



Carbondale & Rural Fire Protection District



Standards of Response Coverage

August 1, 2017

Standards of Response Coverage is a comprehensive report that highlights community demographics, risk, resource deployment, concentration of personnel, and response reliability. The report provides a valuable review of past performance and offers strategic recommendations ensuring safe and effective emergency response.

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EXECUTIVE SUMMARY

The following serves as the Carbondale & Rural Fire Protection District “Standards of Cover” document. The Center for Public Safety Excellence (CPSE) defines the process, known as “deployment analysis”, as written procedures that determine the distribution and concentration of fixed and mobile resources of an organization. The purpose for completing such a document is to assist the organization in ensuring a safe and effective response force for structural and wildland fire suppression, emergency medical services, and specialized response situations.

Creating a Standards of Cover document requires that a number of areas be researched, studied, and evaluated. The following report will begin with an overview, the plan will discuss areas such as risk assessment, critical task analysis, agency service level objectives, and distribution and concentration measures. The report will provide documentation of reliability studies and historical performance through charts and graphs. The report will conclude with policy recommendations.

Carbondale & Rural Fire Protection District currently has 21 full time positions, including the district chief, two administrative staff positions, four division heads, one fire inspector/public education position, one EMS coordinator, one maintenance position and 11 firefighter/EMT positions on three 24 hour shifts. Along with the paid staff, the district has 50 volunteer firefighters and EMTs who provide staffing for incident response at 5 different stations in the district.

The district provides structural and wildland fire suppression, emergency medical services, rescue, fire prevention and public education services along with emergency preparedness services to the communities within Carbondale & Rural Fire Protection District. In 2017, the population served is approximately 15,000 people encompassing the communities of Carbondale, Redstone and Marble along with significant populations in the unincorporated “West End” and Missouri Heights areas of the district. The fire district’s current Insurance Services Office (ISO) rating is a Class 3.

The risk factors specific to the Carbondale Fire District that were analyzed include: topography, water supply, geographical area served and transportation systems. In addition, risk factors including life hazard, special hazards, wildland fire hazards, water supply and building construction and usage were examined to further evaluate community risk levels.

In conclusion, this Standards of Cover is a dynamic document that reflects the changing needs of the Carbondale & Rural Fire Protection District and serves as a mechanism for constantly seeking opportunities for improvement. It is a key element in our plan to reduce risk to our residents and visitors. We are committed to providing the most effective services in a fiscally responsible manner and to continually evaluate our performance in the constant pursuit of improvement.

SECTION ONE: Introduction

What is a Standard of Cover?

The purpose of the SOC is to assist Carbondale & Rural Fire Protection District (CRFPD) in ensuring a safe and effective response force for fire suppression, Emergency Medical Services (EMS), and other responses. For this document Carbondale & Rural Fire Protection District (CRFPD) may be referred to as “District”, as Carbondale Fire District or CRFPD. The SOC is a baseline tool for defining emergency performance standards, provides a basis for continually measuring performance improvements over time, and is a guide to policy decisions dealing with resource procurement and allocation. Also it provides a basis to evaluate the risk assessment and ensure there are adequate resources to address those risks.

As the community changes, District leaders will have a valuable tool to assist with defining appropriate levels of service. There have been many attempts in the fire service to create a standard methodology for determining the exact number of firefighters, configuration of firefighters (career, combination or volunteer), fire stations, or fire inspectors for the community needs. However, the differences in fire service challenges in each community have made it clear that there is not a “one-size-fits-all” solution. The variety of risks and levels of hazards that exist in the CRFPD communities will determine the evaluation, design and development of an “all hazards” response system that identifies service levels that are safe, efficient and effective. The emergency response capabilities should be evaluated using National Fire Protection Association’s Standard 1720 Standards for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operation to the Public by Volunteer Fire Department as a guideline.

Attempts to control an emergency before it has reached its maximum intensity requires geographic dispersion and clustering of resources near service delivery points for maximum effectiveness against the greatest number and types of risk.

Not all areas of exposures within the District are equal. Some types of emergencies, such as multiple car collisions or working structure fires, wildland fires, and serious medical/trauma events require a prompt arrival of adequate resources to control the scene, perform rescue operations, and provide high level medical care. High-risk occupancies require timely arrival of fire companies to rescue occupants or to control the emergency. More resources are required to rescue people trapped in a high-risk building with a high occupancy load than would be needed in a low-risk building with a low occupancy load. More resources are required to control fires in large, heavily loaded structures than are needed for fires in small buildings with limited contents. Remote areas of the District are outside the ability to provide adequate response time, due to the locations of risks, but emergencies in these areas are a small percentage of the incidents. The SOC defines these risks and will assist the District in developing plans to mitigate them.

1 Center for Fire Accreditation International (CFAI); Fire and Emergency Service Self-Assessment Manual (FESSAM); 8th Edition; 2009

It is also understood that there is a cost to improving the deployment system. It is not financially feasible to put a fire station in every subdivision, but the SOC will determine the level of services that are within the present capability of the District.

Therefore, creating a SOC consists of an evaluation of the placement of resources (number, type and location) in relation to the potential demand placed on them by the type of risk and historical needs in the community. Furthermore, if the SOC is to be meaningful to the community, the outcome must demonstrate that lives are saved and properties are protected.

The SOC is a living document and will need to evolve over time. As the data becomes available, the changes should be tracked to ensure effectiveness.

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SECTION TWO: Community and District Baseline

Mission Statement

To serve the communities within the Carbondale & Rural Fire Protection District and help create a safer environment through the provision of quality emergency services, public education, and prevention programs with a professional dedicated force of volunteers and paid staff.

History of The Fire District

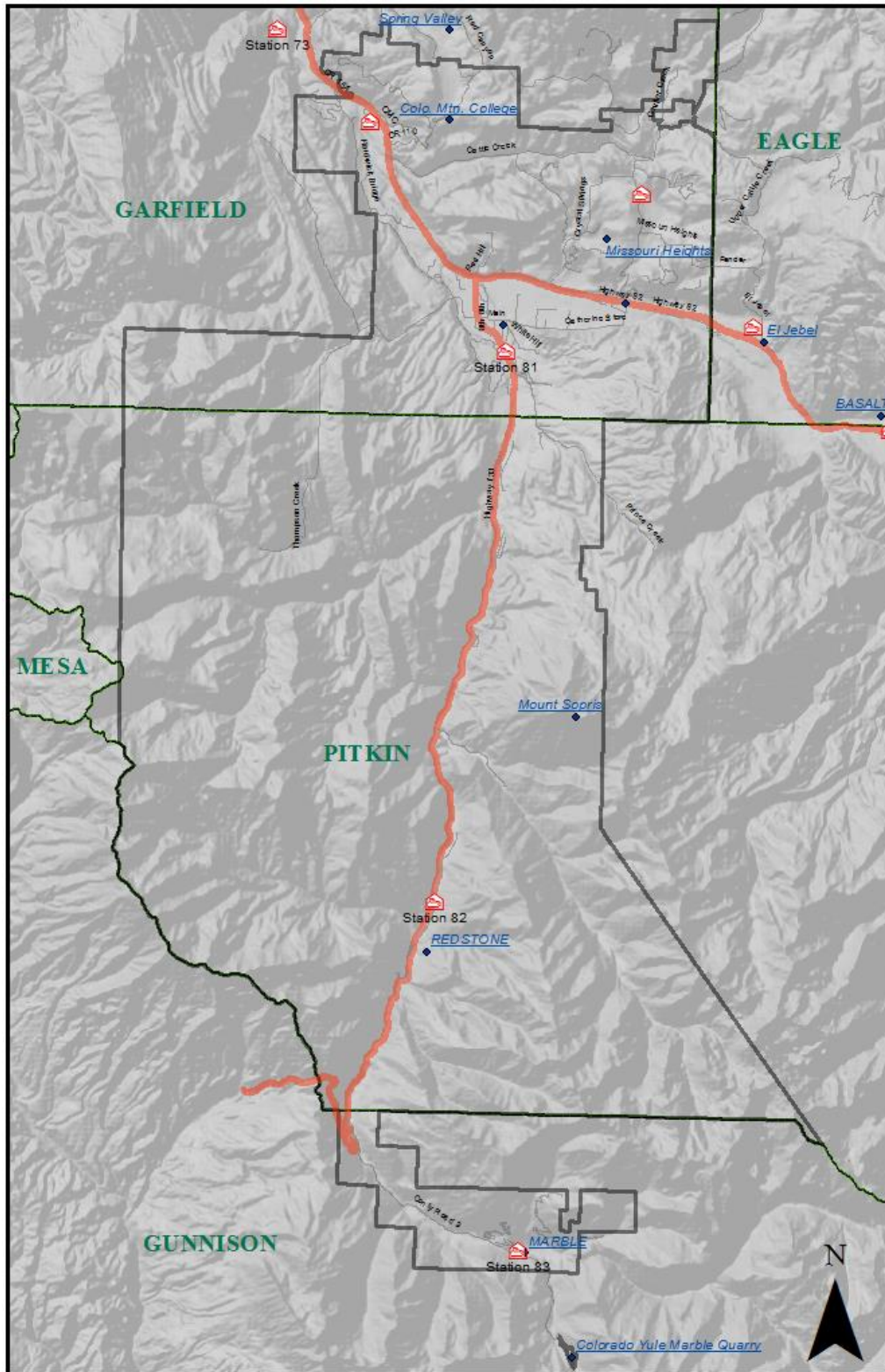
Carbondale & Rural Fire Protection District was founded in 1953 as an all-volunteer fire department and remained as such until 1980 when the first paid fire chief was hired to lead the organization. The District began providing modern ambulance service with volunteer EMT-Basics in 1978. In the early 1980s, the Colorado EMT-Intermediate certification program was institutionalized and some Carbondale volunteers began the slow, methodical change to providing Advanced Life Support Services to the community. Dr. Michael Stahl was recruited as the District's Physician Advisor in the early 1980s and remains in that position today. Currently, the District operates four ambulances staffed and equipped to Advanced Life Support standards including at least one EMT-Paramedic (EMT-P), or EMT-Intermediate (EMT-I) on every emergency call. Over the years, the ever-increasing demand and expectations of the public for advanced level emergency medical services has driven the need for more career EMTs and Paramedics at CRFPD. The same demands for service have driven the need for additional career firefighter positions at CRFPD. All District operations are managed by a professional, career, Deputy Chief in charge of operations. Additionally, the administrative and maintenance demands on the District have driven the need for additional professional positions, including a full time fire marshal, training coordinator, and maintenance coordinator. Currently the District supports 21 full time positions and 50 volunteer firefighters and EMTs. Throughout its history, CRFPD has maintained its culture of "The Volunteer Spirit" and depends heavily on the community volunteers to deliver a high level of fire protection and emergency medical services to the community.

Governance of the District

Carbondale & Rural Fire Protection District was established on January 10, 1955, as a quasi-municipal corporation and is a political subdivision of the State of Colorado. The District was created by court order to serve areas of Gunnison, Garfield, and Pitkin Counties. As a political subdivision, Carbondale & Rural Fire Protection District is afforded the governing authorities and responsibilities authorized under Title 32 Article 1, Colorado Revised Statutes. Because of its status as a political subdivision of the state, Carbondale & Rural Fire Protection District is required to provide reports to other state agencies.

As a Special District, Carbondale & Rural Fire Protection District is not unique. According to the Special District Association of Colorado, in 2008 there existed 253 Special Districts in the state. Special Districts are believed to be an effective and efficient methodology by which to fund services without straining other types of infrastructure. A unique benefit of the Special District is the ability of the taxpayer to determine the specific levels of service provided by the District and fund those services accordingly.

Figure 2.1 - District Boundary Map



SECTION THREE: Community Overview and Risk Assessment

Response Types

Carbondale & Rural Fire Protection District responds to all emergency calls for assistance in the District. These responses include: emergency medical service (basic and advanced life support), structure fires, wildland fires, vehicle fires, rubbish fires, technical rescue (auto extrication, swift water rescue, high and low angle rescue, backcountry rescue, and structural collapse), and hazardous materials incidents. The District also responds to a variety of non-emergent service calls such as utility calls, smoke reports, odor investigations, fire alarms and alarm resets, citizen assists and assistance to law enforcement. In addition, the District performs a significant number of EMS standbys for special events throughout the year. The District is continuously looking to add response capabilities as new risks become known.

Number of Stations and Response Types

Carbondale & Rural Fire Protection District currently has five stations located in the District. The District has six engines, two ladder or “truck” apparatus, four ambulances, one medical “squad” with ALS capability, one swift water/rope rescue vehicle, four water tenders, and two brush trucks. The District also has several utility/command vehicles and one communications trailer for larger incidents and special events.

CRFPD operates and responds from five fire stations located around the District. CRFPD’s varied geography, demographics and community types present unique challenges to providing adequate response everywhere in the District.

Community makeup in the District runs the gamut from urban/suburban to commercial, rural, agricultural and even backcountry areas. Each of these areas require differing levels of staffing, equipment and even location/density of fire stations to ensure appropriate levels of response to emergencies. As a result, response times can vary considerably depending on the type of incident, location and availability of responders at a particular time.

The geography of the District plays a significant role in affecting response in the District. Approximately 60 square miles of the land in the fire district contain areas that are designated as High and even Extreme risk of wildland fire. Approximately 900 homes are located in these High and Extreme areas of the Wildland/Urban Interface or WUI. Historically, CRFPD has responded to a number of significant wildland fires in the District and surrounding area. A number of these fires have been extremely serious and even devastating to the area and people involved.

Wildland fire response is a critical part of what CRFPD does and our mission has always been to “try to keep small fires small” as even a fairly moderate wildland fire will quickly strip the resources of any fire department and require a broad and expensive response that can take days or weeks to mitigate.

Station 81

300 Meadowood Drive, Carbondale

Battalion 8

Ambulance 81

Ambulance 82

Ambulance 84

Rescue 80

Rescue 81

Engine 81

Ladder 81

Tender 81

Brush 81

Brush 85



Primary Response Area: 142.4 Sq. Miles

2010 Population: 9,712

2015 Assesed Value: \$ 228,333,851

Calls in 2015 **929**

EMS Rescue 508

Fire 20

Rupture/Explosion 1

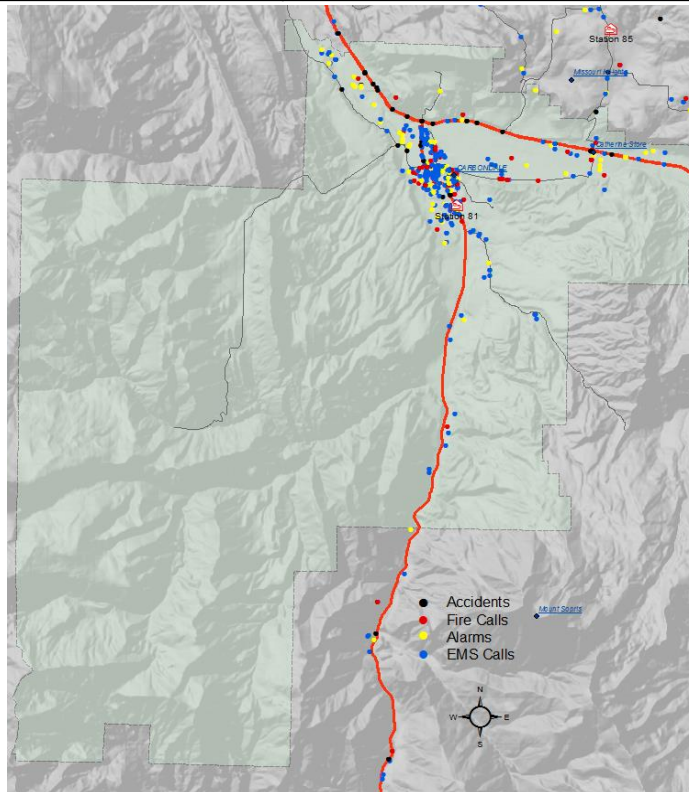
Hazardous Condition 21

Service Call 55

Good Intent Call 185

False Call 136

Other 3



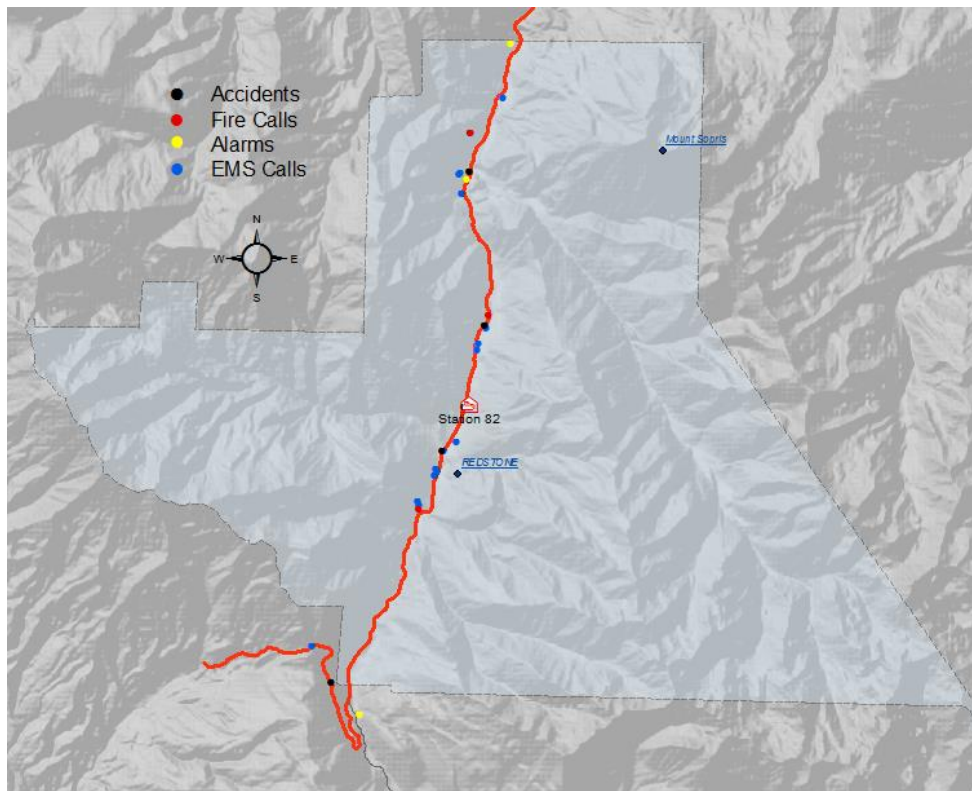
Station 82

1085 Redstone Boulevard, Redstone
Ambulance 80
Engine 82
Tender 82



Primary Response Area: 106.4 Sq. Miles
2010 Population: 865
2015 Assesed Value: \$ 27,925,740

Calls in 2015	29
EMS Rescue	18
Fire	1
Rupture/Explosion	-
Hazardous Condition	1
Service Call	1
Good Intent Call	6
False Call	2
Other	-



Station 83

300 West Park, Marble

Rescue 83

Engine 83

Tender 83



Primary Response Area: 12.7 Sq. Miles

2010 Population: 397

2015 Assesed Value: \$ 14,456,600

Calls in 2015

32

EMS Rescue

19

Fire

4

Rupture/Explosion

-

Hazardous Condition

-

Service Call

-

Good Intent Call

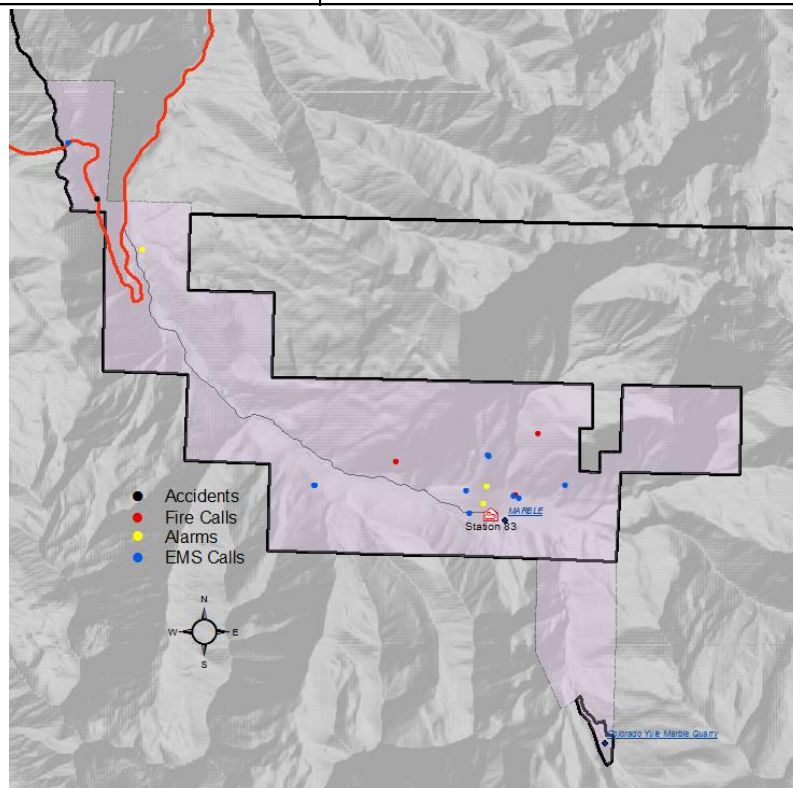
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False Call

3

Other

-



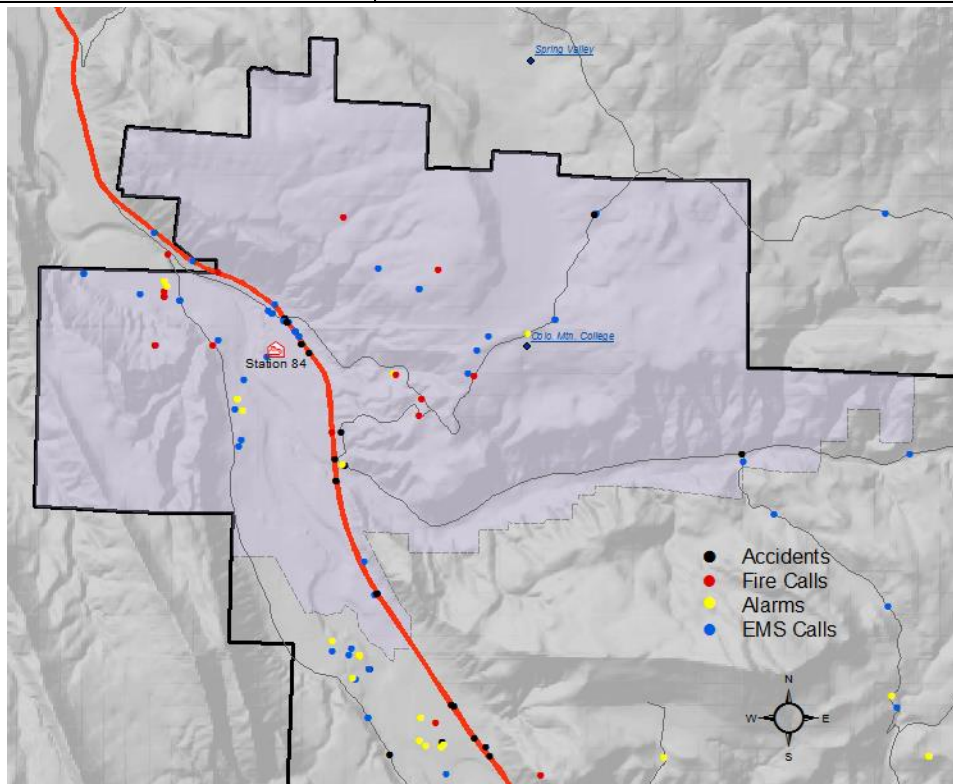
Station 84

5449 Cnty. Road 154, Glenwood Springs
Ladder 84
Engine 84
Tender 84



Primary Response Area: 16.4 Sq. Miles
2010 Population: 2,479
2015 Assesed Value: \$ 46,150,328

Calls in 2015	124
EMS Rescue	65
Fire	9
Rupture/Explosion	-
Hazardous Condition	4
Service Call	5
Good Intent Call	29
False Call	12
Other	-



Station 84

6986 County Road 100, Carbondale

Engine 85

Tender 85



Primary Response Area: 22.1 Sq. Miles

2010 Population: 1,547

2015 Assesed Value: \$ 28,847,940

Calls in 2015

46

EMS Rescue

21

Fire

1

Rupture/Explosion

-

Hazardous Condition

1

Service Call

3

Good Intent Call

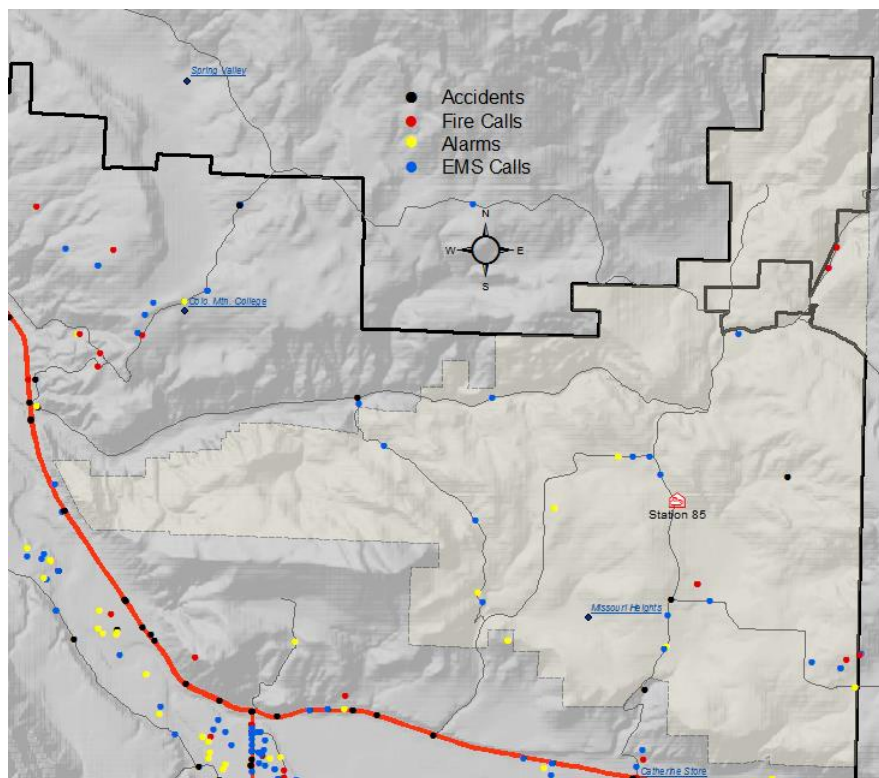
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False Call

5

Other

-



Staffing

Carbondale & Rural Fire Protection District is a “Combination” fire department. This means that the District utilizes a combination of career or paid staff and a dedicated volunteer force.

The District utilizes a three-platoon system to provide coverage for 24 hours per day. This three-platoon system is organized into shifts identified as A, B, and C and each shift member is assigned to one of the three shifts. A shift member will be “on-duty” for a 48 hour period and then “off-duty” for 96 hour period. Two of the shifts have four staff members, the third has a staff of three assigned. One of the members of each shift serves as the shift commander and provides daily management of shift operations. In addition, one of the four chief officers will be “on call” to provide for command support of significant incidents within the district and as a backup in case of concurrent calls. Station 81 is the only station in the district with career staff, and all other stations rely upon the support of volunteer personnel to respond concurrent to the career staff’s response into these areas.

During weekdays, maintenance personnel and administrative staff provide backup to the shift personnel.

District Personnel by Response Area		
Response Area	Off Duty Paid	Volunteer
Station 81	5	7
Station 82	4	2
Station 83	3	5
Station 84	2	1
Station 85	-	3
Out of District	7	6
Totals	21	24

The above graphics depict the general staffing or availability of paid and volunteer members around each station area.

Median Response Staffing to Motor Vehicle Accidents with Injuries by Year and Time of Day

Call Type : 322, Motor Vehicle Accidents with Injuries					
Time Period	Median Staffing Level				
	2012	2013	2014	2015	2016
0800-1700	7	7	7	6	5
1700-2200	6	10	5	6	5
2200-0800	7	7	4	6	5

Weekday On-Duty Staffing Pattern - Station 81																									
TIME	Monday					Tuesday					Wednesday					Thursday					Friday				
	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMS	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMS	FFI/EMS	FFI/EMS	FFI/EMS	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMS	FFI/EMS	FFI/EMS	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMS
	FFI/ALS	FFI/ALS	FFI/EMS	FFI/EMS	FFI/ALS	FFI/ALS	FFI/ALS	FFI/EMS	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff	Admin Staff
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0100-0200																									
0200-0300																									
0300-0400																									
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2100-2200																									
2200-2300																									
2300-2400																									

Weekend On-Duty Staffing Pattern Station 81																								
TIME	Saturday							Sunday																
	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMT	FFI/EMT	FFI/AIS	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMT	FFI/EMT	FFI/AIS	FFI/AIS	Admin Staff	Admin Staff	Chief	Maintenance	FFI/EMT	FFI/EMT	FFI/AIS	FFI/AIS	
0000-0100			O																					
0100-0200			N																					
0200-0300																								
0300-0400			C																					
0400-0500			A																					
0500-0600			L																					
0600-0700																								
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1900-2000			N																					
2000-2100																								
2100-2200			C																					
2200-2300			A																					
2300-2400			L																					

Volunteer Shift Hours by Month 2012-2016

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2012	1372	1298	1538	1552	1704	1218	966	922	998	1146	1689	3518	17,917
2013	1549	1324	1426	1650	1208	1024	761	987	784	1103	1199	1127	14,139
2014	768	768	655	675	532	465	330	832	884	1082	1222	1237	9,449
2015	1152	921	844	678	773	664	736	466	455	518	549	467	8,223
2016	391	413	374	431	333	256	274	285	260	440	393	339	4,189
2012-2015 AVG	1210	1078	1116	1139	1054	843	698	802	780	962	1165	1587	12,432
2016 % of AVG	32%	38%	34%	38%	32%	30%	39%	36%	33%	46%	34%	21%	34%

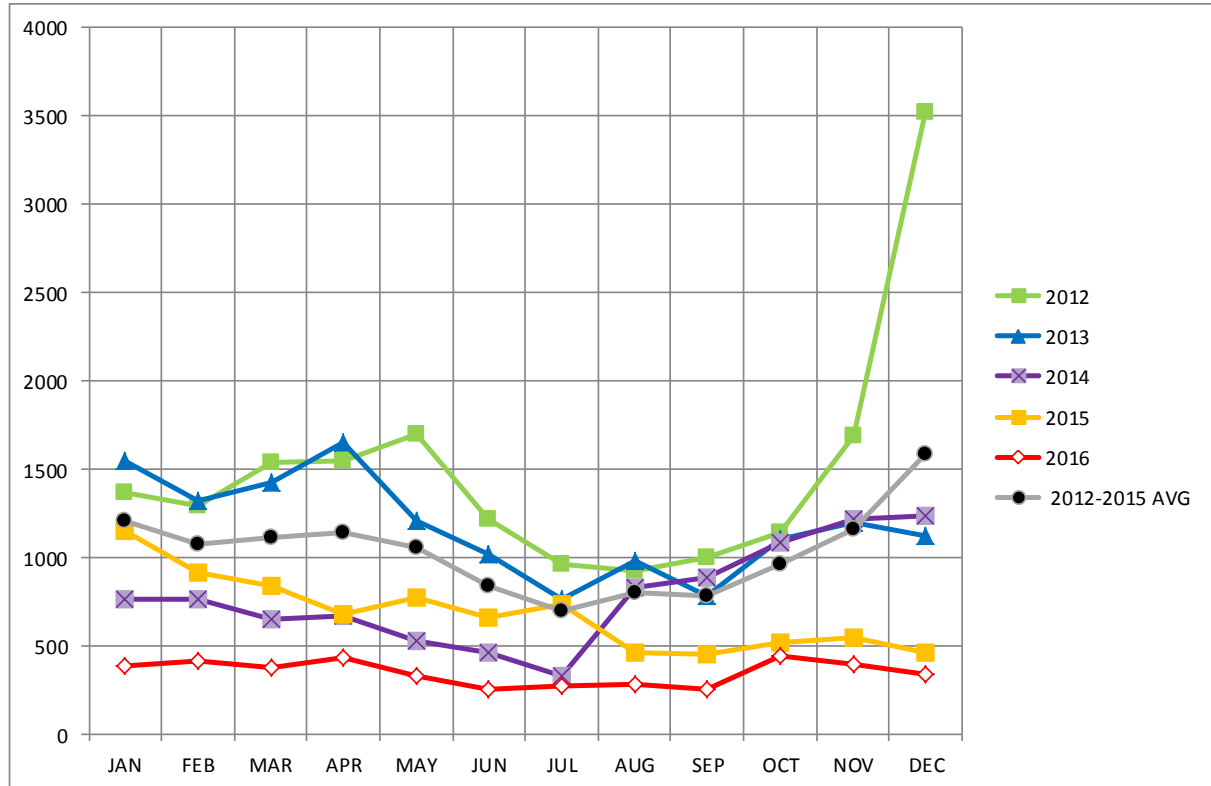


Figure 2.1 - Service Area Demographics

RESPONSE AREA	NFPA 1720				POPULATION	AREA (sq mi)	ASSESSED VALUE
	Demand Zone ^a	Minimum Staff ^b	Response Time ^c	Meets Objective			
Station 81	Urban	15	9	90%	9,712	142.4	228,333,851
Station 82	Rural	6	14	80%	865	106.4	27,925,740
Station 83	Rural	6	14	80%	397	12.7	14,456,600
Station 84	Suburban	10	10	80%	2,479	16.4	46,150,328
Station 85	Rural	6	14	80%	1,547	22.1	28,847,940
TOTALS					15,000	300	345,714,460

NFPA 1720 - Section 4.3.2

Staffing and and response time objectives for structural fire fighting, based on a low-hazard occupancy such as a 2000 ft² (186 m²), two-story, single-family home without basement and exposures and the percentage accomplishment of those objectives forreporting purposes as required in 4.4.2.

- a. A jurisdiction can have more than one demand zone.
- b. Minimum staffing includes members responding from the AHJs department and automatic aid
- c. Response time begins upon completion of the dispatch notification and ends at the time interval shown in the table.

Figure 2.3 Apparatus Resources

Station /Apparatus		Year	Make	Model	NWCG Type
STATION 81 300 Meadowood Drive Carbondale, CO	Battalion	2008	GMC	Sierra 1500	
	Ambulance	2009	Ford/McCoy Miller	F-350	II
	Ambulance	2005	Ford/McCoy Miller	F-350	II
	Ambulance	2006	Ford/McCoy Miller	F-350	II
	Rescue-Engine	2006	Spartan/Rosenbauer		I
	Rescue-Squad	1992	Chevy	K3500	
	Engine	2007	International/Rosenbauer		I
	Ladder	2012	Spartan/Rosenbauer		II
	Tender	1971	Kaiser		ENG - IV
	Engine-Brush	2005	Ford/AdFab	F-550	VI
	Engine-Brush	1999	Ford/Front Range	F-550	VI
STATION 82 1085 Redstone Blvd. Redstone, CO	Ambulance	2001	Ford/McCoy Miller	F-350	II
	Engine	1984	International/General Safety		I/II/III
	Tender	1994	International/Front Range	DT-466	TAC - II
STATION 83 300 West Park Marble, CO	Rescue-Squad	2005	Ford	Excursion	
	Engine	1992	International/General Safety		I/II/III
	Tender	1970	American General		ENG - IV
STATION 84 5449 County Road 154 Glenwood Springs, CO	Engine	1992	International/General Safety		I/II/III
	Ladder	1994	Spartan/General Safety		IV
	Tender	2012	Freightliner/Rosenbauer		SUP - II
STATION 85 6986 County Road 100 Carbondale, CO	Engine	1993	International/General Safety		I/II/III
	Tender	1994	International/Front Range	DT-466	TAC - II

Risk Assessment



08/01/2017

SECTION THREE: Risk Assessment

Risk Assessment

Overall community risk management consists of risk assessment and risk control. In analyzing community risk, it is important to review the components of risk; identify unique factors affecting level of risk; and identify the magnitude and scope of the risk of fire, life safety, rescue, and medical emergencies, or other hazards that threaten life, safety, property, or the environment within the service area. The analysis discussion includes a review of actual and potential loss.

Community Risk Assessment Components

Developing a comprehensive risk assessment involves six key components: fire flow, probability, consequence, occupancy risk, demand zones, and community profile. These apply to all fire, life safety, rescue, first response EMS, and miscellaneous calls for services.

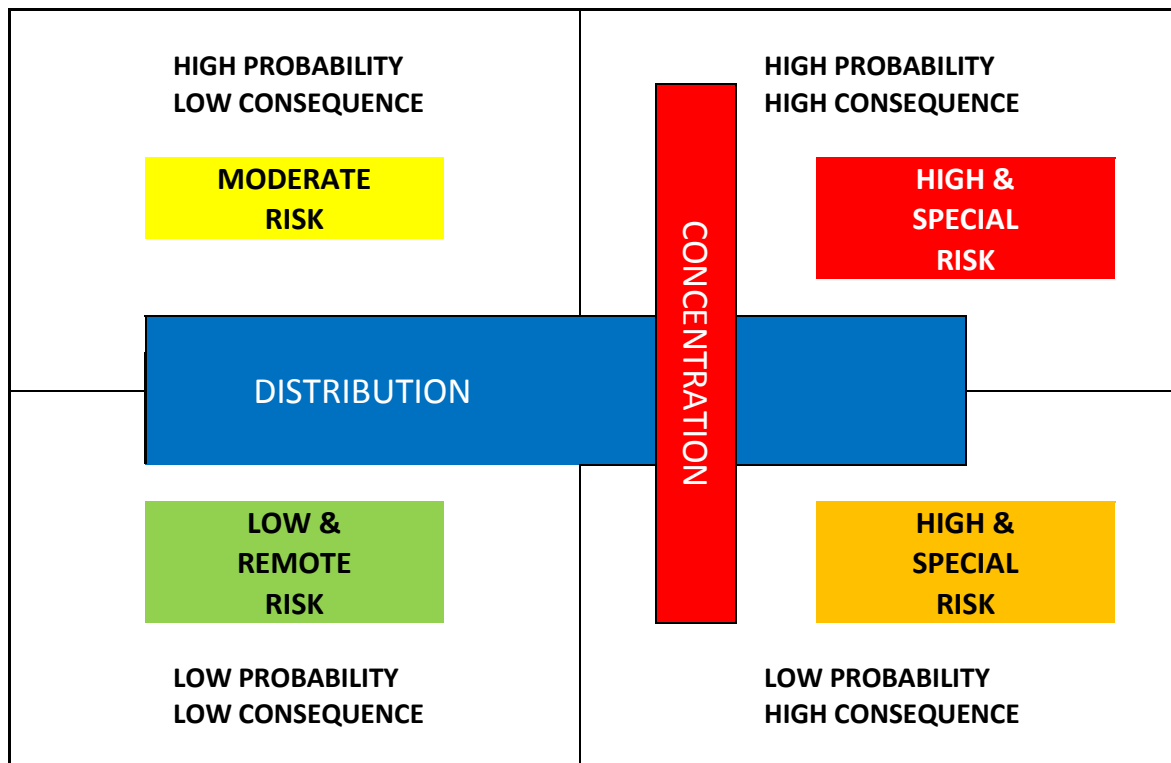
- **Fire Flow** — the flow rate of a water supply, measured at 20 pounds per square inch (psi) residual pressure that is available for firefighting.
- **Probability** — the likelihood that a particular event will occur within a given period of time. An event that occurs daily is highly probable. An event that occurs only once in a century is very unlikely. Probability is an estimate of how often an event will occur, based on available local historical data.
- **Consequence** — has two primary components: 1) life safety (risks to the lives of occupants and responders from life-threatening situations that include fire, rescue, hazardous substance, and emergency medical events); and 2) economic impact (the loss of property, income, or irreplaceable community assets).
- **Occupancy Risk** — an assessment of the relative risk to life and property resulting from a fire inherent in a specific occupancy or in generic occupancy classes.
- **Response Areas** — geographic areas utilized to more definitively analyze risk situations. Areas are based on current fire station locations and correspond to the first-due response area for each of these stations. Fire station placement and resource assignments are determined by desired response time performance, transportation network, population, topography, construction and occupancy character, density, and the relative risk level of a particular neighborhood or area.
- **Community Profile** — an analysis of the attributes of a specific community based on its unique mixture of demographics, socioeconomic factors, occupancy risks, demand zones, historical trends, and level of service currently being provided.

Through a methodical analysis of the risk dynamics present in a community, a risk assessment evaluation makes it possible to develop logical resource deployment strategies to meet the identified needs. The goal of the risk assessment process is to determine the probability of an event occurring, as well as the potential consequences of that event.

Risk Assessment Matrix

The following matrix shows elements to consider when assessing risk. Each quadrant shows a combination of probability of an event occurring and the consequences should that event occur. Each category of risk represents different emergency resource commitment requirements.

Figure 3.1 – Risk Assessment Matrix



The community risk assessment includes defining inherent differences between a single-family dwelling, multiple-family dwelling, large industrial occupancy or commercial campus, and a high-rise residential or commercial structure, then assigning each occupancy type to a different quadrant of the risk assessment matrix. Fire stations and emergency apparatus are distributed uniformly throughout the community to provide prompt initial response to all types of incidents, or resources may be concentrated in high-consequence areas to enable a faster large-scale response to an unlikely but highly consequential event. Even when resources are distributed relatively evenly throughout the community, deployment differs based on type of risk and needs of each particular incident type, or in considering seasonal changes, special situations or other events.

Service Area Factors Unique to the System

Ambulance transport times. Carbondale Fire District is unique in that there are no hospitals located in the District. The closest hospital is Valley View Hospital (VVH), in Glenwood Springs. VVH is approximately 15 miles from Carbondale.

This is significant in that any ambulance transport typically takes a minimum of 1 ½ hours to complete. Additionally, many of CRFPD's EMS or ambulance calls are located outside of the Carbondale area and take much longer to complete. Ambulance calls to the south end of the district, in Redstone or Marble, will easily require 2 ½ hours before the ambulance and crew are back in service.

A typical ambulance call requires three personnel to perform. With staffing levels of 3-4 responders on a shift, these typical ambulance calls can leave CRFPD with 1 responder or no responders at Station 81 for 2+ hours. Concurrent calls (incidents happening at the same time) occur over 150 times a year or, almost 3 times a week. Concurrent calls place another strain on CRFPD's limited staffing, requiring chief officers and other staff to commit to being available and responding while not on duty, adding to overtime costs.

Wildland Fire Risk and Seasonal Staffing. The northern end of the Carbondale Fire District, including Missouri Heights, Cattle Creek, and Spring Valley areas are classified as either Very High or Extreme wildfire risk areas. The Missouri Heights area in particular has experienced several large and damaging wildfires.

For a number of years, CRFPD has implemented a Seasonal Staffing operation to try to mitigate the potential for wildfires. This staffing program includes adding additional temporary personnel that patrol and respond to wildland fire incidents, along with responding to other incident types as well. During the spring/summer/fall season, CRFPD experiences a marked increase in all types of incidents as many more people come into the area to participate in the many recreational opportunities available during the seasons.

Swift Water Rescue. The Carbondale Fire District has two popular rivers that run through it. The Crystal and Roaring Fork Rivers see high levels of recreational rafting, kayaking and fishing. CRFPD is called upon to respond to numerous rescues, searches and reports of overturned rafts and kayaks. Swift Water Rescue incidents are very difficult and potentially dangerous incidents to manage. In addition, these incidents are manpower intensive and can take hours or even multiple days to complete. Training certified swift water rescue technicians also takes a commitment of time and resources to ensure that responders can perform safely and at a high level.

Hiking and Biking. Carbondale Fire District is home to a large number of bike paths and; mountain bike trails are ubiquitous in the area. This area is a prime spot for hikers and climbers that access trails as close as the Mushroom Rock area and as far away as the Lead King Basin area above Marble. CRFPD is experiencing an increasing demand for services in these areas. As more people access the areas in the district, the more CRFPD is called upon to respond to trauma and medical incidents that happen in these out of the way places. Again, this type of

incident requires specific training and equipment in addition to being manpower intensive, long duration incidents.

Geographic Size of the District. Carbondale Fire District is approximately 300 square miles in size. Much of the land is public and CRFPD works with the local Interagency staffs and county sheriffs to respond to incidents in these areas.

As previously stated, long travel times affect response and staffing levels in the district. The 5 district fire stations are located in or near the most populous communities. To drive from one end of the district to the other takes just under an hour as the stations are located as far as 40 miles apart.

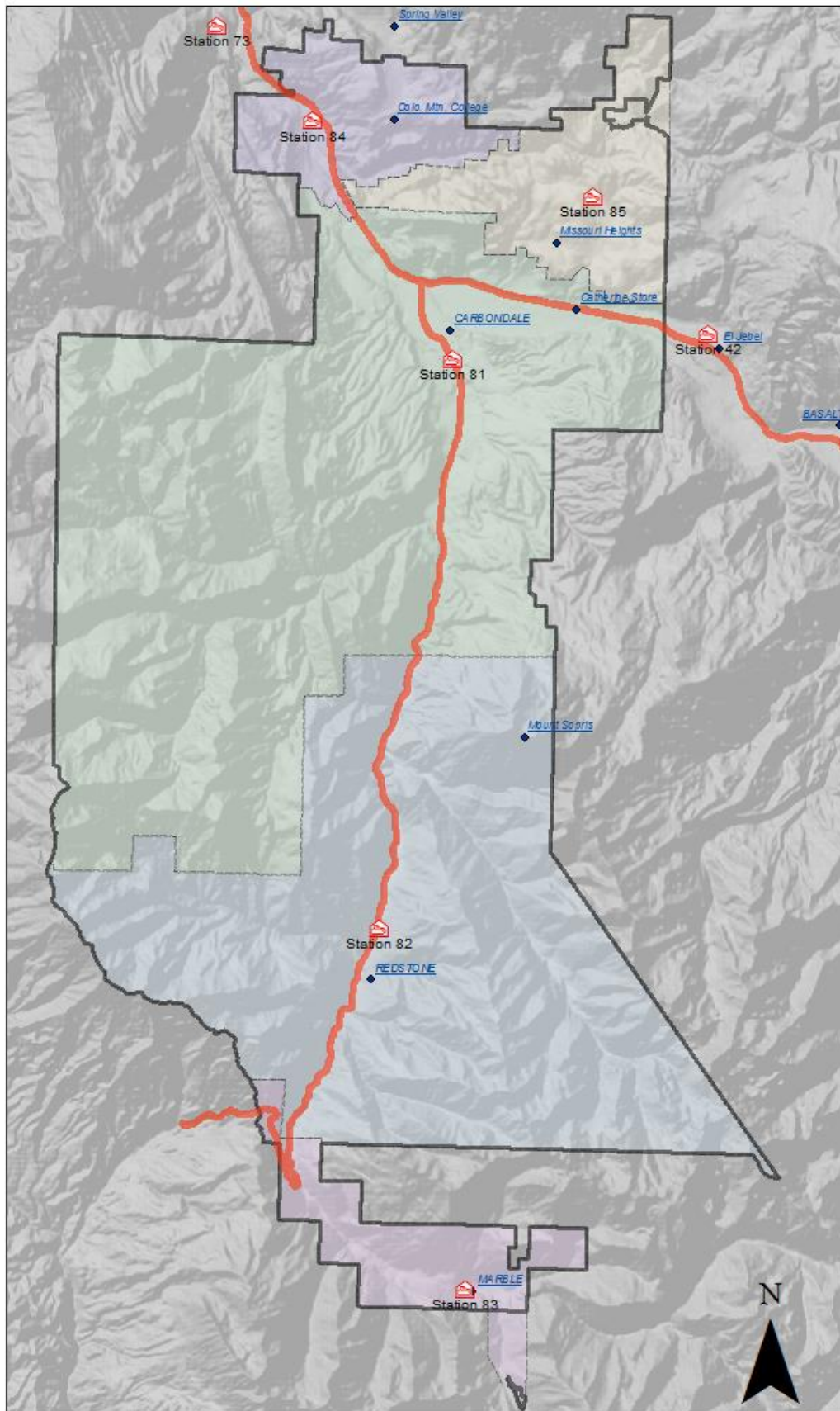
Topography

The topography of the Carbondale Fire District is varied and diverse. From north to south, the district covers the Crystal River Valley. The lower elevations of the Crystal River Valley is comprised mainly of pinion/juniper, sage brush, Gambel Oak and grasses. The terrain of the valley is narrow and steep with many drainages that empty into the Crystal River. The higher elevations of the valley contain sub alpine forests with multiple species of evergreens and large stands of aspens. The drainages that flow into the upper Crystal Valley are steep and long, with a number of them ending up above tree line.

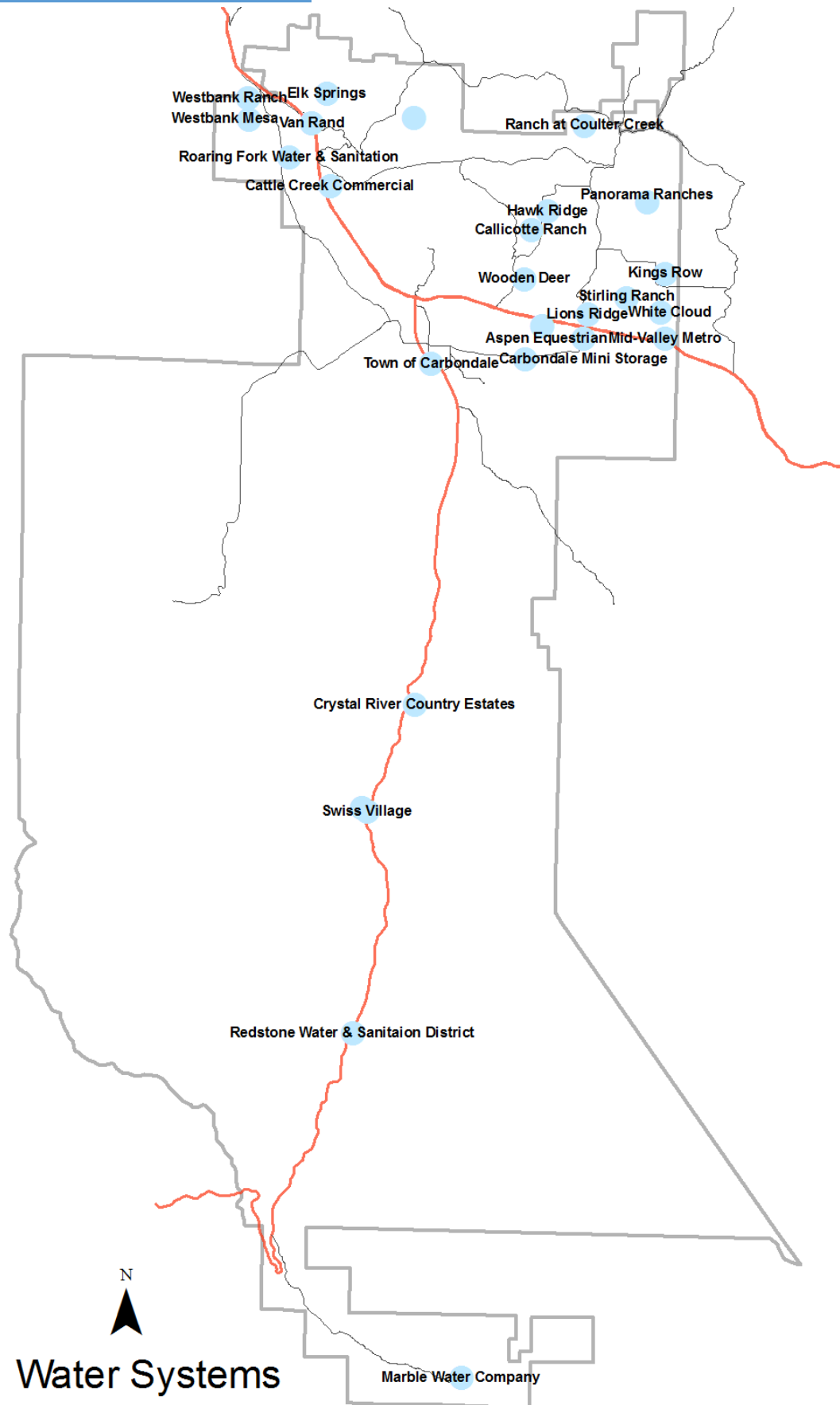
The east-west length of the district is dominated by the lower Roaring Fork Valley. Much of the valley floor is comprised of relatively flat homesteaded ranch lands. Much of that land has been developed into residential subdivisions of varying sizes. Further to the west end of the district, the lower valley lands consist of more commercial and mixed use developments.

As the elevations increase on the north and south sides of the Roaring Fork River, the topography becomes more hilly with pinion/juniper, sage brush, gambel oak and grasses. The north and west ends of the district (Missouri Heights and Spring Valley), have very dense pinion/juniper and oak forest areas that contain hundreds of residential properties from subdivisions to individual ranches. These areas with their vegetation and topography combine to present a significant wildland/urban interface risk for the homes and properties there.

Figure 3.2 Fire Suppression Service Area



Water Systems and Supplies



WATER SYSTEM	ISO	Available Flow (gpm)	Tank Capacity
Aspen Equestrian Estates	✓	>1,500	200,000
Callicotte Ranch	✓	1,000 - 1,500	200,000
Town of Carbondale	✓	>1,500	2,350,000
Carbondale Mini Storage		500 - 1,000	10,000
Cattle Creek Commercial Center	✓	1,000 - 1,500	100,000
Mid Valley Metro District	✓	>1,500	2,000,000
Colorado Mountain College	✓	>1,500	1,000,000
Crystal River Country Estates	✓	500 - 1,000	37,000
Crystal River Estates	✓	500 - 1,000	37,000
Elk Springs	✓	1,000 - 1,500	620,000
Hawk Ridge		< 500	30,000
Kings Row	✓	500 - 1,000	50,000
Lions Ridge		500 - 1,000	
Marble		1,000 - 1,500	130,000
Panorama Ranches	✓	1,000 - 1,500	100,000
Prince Creek Subdivision		< 500	
Ranch at Coulter Creek	✓	1,000 - 1,500	120,000
Ranch at Roaring Fork	✓	500 - 1,000	100,000
Redstone Water & Sanitation District	✓	>1,500	390,000
Roaring Fork Water & Sanitation	✓	>1,500	1,518,000
Seven Oaks (BRB)		< 500	10,000
Sterling Ranch		500 - 1,000	10,000
Swiss Village		500 - 1,000	21,000
Van Rand	✓	1,000 - 1,500	50,000
Westbank Mesa Subdivision	✓	>1,500	250,000
Westbank Subdivision	✓	>1,500	150,000
Whitecloud Subdivision	✓	>1,500	200,000
Wooden Deer Subdivision	✓	1,000 - 1,500	50,000

Incident Type

Response requests are categorized in three main Incident Types – Fire, EMS, and Other based on dispatch activity descriptions. As shown in Figure 3.3, the majority of calls are medical (EMS) in nature. Service demand is currently driven by distribution of population rather than the characteristics of fixed real property. Human beings are highly mobile, thus demand for service in a particular area changes frequently depending upon the time of day, day of week, specific season or event, or as other significant and long-term demographic shifts occur.

Figure 3.3 Total Incidents by Type per Year

	2011	%	2012	%	2013	%	2014	%	2015	%
Building Fires	12	1.26%	9	0.77%	6	0.52%	9	0.86%	10	0.86%
Vehicle Fires	0	0.00%	3	0.26%	1	0.09%	7	0.67%	7	0.60%
Wildland Fires	7	0.74%	26	2.23%	9	0.78%	8	0.76%	6	0.52%
Other Fires	10	1.05%	16	1.37%	25	2.16%	14	1.33%	6	0.52%
Total Fire	29	3.05%	54	4.62%	41	3.55%	38	3.62%	29	2.50%
EMS non MVA	425	44.74%	494	42.29%	520	44.98%	441	42.04%	524	45.17%
MVA with Injuries	43	4.53%	45	3.85%	49	4.24%	54	5.15%	40	3.45%
MVA w/o Injuries	48	5.05%	48	4.11%	44	3.81%	38	3.62%	33	2.84%
Other EMS/Rescue	24	2.53%	39	3.34%	31	2.68%	36	3.43%	31	2.67%
Total EMS / Rescue	540	56.84%	626	53.60%	644	55.71%	569	54.24%	628	54.14%
Gas Leaks	6	0.63%	17	1.46%	10	0.87%	8	0.76%	7	0.60%
Carbon Monoxide	16	1.68%	11	0.94%	5	0.43%	7	0.67%	9	0.78%
Other Hazardous Condition	8	0.84%	14	1.20%	16	1.38%	20	1.91%	11	0.95%
Total Hazardous Condition	30	3.16%	42	3.60%	31	2.68%	35	3.34%	27	2.33%
Service Calls	78	8.21%	85	7.28%	68	5.88%	70	6.67%	64	5.52%
Good Intent	141	14.84%	206	17.64%	189	16.35%	176	16.78%	241	20.78%
False Calls	126	13.26%	152	13.01%	178	15.40%	161	15.35%	158	13.62%
Other Responses	6	0.63%	3	0.26%	5	0.43%	0	0.00%	13	1.12%
Total All Incidents	950	100%	1168	100%	1156	100%	1049	100%	1160	100%

Building Risk Analysis

- Figure 3.5 Buildings by Occupancy Type

Building Risk Analysis by Response Area					
Residential	St-81	St-82	St-83	St- 84	St-85
Single Family Residential	5,359	353	392	584	382
Multifamily dwelling	39			4	
Residential board and care	1				
Dormitory-type residence, other	5			1	
Boarding/rooming house, resident	1				
Hotel/motel, commercial	2	2			
24-hour care Nursing homes, 4 or	2				
Residential, other	1			1	
TOTALS	5,410	355	392	590	382
Vacant Residential Lots	487			290	108
Assembly					
Assembly, other	1				
Athletic/health club	1			1	
Auditorium, concert hall, theater	2				
Bar or nightclub	2				
Clubhouse	1			1	
Fixed-use recreation places	1				
Museum	1				
Religious/Charitable	5	1	1		
Restaurant or cafeteria	13	1	1	1	
Stadium, arena	1				1
Swimming facility: indoor or out	1				
TOTALS	29	2	2	3	1
Educational Facilities					
Adult education center, college	1			5	
Educational, other	5				
Elementary school, including kin	4	1	1		
High school/junior high school/m	3				
TOTALS	13	1	1	5	-
Health Care, Detection & Correction	5				
Governmental	4			2	1
Industrial, Utility, Agricultural, Mining					
Utility or Distribution system,	1			1	
Flammable liquid distribution	2			1	
Sanitation utility	1			2	
TOTALS	4			4	
Manufacturing, processing	7			1	
Mercantile, Business	82	1		22	
Storage					
Residential or self-storage unit	2			4	
Storage, other	5				
Vehicle storage, other	1				
Warehouse	35			36	
TOTALS	43	-	-	40	-

Non Residential Buildings-Facilities by Risk Factor

	St-81	St-82	St-83	St-84	St-85
Buildings/Facilities - Non Residential, Risk - Low	87	1	1	12	2
Buildings/Facilities - Non Residential, Risk - Moderate	121	1	1	29	
Buildings/Facilities - Non Residential, Risk - High	10	1		37	
Buildings/Facilities - Non Residential, Risk - Very High	1	1		2	
TOTALS	219	4	2	80	2

Wildland Fire Risk

Garfield County Community Wildfire Protection Plan (CWPP)

The Garfield County Community Wildfire Protection Plan was developed in accordance with the guidelines set forth by the Healthy Forests Restoration Act (2003) and the Colorado State Forest Service's Minimum Standards for Community Wildfire Protection Plans (2004). This plan:

- Was collaboratively developed through planning meetings with county, state, and federal representatives;
- Identifies and prioritizes areas for vegetation-fuels reduction treatments to reduce the wildfire threat to human welfare, and economic and ecological values at risk in the county;
- Recommends measures to reduce the ignitability of structures; and
- Provides recommendations on ways to improve wildfire response capabilities for the fire protection districts.

1.1 Methodology

Step 5 in the CWPP process is to assess wildfire risks and hazards associated with communities and their WUI within the planning area (Table 2). The planning area for this CWPP is defined by the boundary of Garfield County. There are eight FPDs within the county. Those areas not under a FPD command fall under the jurisdiction of the Sheriff's Office (Map 2). A WUI was defined within each FPD by the chief or his representative. The WUI boundaries were presented at a planning team meeting for discussion and approval by team members. Even though the WUIs vary greatly in size, populations, and geography, standardized assessments were conducted to assess wildfire hazards and risks.

A comprehensive community wildfire assessment takes into account a wide variety of factors in order to fully identify and assess wildfire risks and hazards. These include the nature of community infrastructure, the proximity of hazardous fuels, and probability of wildfire susceptibility and potential intensity. By analyzing all these elements, including input from residents and FPDs, an understanding of wildfire risks and hazards can be developed that provides guidance for developing effective vegetation-fuel treatments and other mitigation opportunities to improve FPD response capabilities.

In addition to the community assessments, fire regime condition class (FRCC), fire behavior fuel model (FBFM), wildfire susceptibility index (WFSI), and wildfire intensity index (WFII) were evaluated within the WUIs. FRCC and FBFM are attributes of the vegetation-fuel and can be

used to describe its degree of hazard to communities. WFSI is a metric that defines the probability of wildfire occurrence and its predicted rate of spread. WFII is metric that defines the potential severity of wildfire.

The WUI risk to wildfire was calculated by summing the results of the five metrics and then dividing by 5 (Table 11). Community risk, FRCC, and FBFM received an equal weighting of one while WFSI and WFII received a weighting of 3.

1.2 Community Hazard Assessment

The WUI areas were delineated by the FPDs based on their knowledge of fire occurrence and community risk (Map 2). The WUI focuses the interest of the CWPP because of economic considerations and the high percentage of residences. Mitigation actions are identified herein to reduce the risk of wildfire loss in the WUIs. The remainder of the county is characterized as rural. In these areas, isolated homes and ranches are best served through individual home and property hazard and risk assessments and are outside the scope of this project.

Field surveys were conducted September and October 2011. A standardized survey process defined by the National Fire Protection Association (NFPA) was utilized to assess the relative level of wildfire risk and hazard for each WUI. Appendix C contains an example of the NFPA Form 1144, *Standard for Protection of Life and Property from Wildfire*.

The NFPA 1144 survey assess means of ingress and egress, road conditions, fire service access, surrounding vegetation-fuel, defensible space around structures, surrounding terrain, weather conditions conducive to wildfire ignition and spread, structure building materials, available fire protection, and placement of utilities. Scores are assigned to each element and then totaled to determine the relative level of risk for each individual assessment. Low, moderate, high, and extreme hazard ratings were assigned based on the surveys (Table 12).

The NFPA 1144 surveys assessed the predominant characteristics important to wildfire risks within the communities of Parachute, Battlement Mesa, Rifle, Rulison, Silt, New Castle, and Carbondale. A representative sample of the scattered residences of Lower Valley, De Beque, and Gypsum FPD were individually assessed using the NFPA 1144 procedure to collectively determine a “community wildfire risk”. Glenwood Springs and Missouri Heights wildfire risks were determined from the information presented in their previously completed CWPPs.

1.3 Fire Regime Condition Class

FRCC is a metric that classifies current vegetation cover according to its departure from an acceptable reference condition such as conditions prior to European settlement. Vegetation changes from the historical conditions have resulted because of disturbance caused by European settlers and an aggressive fire exclusion policy.

The FRCC considers the current wildfire regime (i.e., wildfire return interval and its severity) and vegetation structure (i.e., vegetation composition and structure) in comparison to the reference condition. FRCC may be utilized, in combination with other factors, to help guide management objectives and set priorities for vegetation-fuel treatments and management. The classification of vegetation into FRCC considers only wildland vegetation and not vegetation associated with

agricultural or urban areas. FRCC classes and the hazard ratings used for WUI assessment are shown in Table 12.

1.4 Fire Behavior Fuel Model

Existing vegetation is the fuel source for wildfire and has a direct effect on its behavior. Understanding the potential fire behavior characteristics of different vegetation types is paramount to predicting severity of a wildfire and the need vegetation-fuels management. There are several systems for classifying fuel models. This analysis utilizes the most commonly used fuel modeling methodology known as the Anderson fire behavior fuel models (FBFM). Thirteen FBFMs are presented in four fuel groups: grasslands, shrublands, timber litter and understory, and logging slash (Anderson 1982). Each group comprises three or more fuel models. The different vegetation types that occur in Garfield County (Map 2) can be classified into 8 FBFMs (Map 6). Table 14 defines each of the FBFMs that occur in the county and the hazard rating used to define WUI risks.

1.5 Wildfire Susceptibility Index

Wildfire susceptibility index (WFSI) is defined as the probability of wildfire occurrence and its predicted rate of spread once an ignition occurs. The WFSI data used in this CWPP assessment was derived from the Western Colorado Wildfire Risk Assessment that was presented in the CSFS report, *Colorado Statewide Forest Resource Assessment: A Foundation for Strategic Discussion and Implementation of Forest Management in Colorado*, published in 2008.

The purpose of the WFSI was to provide a measure of wildfire risk within the WUIs and communities. Data used by CSFS to develop the WFSI included topography, historic weather, historic wildfire, surface fuels, and vegetation canopy. WFSI is utilized to define the risk of wildfire occurrence in Garfield County (Map 7).

Table 16 defines the various WFSI classes and their occurrence within Garfield County. The largest and second-largest categories are moderate and high and they occur throughout the county associated in close proximity to all WUIs (Map 7). The low category occurs mainly in the rural areas of the county. The WFSI very high category occurs mainly in the southeast portions of the county in the Glenwood Springs and Carbondale WUIs.

1.6 Wildfire Intensity Index

The wildfire intensity index (WFII) is a measure for the potential for high-intensity wildfire occurrence as defined by flame length and crown fire. This index was also developed for the CSFS 2008 forest resources assessment. Calculation of the WFII is based on fire behavior computer simulations using similar data as for the WFSI. WFII is used to define areas in the county that could support high intensity fires (Map 8).

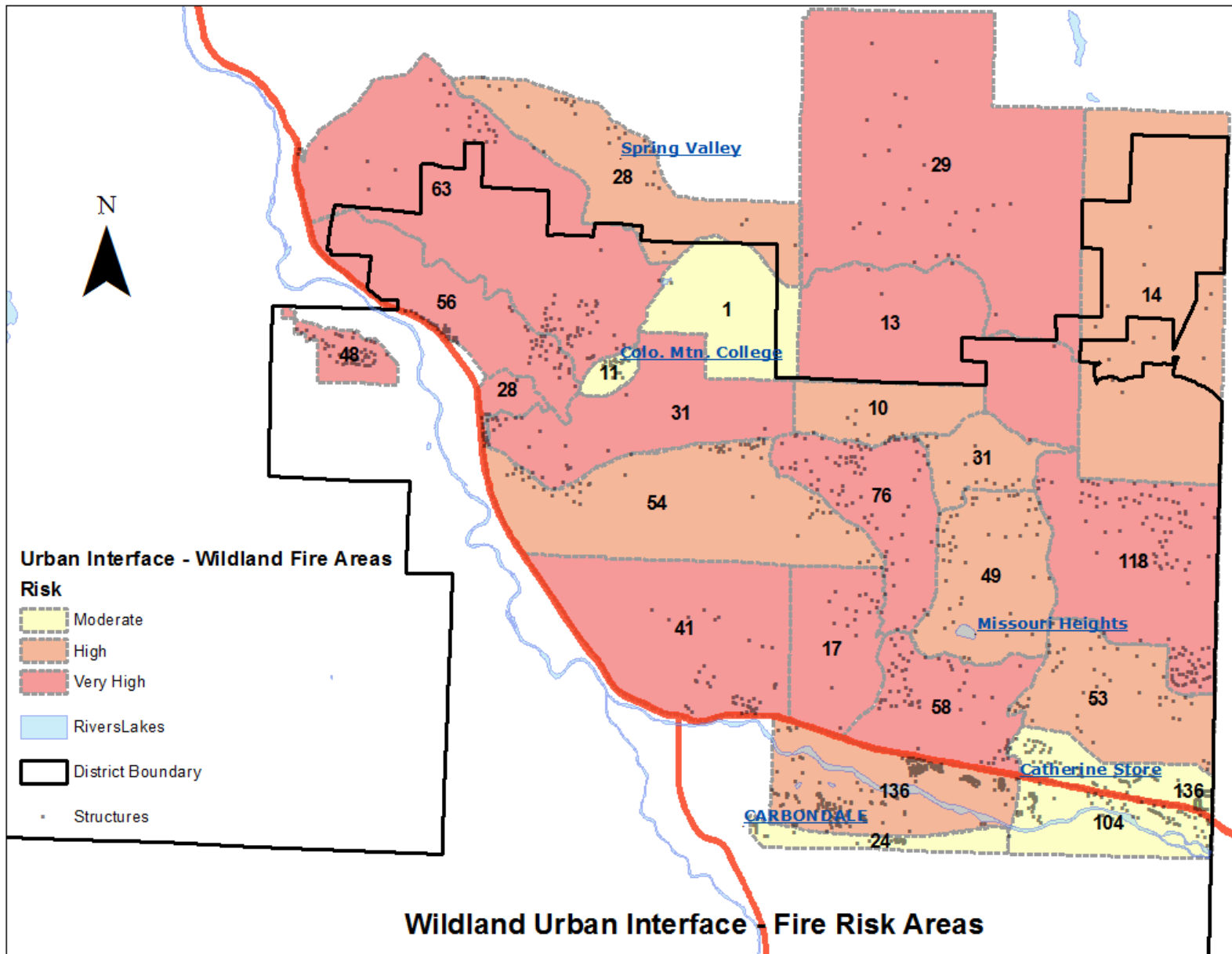
Table 18 defines the various WFII classes and their occurrence within Garfield County. The largest and second-largest categories are low and moderate and they occur throughout the county (Map 8). The high and very high WFII classes are associated mainly with forest vegetation.

Garfield County Community Wildfire Protection Plan

Table 20. Wildland Urban Interface Wildfire Overall Risk Summary

Wildland Urban Interface	Community	NFPA 1144 Community Hazard Rating	FRCC Hazard Rating	FBFM Hazard Rating	WFSI Risk Rating	WFII Risk Rating	Overall Risk
Lower Valley	Dispersed	High	High	Moderate to High	Low	Low to Moderate	High
De Beque	Dispersed	High	High	Moderate to High	Low	Low to Moderate	High
Grand Valley	Parachute	Moderate	High	Moderate to High	Low to Moderate	Low to Moderate	High
	Battlement Mesa	Moderate					
	Rulison	High					
Rifle	Rifle	Moderate	High	High	Low	Moderate	High
Burning Mountains	Silt	Moderate	High	High	Low to Moderate	Low to Moderate	High
	New Castle	High					
Glenwood Springs Rural	Greater Glenwood Springs	High to Very High ¹	High	High	High to Very High	Low to Moderate	Extreme
Carbondale	Carbondale	Moderate	Low to High	High	Very High	Moderate	Extreme
	Missouri Heights	Moderate to Extreme ²					
Gypsum	Dispersed	High	Low to High	High	Low to Moderate	Low to Moderate	High

Wildland Urban Interface – Fire Risk Areas



Area	Subdivisions	Powerlines	Substations	Gas Utilities	Comm Facilites	Structures	Businesses	Public Buildings	Watersheds	Recreation Areas	Risk
A	High Aspen Ranch, Homestead Estates, Ranch at Coulter Creek, Spring Valley Ranch	(1) 69 KV, (3) 115 KV, (2)	Yes	N/A	N/A	29	N/A	N/A	N/A	N/A	Very High
B	Spring Valley Ranch, Lake Springs Ranch	N/A	N/A	N/A	N/A	28	N/A	N/A	N/A	N/A	High
C	Elk Springs, Lake Springs Ranch, Crysteleit, Crysteleit Views	(1) 230 KV	N/A	N/A	N/A	63	N/A		N/A	N/A	Very High
D	Elk Springs	(1) 230 KV	N/A	N/A	N/A	56	N/A	N/A	Roaring Fork River	N/A	Very High
E	Lake Springs Ranch	(1) 230 KV	N/A	N/A	N/A	1	Rivendell Sod Farm	N/A	N/A	N/A	Moderate
F	Ranch at Coulter Creek	(1) 69 KV, (3) 115 KV, (2)	Xcel Energy	N/A	N/A	13	N/A	N/A	N/A	N/A	Very High
G	N/A	(1) 230 KV	N/A	N/A	N/A	14	N/A	N/A	N/A	N/A	High
H	Baby Beans	(2) 215 KV	N/A	N/A	N/A	10	N/A	N/A	Cattle Creek	N/A	High
I	Pinion Pines Apartments	(1) 115 KV, (1)	N/A	N/A	N/A	31	1	Sanitation Plant	Cattle Creek	N/A	Very High
J	Colorado Mountain College	(1) 230 KV	N/A	N/A	N/A	11	N/A	CMC		N/A	Moderate
K	Pinyon Mesa	N/A	N/A	N/A	N/A	28	9+	N/A	Roaring Fork River	N/A	Very High
L	West Bank Mesa	N/A	N/A	Source Gas	N/A	48	N/A	N/A	Roaring Fork River	N/A	Very High
M	Cattle Creek Center	(1) 115 KV	N/A	N/A	N/A	54	10 +	N/A	Cattle Creek	N/A	High
N	Cottonwood Hollow, Cattle Creek Ranch, Hardy Hills, Pinion Peaks, Cedar Ridge	(1) 115 KV	N/A	N/A	N/A	76	N/A	N/A	Cattle Creek	N/A	Very High
O	Cedar Ridge Farm	(1) 115 KV	N/A	N/A	N/A	31	N/A	N/A	Cattle Creek	BLM-CG Cattle Creek	High
P	Panorama Ranches, King Row	(1) 115 KV	N/A	N/A	N/A	118	Strang Ranch	Cdale-Fire Station 85	N/A	N/A	Very High
Q	Hawk Ridge	N/A	N/A	N/A	N/A	49	N/A	N/A	Crystal Springs	N/A	High
R	Aspen Glen	(1) 115 KV	N/A	N/A	N/A	41	Planted Earth	N/A	Roaring Fork River	Red Hill Recreation	Very High
S	N/A	N/A	N/A	N/A	N/A	17	Powers Art Center, LaFarge Western Slope Materials	N/A	Crystal Springs, Roaring Fork	N/A	Very High
T	Wooden Deer, TO Ranch	N/A	N/A	N/A	N/A	58		N/A	Crystal Springs, Roaring Fork	N/A	Very High
U	Stirling Ranch, White Cloud	N/A	N/A	N/A	N/A	53	N/A	Missouri Hgts School	N/A	N/A	High
V	Lions Ridge, Cerise Ranch, Dakota, Dakota Meadows	N/A	N/A	N/A	N/A	136	N/A	N/A	N/A	N/A	Moderate
W	Goose Creek, Mayfly Bend, Roaring Fork Preserve, Ranch at Roaring Fork, Aspen Equestrian Estates	N/A	N/A	N/A	N/A	136	Aspen Polo Club	N/A	N/A	N/A	High
X	Blue Creek Ranch	(1) 115 KV	N/A	N/A	N/A	104	Waldorf School	N/A	Roaring Fork River	N/A	Moderate
Y	The Loadout, Carbondale Mini Storage, Ackerman Log Homes, Mountain Refuse	(1) 115 KV	N/A	N/A	N/A	24	Multiple	N/A	N/A	N/A	Moderate

SECTION FOUR: Standards, Goals & Objectives

Response Types

CRFPD responds to virtually all emergencies in the district. When someone places a 911 call for an emergency other than a law enforcement issue, CRFPD is paged to respond. In addition, CRFPD is often called to assist or provide care at the scene of a law enforcement incident.

The reality of responding to a wide variety of different incident types means that CRFPD personnel must be cross-trained in as many emergency response disciplines as possible. Obtaining certification, recertifying certifications, continuing education training, equipping and staffing for the many different types of response in the district is a time consuming, difficult, and expensive process. A single responder has a limited ability to specialize in other disciplines than firefighting and EMS. This means that it takes more responders certified in different specialties to ensure that CRFPD is able to deliver a high level of service and a high standard of care to the citizens in the district.

Response types in the Carbondale & Rural Fire Protection District include:

Residential Structural Fire Response

- Commercial Structural Fire Response
- Motor Vehicle Accident Response “MVA” (both fire and EMS)
- Emergency Medical Response and Transport (medical and trauma incidents)
- Wild-land Fire Response (different training level and equipment than structural firefighting)
- Hazardous Materials Incident Response (HAZMAT)
- Swiftwater Rescue Response
- High Angle Rescue Response
- Backcountry Incident Response (particularly in the south end of the district)
- Avalanche Response
- Mud-slide Incident Response

Response Standards

Nationally recognized standards for response to emergencies are established by the National Fire Protection Association (NFPA). These standards are developed over time by the NFPA. The standards are reviewed and rewritten every five years to ensure that the standards are relevant to the ever evolving environments of emergency response.

The basis for every standard that comes from the NFPA is to provide for the safety of the emergency responders who are exposed to the dangers of structure fires, wildland fires, EMS incidents, MVAs, swiftwater rescues, HAZMAT incidents, high angle rescues and the like. The NFPA has developed recognized standards for all of the above incident types. The NFPA standards require that all responders be certified in each discipline and that the district carries NFPA compliant equipment and vehicles for each incident type.

Many of the core pieces of equipment, staffing, apparatus and protective gear standards have been developed through the investigation and research of incidents involving emergency responder deaths and injuries. Anytime a responder is injured or killed during a training or

incident response, one of the first items that is looked at very closely is whether or not the fire department involved in the incident is staffed, equipped, train and responding according to the NFPA standards. NFPA safety standards are the legal benchmark by which organizations are judged before, during and after an incident.

SECTION FIVE: Critical Task Capability

Effective Response Force (ERF)

A fire in an occupied residential single or multi-family structure requires tasks to be simultaneously conducted in order to stop the loss of civilian lives, stop further property loss, and minimize risks to the firefighter. The number and type of tasks needing simultaneous action will dictate the minimum number of firefighters needed at different types of fires at the same time. The following tables describe these tasks, which usually are performed simultaneously in the majority of fire responses to single and multi-family dwellings. These tasks usually occur in the first 12 to 15 minutes of a fire ground operation. In order to accomplish these tasks, the first full alarm is 2 engine companies, 1 ladder or truck company, 1 ambulance company and a battalion officer. An effective response force will be determined to have been achieved when 15 suppression personnel have arrived on scene. Additional units and/or mutual aid may be dispatched by the request of the incident commander. Incidents involving rural structure fires with no fire hydrants or larger fire suppression incidents will require 22 suppression personnel to establish an effective response force.

Company	Basic/Minimum Tasks	Minimum # of Personnel Required
Single Family Residential Structure Fire – Non-Target Hazard		
Battalion	Establish command, size up, incident safety officer	1
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Engineer/Pump operator	1
	Attack hoseline	2
2nd Engine	Back-up hoseline	2
	Interim Rapid Intervention Crew (IRIC)	2
Truck	Forcible entry, ventilation	2
	Primary search	2
	Engineer/Pump operator	1
1st Ambulance	Utility Control, FF Treatment/Rehab	1
TOTAL		15
Single Family Residential Structure Fire – No Hydrants		
Battalion	Establish command, size up, incident safety officer	1
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Pump operator	1
	Attack hoseline	2
2nd Engine	Back-up hoseline	2
	Interim Rapid Intervention Crew (IRIC)	2
1st Truck	Forcible entry, ventilation	2
	Primary search	2
	Engineer/Pump operator	1
3rd Engine	Establish Fill site, Fill site officer	1
	Pump operator	1
	Connect/disconnect tenders	1
1st Water Tender	Drop port-a tank, water supply officer	1
	Tender operator	1
2nd Water Tender	Tender operator	1
3rd Water Tender	Tender operator	1
1st Ambulance	Utility Control, FF Treatment/Rehab	1
TOTAL		22

Structure Fire – Life/Conflagration Target Hazard		
Battalion	Establish command, size up, incident safety officer	1
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Pump operator	1
	Attack hoseline	2
2nd Engine	Back-up hoseline	2
	Interim Rapid Intervention Crew (IRIC)	4
3rd Engine	Support first two engines	2
1st Truck	Forcible entry, ventilation	2
	Primary search	2
	Engineer/Pump operator	1
2nd Truck	Forcible entry, ventilation	2
	Life rescue	2
Chief Officer	Assist command	1
TOTAL		22

Structure Fire – Industrial Target Hazard		
Battalion	Establish command, size up, incident safety officer	1
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Fire Attack Group 1; recon, hoseline, standpipe operations	3
2nd Engine	Fire panel	1
	Water supply FDC	2
	Fire Attack Group 1; recon, hoseline, standpipe operations	2
3rd Engine	Fire Attack Group 1; recon, hoseline, standpipe operations	3
	Fire Attack Group 2 Supervisor	1
1st Truck	Fire Attack Group 1; recon, search & rescue	2
	Fire Attack Group 1; forcible entry & ventilation	2
2nd Truck	Fire Attack Group 2; recon, search & rescue	2
	Fire Attack Group 2; forcible entry & ventilation	2
Chief Officer	Assist command	1
TOTAL		22

Hazmat Incident – Small Scale		
Battalion	Establish command, size up, incident safety officer	1
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Hazard mitigation	2
	Emergency decon/safety	1
2nd Engine	Operations	1
	Research	1
	Hazard mitigation	2
TOTAL		8

Hazmat Incident – Large Scale		
Battalion	Establish command, size up, incident safety officer	1
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Hazard mitigation/rescue	2
	Emergency decon/safety	1
2nd Engine	Interim Rapid Intervention Crew (IRIC) team	4
3rd Engine	Evacuate, deny entry	2
4th Engine	Evacuate, deny entry	2
Chief Officer	Assist command	1
		13

Wildland Fire Incidents. Wildland fire suppression requires an effective response force that is capable of:

1. Quickly responding to and suppressing small fires in any Wildland Urban Interface (WUI) area of the district.
2. Enhanced level of response to wildfire incidents that are expanding and require multiple resources to suppress. This includes using district resources along with mutual aid from neighboring districts and interagency resources.
3. Responding to large scale fire incidents that require a draw-down of resources from CRFPD, neighboring districts and federal agencies. Typically multi-day incidents that are low frequency/high impact incidents.

Currently, the district employs two person engine crews to quickly respond to small fires. While this response is typically rapid, two person crews have a limited capability to perform actual suppression operations. The advantage of this type of response is, rapid initial size-up and resource ordering along with the ability to identify immediate evacuation priorities in the WUI areas. When these crews order resources, a tiered response method is used. Resources are ordered from CRFPD first, and then mutual aid from other agencies.

The effective response force for wildland fires is shown below. Wildland firefighting is a manpower intensive operation and staffing levels greatly affect the ability to respond and keep small fires small, which is the best and only way to mitigate the potential for larger scale destructive fires.

Wildland Fire Incident – LOW fire danger		
1st Engine	Establish command, size up, identify anchor point, safety zone, escape route	1
	Pump operator	1
	Attack hoseline or hand tools	3
TOTAL		5
Wildland Fire Incident – EXTREME fire danger, Wildland Urban Interface		
Battalion	Establish command, size up; identify anchor point, LCES	2
1st Engine	Division / Group Supervisor / Operations Section Chief	1
	Pump operator, establish water supply	1
	Attack hot flank	2
2nd Engine	Pump operator, establish water supply	1
	Attack cold flank, identify LCES	3
1st Water Tender	Identify structure protection or fire attack, identify LCES	2
2nd Water Tender	Assist structure protection or fire attack, identify LCES	2
1st Engine WL	Division Supervisor or Task Force Leader	1
	Assist with fire attack or structure protection, identify LCES	3
2nd Engine WL	Division Supervisor or Task Force Leader	1
	Assist with fire attack or structure protection, identify LCES	3
Chief Officer	Assist command	1
TOTAL		21

Emergency Medical Services. Emergency medical responses account for the majority of calls annually within the Carbondale Fire District. These incidents range from basic calls such as minor injuries or illnesses to incidents requiring advanced skills such as cardiac arrests, major trauma or multiple patient incidents. All CRFPD response staff are certified to at least the EMT-Basic level. Each shift is also staffed with at least one Paramedic 24/7 to provide advanced life support service to the community.

The initial effective response force for routine medical calls is one CRFPD ambulance staffed with 3 personnel and a Battalion Officer responding in addition to the ambulance. If CPR, significant trauma or bariatric lifting is needed or if there are multiple patients, additional resources will be dispatched or mutual aid will be called for.

Motor vehicle accidents require a combination response of fire and EMS resources. The initial effective response force for motor vehicle accidents is one battalion officer, one ambulance with 3 personnel and one engine with 4 personnel to perform fire suppression, vehicle stabilization, extrication and possibly traffic control. If a motor vehicle accident is more complex than a single vehicle and occupant, additional EMS and fire resources will be called for.

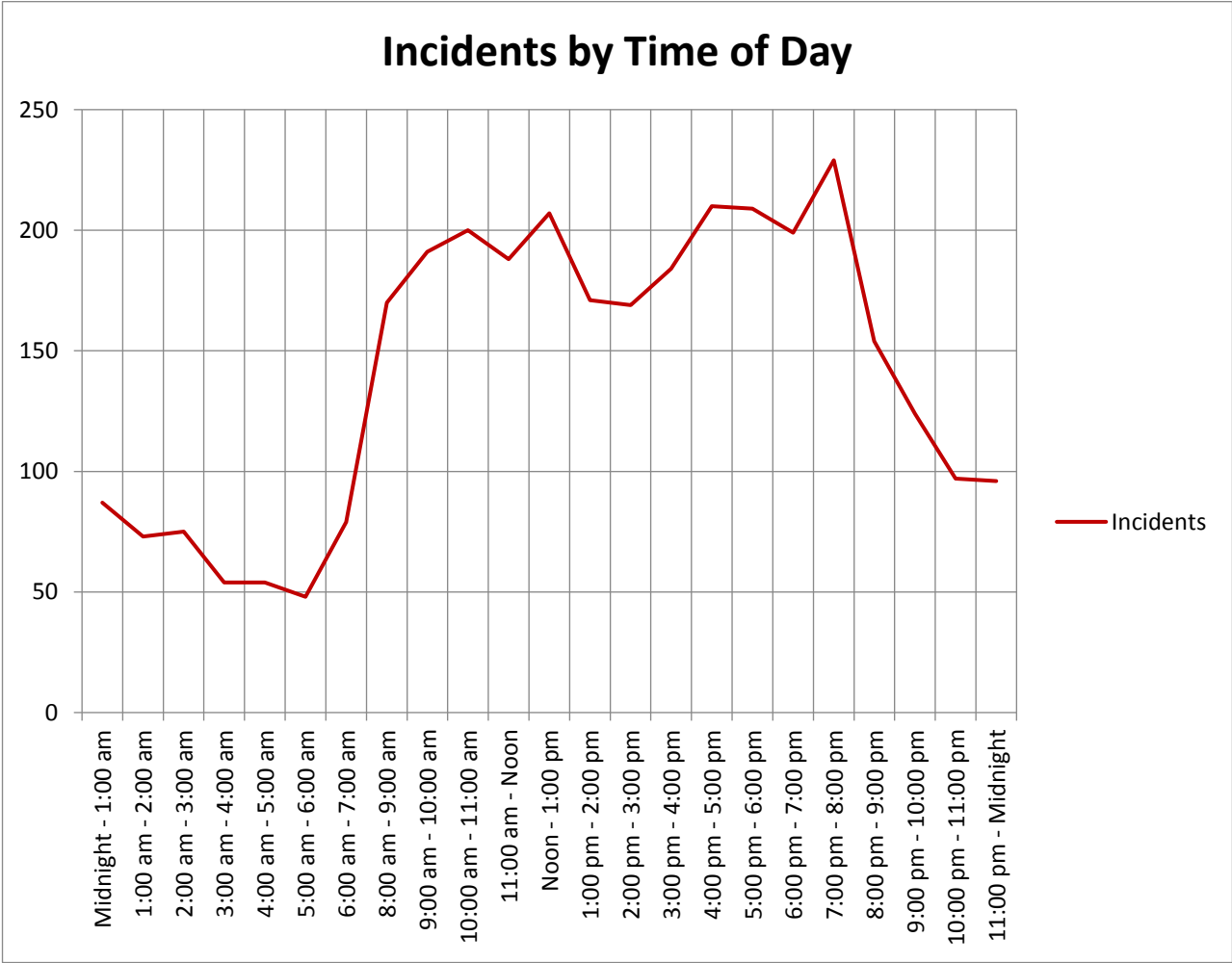
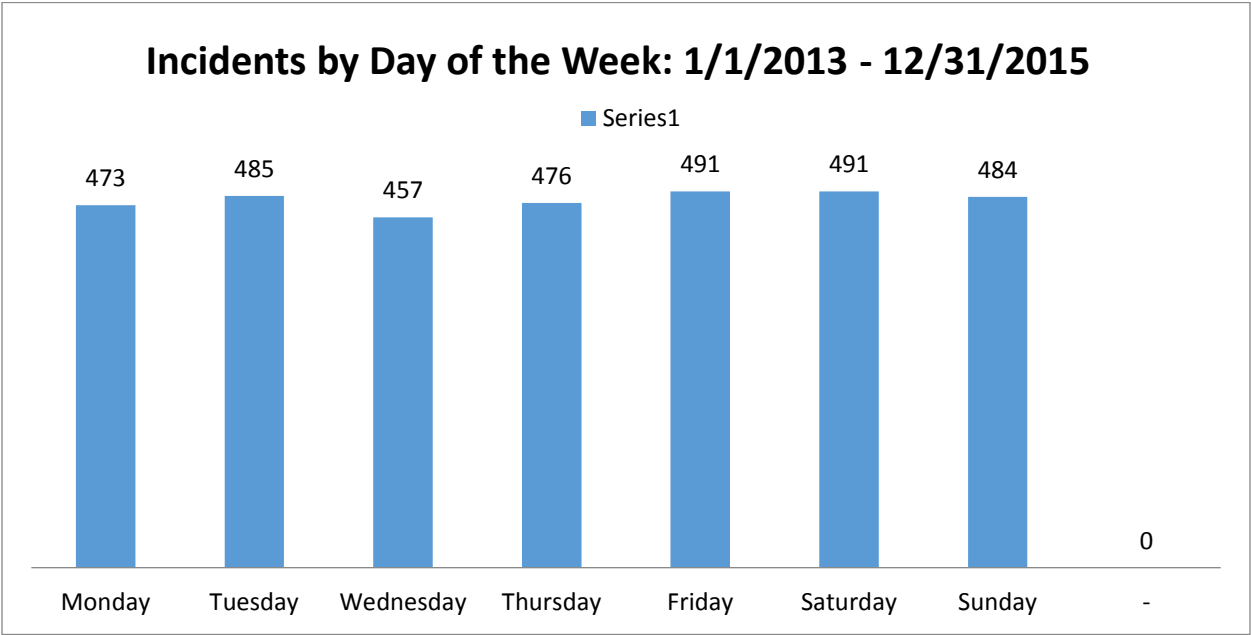
Medical Incident		
Battalion	Establish command, perform size-up	1
1st Ambulance	ALS patient care: IV, Meds, Airway Management, Cardiac Monitoring	2
	TOTAL	3
	* CPR Needed	+2
	* Bariatric/Lifting	+2
Motor Vehicle Accident with Injuries		
Battalion	Establish command, perform size-up	1
1st Ambulance	ALS patient care: IV, Meds, Airway Management, Cardiac Monitoring	3
1st Engine	Engineer/Pump operator	1
	Stabilize Vehicle, extrication, hazard control, traffic control	3
TOTAL		8

Rescue Incidents. The Carbondale Fire District responds to numerous types of rescue incidents. All calls of these types require an effective response force that is not only well-trained for the incident but, an adequate numbers of responders in the correct positions to effectively and safely perform on these incidents.

Swift Water Rescue Incident		
Battalion	Establish command, perform size-up	1
1st Rescue Unit	Establish safety zone	1
	Rescue operations	4
2nd Rescue Unit	Rescue operations - Downstream protection, etc.	4
	Establish Rapid Intervention Crew (RIC)	2
TOTAL		12
High Angle Rescue Incident		
Battalion	Establish command, perform size-up	1
1st Rescue Unit	Victim/patient rescue	6
TOTAL		7
Avalanche/Mudslide Incident		
Battalion	Establish command, perform size-up	1
1st Rescue Unit	Establish perimeter	2
	Victim/patient rescue	2
TOTAL		5

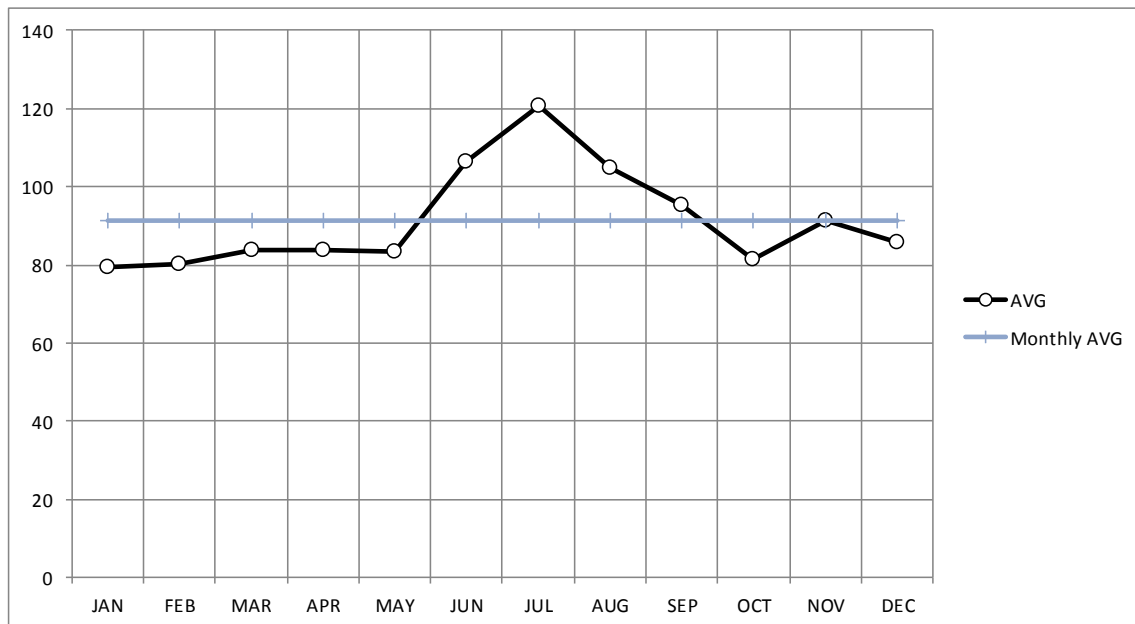
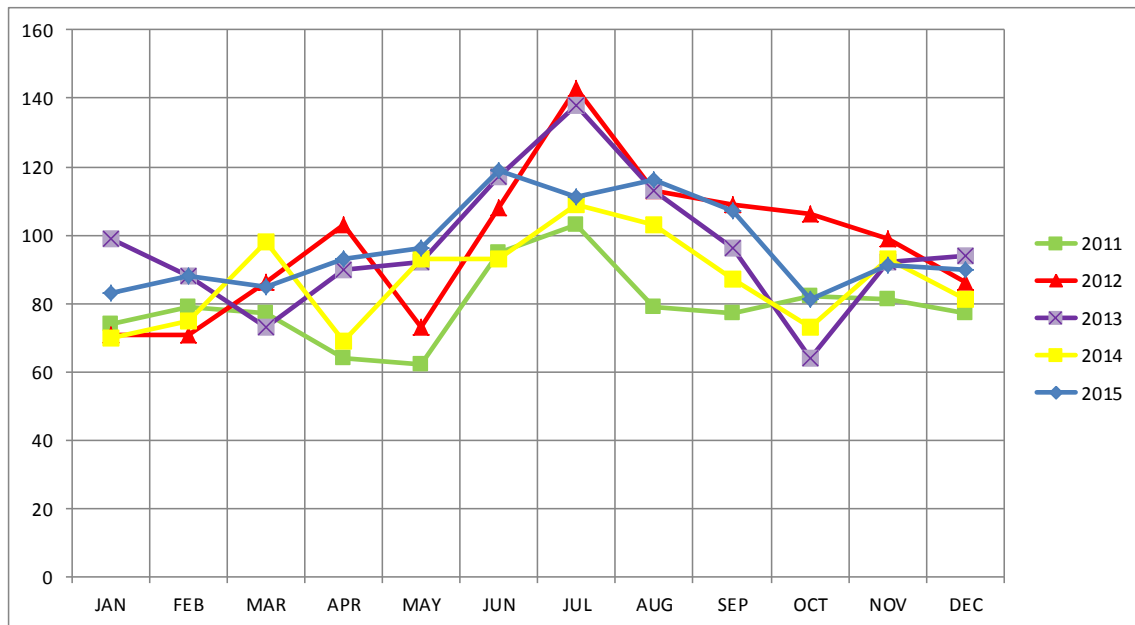
SECTION SIX: Setting Service Level Objectives

CURRENT BASELINES

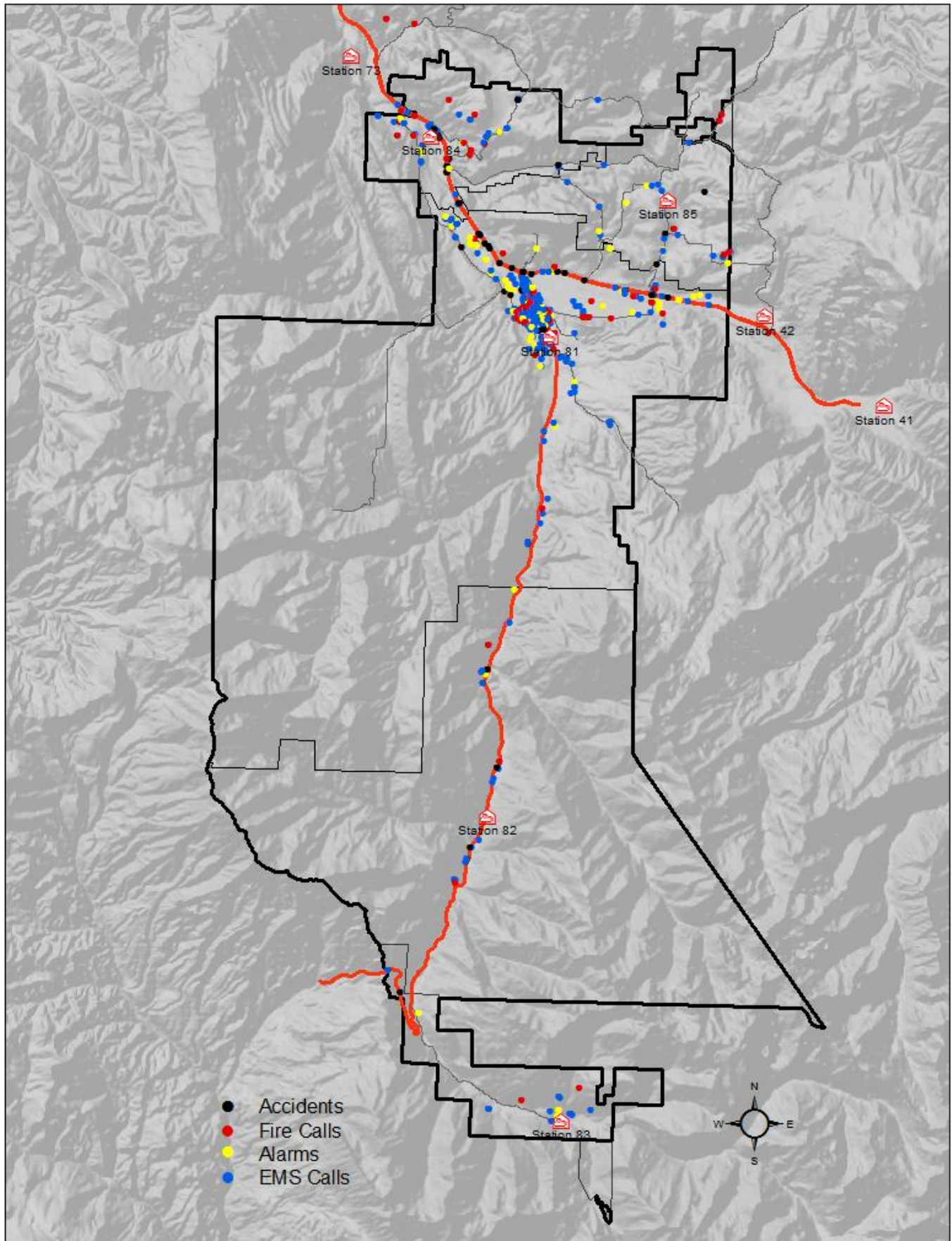


Incidents by Month 2011-2015

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2011	74	79	77	64	62	95	103	79	77	82	81	77	950
2012	71	71	86	103	73	108	143	113	109	106	99	86	1168
2013	99	88	73	90	92	117	138	113	96	64	92	94	1156
2014	70	75	98	69	93	93	109	103	87	73	93	81	1044
2015	83	88	85	93	96	119	111	116	107	81	91	90	1160
AVG	79	80	84	84	83	106	121	105	95	81	91	86	1096
Monthly AVG	91	91	91	91	91	91	91	91	91	91	91	91	



Location of Calls – 2015



Emergency Response Times 2013-2015

First Arriving Unit (CRFPD FireRMS Data)

Station 81		Processing	Turnout	Travel	Response
			1038	1,246	1,247
EMS	Median		2:00	4:00	7:00
	80th Percentile		4:00	7:00	10:00
			693	973	983
Fire/Other	Median		2:00	5:00	7:00
	80th Percentile		4:00	10:00	12:00

Station 82		Processing	Turnout	Travel	Response
			64	73	73
EMS	Median		4:00	3:00	7:00
	80th Percentile		6:00	17:00	22:00
			28	44	44
Fire/Other	Median		5:00	15:00	7:00
	80th Percentile		10:00	22:00	20:00

Station 83		Processing	Turnout	Travel	Response
			39	45	45
EMS	Median		4:00	11:00	16:00
	80th Percentile		7:00	34:00	33:00
			18	26	28
Fire/Other	Median		5:00	11:00	16:00
	80th Percentile		10:00	25:00	33:00

Station 84		Processing	Turnout	Travel	Response
			140	171	171
EMS	Median		3:00	13:00	15:00
	80th Percentile		5:00	16:00	19:00
			134	170	170
Fire/Other	Median		3:00	12:00	15:00
	80th Percentile		5:00	16:00	19:00

Station 85		Processing	Turnout	Travel	Response
			51	58	58
EMS	Median		4:00	16:00	19:00
	80th Percentile		5:00	18:30	22:00
			8	8	8
Fire/Other	Median		3:00	16:00	19:00
	80th Percentile		4:00	19:00	23:00

First Arriving Unit (Garfield County 911 CAD Data)

Station 81 - Response Times 2013-2015 by Year

2013					
Station 81		Processing	Turnout	Travel	Response
		112	364	462	112
EMS	Median	01:06	01:42	04:12	07:48
	80th Percentile	01:37	02:48	08:55	11:42
		93	294	308	94
Fire/Other	Median	01:30	01:56	05:04	06:36
	80th Percentile	02:25	03:15	11:44	11:42

2014					
Station 81		Processing	Turnout	Travel	Response
		104	311	408	105
EMS	Median	01:20	01:37	04:33	07:49
	80th Percentile	01:59	02:57	08:57	18:37
		101	276	286	105
Fire/Other	Median	01:30	01:49	05:56	06:53
	80th Percentile	02:28	03:08	12:34	15:36

2015					
Station 81		Processing	Turnout	Travel	Response
		171	364	503	170
EMS	Median	01:21	01:22	04:25	06:32
	80th Percentile	02:05	02:44	09:04	12:08
		92	293	285	89
Fire/Other	Median	01:28	01:30	05:42	06:15
	80th Percentile	02:34	02:56	12:02	13:42

SECTION 7: Evaluation

The objective of this standard of coverage is to identify and maintain a balance among distribution, concentration and reliability that will keep the community risk at reasonable levels while yielding the maximum protection of life and property.

Ultimately, it is the community through its elected officials that dictates the standard of coverage that will be adopted by the fire district. By its economic decisions with respect to taxation, the community buys a level of fire and life safety service that is consistent with its perceived needs and its available resources. While these decisions can be influenced by many factors, the level of protection available in any community is a local decision that should be made after understanding the local needs, resources and performance.

Each community must decide the appropriate response and travel times for their community. This decision should be based on a variety of factors, including:

- Types of services provided (fire, EMS, specialty response)
- Reasonable travel time for fire department fire apparatus and ambulances to meet emergency response needs of a community
- Size of area served and amount of resources available
- Level of risk a community is willing to accept by establishing or tolerating longer response times.

SECTION EIGHT: Policy Recommendations

Objective 1

Effectively address economic and demographic trends to ensure that an adequate level of emergency response capacity is maintained and augmented and to ensure that the district can meet expected response time standards for the community. In addition, maintain and improve the district's ability to adequately staff and respond to concurrent calls for service.

Recommendations:

1. **Increase response staffing.** To achieve this, additional resources to put more responders on shift will need to be developed. It is recognized that current revenue shortfalls will make this difficult to achieve.
2. **Meet Standards.** Continue to assess the district's ability to meet local standards as well as initial alarm assignment capability stated in NFPA 1720.
3. **Improve Volunteer Staffing and Preparedness.** The volunteer members of the district need clear direction relating to expectations and rewards for meeting expectations. The district needs to address these issues both in funding and organizational realignment.

Objective 2

Ensure that all staff are adequately trained for the positions and disciplines that they will be required to perform.

Recommendations:

1. **Training to Standards.** The wide variety of incidents that CRFPD members are required to respond to necessarily requires them to be trained to the operations level of each discipline such as: swift water rescue, technical rescue, extrication and rescue, and hazardous materials response. NFPA standards of training are the benchmark for each of these disciplines.
2. **Officer Development.** Officer development and training is crucial to the operational safety of the members of the district. In addition, the development of soft skills in managing people, conflicts, time and the like is vital to ensuring a safe, pleasant and motivated force.
3. **Funding of Training.** Training takes on many forms in the district. The training of 24 hour shift personnel, daily staff and volunteers requires that training happen at different times and on different days. This places a tremendous strain on the district's single training officer. Funding for training program development, instructor certification and assistance for the training chief is vital to ensuring a high standard of care and response in the district.

Objective 3

Ensure Funding for Fleet and Equipment.

Recommendations:

1. **Safe, Modern Apparatus.** CRFPD's currently deployed fleet of apparatus includes: 1 fire engine that is 33 years old and 7 engines that are 23 or more years old. Additionally, CRFPD's ambulance fleet (4) range from 16 to 8 years in age. Finally, CRFPD's brush trucks and command vehicles are at and in some cases over their service life. It is vital to the safety of the community and the responders that these apparatus/vehicles are replaced in a reasonable timeframe to ensure the continued level of service and safety that we presently provide.
2. **Current, High Quality Equipment.** Emergency responders rely on quality, up to date equipment that is safe and effective, not only for patients who rely on our care but also to enable our responders to operate safely and efficiently while providing a high standard of care and services.

CRFPD commits to:

- Meet all deployment objectives with 90% reliability for all types of emergency incidents.
- Establish a staffing plan with triggers to hire additional staff as needed for emergency operations, fire prevention, training and public education.
- Develop new volunteer entry process and performance measures to ensure adequate training, preparedness and volunteer staffing.
- Ensure ongoing capital funding for equipment and apparatus purchases that will enable CRFPD to maintain a fleet of safe, modern and reliable apparatus along with up to date equipment to provide excellent patient care and perform emergency services operations safely and efficiently.

Appendix A: Terminology Glossary and Acronyms

- NFPA - National Fire Protection Association
- CRFPD - Carbondale & Rural Fire Protection District
- CPSE - Center for Public Safety Excellence
- EMS - Emergency Medical Services
- ALS - Advanced Life Support
- BLS - Basic Life Support
- ISO - Insurance Services Office
- EMT-P - Emergency Medical Technician – Paramedic
- EMT-I - Emergency Medical Technician – Intermediate
- EMT-B - Emergency Medical Technician – Basic
- CWPP - Community Wildfire Protection Plan
- WUI - Wildland/Urban Interface
- MVA - Motor Vehicle Accident
- HAZMAT - Hazardous Materials