11:12	0:14:14

Wildland Brush Fires – Response Time

City of Bend

During 2008 there were 15 brush fires with more than 6 personnel on scene. **The 80% response time (dispatch to arrival) for these incidents was 15 minutes.**

The currently recognized method of documenting **total** response time now includes the 911 processing time to more accurately reflect the public's perception of response time. The following is our first use of this new standard and is for all emergency wildland brush fires in the city and includes all apparatus times.

City of Bend All Emergency Wildland Brush Fires - 2008				
	911 Processing	Turnout	Travel	**Total Response**
80%	0:04:11	0:04:18	0:08:51	0:17:20
Average	0:02:20	0:02:12	0:05:30	0:10:02

Deschutes County Rural Fire Protection District # 2

During 2008 there were 12 brush fires with more than 6 personnel on scene. **The 80% response time (dispatch to arrival) for these incidents was 28 minutes.**

The currently recognized method of documenting **total** response time now includes the 911 processing time to more accurately reflect the public's perception of response time. The following is our first use of this new standard and is for all emergency wildland brush fires in DCRFPD #2 and includes all apparatus times.

Deschutes Rural Fire District 2 All Emergency Wildland Brush Fires - 2008				
	911 Processing	Turnout	Travel	**Total Response**
80%	0:04:33	0:03:47	0:15:42	0:24:02
Average	0:02:40	0:01:53	0:11:56	0:16:29

EMS Responses – Effective Response Force Response Time for Incidents Requiring 2 or More Companies

City of Bend

During 2008 the 80% response time (dispatch to arrival) for ERF for EMS incidents inside the city was 12 minutes.

The currently recognized method of documenting **total** response time now includes the 911 processing time to more accurately reflect the public's perception of response time. The following is our first use of this new standard and is for all emergency medical incidents with more than one unit in the city.

City of Bend All ERF Emergency Medical Responses - 2008				
	911 Processing	Turnout	Travel	**Total Response**
80%	0:02:52	0:02:43	0:09:20	0:14:55
Average	0:02:15	0:01:45	0:06:32	0:10:32

Deschutes County Rural Fire Protection District # 2

During 2008 the 80% response time (dispatch to arrival) for ERF for EMS incidents inside DCRFPD #2 was 17.5 minutes.

The currently recognized method of documenting **total** response time now includes the 911 processing time to more accurately reflect the public's perception of response time. The following is our first use of this new standard and is for all emergency medical incidents with more than one unit in DCRFPD #2.

Deschutes Rural Fire District 2 All ERF Emergency Medical Responses - 2008				
	911 Processing	Turnout	Travel	**Total Response**
80%	0:03:31	0:02:42	0:14:48	0:21:01
Average	0:02:34	0:01:53	0:10:09	0:14:36

SECTION FIVE: On-Scene Operations, Risk Statement, Critical Tasks, and Establishing an Effective Response Force

On-scene operations, critical tasking, and effective response force are the elements of a standards of cover study that determine staffing levels, number of units needed, and duties to be performed on the fire ground. A fire department must be able to determine what tasks need to be completed in order to have a positive influence on the outcome of the situation, and the number of personnel and apparatus required to complete those tasks.

RISK STATEMENT OF BEND FIRE & RESCUE

- We respond to calls for service with the belief that we will have a positive impact on the lives of the community we serve
- It is expected that we will risk our safety to save the life of a fellow human being
- With calculated safety precautions, we may risk our safety to protect savable property
- We will not risk our safety for life or property that is clearly lost

ON-SCENE OPERATIONS - FIRE

Critical Tasks

These are the most important and immediate tasks that must be completed in a timely manner by personnel on scene at any type of incident to prevent escalation of the incident to a catastrophic condition that threatens life loss and/or property destruction.

In this section the critical tasks are identified that are necessary to be performed at each type of incident, and the minimum number of personnel to be effective is specified.

Allocation of personnel assumes that crews are committed to those assigned tasks, and are not available for re-assignment until the incident has been mitigated sufficiently to allow their release.
The following charts show the minimum personnel needed to complete the critical tasks. These show our first alarm assignment only. Greater alarms will generally require resources from our mutual aid partners.

Firefighter Safety is our first priority

The three Strategic Priorities are: **Life Safety** for the public and our own firefighters**, Incident Stabilization,** and **Property Conservation,** considered in that order.

STRUCTURE FIRES

Critical Tasks, Structure Fire Offensive Attack
Minimum Personnel for an Effective Firefighting Force

Task	Single Family	Commercial/ Multi-Family
Command/ISO/Accountability	1	1
Pump Operations/Water Supply	2	2
Fire Attack	2	4
Fire Ground Support	4	6
RIT	3	3
Secondary Line	2	2
Incident Total	**14**	**18**

Figure 53: Critical Tasks, Structure Fire Offensive Attack

Commercial and multi-family differ from single family dwellings in size, occupant load, fire load and complexity. They are more labor intensive operations, with a higher life hazard, both for firefighters and for occupants.

An **offensive attack** is used when the first arriving company cfficer determines that they have sufficient resources to combat the fire and mitigate the incident. This strategy is a decision process based on size of the fire, material burning, safety of our personnel, and resources available. In this action fire crews enter the building and combat the fire.

A **defensive attack** is used when the first arriving Company Officer determines that the resources are not sufficient to combat the fire from inside the building, **or** the building is clearly lost, **or** safety factors that pose a threat from collapse of the structure, heat or products involved in the fire. In this action, fire crews fight the fire from outside the building with the idea that the building will be a total loss. The incident commander will direct efforts to reducing the hazard, protection of adjacent property, and protection of the environment.

Transitional attack is a combination of defensive tactics to contain and hold the fire until enough resources arrive to be able to change tactics to offensive.

Command/ISO/Accountability

The first arriving officer is responsible for Incident Command. As the Incident Commander (IC), this person fulfills all command staff duties until he/she delegates them. This function includes:

- sizing up the situation
- assessing available resources and identifying the problem
- setting the objectives of the operation
- deciding on and communicating a plan of action
- coordinating the activities of the crew for maximum effectiveness
- monitoring the safety of the operation (see ISO, below)
- monitoring the location of all personnel (see Accountability, below)

ISO (Incident Safety Officer)

This position, required by the State of Oregon Occupational Safety and Health Administration (OR-OSHA) on every fire, monitors the safety of the operation and reports directly to the Incident Commander: During the initial response, the IC is the ISO. This person must do the following:

- Continually observe the operation for potential hazards, watching for
- Potential collapse hazards
- Power line hazards
- Unsafe practices and conditions
- Required safety equipment
- Other hazardous concerns and issues.
- Stop any operation which jeopardizes the lives an/or safety of personnel

Accountability

The IC will be the Accountability Officer until there are enough resources on scene to assign someone to:

- Monitor the location, position and condition of every person in the hazard zone
- Keep the Passport system current
- Call for a Personnel Accountability Roll call at specified intervals
- Notify IC if any personnel are unaccounted for

ISO: When additional resources arrive on scene, the IC will assign an Incident Safety Officer, whose duties are listed above, under **Command/ISO/Accountability.**

Pump Operations/Water Supply

The Apparatus Operator (Driver, Pump Operator or Engineer) on the initial attack engine is responsible for:

- Functioning as the designated water supply officer
- Maintaining a usable flow of water to the attack hose line
- Assisting with making the appropriate equipment available to the attack crew
- Monitor the scene for safety issues.
- Ensuring that a stable water supply is set up.
    - In an area with hydrants:
        - Connect and charge the hydrant line
    - In a non-hydranted (rural) area:
        - Assist with setting up portable reservoir
        - Coordinate water tender shuttle

Fire Attack

The fire attack crew (minimum of 2 personnel) is responsible for the following tasks:

- Don full personal protective equipment (PPE), including self-contained breathing apparatus (SCBA)
- Take the necessary equipment and charged hose line to the point of entry
- Force entry to the building and advance the line to the fire
- Apply enough water to take the main heat out of the fire
- Retreat, if deemed necessary by the IC, until more resources arrive on scene. In certain situations, it will be necessary to remove the heat and products of combustion (smoke) by creating openings in the building before entering the building. This process is known as ventilation, and it can be crucial in changing the interior environment prior to entry by the fire attack crew. In most cases, however, by the time this crew makes entry, there will be additional resources on scene to provide fireground support.
- In the event that a structure is untenable and there are no life safety concern, the Attack Crew will protect adjacent properties with hose streams and will extinguish the fire from the outside.

Fireground Support (“Truck Operations”)

These duties are done by engine crews or the aerial apparatus as assigned to support the ability of the attack crew to locate and extinguish the fire. Their primary job is to make the interior environment safer for the attack crews and occupants while providing alternate means of escape as needed. Support functions include the following:

- Force open doors for attack crews to enter
- Search for victims
- Utility control (gas and electric)

- Ventilation of smoke and hot gases
- Ladder the building
- Provide safe egress for attack crews
- Check for fire extension into hidden void spaces
- Aerial operations
- Manage air resources
  - Monitor air use
  - Assist in changing air cylinders
  - Refill empty air cylinders

RIT (Rapid Intervention Team)

This is a crew which is dedicated only to the safety of the firefighters inside the building. It is their responsibility to do the following:

- Assemble the tools and air resources needed for a potential rescue of a trapped firefighter
- Provide egress by "softening" the building
  - Cut bars on windows
  - Locate exits
- Place ladders in windows where the firefighters are working
- Remain immediately available to enter the building safely if a firefighter is reported trapped, down or not accounted for.

Secondary (or Backup) line

Two firefighters are required to staff a backup attack line to accomplish the following tasks:

- Assist the attack crew
- Keep the egress free of fire
- Monitor safety of attack crew

The above personnel assignments/tasks are for the situation in which **no life threat exists**. **In the case where the initial crew arrives to find a life threatening situation**, the crew (minimum of 3) will do what is necessary to rescue trapped individuals per Bend Fire and Rescue policy. This condition is known as operating in a **rescue mode.**

Secondary Support Critical Tasks, Structure Fire Attack

Task	Single Family	Commercial/ Multi-Family
EMS	2	2
Rehabilitation	2	2
ISO	1	1
PIO	1	1
Extended Operations	6	10
Total	**12**	**16**

Figure 54: Critical Tasks, Secondary Support for Structure Fire Attack

Secondary Support functions can be accomplished by initial response personnel after completion of initial assignments, or by units which are specifically called for these tasks.

EMS (Emergency Medical Services)

Responsible for the following:

- Provide medical services for either victims of the fire or firefighters
- Transport any patient to the hospital (another medic will be called to fill this assignment).

Rehabilitation ("Rehab")

Firefighting is an exceptionally strenuous and taxing job. The rehab task set is critical in extended operations, especially in adverse weather conditions such as extreme heat or cold.

- Provide a place for firefighters to rest, rehydrate, warm up or cool down as necessary, and eat
- Monitor vital signs to ensure that a firefighter is not medically unstable due to exertion.

PIO (Public Information Officer)

The PIO is a vital position, which the IC will fill as soon as practical. The PIO will:

- Gather incident information for dissemination to the news media
- Set up a media area in a safe location
- Offer appropriate information to the media in a timely manner
- Protect sensitive information in a responsible manner
- Assist occupants with information and resources

Extended Operations

This term includes, but is not limited to, the following tasks:

- Augment the capability of the RIT (see above)
- Salvage valuable property or protecting it in place with the use of tarps
- Remove water from the building
- Open up hidden spaces to check for hot spots
- Fill SCBA bottles
- Restore apparatus and equipment to serviceable condition
- Determine area and point of fire origin, investigate cause of fire
- Tend to the immediate needs of occupants
- Drain, pick up, roll and reload hose
- Cleaning and restoring of equipment and supplies
- Relief for fatigued crews

CRITICAL TASKS FOR HIGH RISE TARGET HAZARDS

Task	Minimum Personnel
Incident Command	1
Initial Access/Fire Attack	6
Ventilation, Evacuation	6
Lobby Control	2
Water Supply, Pump Operations	1
Back up Line	3
RIT	3
Aerial Operations	2
Operations Overhead (Operations, Staging)	2
Safety Officer	1
Total Effective Firefighting Force	**27**

Figure 55: Critical Tasks, High Rise Target Hazards

Initial operations include the need to locate the fire and determine the appropriate access and egress routes, ensure that evacuation and rescue needs are identified, take control of building systems, and initiate the fire attack. Initial support companies are responsible for assisting occupant evacuation/rescue, ventilating stairways and involved floors, controlling building systems and access (lobby control), moving equipment to the staging floor, supporting the standpipe and sprinkler system, backing up the initial attack crews, and firefighter rescue (RIT). Additional operational overhead (officers) are needed to manage span of control.

Secondary Support

Extended operations on high rise incidents require a large number of additional people and logistical support. The need to move hose, tools, and SCBA cylinders to the staging floor is very labor intensive. The high occupant load in these buildings makes evacuation of multiple floors and rescue very challenging. Additional EMS

resources may be needed to treat victims. Firefighter fatigue is a critical problem in high rise operations. Rehab and relief crews are essential. Extended operations may require additional companies to meet resource needs.

CRITICAL TASKS FOR SINGLE RESOURCE RESPONSES

Task	Minimum personnel
Incident Command	1
Pump Operator	1
Firefighter	1
Total	**3**

Figure 56: Critical Tasks, Single Resource Responses

Single resource responses include lower risk incidents such as dumpster fires, vehicle fires, chimney fires, low risk wildland fires, smoke investigations, and automatic alarms.

If conditions are found that warrant additional resources, the Incident Commander can request additional units. For example, if smoke is found in the attic at a reported chimney fire, the IC will request a full residential structure fire response.

CRITICAL TASKS FOR WILDLAND FIRE INITIAL ATTACK: (High Risk Response)

Task	Minimum Personnel
Incident Command / Safety Officer	1
Pump Operations, Water Supply	4
Fire Attack	8
Effective Firefighting Force	**13**

Figure 57: Critical Tasks, Wildland Fire Initial Attack

A high risk response is used during the summer fire season when fuel and weather conditions are critical. A first alarm assignment will consist of four engines and a Chief Officer. Fire attack is defined as the ability to produce fire line with engine Company personnel. This includes mobile attack, progressive hose lays and hand line construction. Initial actions include establishing an “anchor point”, which is a safe area to begin fire attack to ensure the fire does not out flank firefighters. Firefighters then continue to progress along the perimeter of the fire to pinch off the forward spread. Later arriving resources reinforce the initial attack by extending lines along the fire perimeter and holding and improving completed fire line, as well as patrolling for spot fires. This does not include structure protection resources. Geography and span of control may require additional overhead support including a dedicated safety officer.

Structure Protection Operations

Resource needs multiply quickly when structures are threatened by wildland fires. In areas of low density and widely scattered homes, one engine company (3 person minimum) is needed to protect each home. In high density areas, one engine company can protect 3-5 homes. Structure protection resource needs should be in addition to the resource needs for perimeter control of the wildland fire. Moving resources needed for perimeter control to protect structures defeats the opportunity to mitigate the fire threat and puts the entire operation in a defensive posture.

Secondary Support for Wildland Fire Responses

Secondary support needs for extended operations vary by the size of the fire and the fuels involved. Mopping up a wildland fire can take from several hours to several days and require a large number of people and equipment. Logistical support such as water, food and fuel become critical. Relief crews are usually needed to relieve the fatigued initial attack resources.

The Oregon Department of Forestry (ODF) has wildland fire protection responsibility for portions of the City and Fire District. The ODF Central Oregon District covers a very large initial attack area with limited resources. ODF has the ability to mobilize a large firefighting force for extended attack operations on large fires. We also have mutual aid agreements are in place with the U.S. Forest Service (USFS)and Bureau of Land Management (BLM). It is common to have a multi-agency response to fires bordering these jurisdictions.

The Central Oregon Mutual Aid Plan can mobilize Task Forces to assist other agencies with extended attack resources. This plan provides additional resources for our incident needs; however it can also deplete our resources when we send aid to other districts. Incidents that deplete local mutual aid capabilities can receive support from the State Mobilization Plan. This includes firefighting and logistical resources and Incident Management Team support.

ON-SCENE OPERATIONS - EMS

Critical Tasking For EMS Responses

Critical Tasking Non-Life Threatening Medical Response

Task	Minimum Personnel
Primary Medic / Incident Commander	1
Driver/ Information	1
Total	**2**

Figure 58: Critical Tasks, Non-Life Threatening Medical Response

Critical Tasking Life Threatening Medical Response

Task	Minimum Personnel
Primary Medic / Incident Commander	1
Driver/ Information	1
Treatment and Care	3
Total	**5**

Figure 59: Critical Tasks, Life Threatening Medical Response

Treatment and care duties may include: IV starts, c-spine immobilization/LBB immobilization, giving medications, CPR, hemorrhage management, heart monitoring, airway management, and other skills as needed.

If the medic crew needs any additional manpower for assistance in providing care or lifting/carrying patients, they can request additional resources as needed on a case by case basis.

If the number of patients begins to exceed the initial assignment in terms of patient care, the IC can implement the MPI/MCI response.

Critical Tasking Motor Vehicle Accident

Injury MVA/Low Mechanism

Task	Minimum Personnel
Incident Commander	1
Scene Control/ Hazard Mitigation/ Safety	1
Driver / Information	1
Patient triage, Treatment, and Care	2
Total	**5**

Figure 60: Critical Tasking, MVA Low Mechanism

Injury MVA/High Mechanism/ Entrapment

Task	Minimum Personnel
Incident Commander	1
Scene Control/ Hazard Mitigation	1
Driver / Information	1
Patient Triage, Treatment, and Care	3
Extrication	3
Total	**9**

Figure 61: Critical Tasking, MVA High Mechanism/Entrapment

Extrication is defined as patient removal either by means of manual or mechanical methods.

Treatment and care duties may include; IV starts, c-spine immobilization/LBB immobilization, giving medications, CPR, hemorrhage management, heart monitoring, airway management, and other skills as needed.

If a fire is part of a MVA incident or more manpower is needed, an engine response will need to be requested.

If the number of patients begins to exceed the initial assignment in terms of patient care, the IC can implement the MPI/MCI response.

ON-SCENE OPERATIONS – SPECIAL RESCUE AND HAZMAT

Swift Water

Initial Response/ Scene Stabilization

Task	Victim Identified	Victim Unidentified
Incident Command	1	1
Operations Officer	1	1
Safety Officer	1	1
Down Stream Safety	2	2
Up Stream Safety	1	1
Riggers	2	2
River Right Search Team	2	2
River Left Search Team	2	2
Total	**12**	**12**

Figure 62: Critical Tasks, Swift Water Rescue, Initial Response

Swift Water Incident Mitigation*Task	Victim Identified
Incident Command	1
Public Information Officer	1
Safety/Accountability Officer	1
Operations Officer	1
Technicians/Riggers – River Left	4
Technicians/Riggers – River Right	4
Rescue Group – River Left	2
Rescue Group – River Right	2
Up Stream Safety	1
Down Stream Safety – River Left	2
Down Stream Safety – River Right	2
Total	**21**

Figure 63: Critical Tasks, Swift Water Rescue, Incident Mitigation

*Note: with situations in which access, night, wide river sections, number of patients, and overall degree of entrapment become a factor, the number of rescuers may increase.

Ice Rescue

Task	Victim Identified
Incident Command	1
Safety/Accountability	Same as IC
Rescue Group	4
Riggers	4
Haul Team	3
Total	**12**

Figure 64: Critical Tasks, Ice Rescue

*Note: Situations in which victims are unaccounted for will require more personnel. Ex. Divers. Add three additional personnel for every victim after the first two.

Steep Angle Rescue

Initial Scene Stabilization

Task	Minimum Personnel
Incident Command	1
Safety/Accountability	Same as IC
Rescuer	1
Edge Person	1
Total	**3**

Figure 65: Critical Tasks, Steep Angle Rescue, Initial Scene Stabilization

Incident Mitigation*

Task	Minimum Personnel
Incident Command	1
Safety/Accountability	Can be Operations Officer.
Operations Officer	1
Riggers	4
Rescuers	2
Edge Personnel	2
Haul Team	2
Total	**12**

Figure 66: Critical Tasks, Steep Angle Rescue, Incident Mitigation

*Note: Situations in which number of patients, accessibility, weather, and lighting become a factor may require more personnel.

Confined Space Rescue

Task	Minimum Personnel
Incident Command	1
Safety/Accountability	1
Operations Officer	1
Rescue Group	4
Air Resources / Air Monitoring	2
Rigging Group	2
Lock Out/Tag Out	1
Total	**12**

Figure 67: Critical Tasks, Confined Space Rescue

*Note: Situations in which degree of entrapment, lighting, Haz-Mat presence, and overall incident complexity become a factor may require more personnel.

Trench Rescue

Task	Minimum Personnel
Incident Command	1
Safety/Accountability	1
Operations Officer	1
Equipment Leader	1
Cutting Team	2
Shoring Team	4
Rescue Team	2
Total	**12**

Figure 68: Critical Tasks, Trench Rescue

*Note: Situations in which light, weather, trench depth, utilities, degree of entrapment, Haz-Mat presence, and overall complexity of the incident become a factor may require more personnel.

CRITICAL TASKS FOR HAZARDOUS MATERIAL RESPONSE

Task	Minimum personnel
Incident Command	1
Pump Operator	1
Firefighter	1
Total	**3**

Figure 69: Critical Tasks, Hazardous Materials Incident, Initial Response

Single resource responses include lower risk incidents such as small natural gas line breaks, small quantity gasoline and diesel spills, and unknown odor investigations.

If conditions are found that require additional resources, the Incident Commander can request additional units. For example, if a larger product is found, unknown or

unmarked substance is found, or injured or contaminated people are found, or a truck or rail container leaking, the IC will call for a full hazmat response.

Critical Tasks for Hazardous Material Response (full response)

Task	Minimum Personnel
Incident Command	1
Dedicated Safety Officer	1
Fire Protection	4
Medical standby	2
Spill control / leak detection / isolation	6
Effective Force	**14**

Figure 70: Critical Tasks, Hazardous Materials Incident, Full Response

A full hazmat response is used for incidents that escalate into an unknown product release, when perimeters and evacuations need to be established, or when the need for specialized personnel or hazardous materials team needs to be called in. The fire department resources typically are a first response to a hazmat incident. Mitigation cannot take place until the product can be identified and options are reviewed. The fire department does not typically do any clean up unless it is small fuel spills or containers that can easily be handled by city personnel and within our training and resource limitations.

The biggest risk to our community is from a commercial product spill, railroad emergency, or highway transportation accident. In these instances it is likely that a technical hazardous materials response team will be called in to assist. The hazmat team that covers Central Oregon is the Salem team. They estimate that they will have a 3 hour travel time to get to Central Oregon.

In most cases, hazmat incidents are very time consuming. Resources are usually needed to remain on scene in standby mode for protection of the scene.

ESTABLISHMENT OF AN EFFECTIVE RESPONSE FORCE

We have established which critical tasks are necessary to address emergencies and what the minimum number of personnel is required to complete these tasks. The Effective Response Force (ERF) is present when all apparatus and personnel arrive on scene and are able to act in a coordinated effort to complete the critical tasks necessary to stop the progression of the incident. Establishing response reliability for the effective response force is measured by the percentage of time the effective response force arrives within the set maximum amount of time.

Bend Fire & Rescue is currently achieving an effective response force (ERF) for structure fires in the city – 14 personnel on scene – **in 2008 80% of the time in 18 minutes.** The goal for ERF is **80% of the time in 15 minutes.** The following chart shows the actual number of times BF&R was able to muster an effective response force was a small percentage of structure fires. The 80% in 18 minutes previously stated is for the incidents we obtained the necessary 14 personnel on scene.

We met effective response force requirements 11% of the time for City structure fires and 17% of the time for DCRFPD #2 structure fires. This is for a variety of reasons, if a fire does not require the full ERF response units are cancelled while enroute, it may also result from inadequate resources. The other component for effective response force numbers on structure fires is of course the severity of the fire. History shows that the more firefighters arriving on scene in the quickest time makes the greatest impact on rescue, control of the fire, and extension to other rooms in the structure and beyond the structure. The first arriving personnel on scene assume command and make a size-up to determine if more of less apparatus, personnel, and resources are necessary to effectively mitigate the incident.

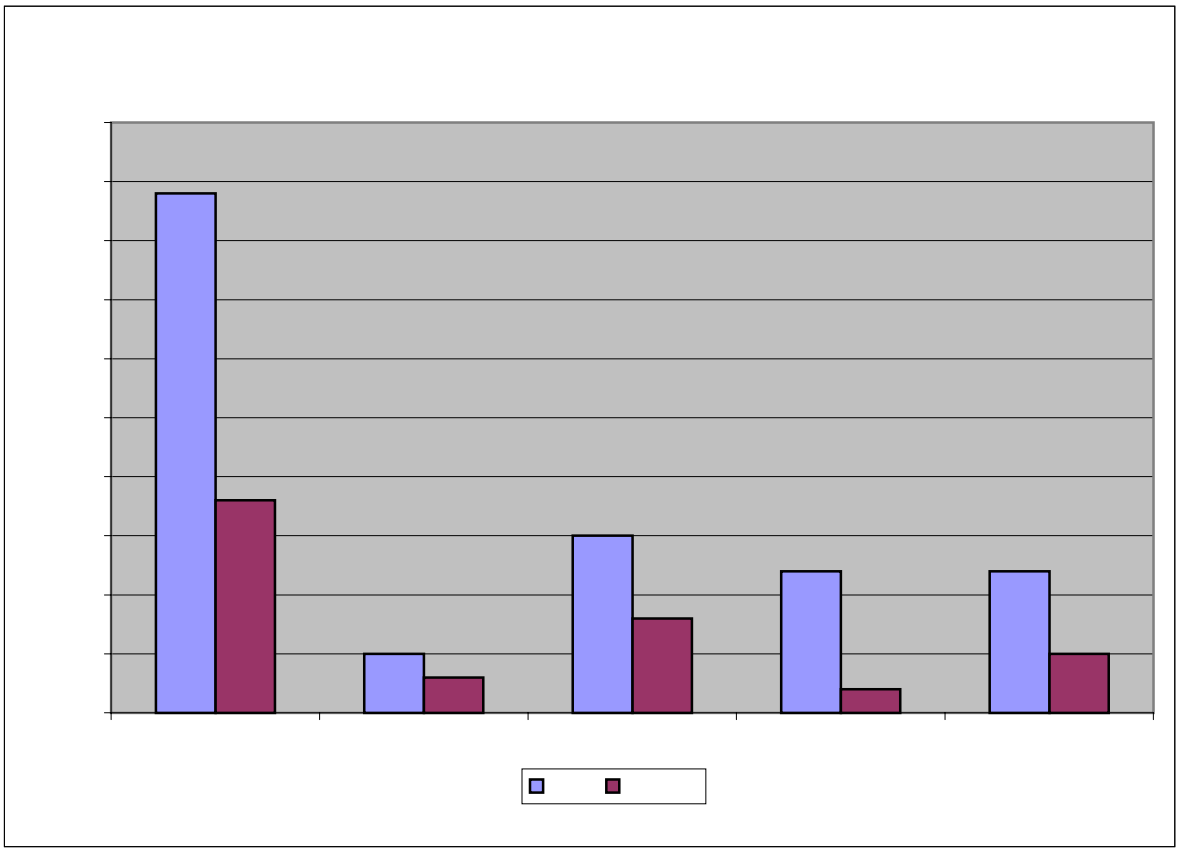


Figure 71: 2008 Structure Fire Response Staffing

Based on the evaluation of current response performance, critical tasking, and development of an effective response force, the following standards of coverage and goals are proposed:

INITIAL UNIT RESPONSE TIME – Performance Statements for all Emergency Incidents

City of Bend

Current Performance Statement: For **80%** of all incidents, the first due unit shall arrive within **8.5 minutes** (turnout time + travel time) response time. The first due unit shall be able to advance an attack line on a fire, provide ALS care on EMS incidents, and begin rescue efforts for rescue incidents.

(NFPA 1710 states 5.3 minutes (turnout time + travel time) response time for initial response on fire and special operation responses and 5 minutes for EMS responses, 90 percent of the time.)

Goal Performance Statement:
For **80%** of all incidents, the first due unit shall arrive within **8.5 minutes** (turnout time + travel time) response time. The first due unit shall be able to advance an attack line on a fire, provide ALS care on EMS incidents, and begin rescue efforts for rescue incidents.

Deschutes County Rural Fire Protection District #2

Current Performance Statement: For **80%** of all incidents, the first due apparatus shall arrive within **12 minutes** (turnout time + travel time) response time. The first due unit shall be able to advance a fire control line on the fire, provide ALS care on EMS incidents, and begin rescue efforts for rescue incidents.

Goal Performance Statement: For **80%** of all incidents, the first due apparatus shall arrive within **12 minutes** (turnout time + travel time) response time. The first due unit shall be able to advance a fire control line on the fire, provide ALS care on EMS incidents, and begin rescue efforts for rescue incidents.

Ambulance Service Area – Frontier Area Outside of Fire District

Current Performance Statement: For **80%** of all incidents, the first due apparatus shall arrive within **35 minutes** (turnout time + travel time) response time. The first due unit shall be capable of providing ALS care on EMS incidents.

Goal Performance Statement: For **80%** of all incidents, the first due apparatus shall arrive within **35 minutes** (turnout time + travel time) response time. The first due unit shall be capable of providing ALS care on EMS incidents.

STRUCTURE FIRE EFFECTIVE RESPONSE FORCE TIME – Performance Statements:

City of Bend

Current Performance Statement: Within the city limits of Bend and where adequate water flow is available from fire hydrants, the initial Effective Response Force (14 personnel) shall arrive within 18 minutes (turnout time + travel time) 80% of the time, and be able to provide a minimum of 400 gpm for 30 minutes and establishment of an effective water flow application rate of 300 gpm from two handlines, each of which shall have a minimum of 100 gpm.

(NFPA 1710 states an initial full alarm assignment within 9 minutes 20 seconds (turnout time + travel time) to 90 percent of the incidents with a minimum of 400gpm for 30 minutes and establishment of an effective water flow application rate of 300 gpm from two handlines, each of which shall have a minimum of 100 gpm).

Goal Performance Statement: Within the city limits of Bend the initial Effective Response Force (14 personnel) shall arrive within 18 minutes (turnout time + travel time) 80% of the time, and be able to provide a minimum of 400gpm for 30 minutes and establishment of an effective water flow application rate of 300 gpm from two handlines, each of which shall have a minimum of 100 gpm.

Deschutes County Rural Fire Protection District #2

Current Performance Statement: Within the fire protection district of DCRFPD #2 the initial Effective Response Force (14 personnel) shall arrive within 18 minutes (turnout time + travel time) 80% of the time, and be able to provide a minimum of 200 gpm sustained water flow for 20 minutes.

Insurance Services Office (ISO) Criteria for Class 8B: The minimum fire flow must be able to start within 5 minutes of the arrival of first Engine Company and the water supply must be able to deliver an uninterrupted minimum fire flow of 200 gpm for 20 minutes. The department must be able to deliver the minimum fire flow to at least 85% of the built-upon areas of the community within 5 road miles of a recognized fire station.

Goal Performance Statement: Within the fire protection district of DCRFPD #2 the initial Effective Response Force (14 personnel) shall arrive within 18 minutes (turnout time + travel time) 80% of the time, and be able to provide a minimum of 250 gpm fire flow for 2 hours duration without interruption.

Insurance Services Office (ISO) Criteria for Class 8: There must be a minimum water supply of 250 gpm for a 2 hour duration for the entire fire protection in the area. If the fire department delivers the 250 gpm through tanker shuttle, large-diameter hose, or other alternative water supply, the water must be available within five minutes of the arrival of the first-due apparatus, and the department must maintain the flow, without interruption, for the two-hour duration.

WILDLAND FIRE EFFECTIVE RESPONSE FORCE TIME – Performance Statements

City of Bend

Wildland Fires are very seasonably dependent and this results in wide variations of severity and numbers of incidents. The number of fires that require a full effective response force (currently 13 personnel) has fortunately been low in recent years. Of course, it only takes one severe fire season to change this perspective. Therefore, the performance statements will reflect this current lower volume and severity of incidents and will use the response of the 3 first arriving apparatus (6 – 10 personnel).

Current Performance Statement: Within the city of Bend the initial Effective Response Force (6 - 10 personnel) shall arrive within 15 minutes (turnout + travel time) 80% of the time and be able to establish an anchor point and begin flanking the fire perimeter.

Goal Performance Statement: Within the city of Bend the initial Effective Response Force (6 - 10 personnel) shall arrive within 15 minutes (turnout + travel time) 80% of the time and be able to establish an anchor point and begin flanking the fire perimeter.

Deschutes County Rural Fire Protection District #2

Current Performance Statement: Within the DCRFPD #2 the initial Effective Response Force (6 - 10 personnel) shall arrive within 28 minutes (turnout + travel time) 80% of the time and be able to establish an anchor point and begin flanking the fire perimeter.

Goal Performance Statement: Within the DCRFPD #2 the initial Effective Response Force (6 - 10 personnel) shall arrive within 28 minutes (turnout + travel time) 80% of the time and be able to establish an anchor point and begin flanking the fire perimeter.

EMS EFFECTIVE RESPONSE FORCE INCIDENTS WITH 2 OR MORE COMPANIES – Performance Statements

City of Bend

Current Performance Statement: Within the City of Bend the initial Effective Response Force for EMS incidents requiring 2 companies or more (5 or more personnel) shall arrive within 12 minutes (turnout + travel time) or less 80% of the time.

Goal Performance Statement: Within the City of Bend the initial Effective Response Force for EMS incidents requiring 2 companies or more (5 or more personnel) shall be 12 minutes (turnout + travel time) or less 80% of the time.

Deschutes County Rural Fire Protection District #2

Current Performance Statement: Within the DCRFPD #2 the initial Effective Response Force for EMS incidents requiring 2 companies or more (5 or more personnel) shall be17.5 minutes (turnout + travel time) or less 80% of the time.

Goal Performance Statement: Within the DCRFPD #2 the initial Effective Response Force for EMS incidents requiring 2 companies or more (5 or more personnel) shall be 17.5 minutes (turnout + travel time) or less 80% of the time.

DISPATCH CALL TYPES

Dispatch Call Types are commonly referred to as Run Cards. These predefined apparatus assignments, based on the type of incident, establish the automatic initial response of apparatus and personnel predicated on the expected level of commitment for the specific incident. Based upon the information obtained from the caller in the 9-1-1 center, a call type is determined and entered into the dispatch computer system.

Run Cards are set up in the dispatch system to automatically assign apparatus and are tiered in the response level as the complexity or severity of the incident increases.

The Call Types or Run Cards are as follows:

Note: Run Card assignments are not cumulative totals (complete alarm assignment at listed level of alarm), each additional alarm adds the resource stated, as the number of alarms increase; assignments can be modified as necessary by the Battalion Chief. BF&R does not routinely use or request 2nd, 3rd, etc. alarm assignments: Battalion Chiefs order resources as they deem necessary. Although the alarm assignments are listed below, BF&R does not currently have on duty personnel to staff all alarm assignments. *First alarm responses for any significant fire usually completely deplete on-duty resources*. Because our current daily average number of responses is in excess of 20/day the chance of apparatus

being previously committed to prior incidents, and therefore unavailable, is very high. As incidents escalate, off-duty personnel are called back to staff apparatus as possible. Although personnel are not required or paid to be on call, they are issued pagers to return for call backs if they are available.

Alarms are listed alphabetically.

Ambulance/Medic – Alpha, Bravo

- 1st alarm – 1 Ambulance
- 2nd alarm – 1 Ambulance, 1 Engine, 1 Battalion Chief

Ambulance/Medic - Charlie, Delta, Echo

- 1st alarm – 1 Ambulance, 1 Engine
- 2nd alarm – 1 Ambulances, 1 Engine, 1 Battalion Chief
- 3rd alarm and more alarms – Additional Ambulances are dispatched as required based on number of patients, Engines are added as additional manpower is needed or fire is involved.
- When Multiple Patient Incidents (MPI) or Mass Casualty Incidents (MCI) are dispatched regional resources are activated with Task Forces of Ambulances and other apparatus as required.
- The Clausen System for Medical Dispatch is utilized by DCCA to decide medically appropriate levels of response for ambulance responses. This system utilizes a tiered level of response as the severity of the medical or trauma incident increases.

Motor Vehicle Crash – Low Mechanism

- 1st Alarm – 1 Ambulance, 1 Engine
- 2nd Alarm – 1 Ambulance, 1 Rescue, 1 Battalion Chief

Motor Vehicle Crash – High Mechanism

- 1st alarm – 1 Ambulance, 1 Rescue, 1 Engine, 1 Battalion Chief
- 2nd alarm – 2 Ambulances, 1 Engine

Brush Fire – Light (Non-Fire Season)

- 1st alarm – 1 Engine

Brush Fire – Heavy (Wildland Fire Season)

- 1st alarm – 4 Interface, Battalion Chief
- 2nd alarm – 1 Interface, 1 Water Tender, 1 Type 6, 3PC, 3CO, PIO, ISO, DO (notification for Mutual Aid)
- 3rd alarm – 2 Brush Units
- 4th alarm – Task Force

Commercial Structure Fire – Hydrant Area

- 1st alarm – 4 Engines, 1 Ladder Truck, 1 Medic, Battalion Chief
- 2nd alarm – 3PC, 3CO, PIO, ISO, DO (notification for Mutual Aid)
- 3rd alarm – 2 Engines (Mutual Aid)
- 4th alarm – Structural Strike Team

Commercial Structure Fire – Non-Hydrant Area

- 1st alarm – 3 Engines, 1 Water Tender, 1 Ladder Truck, 1 Medic, Battalion Chief
- 2nd alarm – 3PC, 3CO, PIO, ISO, DO (notification for Mutual Aid)
- 3rd alarm – 1 Engine, 1 Tender
- 4th alarm – Structural Strike Team

Duty Officer or Public Service

- 1 Engine or Battalion Chief as needed

Hazardous Material

- 1st alarm – 1 Engine
- 2nd alarm – 2 Engines, 1 Rescue, Medic, Battalion Chief
- Any Hazardous Material spills or releases of significant quantity or unknown type: activate the Regional Haz-Mat Team
- Additional resources are dispatched as necessary i.e. ambulances, clean up companies, etc

Illegal Open Burning

- 1 Engine

Rescue – Steep Angle, Water, Confined Space, Trench, Collapse

- 1st alarm – 2 Engines, 1 Rescue, 1 Medic, BC
- 2nd alarm – 2 Engines, Rescue Page, Search & Rescue, PIO
- 3rd alarm and more are dependent on the type of incident and complexity
- Rescues can become extremely complex, time significant, and personnel intensive incidents

Single Engine Response

- 1 Engine or Battalion Chief

Structure Fire – Hydrant Area

- 1st alarm – 3 Engines, 1 Rescue, Medic, Battalion Chief
- 2nd alarm – 1 Engine, 1 Medic, 3PC, 3CO, ISO, PIO, DO (Notification for Mutual Aid)
- 3rd alarm – 2 Engines Mutual Aid
- 4th alarm – Structural Task Force

Structure Fire – Non-Hydrant Area

- 1st alarm –3 Engines, 1 Water Tender, Medic, Battalion Chief
- 2nd alarm – 1 Rescue, 1 Water Tender, Medic, 3PC, 3CO, ISO, DO (Notification for Mutual Aid)
- 3rd alarm – 1 Water Tender, 1 Engine
- 4th alarm – Structural Task Force

SECTION SIX: Distribution of Resources

Bend Fire & Rescue has 5 fire stations and is currently preparing for property acquisition for a 6th station. As previously discussed, location of these stations has been established historically from growth patterns and verified with fire station locating software. Bend's vast area and lower population density requires stations to be located in areas outside the core of the City of Bend to decrease response times for the entire City and Fire District.

Fire stations have multiple pieces of apparatus assigned at each location. Although each station may house up to 6 or more pieces of fire, rescue, or ambulance equipment, staffing for each station is limited to a minimum of 3 personnel in 3 stations, 4 in one station, and 5 at the remaining station. This minimum level of staffing occurs when personnel are on sick leave, injury leave, vacation, holiday, or other leave. Maximum/full staffing would place 5 personnel at 1 station, 6 personnel at 2 stations, and 3 personnel at 2 stations. These staffing levels were implemented during June of 2009.

If stations are staffed at maximum/full staffing 2 stations will have 2 staffed pieces of apparatus i.e. one of the following: Engine, Ladder Truck (Quint) or Rescue, Interface Engine, or Tender and a 2 person staffed ambulance. Unfortunately, maximum staffing is a rarity, and it is much more common for only 1 or 2 stations to have 2 crews, leaving single crews at the other stations. BF&R is fairly unusual in this operational configuration. Personnel will be assigned to the apparatus that is dispatched based on the type of incident. When a response occurs, the remaining apparatus in the station are unstaffed.

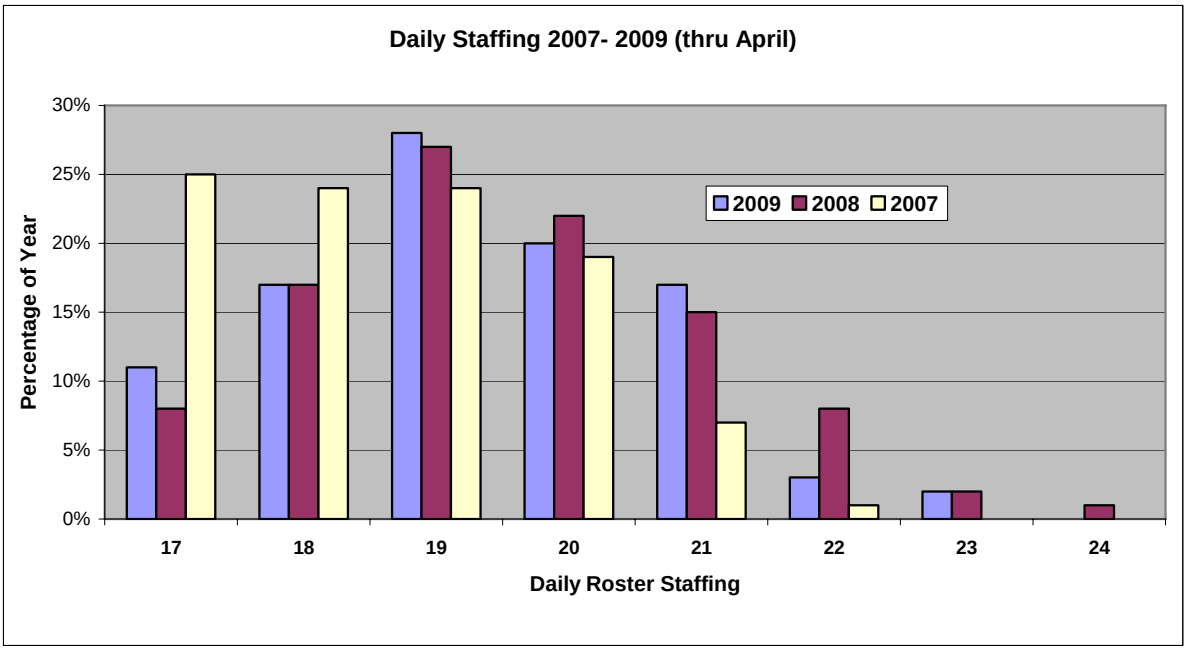


Figure 72: Daily Roster Staffing

STATION STAFFING

Staffing listed below, are minimum and maximum per shift per station. Maximum staffing is rarely reached due to current position vacancies, injury leave, sick leave, vacations, etc. Apparatus is set minimum to staff the vehicle for operation under normal operational parameters. Cross staffing refers to personnel moving to other types of vehicles for specific call types, i.e. for brush fires personnel would use interface engine. Previously discussed critical tasking is the foundation for staffing levels on apparatus.

Station 301 – West		Minimum Staffing	Maximum Staffing
	Battalion Chief	1	1
	Engine 321	3	3
	Interface Engine 341	Cross Staffed	Cross Staffed
	Quint* 351	Cross Staffed	Cross Staffed
	Medic 371	Cross Staffed	2
	Medic 370	Reserve Apparatus	Reserve Apparatus
Station 302 - Tumalo			
	Engine 322	3	3
	Interface Engine 342	Cross Staffed	Cross Staffed
	Medic 372	Cross Staffed	Cross Staffed
Station 303 - South			
	Engine 323	3	3
	Interface Engine 343	Cross Staffed	Cross Staffed
	Water Tender 333	Cross Staffed	Cross Staffed
	Medic 373	Cross Staffed	Cross Staffed
Station 304 - East			
	Engine 324	3	4
	Water Tender 334	Cross Staffed	Cross Staffed
	Light Brush 344	Cross Staffed	Cross Staffed
	Medic 374	2	2
Station 305 - North			
	Engine 325	3	3
	Rescue 365	Cross Staffed	Cross Staffed
	Water Tender 335	Cross Staffed	Cross Staffed
	Light Brush 345	Cross Staffed	Cross Staffed
	Medic 375	Cross Staffed	2
	Engine 326	Reserve Apparatus	Reserve Apparatus

***Quint Fire Apparatus have a pump, water tank, hoses, aerial ladder or platform, and ground ladders.**

Figure 73: Station Staffing

Personnel and apparatus are stationed based on multiple factors. A periodic evaluation of these factors may change staffing or apparatus placement.

Evaluation of these factors is one of the most significant challenges facing BF&R. There is no one source of data compiled which takes into account all of the considerations that form an "ideal" configuration of staffing and apparatus placement. The set of factors that must be considered are as follows, but this is not all-inclusive:

- Street infrastructure, including addition of new streets, bridges, controlled intersections, railroad crossings, roundabouts, dead ends, traffic patterns, shortest routing, street construction, utility work, one-way streets, weather related problems (historical flooding, snow accumulation, etc.)
- Station location for access to the Parkway and through streets
- Frequency of incidents by location
- Frequency of incidents by type
- Frequency of incidents by time of day
- Population growth patterns
- Industry type and location
- Hospital location
- Nursing and senior care facilities
- Wildland Interface zones
- Bordering national forests, BLM, and state forest lands
- Access points to Deschutes River and canals

Deschutes County Communication Agency (DCCA) is currently adopting a GIS (geographical information system). With complete implementation, the department will be able to evaluate the location of all incidents by overlaying them onto a map. With various "layers" of the map, the department can overlay response zones which take into consideration many of the aforementioned factors above. Particularly valuable will be the ability to evaluate response times by road factors such as intersections, bridges, routing, etc. After implementation, the department can shape response zones which can show true response times and inherent weaknesses in the street infrastructure that might create delays for emergency apparatus. Response zones can then be created based on time and percentile analysis can be used to describe performance capabilities. This project has been ongoing for quite some time (years) and a final implementation date is unknown.

SECTION SEVEN: Concentration of Resources

To be most effective in mitigating incidents of all types, it is essential that typed resources are concentrated in those areas that are likely to demand utilization. Currently, BF&R is utilizing this concept only loosely due to local conditions. In other words, our local economic, industrial, and businesses, are not dense enough to truly utilize this concept in a strict sense.

We do have areas of similar development and use, such as the dense medical community on the Northeast side of Bend. Our East Station – 304 is appropriately located for responses to this area. However, the calls to this area are concentrated during normal business hours and the routine calls are being handled by the staffed ambulance. We have also found the Bend Parkway gives great central access from our North Station – 305. By staffing 305 with a second crew when staffing allows they have better and quicker access to all geographical areas of Bend as opposed to starting away from the Parkway and responding across town.

Another way to concentrate resources is by having apparatus positioned to meet the likely needs of the area, (e.g. our interface engines are placed at the stations that have the most significant possibility of a wildland/urban interface fire). The rescue truck with extrication equipment is stationed at the north station near the Bend Parkway and where additional crews are stationed if manning is above minimum staffing levels. The ladder/quint truck is stationed at the west station which is the closest station to downtown with the highest density of taller structures that could require the use of the ladder truck. However, given that the West Station has the lowest response reliability, we are considering the possible movement of the ladder truck to the North Station that has 2 crews more frequently and Parkway access.

As Bend grows and population density increases, concentration of resources will become more significant. As the density of population increases, so does the density of alarms, as well as the need for more personnel in stations for better depth of resources. It is expected that this trend will continue in the future.

Station and resource concentration/location to achieve more effective utilization has some historical perspective in Bend. The greater Bend area has been very spread out for a long time and is likely the result of rural parcels being used as small ranches and farms. As Bend has grown the planning regulations have changed and the minimum size of buildable lots has decreased drastically, even in the more rural areas. With the increased density of homes and population the resultant increase in emergency service alarms is to be expected. However, the original infrastructure of fire stations was based on more rural response patterns, i.e. expectations for emergency responses were based on more through streets with less traffic control devices, less traffic, etc.

Now that infill and density are occurring the community needs to consider whether the fire stations too far apart? Certainly from the perspective of traditional fire service infrastructure they are too distant from each other for the best response times. NFPA 1710 specifies a 5.3 minutes or less response time for the first arriving engine company and/or 9.3 minutes or less for the deployment of a full first alarm assignment 90% of the time[7] for most effective firefighting performance. BF&R can only meet this national standard a fraction of the time, and for a complete first alarm with an effective response force it is approximately twice as long. During 2008 the first arriving apparatus on scene at city structure fires arrived in 5.3 minutes or less only 30% of the time and this was not necessarily an engine company.

[7] NFPA 1710 4.1.2.1

There is definitely a limit to how much we can reduce response times, even with the most efficient system and maximum manpower, and that is in part a function of the distance between stations. An in-depth examination of this situation is beyond the scope of this process and will require an extensive analysis and cost benefit ratio consideration.

SECTION EIGHT: Response Reliability

Measuring response reliability establishes how much depth the emergency service has and if resources are appropriately disseminated. Ideally, at 100% response reliability every call would be handled by the closest station with adequate personnel and the appropriate apparatus: this would keep response times to a minimum. However, this requires vast resources, and few communities can afford this level of service.

The answer is a compromise and a system to provide backup response capabilities when the closest station is on a response, at training, out of service due to mechanical problems, or other assignments. This is the routine operation for any fire department. Establishing what an acceptable amount of response reliability is where some national standards come into play, specifically, the American Heart Association and the National Fire Protection Association. As previously discussed, the standards for total response time are predicated on saving life and property. If response time increases too much in medical responses – such as a heart attack – studies have clearly shown outcome for patients declines. If response times for fires increase incipient fires grow rapidly and life and property damage escalates.

This is why measuring response reliability becomes so important. If crews are responding into other station's response areas to provide a back up response for a crew already on a previous call, response times get much longer. In some instances, other agencies are called to provide mutual aid response when all crews are on calls and another incident occurs.

In an earlier section, concurrent calls were discussed. Response reliability is a key component and another way to measure. As demonstrated in the charts below, City responses are handled by first due stations approximately 72% - 78% of the time for 3 stations and 87% for one station. This means that for 3 of the stations, approximately 25% of the time, apparatus have to respond into another station's response area to cover the first due station's call. Station 304 – East with 2 dedicated crews has the more desirable reliability of 87% for City responses. Clearly, staffing at this level improves response reliability.

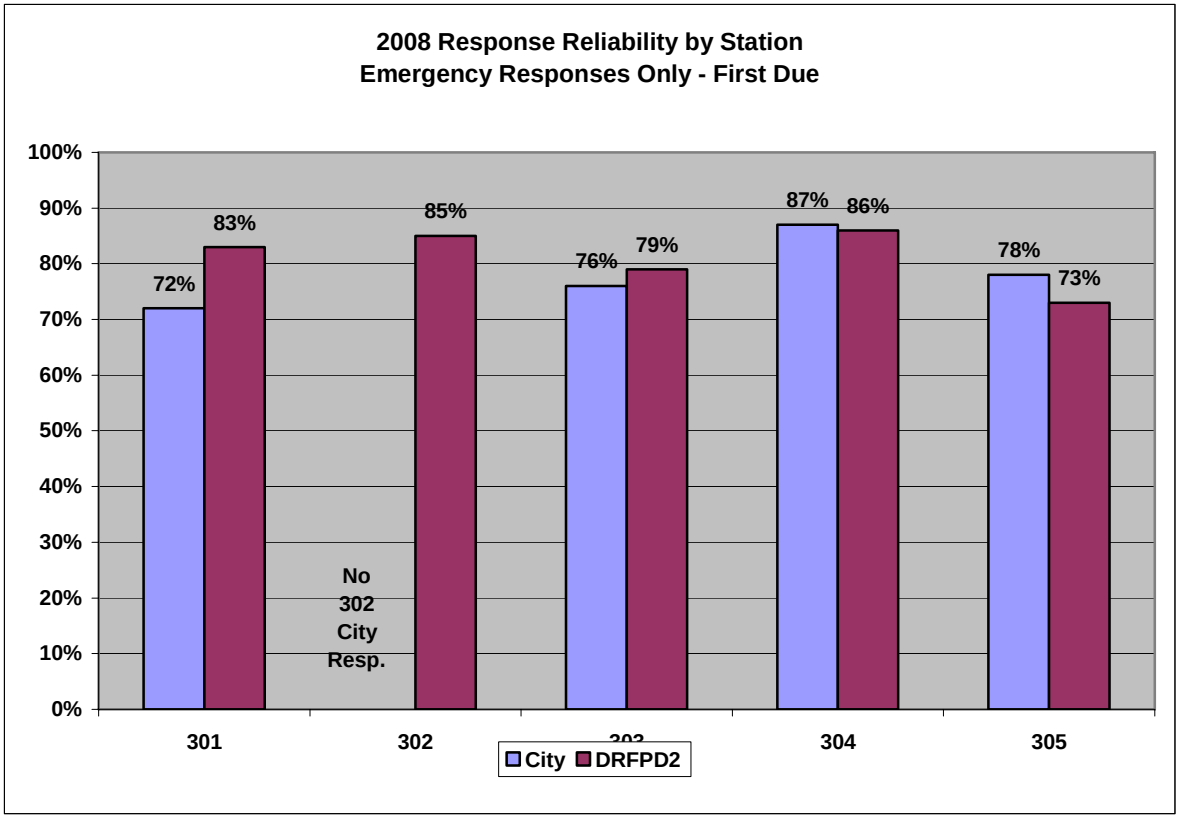


Figure 74: 2008 Response Reliability by Station

Unmistakably, this is a significant amount of apparatus movement across station response zones. With the number of simultaneous calls increasing, and the present status of response reliability, this demonstrates a weakness in the system.

When manning is at maximum, response reliability improves because 3 stations have 2 dedicated crews. Station 304's dedicated ambulance responds to all EMS calls in 304's and 303's response areas. Station 305's dedicated ambulance responds to all EMS calls in 302's, 305's and 301's response areas. Because 75+% of all responses are EMS-related, the majority of EMS calls can be handled by these two dedicated ambulances. If there are concurrent calls, then 303 and 301 can respond with their ambulances. With these two extra crews more stations are available for first due responses in their own areas – this improves response reliability. Unfortunately, shortages of staffing limit the frequency of this staffing configuration.

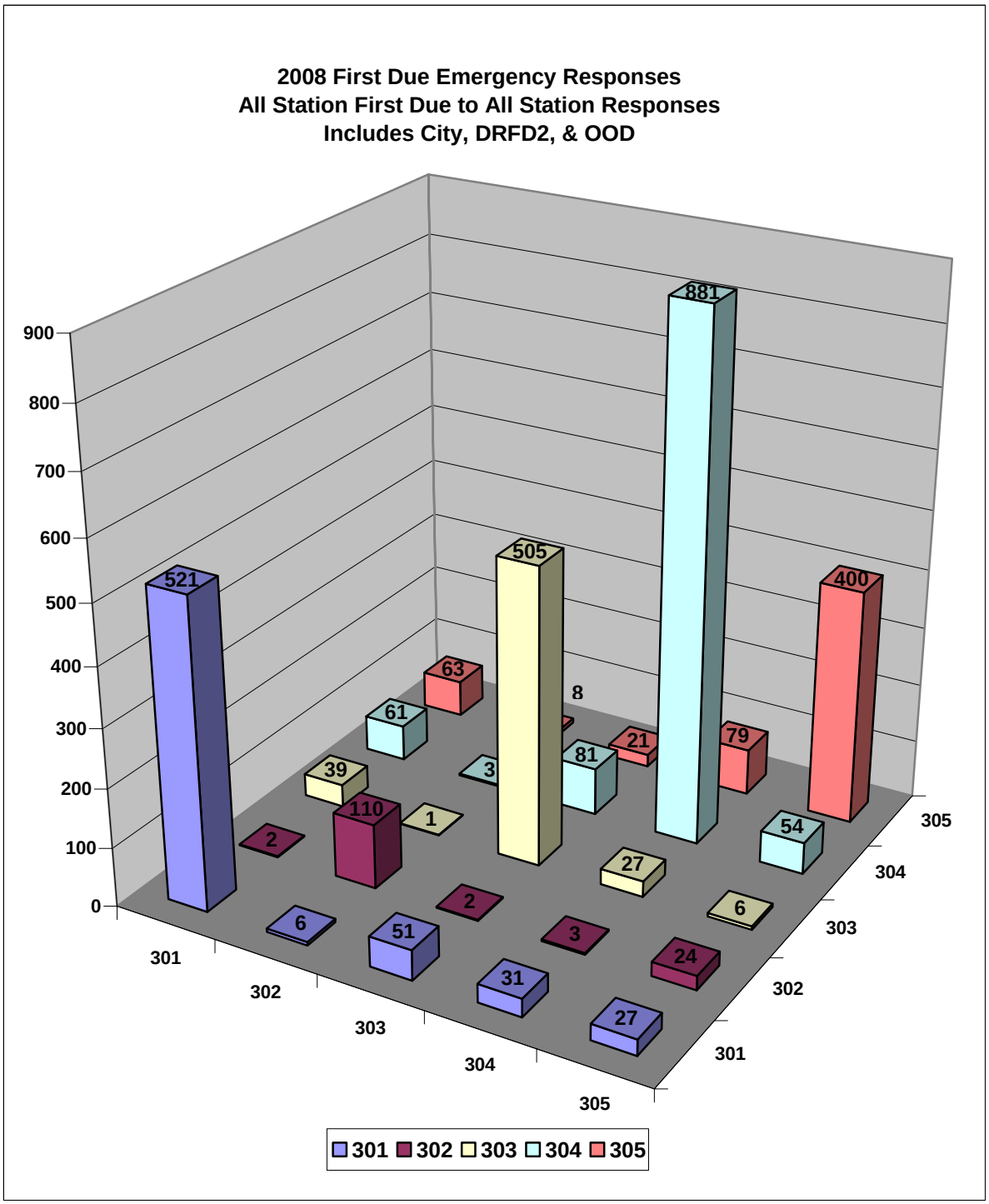


Figure 75: 2008 First Due Emergency Responses

The above chart represents how many emergency responses that each station is responding to in their area and other station areas. Example: The purple columns are for station 301 (West), they responded to 521 incidents that occurred in their primary response area, 6 in station 302 area (Tumalo), 51 in station 303 area (South), and 27 in station 305 area (North). Note: these are emergency incidents, does not include nonemergency responses.

Another factor that must be considered when measuring response reliability is the amount of time that units and personnel are being utilized by type of call. By analyzing our historical data for call time the following call increments were realized.

For responses within the City

- EMS responses with patient transport – average 1 hour and 10 minutes
- EMS responses without patient transport – average 35 minutes
- Structure fires with extensive damage – average 2 hours and 30 minutes
- Structure fires without extensive damage – average 1 hour and 35 minutes
- Brush fires inside city limits – average 1 hour
- Rescue responses – average 1 hour
- Service/public assistance responses – average 1 hour

For responses in DCRFPD #2

- EMS responses with patient transport – average 1 hour 25 minutes
- EMS responses without patient transport – average 40 minutes
- Structure fires with extensive damage – average 2 hours and 20 minutes
- Structure fires without extensive damage – average 2 hours
- Brush fires – average 2 hours
- Rescue responses – average 3 hours
- Service/public assistance responses – average 1 hour

These time increments are average: complex advanced life support patient responses can easily take more than 2 hours. Complex rescue incidents require several hours. Large or commercial structure fires can last 6 to 12 hours with some going more than an entire day. Extensive wildfires can last for days and consume all local and regional resources.

These average time response numbers illustrate **typical** responses in the categories listed. By understanding the amount of average time that incidents consume, one can get a better perception of the resource allocation and response reliability when a unit and its personnel are dedicated to a response. With the lack of personnel depth in our stations, this further demonstrates the need for additional crews to staff apparatus that would otherwise not be utilized until the crew returns from the first incident.

<u>SECTION NINE:</u> Performance Measurement, Performance Abnormalities, Quality Improvement, and Policy & Practice Guidelines

PERFORMANCE MEASUREMENT & ABNORMALITIES

Collecting and analyzing the data to obtain a statistical view of BF&R's performance necessitates a thorough review of the raw data that is collected. This process starts with the dispatch software that documents times on all aspects of call receiving, processing, and dispatching. All response data was historically downloaded to the City of Bend's HTE records system, and then personnel completed the required reporting information for each incident. In August, 2005, the new records system "24/7" was launched, and the dispatch data is transferring "live" and eliminating the HTE records system.

When the current 24/7 records program was implemented a computer interface was installed to allow the information from dispatch to be downloaded to the records program. This interface program has caused many problems since installation and caused a significant amount of incident time documentation errors. The problem, although difficult to describe, is that times for event milestones are being recorded that are not accurate. We have been attempting to work with two software companies to solve this problem, but we have been unsuccessful. On going discussions are occurring and a solution is hopefully on the horizon. No time table has been set for resolution of this problem.

All incident data has to be "cleaned" prior to utilizing it for performance measurement. "Cleaning" the data eliminates those incidents that are not valid and badly skew our performance. This is **not** a process to allow us to include only those incidents that meet our needs or standards; this is a process that cleans out grossly wrong data from responses. Example: evaluation of turnout time as one parameter of measuring system performance. When the raw data is analyzed it showed an average turnout time of over 3 minutes, when we analyzed the data we found multiple incidents of turnout times in the hours and even one for over 20 hours. On examination of the details of the incidents and found the problem with the clock documentation of the time – of course we never take hours to "turnout". When this inaccurate data was eliminated it brought us closer to our own stated standard of 90 seconds on average.

Historically, we have not been cleaning the data and the results were sometimes obvious – as in the cited example – but sometimes not so obvious, almost undetectable. The net result was almost always showing our measured performance as slower than it actually was. As previously discussed, a great portion of these errors are a result of system error. This system issue can hopefully be improved by implementing mobile data computers for all apparatus and improving software recognition of the appropriate time stamps.

Data analyzing and cleaning takes a considerable amount of time, and currently this is not a standardized function within BF&R due to lack of staff. Data is currently

being reviewed only for gross errors that are easily identified. This process will verifies and validates the data that is used to measure performance and periodically review the process for compliance. Without this function, operational decisions cannot be made with complete confidence.

Once we are confident with the collected data, then it can be utilized for the important operational decisions, and it will come full circle – we then implement the change and evaluate the data to see if the changes are effective.

EMS QUALITY ASSURANCE COMMITTEE

The QA committee is charged with maintaining quality of patient care for the department. This committee meets the 4th Tuesday of each month to review all of the EMS reports. The committee membership consists of three shift representatives and two members at large from the department.

All responses are reviewed for the following criteria, but not all inclusive:

- Was the treatment provided done according to protocols?
- Did the Medic accurately document the conditions found at the scene that would justify the treatment provided?
- Were all patients that were not transported appropriately evaluated and treated on the scene?

Since we have been reviewing 100% of all EMS responses we have positively impacted patient care by identifying the need for new protocols, drugs, medical equipment needs, procedures, and medical communication.

PHYSICIAN SUPERVISOR CASE REVIEWS

Twelve times per year our two physician advisors meet on the 4th Tuesday of the month for a confidential case review with the on duty crews and any off duty EMT's who wish to attend.

The doctors review all EMS patient contacts for the month and then choose which cases they will review with our personnel in a two hour session. Through the use of a secure internet connection at the training center the doctors are able to show us all of the patients' X-rays, CT Scans, MRI images, as well as being able to listen to the dictation notes from the physicians who treated the patient. We are also able to view written dictation notes as well from the ER doctor who was on duty at the time that the patient was seen.

MEDICAL PROTOCOLS

Each month the East Cascades Emergency Medical Services (ECEMS) Council meets and has a portion of the agenda for any proposed protocol changes. Once a year the physician advisors in Central Oregon meet to review the proposed changes and to accept or reject the proposals. Updates are sent out once a year and a roll-

out training is held to go over the new changes. These roll-out sessions are documented, recorded, and sent to all agencies who are not able to attend the live meeting

STANDARD OPERATIONAL GUIDELINES – SOGs

SOG's provide a summarized outline for personnel to follow on incidents of all kinds. Although all personnel are trained to perform automatically during incidents, not all types of incidents occur on a regular basis, and some objectives are relative to the specific type of incident. Having a way to quickly review standardized procedures can be a real benefit, particularly for new personnel, newly appointed officers, or those working in a capacity not normally assigned.

For SOG's to be practical and relevant they need to be periodically reviewed and updated as the department and community grows and changes.

POST INCIDENT ANALYSIS

Post Incident Analysis (PIA) provides a method to review incidents with the intent to improve safety for incident responses, as well as to continually improve all operations.

Incident analyses occur for any of the following reasons:

- Any incident deemed necessary by the IC
- Any incident where a written request is made to and approved by the Shift Commander
- Any incident where there is a serious injury to a firefighter
- Any "Greater Alarm" incident requiring mutual aid.

After a PIA is conducted, a summary is recorded and then forwarded to the Deputy Chief of Operations for review. The Training Officer is responsible for applying information resulting from the PIA to the Training Program.

CUSTOMER SERVICE SURVEY REPORT

We have had a customer service survey program in place for a few years and the results have always been quite favorable. The following criteria have been utilized for the surveys:

- Every 15th fire and EMS incident response elicits a simple questionnaire to be mailed to the involved party.
- Every 10th fire inspection also elicits a questionnaire to the inspected business.

In 2008 the responses to the incident questions were as follows:

- *Rate our Firefighter's and Medic's abilities to respond professionally and quickly to your call:* 78% excellent, 14% good, 8% no opinion, and no poor responses.
- *Rate our Firefighter's and Medic's abilities to arrive promptly at the incident location:* 76% excellent, 13% good, 1% fair, 10% no opinion, and no poor responses.
- *Rate our Firefighter's and Medic's ability to show concern for your health, safety, and welfare at the incident:* 82% excellent, 8% good, 10% no opinion, and no poor responses.
- *Rate our Firefighter's and Medic's ability to appear professional in manner and dress:* 80% excellent, 13% good, 7% no opinion, and no poor responses.
- *Rate our Firefighter's and Medic's abilities to inform you of the conditions of your property (i.e. house, car) during and after the incident:* 37% excellent, 9% good, 1% fair, 53% no opinion, and no poor responses.
- *Rate our Firefighter's and Medic's ability to provide you with complete instructions and information after the incident:* 58% excellent, 7% good, 1% fair, 34% no opinion, and no poor responses.

If you eliminate those that had no opinion the vast majority of responses would be excellent, we feel quite good about that but there is always room for improvement.

SECTION TEN: Safety and Survival of Firefighters and Citizens

The safety of our citizens and firefighters is principal to our mission. For this to be fully integrated into our department, safety must permeate all aspects of the organization. BF&R has made this commitment, and this section briefly discusses the various programs, functions, and activities dedicated to safety.

BF&R has had a continuously operating Safety Committee for more than 30 years and has achieved much. Oregon OSHA has routinely been asked and responded to evaluate the safety of our stations, operations, and policies. We have had inspections without any infractions – something we consider to be an achievement.

Much of our training for personnel is designated for safety related purposes and is mandatory.

On-scene safety is the **number one priority** for all personnel. Designating an ISO (Incident Safety Officer) on incidents is paramount and having adequate training to conduct this function is critical. When incidents are complex and extended, the necessity of having someone look at the "big" picture becomes very important. Although safety is important to all, when conducting individual tasks, the view becomes narrower, and this is when the ISO function becomes essential to protecting all personnel on scene, as well as the general public.

HEALTH & FITNESS PROGRAM

Fire, Rescue, and EMS operations are recognized throughout the country as among the most hazardous duties of all occupations for which statistical data is available. Tasks required of fire service personnel are extremely demanding physically. Personnel performing these operations must possess above average strength, endurance, and agility. Keeping all Bend Fire employees at the level of fitness necessary to avoid injury and complete all tasks of operations is one of the biggest challenges that face the department.

FITNESS COMMITTEE

The function of the Fitness Committee is to continually assess the effectiveness of the fitness program and implement contemporary health and fitness concepts for the benefit of department members. The goal of the fitness committee is to help each member maintain the level of fitness needed to live healthy lives and perform all job duties effectively. The fitness committee is not a disciplinary body. To date, the fitness committee has achieved many of its goals.

- Working with fire department administration to dedicate a portion of every work day to a mandatory fitness period for employees.
- Maintaining dedicated exercise rooms and an inventory of commercial grade exercise equipment in each station.
- Providing annual blood draws to help in early identification of heart disease and verification of vaccine strength.

Currently the fitness committee is in early stages of planning to implement the Joint Wellness-Fitness Initiative, a national health program being cooperatively started by both the International Association of Fire Fighters and the International Association of Fire Chiefs. The Joint Wellness-Fitness Task Force, representing labor and management, have dedicated itself to developing a holistic, positive rehabilitating and educational approach to wellness and fitness programs in the fire service. The task force has created 3 programs:

The Fire Service Joint Labor Management Wellness/Fitness Initiative

This program is designed for incumbent fire service personnel. It requires a commitment by labor and management to a positive, individualized wellness-fitness program. The components are as follows:

- Fitness evaluation
- Medical evaluation
- Rehabilitation
- Behavioral health
- Data collection

The Candidate Physical Ability Test

The Candidate Physical Ability Test (CPAT) was developed as a fair and valid evaluation tool to assist in the selection of fire fighters, and to ensure that all fire fighter candidates possess the physical ability to complete critical tasks effectively and safely. The CPAT Program covers every aspect of administering the CPAT, including recruiting and mentoring programs, providing recruits with fitness guidance to help prepare them for the CPAT and setting up and administering the test.

BF&R has historically used in-house testing for physical testing of candidates; the CPAT would be a new program.

The Fire Service Peer Fitness Trainer Certification

The IAFF/IAFC Task Force has determined that successful implementation of the Wellness/Fitness Initiative and the CPAT requires fire fighters in each department who can take a leadership role. These individuals must have the ability to design and implement fitness programs, to improve the wellness and fitness of his or her department and to assist with the physical training of recruits. This need for department-level leaders led to the development of the Fire Service Peer Fitness Trainer certification program. The program is being developed in conjunction with the American Council on Exercise.

BF&R currently has 3 personnel seeking certification as Peer Fitness Trainers or personal trainers through ACE or another certifying agency.

SECTION ELEVEN: Recommendations

1. Recommendation - Staffing

Recognizing the challenges of adding personnel to mitigate the current staffing shortages, we feel that is incumbent on staff to recommend that we make progress toward addressing this issue.

Our recommendation is to add personnel based on the following schedule:

2011 – 7 Firefighters

2013 – 6 Firefighters

Rationale

Current staffing levels adversely impact our response times, response reliability and the ability to develop an effective response force on many incidents. Our response times and ability to develop an effective response force currently deviate significantly from industry standards and national norms. Deployment of additional personnel will move us toward achieving performance statement goals for initial unit response times, effective response force and response reliability.

The primary focus on additional staffing will be directed to EMS Units to address multiple EMS responses. Dedicated medic units operate as a two person crew so adding 7 Firefighter/Medics adds 1 new medic response unit for each day.

Metrics

The effectiveness of implementing this recommendation will be measured by the impact to response times, response reliability and ability to develop an effective response force relative to future call volume increases or decreases.

2. Recommendation – Response to care facilities

The Fire Department should begin a program to collect and analyze data to determine location and types of calls to retirement and senior care assisted living facilities. Develop an outreach program to educate residents and staff of these facilities. Consider alternative response methods for these facilities to increase emergency response reliability.

Rationale

A significant portion of EMS incidents are attributed to retirement and senior care assisted living facilities. All possible solutions to address this response volume should be considered. By addressing this issue as a education and training process we should be able to make a positive impact to our response reliability, response time and ability to develop an effective response force for other incidents.

Metrics

The effectiveness of this program will be measured through data collection of numbers and types of facilities and corresponding response volume.

3. Recommendation – Fire Prevention

Continue to support and participate in public education programs to modify behaviors and reduce the risk for catastrophic wildland interface and other fires.

Rationale

Wildland and Urban Interface Fires continue to be the most significant risk for catastrophic fire consequences in the community. Programs to reduce hazards and change behaviors have been successful. Continuation of these programs is an important component to reducing our risk of catastrophic fires.

Metric

It is difficult to measure the effectiveness of these activities due to the number of variables that determine frequency and intensity of these fires. We can measure the number and types of interventions that we facilitate.

4. Recommendation – Data analysis

Continue to work toward a technological and staffing solution to provide for better and more accurate data analysis and improve the department's ability to deploy resources based on real-time information.

Rationale

A solution to the computer interface problem between dispatch and our records program has not been identified although work continues. A thorough data review process and personnel for this function are a basic need that has not been met. Changes in operations need to be based on accurate and current response data to allow for appropriate adjustments to improve performance.

Metric

The initial phases can only be measured by the outcome of the research. The metrics for the final solution will be determined at a later date.

5. Recommendation – Future fire stations

Continue to work toward identification of appropriate locations for future fire stations. Once locations have been identified work toward securing commitments toward future fire station property and construction funding. In order to make a significant and meaningful impact to response times the department needs to consider and plan for additional future fire stations and associated staffing.

Rationale

Current and future urban renewal districts (Juniper Ridge and the Central Area Plan) will necessitate the need for additional resources and stations. Agreements need to be pursued for station locations and funding for capital projects related to station construction. Infilling with a centrally located station and additional stations in outlying areas such as Juniper Ridge will improve our response performance.

Metric

The successful completion of these agreements will be the metric for this goal.

6. Recommendation – Traffic system

Continue to work in a cooperative manner with traffic engineering staff to minimize adverse impacts to emergency service delivery. Continue participation in citizen advisory groups to ensure that the public is aware of potential impacts.

Rationale

The implementation of traffic control devices and street engineering modifications has an impact on emergency operations. Though there are community wide benefits from these traffic modifications, the public should continue to be informed of the potential impacts to emergency services.

Metric

The outcomes are difficult to measure for this recommendation. The intended outcome is maintaining a cooperative relationship with Traffic Engineering and increased public awareness of the impacts to emergency response from traffic calming modifications in the community.

7. Recommendation – Training & standards

Continue improvements to operational standards, training delivery and recruitment processes. Continue development and implementation of individual and company performance standards.

Continue to work toward decentralization of training to improve response reliability by keeping resources in first due response areas.

Consider and work toward an increased ability to provide more and higher quality training. Consider more effective and less expensive methods for recruitment test such as implementation of the Candidate Physical Ability Test (CPAT) through a third party testing and recruitment service.

Deploy one additional person to the Training Division for training delivery, quality control and recruitment.

Rationale

High quality training is key to safe and effective emergency operations. The department has made significant improvements in this area over recent years.

As training requirements increase and resources decrease we need to continually strive for innovative training delivery methods to be able to provide effective emergency services.

Metric

It will be difficult to quantify or measure the impacts of this change. The cost from not implementing this recommendation could be in the form of OSHA fines, liability and a catastrophic event.

8. Recommendation - Technology

Continue to identify, research and implement all appropriate technical, hardware, and software solutions for improving turnout and response times

Rationale

The ability to respond to emergencies in a timely and effective manner is key to our mission. Dwindling resources challenge our ability to carry out this mission. The use of innovations such as mobile data computers (terminals) can help us overcome some of the effects of a reduction in resources.

Metric

The outcomes for this type of project will be measured through according to the type of impact to the operational deployment.

9. Recommendation - Funding

Continue to work toward improvement of the department's financial position.

- Continue to explore and embrace additional efficiencies
- Continue to work in cooperation with the Fire Firefighters Local 939 to control and reduce personnel costs.
- Continue to research and apply for grants and other outside funding sources.
- Continue to work toward short and long range funding options such as a local option levy and/or fire district solution.

Rationale

As the gap between departmental costs and funding continues to grow we will need to both work to minimize increases in costs as well as increase revenue. The failure to shrink the funding gap will result in reductions in personnel and programs with a negative impact to the community.

Metric

The metric for the outcomes of this recommendation will be the service levels of the department.

Signature Page

Authority Having Jurisdiction – City of Bend

City of Bend Council

_____
Kathie Eckman, Mayor

_____
Mark Capell, Mayor Pro Tem

_____
Jodie Barram

_____
Jim Clinton

_____
Jeff Eager

_____
Tom Greene

_____
Oran Teater

Signature Page

Authority Having Jurisdiction – Deschutes County Rural Fire Protection District No. 2

Board of Directors

_____
Al Dertinger

_____
Goerge Roshak

_____
Kent Haarberg

_____
Ron Ladd

_____
Dick Ridenour