Big Sky Fire Department

Montana

Emergency Services Master Plan

November 2015

Emergency Services
Consulting International

Table of Contents

Executive Summary

Emergency Services Consulting International (ESCI) was engaged by the Big Sky Fire Department to provide a Master Plan for the delivery of emergency services within the service area. This Emergency Services Master Plan will assist the department in future planning and provision of comprehensive emergency services to the citizens of Big Sky. This report evaluates current conditions; projects future growth, development, and service demand; and provides recommendations to enhance current services or to provide an equal level of service over the next 10 to 15 years.

ESCI thanks the Big Sky Fire Department Board of Trustees, the fire chief, and the staff of the BSFD for their outstanding cooperation in the preparation of this report. All involved were candid in their comments and provided a tremendous amount of essential information.

The Master Plan begins with an Evaluation of Current Conditions, which provides a snapshot in time of the organization as it was found when ESCI completed its initial field work in the summer of 2015, and establishes an informational baseline from which the balance of the Master Plan is developed.

Evaluation of Current Conditions

An analysis of current conditions is documented in seven survey sections, reviewing the BSFD organizational composition, management components, staffing and personnel management, training and fire prevention programs, service delivery, and capital assets and infrastructure. Each component of the evaluation includes an introductory explanation of the subject area and a discussion of desirable outcomes and identified best practices.

Criterion used to evaluate the fire department has been developed over many years. These gauges include relevant guidelines from national accreditation criteria, the National Fire Protection Association (NFPA) standards, federal and state mandates for fire and EMS systems, recommendations by various organizations such as the Center for Public Safety Excellence (CPSE), and generally accepted best practices within the fire and EMS industry.

The department is a full service agency, providing an array of services including fire prevention and suppression, technical rescue, hazardous materials, ambulance transportation, advanced life support medical response, and many other services. The department operates from two facilities using a sizeable fleet of fire and EMS response vehicles. The department staffs primarily with career personnel, supplement by paid-on-call members and overseen by a fire chief and one administrative support position.

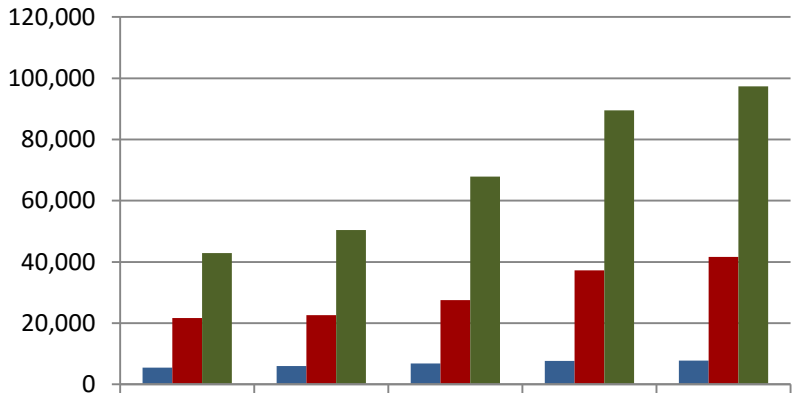
In completing the evaluation phase, the ESCI found a well-managed fire department that has done an excellent job of keeping pace with its challenges and increasing demands, while also very effectively addressing the management, administrative, and operational needs of a modern day fire department. The elected officials and staff of BSFD have good reason to be proud of the quality of an organization that they have created.

The following discusses some of the key findings:

Current and Future Service Demand

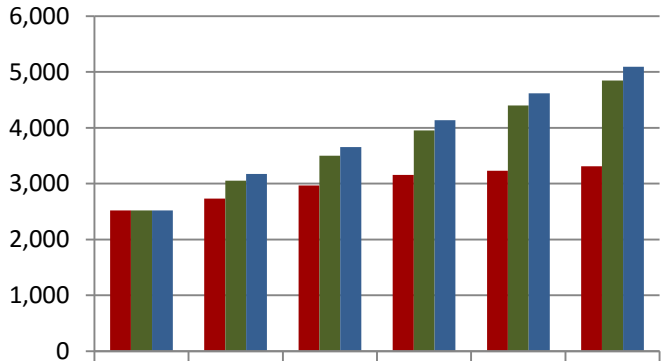
The BSFD is experiencing consistent and significant population growth, which is expected to continue well into the future. With community growth comes increasing service demand and workload for the fire department, challenging the agency to keep pace with growing needs.

Recent population growth in Bozeman, Gallatin County and Madison County are graphed in the report as follows:



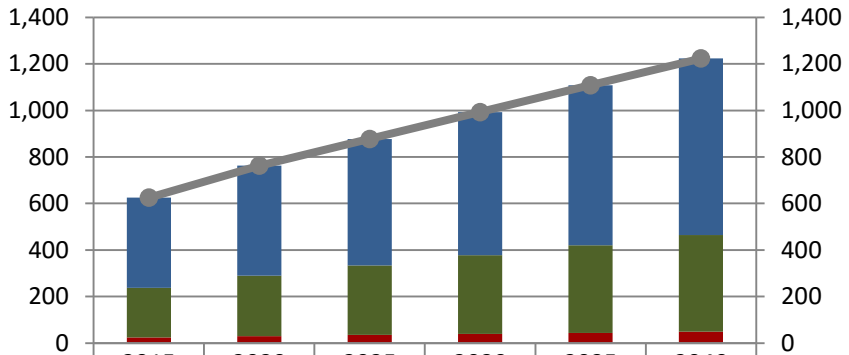
	1980	1990	2000	2010	2014
Madison County	5,448	5,989	6,851	7,691	7,820
Bozeman	21,645	22,660	27,509	37,280	41,660
Gallatin County	42,865	50,463	67,831	89,513	97,308

Looking forward, population trends are expected to increase, as graphed below:



	2015	2020	2025	2030	2035	2040
Gallatin County Projection	2,518	2,731	2,966	3,155	3,230	3,312
Forecast Model	2,518	3,054	3,503	3,951	4,399	4,847
Big Sky CDP Historical Growth	2,518	3,176	3,656	4,137	4,617	5,097

When translated to fire department service demand, ESCI projects that Big Sky's workload will more than double by 2040:



	2015	2020	2025	2030	2035	2040
EMS	388	473	544	616	687	758
Other	213	259	298	338	377	416
Fires	25	30	35	40	44	49
Overall	625	762	878	993	1,108	1,223

Given the above projections, Big Sky Fire Department needs to assertively plan ahead for what can be expected to be a steadily increasing workload.

Service Delivery and Response Performance

Response performance criteria and actual service delivery performance are analyzed in the Service Delivery and Response Performance section, providing information with which the department can develop future deployment methodologies and identify desired levels of response performance and staffing.

Response times in 2013 through 2014 are evaluated in the Service Delivery and Response Performance section. The following table details response performance, based on the 80th percentile of all incident types:

2013-2014 Response Time Performance	
Average	**80th Percentile**
10:05	15:00

The most frequently recorded response time is within the 12th minute (11 to 12 minutes). The average response time is 10 minutes, five seconds. The first BSFD apparatus was on scene in 15 minutes or less, 80 percent of the time.

Future Delivery System Models

The current conditions analysis and system demand projections form the foundation from which ESCI has developed strategies for the delivery of services in Big Sky Fire Department for the future.

This report cites multiple future system model modifications, included both short-term and long-term initiatives that are identified in the interest of improving and maintaining future system integrity. Each initiative is discussed in detail and guidance is provided.

The discussion of future delivery systems included an explanation of the importance of developing response time standards and targets, viewed by ESCI as critically important to any fire department, if they are to be able to appropriately plan for the future. Once properly established, the identified targets become the criteria against which future staffing and deployment decisions are made.

In identifying future service delivery approaches, it is imperative that an appreciation for the very unique situation found in Big Sky be fully understood. Multiple elements combine to present a challenge in this instance that are not found in other fire and EMS agencies. Specifically:

- Very limited outside assistance is available in Big Sky due to the fact that there are very few mutual aid resources within an acceptable distance of the jurisdiction.
- Community risk is higher than usual based on the size, cost, and complexity of large homes and commercial properties that have been constructed and are planned in the future.
- Ambulance transportation distances and frequency of EMS incidents occupy a large amount of time commitment for a small number of available on-duty staff members.
- Community growth is projected to continue to be at a high level and includes substantial, large development considerations that will challenge the fire department to meet future service demands.

Short- and mid-term strategies and models are discussed next. The initiatives identified and explained are ranked by priority as follows:

- Priority 1 – Items Involving Immediate Internal Safety Concerns
- Priority 2 – Considerations That May Present Legal or Financial Exposure
- Priority 3 – Matters That Address a Service Delivery Issue
- Priority 4 – Considerations to Enhance the Delivery of a Service
- Priority 5 – An Important Thing to Do

The report continues by discussing long-term strategies and needs, including:

- Big Sky Resort Tax Dispersal Policies
- Future Staffing and Deployment
- Administrative and Support Staffing
- Truck Company Relocation/Deployment
- Future Fire Station Considerations

- Additional Long Range Future Station Location Considerations
- Protection in Areas Outside of Big Sky Fire District
- Apparatus Replacement Planning
- Future Training Site Development

The Big Sky Fire Department is, and will continue to be challenged to meet current and forecasted needs. The information provided in this report offers a great deal of information with which to develop future planning regarding deployment of resources and guidance in regard to moving forward. The organization, now armed with an insight into the future of Big Sky fire and EMS needs, is well positioned for making the decisions that are in the best interest of the citizens that they serve.

Evaluation of Current Conditions

The Big Sky Fire District (referenced herein as BSFD, department, or district) Emergency Services Master Plan begins with ESCI's Evaluation of Current Conditions, an assessment of the district as it was found to operate upon initiation of the project in June of 2015. Using organizational, operational, staffing, and geographic information system (GIS) models, this phase of the study identifies how the organization is currently operating and provides recommendations for improvement in the way services are delivered to the community.

The evaluation is based on data provided by BSFD and collected in the course of ESCI's fieldwork. The information is then mirrored against a combination of Montana State laws and regulations, National Fire Protection Association (NFPA) standards, Commission on Fire Accreditation International (CFAI) self-assessment criteria, health and safety requirements, federal and state mandates relative to emergency services, and generally accepted best practices within the emergency services community, as well as the experience of ESCI's consultants.

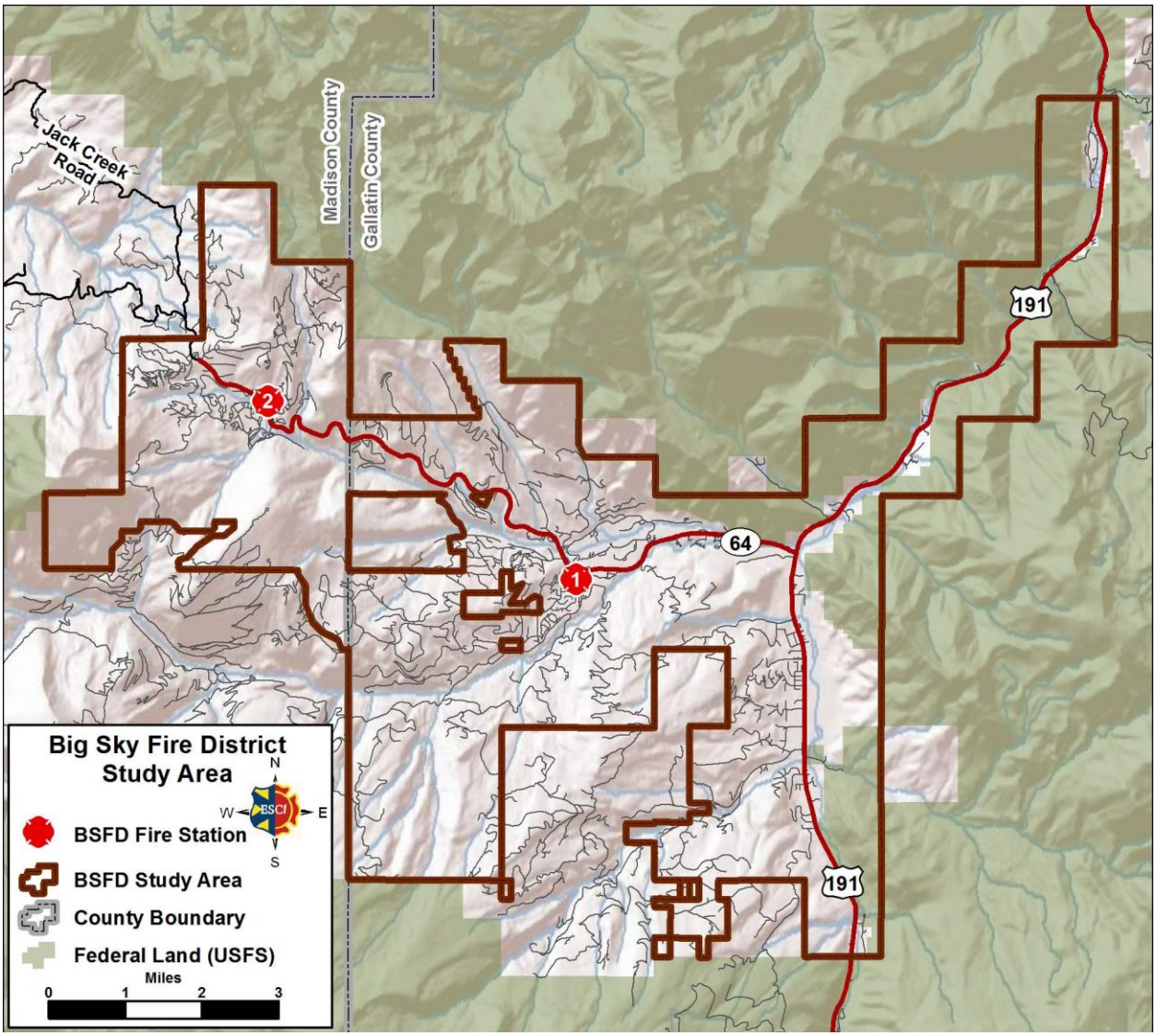
Each section in the following report provides the reader with general information about that element, as well as observations and analysis of any significant issues or conditions that are pertinent. Observations are supported by data provided by BSFD and collected as part of the review and interview process. Recommendations are found in the right hand column of each table and supporting explanation is provided below each table section, where needed. The evaluation begins with a baseline review of the BSFD organizational composition.

ORGANIZATIONAL OVERVIEW

The first report section provides an overview of the organization, discussing its configuration and the services that are provided. Data provided by Big Sky Fire Department staff is combined with information collected in the course of ESCI's fieldwork to develop the following overview.

The purpose of this section is two-fold. First, it confirms the accuracy of baseline information collected by ESCI and our understanding of the agency's composition. This provides the foundation from which the Emergency Services Master Plan is developed. Secondly, the overview serves as a reference for the reader who may not be fully familiar with the details of the agency's operations. Where appropriate, ESCI includes recommended modifications to current observations based on industry standards and best practices.

Figure 1: Service Area Map



Big Sky Fire District provides services to an area of approximately 57 square miles, located in Gallatin and Madison Counties, Montana. The configuration of service area is primarily a destination residential and winter recreational community. While the resident population in the BSFD service area is calculated to be 2,518, the actual number of people in the response area increases significantly during peak recreation periods, estimated by the fire district to reach up to 15,000. In addition to the 57 square mile response area, services are provided to a considerably larger area surrounding the fire district.

ESCI routinely uses population data as one of several measures relative to service demand and fire department workload. However, commonly accepted comparisons do not apply in the same manner in Big Sky as they do in most other jurisdiction, due the highly unique demographic configuration. Where ESCI's data calculations reveal a resident population of 2,518, the residential numbers to not include the additional workforce population that transits into the service area daily, which adds an estimated 2,280

to the service population, resulting in an estimated daytime population of 4,500.[1] It is noted that as anticipated large development projects are completed, not only will resident and vacationing populations increase, but the number of commuting workforce members will grow, as well.

Governance

The foundation of any service provided by governmental or quasi-governmental agencies lies within the governance structure and resultant policies that charge the agency with the responsibility to provide services and authority upon which to act. In most governmental agencies, including BSFD, those policies lie within the charters, ordinances, and other governing documents adopted by the fire district and Montana Code, as described below. The following figure provides a general overview of the Big Sky Fire Department's governance and lines of authority elements.

Figure 2: Survey Table – Governance

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Governance and Lines of Authority		
A. Governing body	5 member elected Board of Trustees, organized as a Rural Fire District per state statute	
i) head of governing body	Chairperson of the Board of Trustees	
ii) key employee of governing body	Fire chief	
iii) meetings	Meet 4th Wednesday each month	
B. Elected official authority defined	Charter defines and gives authority to District, as does the Board Policy Manual and Montana Code Annotated 7-33-2105	
C. Fire chief position	Yes	
i) hired by contract	No contract, the fire chief is at-will employee	
ii) term of contract	N/A	
iii) periodic performance evaluation	Policy is 12 months Recently have been 18-month periods. With two updates at 6 month intervals after the 18 month review was completed.	Assure that the fire chief receives regular performance reviews from the Board of Trustees.
D. Fire chief/authority defined	Job description and state law	
E. Policy and administrative roles defined	Defined in: • Personnel Policy Manual • Job Descriptions • Board Policy Manual	

[1] Big Sky Housing Development Plan.

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Attributes of Successful Organizations		
A. Policy, rules, guiding documents	Personnel Policy Manual Job Descriptions Board Policy Manual Standard Operating Guidelines (SOGs)	Conduct a review of the agency's guiding documents to assure currency and accuracy. Amend as needed.
i) process for revision provided	Not formal	Establish a schedule of regular review of foundational documents.
B. Legal counsel maintained		
i) consultation available	Yes, via private contract attorney, Kim Christopherson, based in Kalispell. County attorney can be used but availability is limited.	
ii) labor counsel	Private contract attorney	
C. Financial controls		
i) financial control system	Expenditure requests are processed by the fire chief with individual line item coding. Two signatures required by fire chief or a fire captain and either one or two Board members. The Board receives copies of all expenditures in monthly informational packet. All financial transactions are processed by a local private CPA firm (Knaub and Company).	
ii) financial review	External annual, handled by external firm	
iii) auditor	Yes, Holmes and Turner, Bozeman-annual audit	
iv) frequency of review	Annual	
D. Governing body minutes maintained		
i) availability of minutes	On line and available, or printed and available, sent to Labor group monthly. Audio recordings are also retained.	Consider publications to community

Discussion

Although referred to as a fire department, BSFD is not a municipal subdivision of any city but rather is configured as a Rural Fire District, as detailed in *Montana State Code Part 21 – Rural Fire Districts.* BSFD's foundational governance configuration is typical of Montana Fire Districts, operating under the direction of a five-member Board of Trustees (BOT). The BOT hires the fire chief, who is charged with managing the day-to-day operation of the district.

ESCI reviewed district's operational configuration and viewed what are considered to be the fundamental attributes that are found in a similar, and successful, fire department. Observations found that the

requisite foundational elements are in place in Big Sky upon which a successful organization is structured. ESCI identified recommendations regarding some observations in the governance review, discussed in the following section.

District Rules, Regulations and Administrative Policies

BSFD has established baseline management documents that consist of Board of Trustees Policy Manual, department Standard Operating Guidelines (SOGs), an employee Personnel Manual and a Collective Bargaining Agreement (CBA). While the CBA is subject to regular negotiation and revision, the other documents are reviewed and updated only on an as-needed basis. Because these documents form the foundation upon which district operations are based, it is essential that a regular schedule of review and revision be established.

ESCI reviewed the district's foundational documents, finding that the appropriate baseline elements are in place. However, some are outdated and in need of review and revision, which is discussed in further detail later in this report.

Financial Controls

Indications from field interviews are that appropriate purchasing practices are in place. The approach appears to be a transparent and appropriate financial control system.

Key Recommendation:

- Review and institutionalize the Board Policy Manual.

Organizational Design

The organizational design of an emergency services agency is vitally important to its ability to deliver service in an efficient and timely manner while providing the necessary level of safety and security to the members of the organization, whether career, paid on call, or volunteer. During an emergency, an individual's ability to supervise multiple personnel is diminished thus industry standards recommend a span of control of four to six personnel under stressed situations. This is a recommendation carried forward from military history and has shown to be effective in emergency service situations.

In addition, employees tend to be more efficient when they know to whom they report and have a single point of contact for supervision and direction. A recent research project conducted by the Columbia University, Northwestern University, and University of Queensland, Australia, found that,

> …when there are tasks that require teamwork, people get more done when there are leaders and followers. Without a clear chain of command, members often become sidetracked with grabbing power and lose track of the task at hand.[2]

The following figure summarizes the organizational design components of BSFD:

[2] "Why Hierarchies are Good for Productivity," *Inc*. September 2012, p 26.

Figure 3: Survey Table – Organizational Design

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Organizational Structure		
A. Structure type	Traditional top down hierarchy	
B. Descriptions of all jobs maintained	In place for all positions and available	
i) job descriptions updated	On an as-needed basis only	Conduct an annual review of job descriptions in order to maintain accuracy and relevance.
C. Employment agreements	Labor collective bargaining agreement is currently in place for 2015-2018	
Chain of Command		
A. Defined Chain of command	Yes	
B. Span of control	Full time members: Captains report to fire chief. All on call members report directly to fire chief for administrative matters, but direct supervision is that of the on duty captain during operations.	Address excess span of control that results from multiple direct reports to the fire chief by having the on call captain supervise on call staff for administrative needs.
C. Hiring/Firing authority	The fire chief has hiring and firing authority	
Formation and History		
A. Organization formed	Department was formed in 1971, became two separate, governmental unit fire districts in 1979 and combined as found today in 1994.	
B. History maintained	Minimal, fire chief and staff have attempted to find and assemble. Some data available.	Compile and maintain an organizational history to the extent possible to establish reference for future members.
i) Individual or group responsible	No person assigned to maintain history	

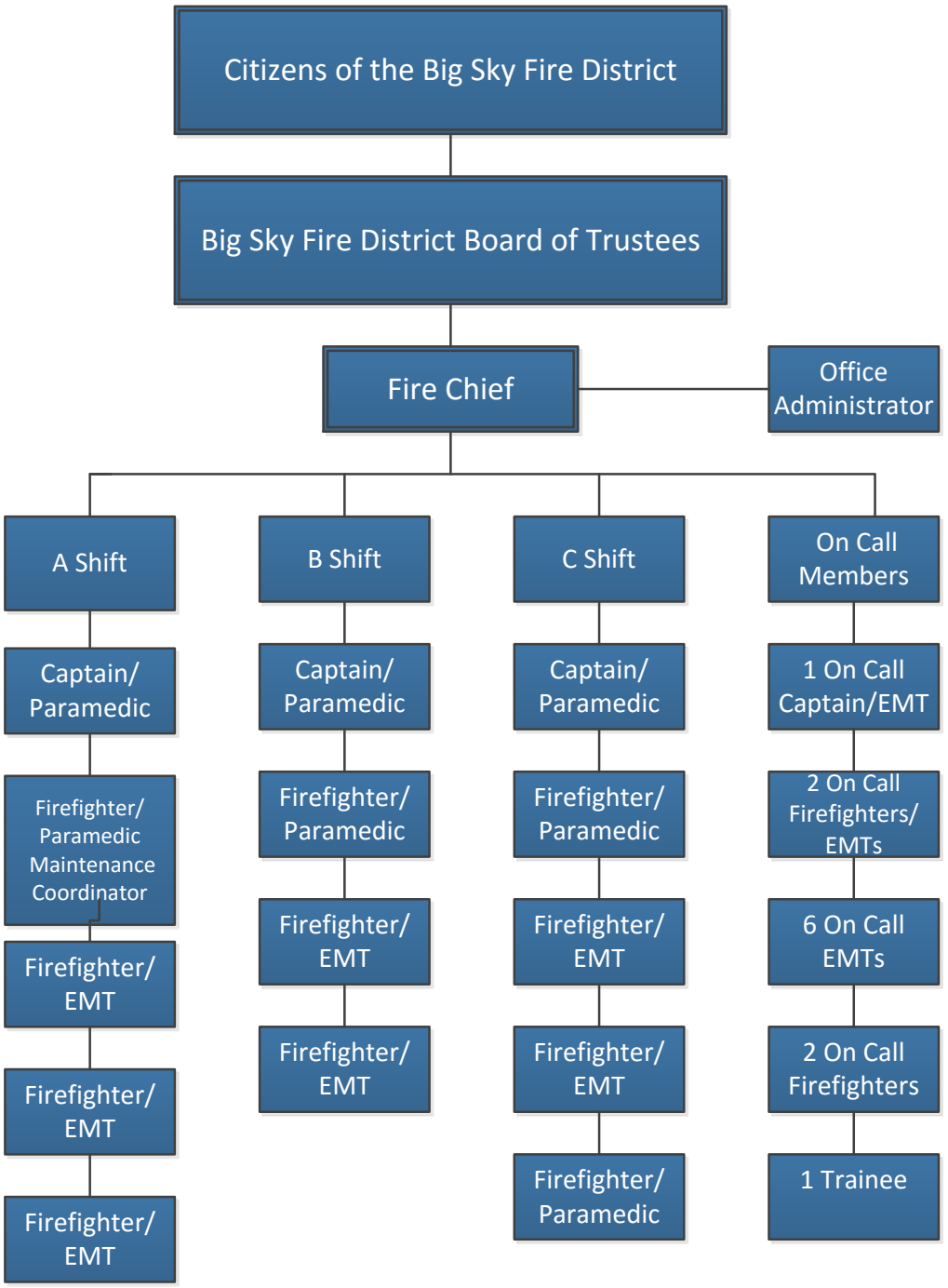
Discussion

The agency is configured in a traditional top-down hierarchical manner, typical of most fire departments, that establishes lines of authority and reporting protocol. However, as configured, the fire chief's span of control exceeds acceptable limits, as discussed in the next section.

Organizational Chart

To operate effectively the structure of a fire department needs to be clearly defined in the form of an organizational chart. The chart institutionalizes the agency's hierarchy, identifies roles and, most importantly, denotes reporting authority and accountability. A well-developed chart helps to assure that communication flows appropriately and limits opportunities to circumvent the reporting structure. The BSFD organizational chart is shown in the following figure.

Figure 4: BSFD Organizational Chart



The organizational chart accurately reflects the reporting hierarchy. A captain is assigned to supervise each of the three shifts, one of which is on duty at a time. Firefighters report to their captain, resulting in a maximum span of control of 4 to 1. A maximum ratio of 5 to 1 is generally considered to be acceptable, with some exceptions that are applied to part time, paid on call and some other situations.

The three captains and the office administrator report directly to the fire chief. However, as currently configured, all of the paid on call members of the department also report directly to the fire chief in regard to administrative matters, although they report to the on duty captain during emergency operations, which is an accepted practice. Even so, adding paid on call employees to the chief's direct reports takes the span of control to an unacceptably high level. In practice, on call employees typically require less supervision and administration than full time personnel, so the actual ratio could be argued to be less, but even so, the ratio is higher than appropriate.

The span of control issue would be best addressed by the establishment of two supervisory positions within the on call ranks. To avoid chain of command conflicts, these should be established as a rank of on call lieutenant. While there may not be on call responders available at this time that are both qualified and willing to step up to a higher level of responsibility, ESCI advises that a training and development plan be established to meet the need.

Not reflected on the current organizational chart is a deputy chief's position. A deputy chief position was not in place at the time of ESCI's field work visit, however, establishment of a new position was approved and funded immediately thereafter and is currently being filled. The new position will be configured to address a good share of the span of control concern discussed.

It is further noted that, at the time of ESCI's field work, a roster of 12 paid on call members was in place. However, since that time, the number of responders has declined from 12 to seven. The trend is of concern, and indicative of the difficulty that the department is experiencing maintaining an acceptable number of paid on call members.

Service Area and Infrastructure

The size and composition of a fire department's service area affects the type and number of personnel, fire stations, and vehicles that are needed to provide services efficiently. Sometimes complex decisions need to be made regarding the deployment strategies employed to properly position resources based on land area, geography, risk, and similar factors. Following is a summary of the BSFD's service area and service infrastructure resources.

Figure 5: Survey Table – Service Area and Infrastructure

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
General Description of Agency		
A. Agency type	Rural Fire District	
B. Area, square miles	57 square miles within taxing district, unofficial response area much larger.	
C. Headquarters	Administrative offices are located at Station 1.	
D. Fire stations	Two fire stations, main station in Meadow Village and a substation in Mountain Village.	
E. Other facilities	None	

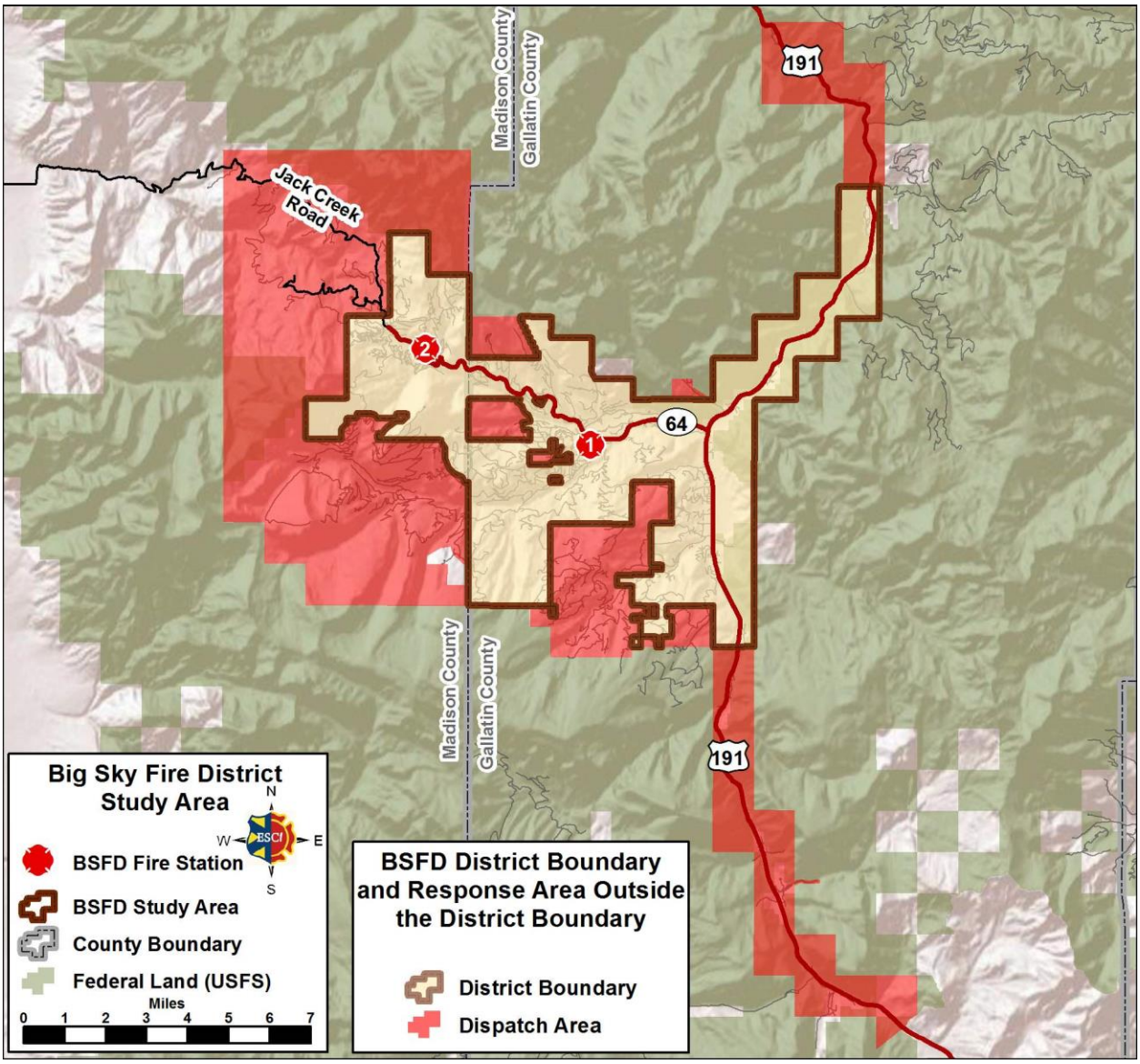
Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
F. Population served	2,518 estimated by ESCI, increasing up to 15,000 during peak seasonal activity periods.	
Service Delivery Infrastructure		
A. Emergency vehicles		
i) engines	2-Type 1 Engines	
ii) engine, reserve	0	
iii) ladder truck	1 (located at Station 2)	
iv) ambulance	3 (2 at Station 1, 1 at Station 2)	
v) ambulance, reserve	0	
vi) Quick Response Unit	Chief's command vehicle also serves as an Advanced Life Support quick response vehicle.	
vii) water tender	2	
viii) brush	2 (Type 6 Brush Engines-1 at each station)	
ix) rescue	None	
B. ISO (Insurance Services Office) rating	Protection class 5,9,10. Last rating in 2003.	
C. Total fire department personnel, uniformed and civilian	23 (As of 6/9/2015)	
i) administrative and support personnel, full time	2	
ii) administrative and support personnel, paid on call	0	
iii) operational personnel, full time	14	
iv) operational personnel, paid on call	12	

Discussion

The BSFD service area is large, consisting of more than 57 square miles of a geographically diverse region. In addition, a larger area, outside of the fire district boundaries is served.

The extended service area is depicted in the following figure.

Figure 6: Extended Service Area Map



While the focus of this study is the fire district's jurisdiction, it is important to recognize that the actual area served extends considerably beyond the district limits, as generally shown. The additional area constitutes an estimated 81 square miles of response obligation and represents nine percent of incident activity.[3] Note that the Yellowstone Club (southwest of the BSFD boundary) is included in the dispatch area displayed in the previous figure, since BSFD is listed as a second due EMS unit in this area.

BSFD has deployed personnel and apparatus in two fire stations, balancing the needs of providing effective coverage to what is a widely dispersed geographic area. However, nearly all response is provided from Station 1 in Meadow Village, while response from the Mountain Village, Station 2, occurs very rarely

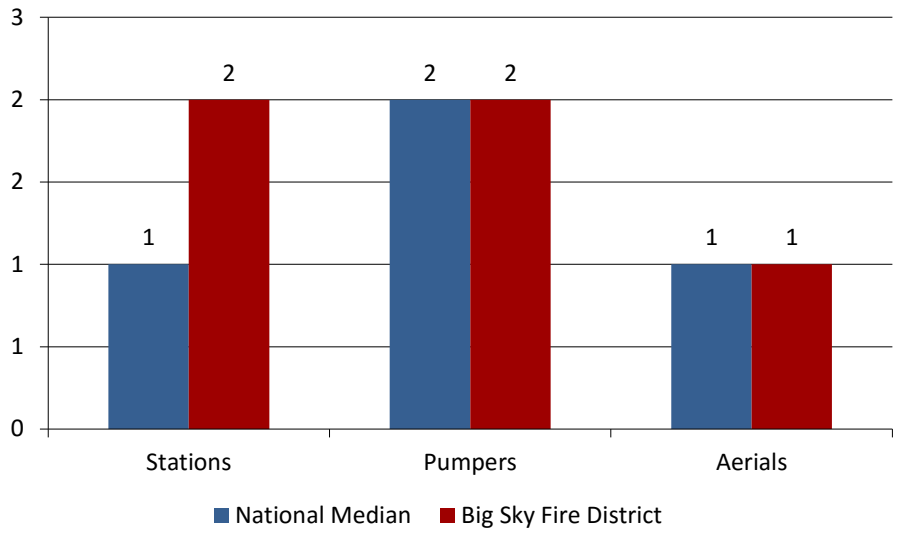
[3] The square mileage calculation is generated using GIS mapping data, but differs from client estimates.

and, when it does, is conducted by personnel that respond from Station 1, or the emergency scene, to Station 2.

Because of its broadly distributed geography, BSFD will be continually challenged to make the most prudent staffing and facility placement decisions, balancing multiple considerations including risk exposure, response times, access challenges, deployment, community expectations, and fire department financial capacity.

In the following figure, a comparison of fire stations, pumpers (engines), and aerial trucks is provided, mirrored against national median data.

Figure 7: BSFD Capital Asset Summary



Relative to national comparators, BSFD compares similarly in regard to number of fire stations and engines, based on population. It is noted that the district's only aerial ladder truck is located at Station 2, which is not staffed, requiring a crew from Station 1 to respond to Mountain Village when the truck is needed. The situation compromises the department's ability to make effective use of the vehicle, and is discussed in further detail later in the report.

Emergency Response Type and Frequency

BSFD responded to 589 requests for assistance from the citizens of the district in the 2014 reporting year. As is typically found, the vast majority of incidents were emergency medical. The district's emergency calls for 2014 are listed in the following figure.

Figure 8: Survey Table – Emergency Response Type and Frequency

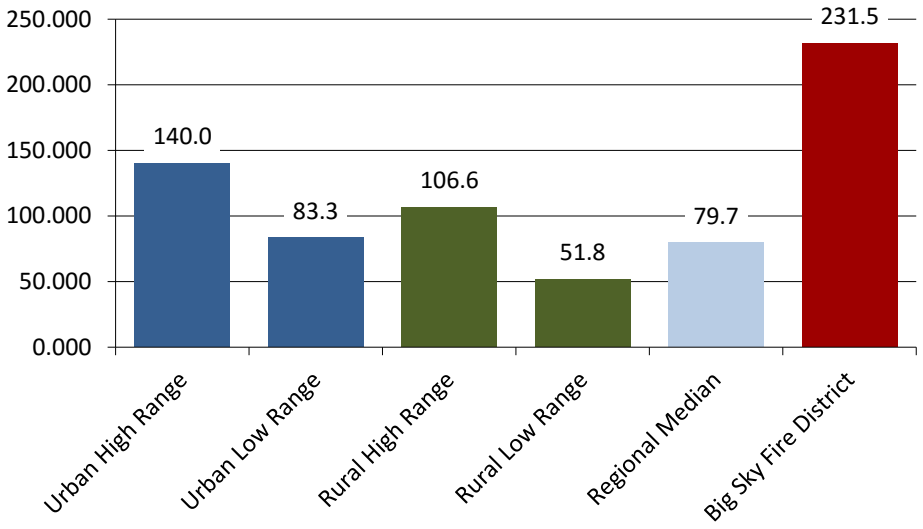
Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Incidents		
A. Fire	23	
i) value of property exposed to fire, 2014	Not tracked	Track the value of property that is exposed to fire annually
ii) value of property lost to fire, 2014	Not tracked	Annually track the value of fire property loss
B. Rupture or explosion	0	
C. EMS/rescue	363	
D. Number of EMS transports	230	
E. Hazardous condition	25	
F. Service call	12	
G. Good intent call	65	
H. False call	101	
I. Severe weather	0	
J. Other	0	
Total	**589**	

Discussion

Sixty-two percent of BSFD's 2014 incidents involved response to medical emergencies. The percentage is similar to, though somewhat lower than, what is typically found in similar sized fire departments. Of those, 230 calls require ambulance transportation to a hospital. A total of 23 incidents were reported as structural fires in the reporting year, which is consistent with the ratios seen in similar agencies, based on ESCI's experience. Additional detail on emergency response, service delivery effectiveness, and response performance is provided in the Service Delivery and Performance section of this report.

ESCI compared the number of total emergency incidents to which BSFD responded in calendar year 2014 to a variety of regional comparators based on data provided by the National Fire Protection Association, shown in the following figure.

Figure 9: Total Incidents per 1,000 Population



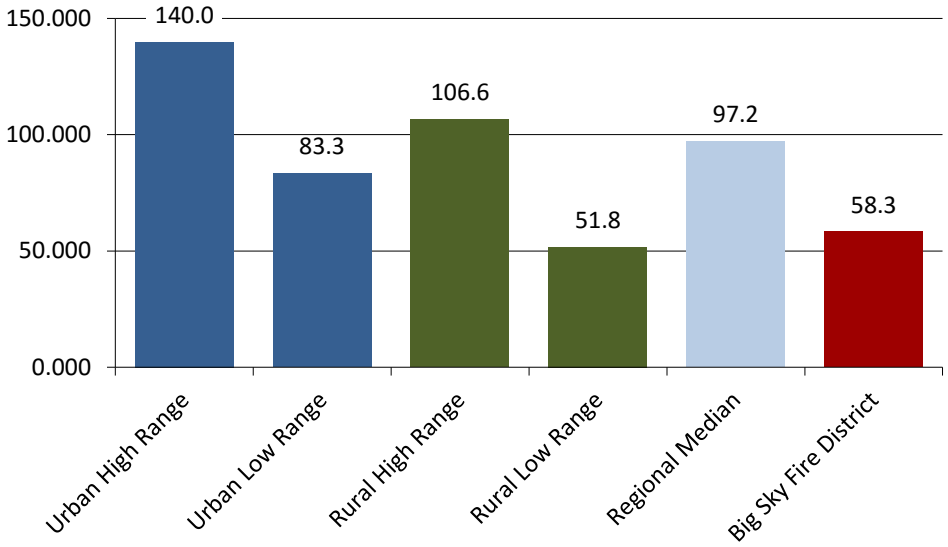
Unexpectedly, the available comparative data differs from ESCI's experience, indicating that total emergency incidents in BSFD are significantly higher than those found in comparable jurisdictions, based on West Coast data from the National Fire Protection Association (NFPA). However, this comparison needs to be put into perspective. Benchmark data available through NFPA is based primarily on population and does not consider geographical size or population density of the particular area. The data from which these comparable figures are extracted does not delineate between volunteer or career departments nor does it segregate those departments heavily involved in the provision of emergency medical services, particularly transport service, which results in an increased workload due to patient transportation times.

The data also cannot take into account a jurisdiction like Big Sky Fire Department, which sees a significant transient and recreational population that is not factored into the per 1,000 population numbers. So the variation in the chart above should be considered from that perspective.

To add clarification for a point of reference, the NFPA benchmark data indicates a range of approximately 80 incidents per 1,000 population for fire jurisdictions serving a population of 2,500 to 5,000, and 86 incidents per 1,000 for agencies serving 5,000 to 10,000. Based on this data, ESCI calculates that Big Sky's incident volume compares more accurately with a population of approximately 7,500 to 10,000. This falls more in line with the total population served when resident, non-resident, vacation, and transient work force factors are considered.

As a comparison, the incidents per 1,000 population graph was re-calculated using a population of 10,000 and the modified population category from the NFPA data, resulting in the following:

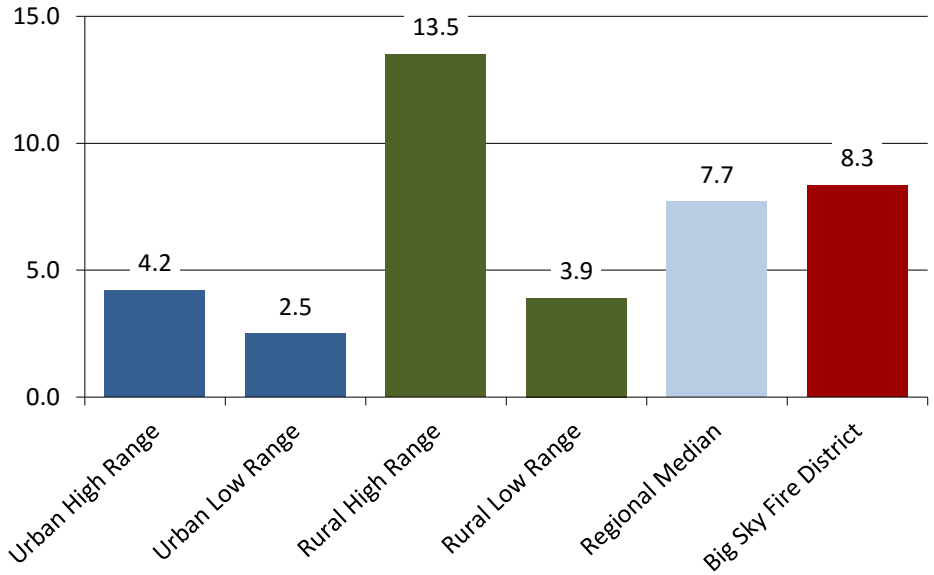
Figure 10: Total Incidents per 1,000 Population Based on 10,000 Population



Using the adjusted population data, BSFD's incident occurrence is more closely aligned with regional medians.

To seek further clarification, ESCI completed a similar comparison in the following figure, referencing only fires that occurred on a per 1,000 population basis.

Figure 11: Fires per 1,000 Population



BSFD's data reflects a number of fires on a per 1,000 population basis to be somewhat above the regional median. Incident frequency is highly variable based on multiple factors and, in this instance, may be influenced by the large geographic area that is served by BSFD, outside of district boundaries. The number of fires is also influenced by the effectiveness of fire prevention, new construction code enforcement, and public education efforts that are undertaken by a fire agency.

Budgets and Finance

Introduction

Sound fiscal health is vital to ensuring the effective operation of the Big Sky Fire Department. For this reason, BSFD may not survive without satisfactory funding support. Funding, which may come from a variety of sources such as property tax, resort tax, donations, and others, forms the basis from which the agency is able to provide the appropriate resources needed to fulfill its mission. Without sustainable funding levels, the agency is destined for failure.

In the current economy, local governments are searching for the means by which to effectively balance monies coming in and monies going out. Parallel to this, agencies such as Big Sky are finding it very difficult to deliver services that a community desires and are often asking for increased funding support to provide continued levels of service.

For all the reasons above, ESCI recommends that Big Sky periodically assess the financial condition of the district, highlight potential fiscal problems, and provide information necessary for timely corrective action that includes interaction with the Big Sky Resort Tax Board members. By taking appropriate action to address the weaknesses and strengthen fiscal health, Big Sky will be ahead of the curve when additional resources come available, or should available resources decline.

Current Conditions

The following figure provides a snapshot of the current revenues, operating budget, and debt. The data presented here illustrates total departmental budget including personnel, supplies/materials, and capital expenditures, information that will be used in fiscal analysis portion of this report.

Figure 12: Survey Table – Operating Budget and Financial Resources

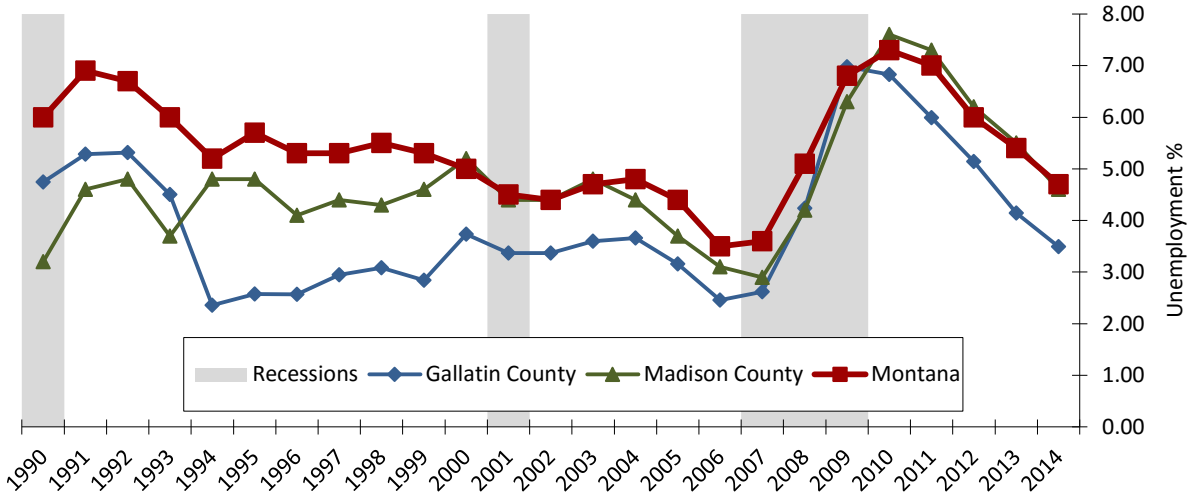
Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Finance Overview		
A. Designated fiscal year	July 1 - June 30	
B. Assessed property value, FY 2014-15	$23 M (Gallatin County) $26 M (Madison County)	
C. Most recent general operating fund budget, fire department, FY 2015-16 Adopted	$2.4 M	
D. General fund property tax collection	$1.5 M Budgeted	
i) levy rate (2009-10 through 2014-15)	**Gallatin:** 32.1, 32.63, 22.71, 22.82, 23.43, 23.77 **Madison:** 28.97, 29.24, 19.38, 19.66, 19.28, 20.06	
ii) general fund levy collection rate – prior year	Approximately 99%	
E. Resort Tax/Operating Grant, fire department FY 2015-16 Adopted	$586,100	These monies are not guaranteed nor do they have an associated "tax rate" allocated to the Fire Department.
i) tax/bond rate	N/A	
F. Other tax levy, public safety	N/A	
i) levy rate	N/A	

As shown in the figure, the fire district is a suburban resort community supported by tax revenues through two counties (Gallatin and Madison) with a combined assessed property value of $49M. The district operates with a $2.4M budget with an additional $586K in the form of operating grant generated through a local Big Sky Resort Tax. Though not guaranteed or promised to the department, this year-to-year funding stream has been stable in recent years.

Local Economics

The district's unemployment rate has declined since the 2007-2010 recession (as shown in the following figure. The Gallatin County unemployment rate was approximately 4.74 percent in the 1990 census, growing to 6.98 percent in 2009 before dropping to 3.49 percent in 2014. Madison County's unemployment rate was 3.2 percent in 1990, growing to 7.6 percent in 2010 before dropping to 4.6 percent in 2014. Both counties have maintained below-state levels over the past 24 years.

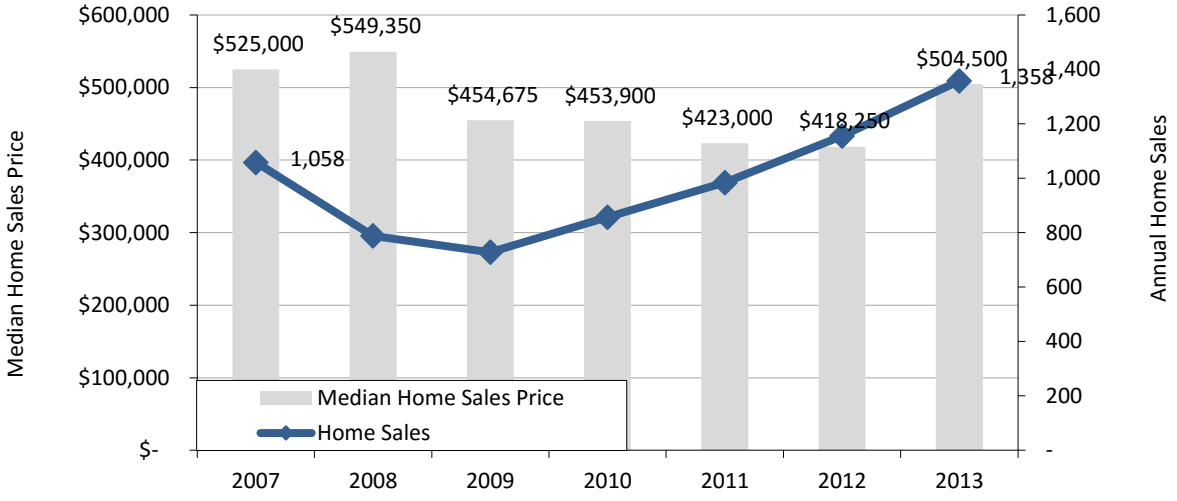
Figure 13: Unemployment Rates for Gallatin, Madison, and the State of Montana



Source: US Census Bureau

As shown in the next figure, median home sale prices have declined from 2008 until 2012. Since 2013, home sales have increased to $504,500, which is near pre-recession prices. Annual home sales have increased since 2007 from 1,058 to 1,358 in 2013. Increases found in jobs indicate increased buying power, which is likely supporting a buyer's market.

Figure 14: Homes Sales and Median Sales Price



Source: Gallatin Association of REALTORS®/Southwest Montana MLS

Assessed values have increased 16 percent between 2010 and 2015. The average annual increase during this period was three percent. Revenue generated from property tax has also increased. From 2010-2015 property tax revenue increased by 64 percent or an average of 11 percent annually. Revenue increases were attributed to the fact that both Gallatin and Madison counties have increased their mill levies.

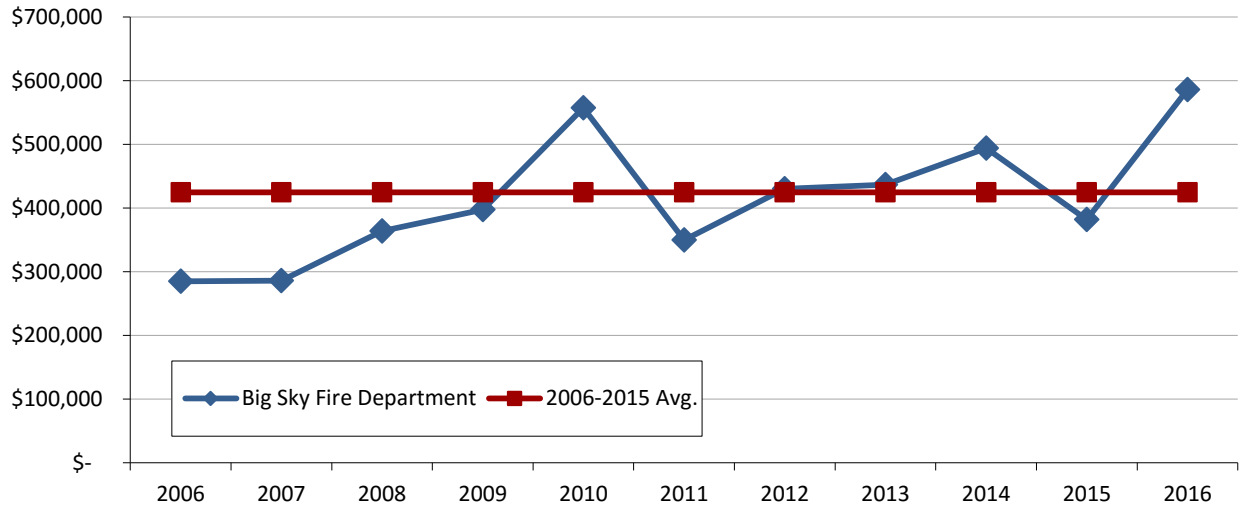
Figure 15: Assessed Value Trends FY 2009-10 through 2014-15

Data Element	2009-10 Actual	2010-11 Actual	2011-12 Actual	2012-13 Actual	2013-14 Actual	2014-15 Budget
Property Tax	$924,697	$955,230	$994,719	$1,040,853	$1,247,727	$1,512,234
Assessed Value	$42,845,770	$45,114,896	$47,055,631	$49,692,736	$49,296,335	$49,893,219

Another form of tax revenue is the Big Sky Resort Tax in the form of a three percent sales tax on luxury items. Since the inception in 1992, the tax has raised monies towards funding services including public safety, tourism development, and transportation, as well as many other critical services. The following focuses on Resort Tax support for the Big Sky Fire District.

As shown, the total support in 2006 was $285K until its summit in 2010 at $557K. From 2010 until 2014 the funding support decreased $382K. 2015-16 increases to approximately $586K, which is the highest since 2006. The ten-year average is $425K.

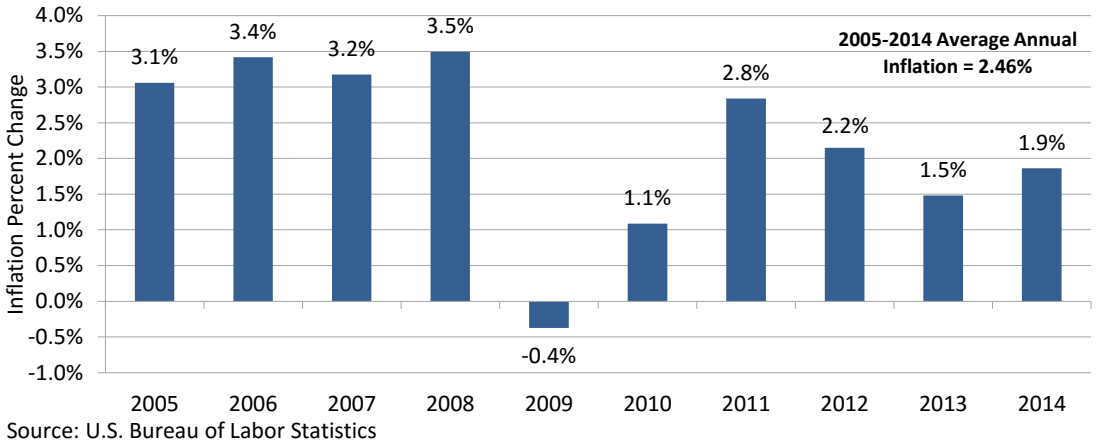
Figure 16: Big Sky Resort Tax Trend from 2006 through 2015



Source: Big Sky Resort Area District

Inflation is another measure of economic activity. However, an inflation measure specific to the study area is not available. The following figure shows the recent trend in the West Region Urban Consumer Price Index for All Urban Consumers (CPI-U). As shown, the annual inflation index declined in 2009 and has since turned positive, yet with smaller increases than before the recession. The average annual inflation rate from 2005 through 2014 was 2.46 percent. Inflation in 2014 was below this average at 1.88 percent.

Figure 17: Inflation Trends: West Urban CPI-U



Source: U.S. Bureau of Labor Statistics

Revenues and Expenses

ESCI completed an analysis of historical revenues and expenses in the fire district to help identify relevant financial trends, strengths and weaknesses, and to inform the financial forecast presented in the next section of the report. The historical analysis helps illustrate how Big Sky Fire District funds its services—where the money comes from and where it goes.

The district anticipates $2.4 million in revenue in 2015-16 A compared to $1.9 million in 2010, a 29.6 percent increase. This includes $586,100 in revenue from Resort Taxes for operating and capital expenses. BSFD's total tax revenue comprises 62 percent of the 2015-16 adopted budget.

A strong concern emerges in the 2015-2016 budget year and beyond with the opening of the Big Sky Medical Center. This will provide much better access to emergency care for the community, but is forecast to reduce the need of ambulance transports (and the mileage billed as the hospital is no longer 45 miles away). Because of this, $75,000 was rescinded from the 2015-2016 budget (to reflect a 20 percent reduction in requests) in order to not overestimate revenues ($370,000 down to $294,500).

The district has an emergency services contract with Boyne USA (the local ski resort operator) to provide services to the Moonlight Basin area on the western edge of district boundaries. This provides $15,600 of revenue a year.

The Gallatin County Sheriff's Office rents a part of Station 1 as their base of operations for the Big Sky area and is charged $6,000 in rent annually.

BSFD charges for out-of-district response at a rate of $500 per hour, per unit that responds to a fire. In addition, $250 is added to any non-resident, out-of-district ambulance transport fee and $250 is charged for EMS provided without transport.

Figure 18: Big Sky Revenue Trends

Revenue Source	2009-10 Actual	2010-11 Actual	2011-12 Actual	2012-13 Actual	2013-14 Actual	2014-15 Budget	2015-16 Adopted	% of 2015-16 Adopted
Tax Revenue	$924,697	$955,230	$994,719	$1,040,853	$1,247,727	$1,512,234	$1,520,000	62.0%
Entitlement Levy	$16,939	$17,517	$17,517	$19,110	$19,315	$17,500	$17,500	0.7%
Federal Grant	$-	$8,000	$-	$-	$-	$-	$-	0.0%
Grant Income	$98,622	$69,822	$-	$-	$-	$-	$-	0.0%
Resort Tax	$557,294	$258,716	$426,145	$440,600	$494,000	$382,000	$586,100	23.9%
Services Revenues	$3,000	$2,765	$4,250	$9,546	$8,443	$3,500	$3,500	0.1%
Impact Fees	$40,000	$12,000	$26,675	$(1,995)	$17,000	$-	$-	0.0%
Ambulance Fees	$218,146	$239,081	$330,510	$411,426	$379,917	$370,000	$294,500	12.0%
Contracted	$12,000	$12,000	$12,000	$12,000	$15,600	$15,600	$15,600	0.6%
Miscellaneous	$14,495	$14,474	$14,860	$(7,452)	$14,946	$10,500	$10,000	0.4%
Donation	$1,486	$870	$115	$1,850	$1,490	$-	$-	0.0%
Investment	$4,490	$3,821	$3,514	$4,633	$6,060	$3,500	$3,500	0.1%
Sales of Assets	$-	$-	$23,501	$-	$(880)	$-	$-	0.0%
Other	$-	$-	$-	$18,170	$-	$-	$-	0.0%
Total Revenue	**$1,891,169**	**$1,594,296**	**$1,853,805**	**$1,948,741**	**$2,203,617**	**$2,314,834**	**$2,450,700**	**100.0%**

The district's largest operating expense is personnel costs followed by supplies and services. Personnel costs fund 15 paid and scheduled employees—including 12 paid on call staff.[4] The following figure provides information on expenditures by type from 2010-2016.

Figure 19: Big Sky Expense Trends

Expenditure Type	2009-10 Actual	2010-11 Actual	2011-12 Actual	2012-13 Actual	2013-14 Actual	2014-15 Budget	2015-16 Adopted	% of 2015-16 Adopted
Payroll Expenses	$680,579	$684,885	$707,275	$811,821	$1,076,956	$1,204,452	$1,350,378	58.4%
Employee Benefits	$311,492	$312,717	$313,304	$338,930	$409,872	$501,793	$512,052	22.1%
Supplies/Services	$330,602	$335,157	$377,597	$378,044	$380,034	$543,566	$451,543	19.5%
Operations	**$1,322,673**	**$1,332,759**	**$1,398,176**	**$1,528,795**	**$1,866,861**	**$2,249,811**	**$2,313,973**	**100.0%**
Debt Service	$217,723	$88,741	$-	$-	$-	$-	$-	
Bad Debt	$60,953	$28,286	$67,199	$30,849	$129,558	$60,000	$75,000	
Operations + Debt	**$1,601,348**	**$1,449,786**	**$1,465,375**	**$1,559,644**	**$1,996,419**	**$2,309,811**	**$2,388,973**	
Capital	$147,865	$71,403	$197,655	$129,614	$112,765	$-	$60,001	
Grant Expense	$89,069	$69,823	$-	$-	$-	$-	$-	
Total Expenditures	**$1,838,282**	**$1,591,011**	**$1,663,029**	**$1,689,257**	**$2,109,184**	**$2,309,811**	**$2,448,973**	

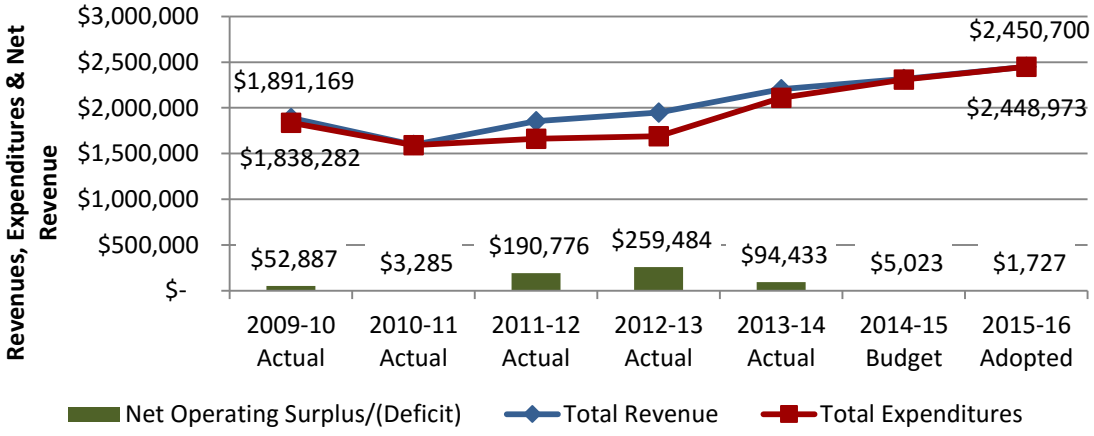
[4] Since ESCI's initial field work, the number of paid on call members declined from 12 to seven.

As shown, personnel costs (payroll and benefits) represent 80.5 percent of total budgeted operating expenses in 2015-16. Personnel benefits include payments to the district's wages and salaries, overtime, temporary wages and overtime, acting captain pay, on call compensation, PERS/FURS, MERP, deferred compensation plan, termination pay, workers compensation, and the Aflac program.

The next largest expense is supplies and services (almost 20 percent), which include supplies, maintenance, subscriptions, utility services, etc. The district has debt in the amount of $75,000 and operates with a capital budget of $60,001.

The district's total revenue exceeded its total expense in all years, as noted in the following figure. The cumulative total net operating surplus for those years totaled $608,000.

Figure 20: Net Revenue Trends



Revenues and Expenses Projections

As part of this study, ESCI developed baseline projections utilizing trend data, industry standards, and inflation measurements. The following forecasts are not predictions of future policy direction nor are they recommendations as to what revenues and expense levels should be. The projections purely reflect a series of assumptions based on historical behavior, inflationary factors, and industry experience. It is important for Big Sky Fire District to inform future forecasting models on an annual basis.

The following figures include these key assumptions utilized in the forecast:

Revenues

- The district realizes an annual increase of three percent in AV collection.
- Service revenues increase two percent annually.
- Ambulance fees increase two percent annually.
- Contracted services increase two percent annually.
- All other items remain fixed at 2015-16 amounts.

Expenditures

- Payroll expenses increase three percent annually.
- Benefits increase five percent annually.
- Supplies and services match CPI-U rates at 1.88 percent annually.
- Bad debt is fixed at $65,000 (the past five-year average).
- Capital costs increase to $234,400 for future replacement costs.

Figure 21: Baseline Revenue Forecast – FY 2016 through 2020

Revenue Source	2015-16 Adopted	Forecast 2016-17 Forecast	2017-18 Forecast	2018-19 Forecast	2019-20 Forecast	2020-21 Forecast	% of 2020-21
Tax Revenue	$1,520,000	$1,565,600	$1,612,568	$1,660,945	$1,710,773	$1,762,097	64.7%
Entitlement Levy Tax	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500	0.6%
Federal Grant Revenue	$-	$-	$-	$-	$-	$-	0.0%
Fire North Federal Grant	$-	$-	$-	$-	$-	$-	0.0%
Resort Tax Revenues	$586,100	$586,100	$586,100	$586,100	$586,100	$586,100	21.5%
Services Revenues	$3,500	$3,570	$3,641	$3,714	$3,789	$3,864	0.1%
Impact Fees	$-	$-	$-	$-	$-	$-	0.0%
Ambulance Fees	$294,500	$300,390	$306,398	$312,526	$318,776	$325,152	11.9%
Contracted Services	$15,600	$15,912	$16,230	$16,555	$16,886	$17,224	0.6%
Miscellaneous Revenue	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	0.4%
Donation	$-	$-	$-	$-	$-	$-	0.0%
Investment Income	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	0.1%
Sales of Assets	$-	$-	$-	$-	$-	$-	0.0%
Other	$-	$-	$-	$-	$-	$-	0.0%
Total Revenue	**$2,450,700**	**$2,502,572**	**$2,555,937**	**$2,610,840**	**$2,667,324**	**$2,725,436**	**100.0%**

As shown in the preceding figure, 2020 forecast tax revenues make up 65 percent of the total revenues. Revenues are assumed to increase by nine percent by 2020. Resort revenues make up 21.5 percent of the revenues for the same period. In addition, ambulance fees are anticipated to reach 12 percent of the revenue sources for FY 2020-21.

Figure 22: Baseline Expense Forecast – FY 2016 through 2020

Expenditure Type	2015-16 Adopted	Forecast 2016-17 Forecast	2017-18 Forecast	2018-19 Forecast	2019-20 Forecast	2020-21 Forecast	% of 2020-21
Payroll Expenses	$1,350,378	$1,390,889	$1,432,616	$1,475,595	$1,519,862	$1,565,458	57.7%
Employee Benefits	$512,052	$537,655	$564,537	$592,764	$622,402	$653,523	24.1%
Supplies and Services	$451,543	$460,031	$468,680	$477,491	$486,468	$495,614	18.3%
Subtotal Operations	**$2,313,973**	**$2,388,575**	**$2,465,833**	**$2,545,850**	**$2,628,733**	**$2,714,594**	**100.0%**
Debt Service	$-	$-	$-	$-	$-	$-	
Bad Debt	$75,000	$65,000	$65,000	$65,000	$65,000	$65,000	
Subtotal Operations + Debt	**$2,388,973**	**$2,453,575**	**$2,530,833**	**$2,610,850**	**$2,693,733**	**$2,779,594**	
Capital	$60,001	$235,400	$235,400	$235,400	$235,400	$235,400	
Fire-North Grant Expense	$-	$-	$-	$-	$-	$-	
Total Expenditures	**$2,448,973**	**$2,688,975**	**$2,766,233**	**$2,846,250**	**$2,929,133**	**$3,014,994**	

As shown in the previous figure, expenses are assumed to increase by ten percent (2.9 percent annually) from 2016F through 2020F. For all years, expenses exceed revenues. This is important to note because fund balances will start to decline and additional revenue increases will be vital for the financial health of the fire protection district. For modeling purposes we have assumed an annual capital expenditure in the amount of $235,400 to go towards future replacement costs. As capital improvement plans are updated and purchases are made, forecasting models should be as well.

Keep in mind, the financial forecast is sensitive to the assumptions regarding property taxes, resort taxes, ambulance fees, personnel and benefits costs, and capital expenses. For instance, if BSFD were to see a decrease in resort taxes collected, the district would feel the impacts negatively. In addition, if the ambulance fees leveled off, there is a great chance there would be a loss to the district for staying in the transport business. Conversely, if the property tax collections and the levy rate increased, financial position could improve to offset poor performance in ambulance and resort collections. The key to a successful financial future is staying vigilant while maintaining a conservative approach to spending. Again, it is highly recommended that the district utilize a model like the one presented above and make adjustments as financials have been realized.

Key Recommendation:

- Develop a financial tracking and planning model to continually monitor revenue and expenditure trends, enabling the district to foresee conflicts and adjust accordingly.

MANAGEMENT COMPONENTS

As an emergency services provider supporting a growing community, BSFD faces challenges to organizational growth and management. Community growth is expected to accelerate again in the future and the organization must assure that it is adequately prepared in terms of the fundamental components of its management configuration to keep pace with future needs.

In addition to the operational challenges of emergency response, the management of the business of a fire department always presents unique issues involving the administration of financial resources, the setting of goals and objectives, internal and external communications, information management, and security. This section of the report examines the department's efforts in this area and preparation for the future health of the organization.

Foundational Elements of the Big Sky Fire District

The process of strategic planning involves clarifying an organization's mission, articulating its vision for the future, and specifying the values within which it will conduct itself.

Figure 23: Survey Table – Foundational Elements

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Mission, Vision, Strategic Planning, Goals and Objectives		
A. Mission statement adopted	Yes, developed internally with Board and membership.	
i) Displayed	Posted on line	
ii) Periodic review	Not routinely	Set annual review process.
B. Vision established and communicated	No	
C. Values of staff established	Only in informal meetings and discussions within organization	
D. Strategic plan	Not at this time	Initiate development of a strategic plan involving all stakeholders.
i) Adopted by elected officials	No	Once complete, formally adopt a strategic plan.
ii) Published and available	No	Publish the strategic plan on the department's website.
iii) Periodic review	No	Establish a schedule for periodic review of the strategic plan.
E. Agency goals and objectives established	No	Complete identification of agency goals and objectives.
i) Date developed	No	Establish a schedule for periodic review of goals and objectives.
ii) Periodic review	No	Establish a schedule for periodic review of goals and objectives.
iii) Tied to division/personnel performance statements/plans	No	
iv) Objectives linked to programs	No	
v) Performance objectives established	Nothing formal	Establish performance objectives to verify quality and levels of progress.
F. Code of ethics established	Standards of Conduct elements that is located in Personnel Manual	Develop formal Code of Ethics document.

Key Recommendations:

- Undertake a strategic planning process.
- Initiate an annual review of mission, values, and vision statements.
- Establish formal, annual administrative performance objectives.
- Develop a stated code of ethics.

Discussion

Currently, BSFD planning efforts, both long term and short term are limited in scope and content. There is a need for BSFD to embark on a path toward developing a comprehensive five year strategic plan, including mission, vision, and values, and performance objectives. Strategic planning is defined as:

> …a rapid cycle approach to strategic planning that allows organizations to best prepare themselves to create and maintain stability and vitality in the face of complex and dynamic futures.

The BSFD strategic planning process will identify specific goals and objectives whereby it intends to meet its vision. These goals and objectives will provide guidance in decision-making and focus the district's efforts on the most critical issues that will impact its success in the future. In addition, the plan will provide the members with direction on the future and how they each fit in.

The future strategic plan will provide the necessary foundational elements to serve as an effective planning document for the near future. The BSFD Board should formally demonstrate endorsement and provide appropriate support to ensure a timely and effective implementation of the plan.

The plan must focus on critical issues affecting the BSFD both today and into the future. The BSFD is at a crossroads where decisions to support quality public safety must be considered in a long-range viewfinder. Potential growth predictors and a community that desires a high quality of life are at a point where difficult, far reaching decisions must be made in order to maintain adequate emergency services.

ESCI recommends engaging in a comprehensive strategic planning process that includes all internal and external stakeholders.

Foundational Documents and Processes

Similarly, an organization should establish appropriate documentation, policies, procedures, and identification of internal and external issues that affect the agency. Processes must also be established to address the flow of information and communication within the BSFD as well as with its constituents.

Figure 24: Survey Table – Foundational Documents and Processes

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Availability of SOPs, Rules and Regulations, Policies		
A. Copies of rules provided	Yes, SOGs, Personnel Manual provided, hard copy and online.	
i) Last date reviewed	Unknown	
B. Copies of SOGs or guidelines available	Yes, SOGs covered in rookie training, physical copies provided, also online.	
i) Regular update	Not scheduled	Conduct an annual review of rules, regulations and SOGs.
ii) Process for development of new SOGs	Not in place at this time.	Identify a written process for the development and adoption of new SOGs.
iii) SOGs used in training evolutions	Operations outpacing SOGs and SOGs outdated.	Regularly incorporate SOGs into training evolutions and scenarios.
C. Policy manual available	Yes, covered and provided in rookie training, physical copies provided, also on department intranet/online.	
i) Reviewed for consistency	Yes, not regularly reviewed.	Implement annual reviews of all policy manuals.
ii) Reviewed for legal mandates	Yes, not regularly reviewed.	Implement annual legal reviews of new policies, when developed.
iii) Training on policies provided	Yes, signed off by each member.	
Critical Issues		
A. Critical issues are identified	No formal process in place to identify and review critical issues on regular basis.	Establish formal process to understand future, current critical issues and how to plan and react.
i) First critical issue	SOGs currently out of date and pacing with operations.	Establish SOG review process, annual updates.
ii) Second critical issue	Appears to be overload on existing administrative personnel to maintain pace higher work and regulatory demands. Current fire chief position and office administrator are overwhelmed with pace and capacity of workload. Difficult with keeping pace with community growth and development and operations overwhelm a one leadership position the fire chief.	A deputy chief position, once filled, funded via the 2015 Resort Tax funding should alleviate some of the demands. Evaluate the need for a second administrative position and/or deputy chief positions in future. Two deputy chief positions may be ultimately needed to provide adequate command, control, and administration: administration/fire marshal and operations.

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
iii) Third critical issue	Automatic and mutual aid partners are far away. Geographic separation is an obstacle to quickly assist in operations on incident management.	
iv) Internal evaluation of critical issues	No regular process of understanding, prioritizing, and managing critical issues.	Establish a practice of annual identification and review of critical issues facing the organization.
Challenges of the Future		
A. Challenges are identified		
i) First challenge	BSFD operating in a high risk environment with minimal mutual and automatic aid resources available within a timely manner.	Maximize effort to leverage increased availability of existing staff (full time or paid on call) for response.
ii) Second challenge	Public education to community on FD services, challenges, issues relative to high risk location and environment, and wildland interface locale.	Develop a public education plan to deliver information across a variety of channels to the widest audience possible.
iii) Third challenge	Fragility of EMS transportation, routes/plans, egress from area an issue.	Regularly update and review transportation, egress/ingress plans that address a variety of incident types.
iv) Fourth challenge	Communications infrastructure, radios, phones, systems is failure-prone, pager failures Frequent failures occur.	Examine all methods to improve consistency and reliability of operational communications systems.
v) Fifth challenge	Training Challenges Provide additional external training for further employee development and training.	
vi) Sixth challenge	Need comprehensive planning efforts relative to range of service delivery, challenges, issues.	
Internal and External Communications		
A. Internal communications		
i) Regularly scheduled staff meetings (fire department)	Full member scheduled staff meetings are conducted 2-3 times per year coordinated with EMS training.	Establish formalized weekly, monthly and quarterly meeting dates.
ii) Written staff meeting minutes	Yes	Publish staff meeting minutes and disseminate throughout organization.
iii) Memos	Yes, via emails.	
iv) Member newsletter	No, accomplished through email.	
v) Member forums	Yes	
vi) Open door policy	Yes	
vii) Bulletin board	Yes	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
viii) Vertical communication path clearly identified	Yes, located in Personnel Manual and Organizational structure.	
ix) E-mail	Yes	
x) Employee mail boxes	Yes	
xi) Voice mail	Full time employees	
xii) Issues task force	N/A	
B. External communications		
i) Community newsletter	Will be included in an annual BSFD report.	
ii) Website	Yes	Continue to ensure the district website is frequently updated and relevant.
iii) Advisory committee(s)	No	
iv) Complaint process	No	Implement a defined complaint process for community, citizens to have access and channel for feedback.
v) Social media (Facebook/twitter)	Successful program and method. Actively engaged on both Twitter and Facebook.	
vi) Community survey	No	Establish a defined and available process for annual or bi-annual community surveys.
vii) Local community planning organizations	Yes	
viii) Focus groups	No	

Key Recommendations:

- Conduct scheduled review and update as needed of rules and regulations.
- Identify a written process for the development and adoption of new SOGs.
- Establish a formal planning process to understand current and future critical issues/impacts.
- Develop an aggressive public education plan to deliver information across a variety of channels to the widest audience possible. Including a formal citizen complaint process to obtain user feedback.
- Maximize effort to leverage increased availability of existing staff (full time or paid on call) for response.
- Examine all measures to improve constancy and reliability of operational communications systems.
- Improve internal communications systems within BSFD, administrative processes, staff meetings, minutes, etc.

Discussion

Policies and Procedures

BSFD policies and procedures are contained in a set of Board of Trustees District Policies, Standard Operating Guidelines (SOGs), and a Big Sky Fire Department Personnel Manual.

The Big Sky Personnel Manual was reviewed and updated in 2013. The content appears to be up to date and consistent with current practices. A review of the Standard Operating Guidelines reveals that they are out of date and require review and further development to match current operations and service delivery. In addition, most indicate that they have not been reviewed and/or revised recently. A periodic review is essential for safety and efficient operations. ESCI underscores the importance of establishing a regular schedule for future review of all foundational documents, which should be completed at least every three years.

Critical Issues

The process of taking time to periodically list the issues that are facing an organization can be invaluable as a checkpoint for the district as it moves forward. Doing so on a periodic basis is recommended. In the course of ESCI's fieldwork, the fire chief was asked to identify critical issues and challenges that face the organization and are listed in the previous figure.

A primary concern is the need for a quality, comprehensive planning process to understand the environmental external and internal factors that affect the district. The planning process should contain tools and processes to examine and react to future challenges.

Currently, the fire chief is overloaded with requisite duties needed to adequately administer and manage the fire district. There is a need for additional administrative staffing. The future addition of one FTE deputy chief position to support needed command, control, and administrative duties will provide immediate relief to a burdened system of management. However consideration will need to be given to additional administrative overhead positions in the near future. As workloads increase in complexity and demand due to district growth, increased administrative demands will follow. Of particular note, a fire protection consultant position was recently discontinued, transferring that workload to the fire chief. The lack of this position will need to be addressed.

Challenges

Also discussed during ESCI's fieldwork are current challenges. BSFD should immediately maximize efforts to leverage increased availability of existing staff (full time or paid on call) for response. There is a constant risk and potential need for additional staffing on incidents. Emergency medical calls are the majority of incidents, and data indicates that BSFD can manage with existing full time staff. However, in the event of a more complex incident requiring more staffing, the BSFD has difficulty fielding additional operational personnel. This is a situation that should be a high priority to plan, manage, and find methods to mitigate. One small house fire can exhaust all available staffing, and can place on scene personnel at a safety risk. Priority should be given to examine methods to augment staffing for an immediate response level, be it more paid on duty staffing, or on call staff, can ensure timely and adequate response to incidents. This is discussed in more detail below in the Emergency Staffing section.

Geographical separation and limited reliable mutual aid resources are another critical issue. The district has geographical shapes and constraints making response times long and access difficult in some areas. BSFD's location is a long distance from reliable mutual aid partners. Efforts should be made to strengthen mutual aid with the Yellowstone Club Fire Department staff. Building this relationship will help both communities should an incident of any significance occur.

An additional challenge is delivery of quality, robust public education through multiple community channels on district services and future challenges. This was evident during interviews conducted by ESCI, as a number of community leaders desired more information about what the district is doing each day, what the future issues are, and where does the community fit.

Finally, a challenge facing BSFD on a continual basis is reliable radio communications. This can be a serious safety issue and should be examined and rectified. Reliable communications with dispatch, incident command, and crew-to-crew is an essential part of any emergency service. Interviews conducted with a variety of people revealed a lack of consistency/reliability, a mixture of equipment including pagers, cell phones, radios, and no plan to improve the condition. ESCI recommends this as a high priority to investigate and rectify.

Figure 25: Survey Table – Record Keeping and Documentation

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Document Control		
A. Process for public access established	Request form required	
B. Hard copy files protected	Locked in files	
C. Computer files backed up	Copies on one site, FD server.	Establish redundant off site backup server location for records.
Security		
A. Building security	Yes	
B. Office security	Locked when unoccupied	
C. Computer security	Yes	
D. Capital inventory maintained	No formal inventory There is a review of items over $500.00 in value. Any purchase item must be matched with annual budget. Fire chief manages system.	Formalize and develop a defined inventory system and annual review process.
i) Asset security system used	Yes	
ii) Inventory interval	Not defined	
E. Monetary controls used		
i) Cash access controls	Locked, controlled in administrative office. Petty cash maximum $200.	
ii) Credit card controls	Fire chief, office administrator has credit cards. Each bill is reviewed with corresponding receipts and the fire chief codes receipts to the budget line items.	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
iii) Purchasing controls	Process in place appears adequate	
Reporting and Records		
A. Records kept by computer	Yes	
i) Type of platform	Windows	
ii) Operating system	Windows	
B. Periodic report to elected officials		
i) Financial report	Monthly	
ii) Management report	Windows	
iii) Operational report	Windows	
iv) Distributed to others	District Board and Labor Group	
C. Annual report produced	Not a consistent publication	Produce an annual report, published to BSFD, Board, and community via all media channels.
D. Required records maintained		
i) Incident reports	Yes	
ii) Patient care reports	Yes	
iii) Exposure records	Yes	
iv) SCBA testing	Yes, all phases and equipment	
v) Hose	Yes, in house	
vi) Ladder	Yes, outside contractors	
vii) Pump	Yes, outside contractors	
viii) Breathing air	Yes	
Information Technology		
A. Computer platform	Windows	
B. Maintenance/IT support provided by	Privately contracted community citizen	
C. Computer security	Appears adequate	

Key Recommendations:

- Implement second computer records server either off site or cloud based.
- Create and publish a BSFD Annual Report noting all accomplishments, response data, and future challenges. Distribute throughout the community.

Discussion

Record Keeping, Document Control

BSFD's reports and records practices are generally appropriate, with a few recommendations noted above. The importance of effective record keeping cannot be overstated and it was apparent from the data provided to ESCI in the course of this project that the agency has effective records management practices in place. ESCI recommends installation of a second computer records server at an off-site, secure location or cloud based.

An annual report informs both the community and the elected officials about current events, accomplishments, and challenges related to the fire district. The report identifies and validates needs and

lets the community know that they are being effectively served. ESCI recommends creating a BSFD annual report, approved by the Board and disseminated to the community.

STAFFING AND PERSONNEL MANAGEMENT

An organization's most valuable asset is its people. It is important that special attention be paid to managing human resources in a manner that achieves maximum productivity while ensuring a high level of job satisfaction for the individual. Consistent management practices combined with a safe working environment, fair treatment, and opportunity for input and recognition of the work force's commitment and sacrifice are key components impacting job satisfaction. This section provides an overview of BSFD's staffing configuration and management practices.

Administrative and Support Staffing

One of the primary responsibilities of a fire department's administration is to ensure that the fiscal, infrastructure, and support elements are in place and functioning smoothly to enable the core mission to be accomplished; responding to and mitigating emergencies in a safe and efficient manner.

Like any other part of a fire department, administration and support need appropriate resources to function properly. In this section of staffing analysis, the ratio of administrative and support positions to total organizational staffing is compared to industry best practices and similar organizations. An appropriate balance of administration and support staff compared to operational resources and service levels is an important consideration to achieving organizational success.

The following figure reviews the administration and support organizational structure of the BSFD.

Figure 26: Survey Table – Administrative and Support Staffing

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Administration and Other Support Staff		
A. Fire chief	1	Increase delegation of primary operational and administrative responsibilities where possible. Fire chief should prioritize and concentrate and manage only the most important items impacting the district.
B. Deputy Chiefs	None	The fire chief has formally received funding and board approval to authorize one FTE deputy chief position. Recruitment process underway.
C. Training	EMS and fire training officers are line captains assigned to these duties. Counted as .5 support staff each.	
D. EMS Coordinator	EMS training officer is assigned to a fire captain.	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
E. Fire Investigator	Fire chief, county assists when needed	
F. Office Administrator	1	
G. Mechanic	Assigned to one shift duty firefighter	
H. Total administrative & support staff	2	
I. Percent administrative & support to total	8%	

Key Recommendations:

- The fire chief should prioritize workload based on priority and increase delegation of operational and administrative responsibilities to other staff members.
- Continue recruitment of deputy chief position.

Discussion

The level of administration and support staffing represents eight percent of the total BSFD staff. It is ESCI's experience that effective administrative staffing totals typically range from 15 to 18 percent of agency totals. However, fire districts tend toward the high end of the range because districts need to provide their own support system infrastructure. Generally this data represents larger size departments than BSFD and have personnel to be assigned to various administrative duties. At BSFD, the fire chief and office administrator are the only available office staff, and are currently overloaded.

A key component of the above conclusion relates to the fire chief's position. The chief is tasked with multiple responsibilities, including emergency management, training oversight, support and logistic tasks, exceeding the capacity of one individual to address them all effectively. At the time of our fieldwork, ESCI learned that consideration was being given to a review of the current organizational structure, including the reallocation of these duties to designated personnel or to a new deputy fire chief position, for which recruitment is currently ongoing. ESCI concurs with this initiative.

Emergency Response Staffing

It takes an adequate and properly trained staff of emergency responders to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved.

Tasks that must be performed at a fire can be broken down into two key components—life safety and fire flow. Life safety tasks are based on the number of building occupants, their location, status, and ability to take self-preservation action. Life safety related tasks involve search, rescue, and evacuation of victims. The fire flow component involves delivering sufficient water to extinguish the fire and create an environment within the building that allows entry by firefighters.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent action, the command officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include:

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

The first 15 minutes is the most crucial period in the suppression of a fire. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to fire, rescue, and medical situations. Critical tasks must be conducted in a timely manner in order to control a fire or to treat a patient. BSFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. The following figure lists BSFD's emergency response staffing configuration.

Figure 27: Survey Table – Emergency Response Staffing

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Emergency Service Staff – Fire		
A. Fire Chief	1 Responds to higher level calls and is part of operational staffing	
B. Captain	3 full time, and 1 paid on call	
C. Firefighters	24 total suppression staff 15 full time 9 paid on call Paid on call FTEs: Captain – 1 EMT B Firefighter – 1 paramedic Firefighter – 1 EMT B Firefighter – 1 EMT-B staff – 5 On all shifts, personnel are rotated through the ALS ambulances and engines as needed for the response at hand. No personnel are permanently assigned to apparatus.*Off duty career and on call personnel are strongly urged to respond to support on-duty staff during incidents, especially for B Shift, which has less staff than the other two.	
Emergency Service Staff – EMS		
A. Shift Paramedic	Minimum of 1 per day, captain or firefighter	
B. EMT	Full time: 7 On call: 7 EMT may fill in remaining positions	
C. EMT-Paramedic	8 in total	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
D. Total operational staff	Full time: 15 Paid on call: 12[5] **Station One-full time staffing** **A Shift:** 1 Captain and 4 Firefighter/EMT and/or Firefighter Paramedics (at least 1 paramedic always on duty) **B Shift:** 1 Captain and 3 Firefighter/EMT and/or Firefighter Paramedics (at least 1 paramedic always on duty) **C Shift:** 1 Captain and 4 Firefighter/EMT and/or Firefighter Paramedics (at least 1 paramedic always on duty) **Minimum Staffing** **A Shift:** 1 Acting Captain and 3 Firefighter/EMT and/or Firefighter Paramedics (at least 1 paramedic always on duty) **B Shift:** 1 Acting Captain and 2 Firefighter/EMT and/or Firefighter Paramedics (at least 1 paramedic always on duty) **C Shift:** 1 Acting Captain and 3 Firefighter/EMT and/or Firefighter Paramedics (at least 1 paramedic always on duty) **Station 2 is not staffed**	Staff deployment levels are not a formal written policy of the department and subject to daily change as needed and as staff is available. Establish a written document in the Policy Manual, board approved, outlining staffing. Identify both full and minimum staffing requirements.
E. Fire department total	26 total staff Includes full time and paid on call, fire chief, and office administrator	
F. Percent of operational officers to firefighters	4.66%	
Use of Career and Paid On Call Personnel		
A. Career scheduling methodology		
i) Length of normal duty period	48/96 – 24 hour shifts for full time staff	
ii) FLSA period	Each member full time shift staff issued 76 hours per each six months' time bank only used as leave time.	
iii) Residency requirements	Yes, In district or within five miles of a BSFD station.	
B. Operational career services	Yes	
i) Fire suppression	Yes	

[5] Paid on call numbers declined from 12 to seven subsequent to ESCI's initial field work and data collection.

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
ii) EMS/rescue, first response	Yes	
iii) EMS, advanced life support	Yes	
iv) Specialized rescue	Yes	
v) Fire prevention inspections	Yes	
vi) Emergency management	Yes	
vii) Public education	Yes, when available and requested.	
viii) Hazardous materials response (level)	Operational level All full time staffed at operations level	
C. Volunteer services		
i) Chaplain	Yes	
ii) Civilian administrative	Contracted computer repair/maintenance	
Responsibilities and Activity Levels of Personnel		
A. Assignment of routine duties:		
i) By position	Yes	
B. Special duties assigned by:		
i) Duty assignment	Listed in Job Specifications Various duties are assigned to each shift. Duties posted in apparatus floor. Maintenance duties are recorded.	
C. Work groups/Committees		
i) Labor	Yes, fire chief and labor representatives.	
ii) Apparatus/equipment	Yes	

Key Recommendation:

- Establish a written document in the policy manual, board approved, outlining staffing requirements. Display in detail both full and minimum staffing requirements.

Discussion

Considerable ongoing local, regional, and national discussion and debate around large incidents of significant consequence have brought attention to the matter of firefighter staffing. Frequently, this discussion is set in the context of firefighter safety. While there are published standards regarding firefighter staffing, they generally speak in terms of the number of firefighters assigned to a particular response apparatus, often characterized as a preferred standard of "… a minimum of four personnel per company." ESCI notes that the more critical issue is the number of firefighting personnel assembled in a reasonable amount of time at the scene of an emergency that can perform the required critical tasks to mitigate the emergency, regardless of the type or number of vehicles upon which they arrive.

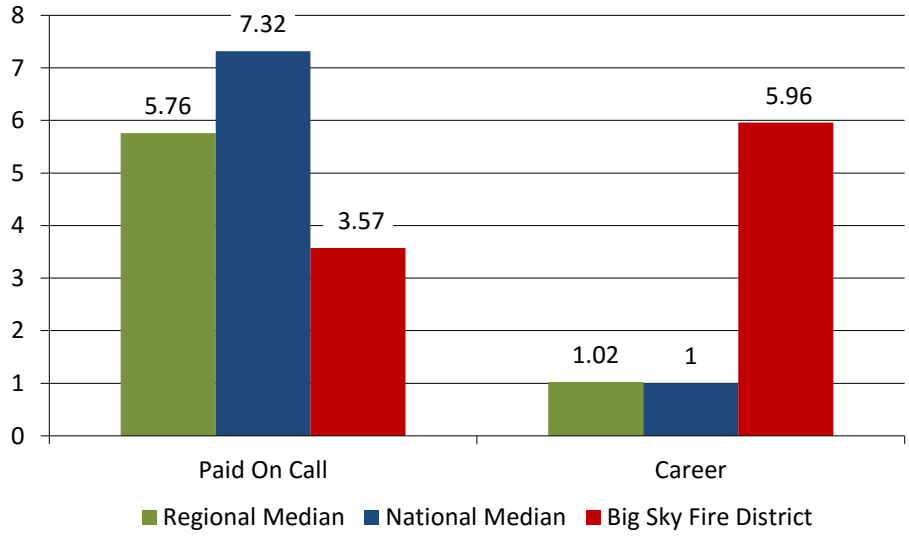
It is important to understand that the assembly of firefighters on an incident, also called an "Effective Firefighting Force" or "Effective Response Force," is a determination that is made at the community level based on risk, capability, and citizen expectations.

There is no mandated requirement, though there are standards that are discussed in detail in this report. In the Service Delivery section, resource concentration is evaluated in detail, finding that BSFD is not able to establish a full effective response in a timely manner in many portions of the response area, mainly as a result of low daily staffing and a delayed arrival of paid on call staff.

Another means of comparison is that of measuring the number of firefighters on staff per 1,000 population of the service area.

The following figure illustrates current BSFD paid on call and full time staffing on a per 1,000 population basis, with both national and regional medians presented as a comparison. Current paid on call staffing levels are lower than the regional and national medians for similar combination fire districts, whereas the full time levels are higher than national and regional medians.

Figure 28: Paid on Call and Full Time Staffing Ratio Comparisons[6]



BSFD currently operates with a paid on call staffing ratio of 3.57 firefighters per 1,000 population, which is below the regional and national ratios, and 5.96 per 1,000 population for full time, career staff.

At minimum daily staffing levels, BSFD has a total of four emergency personnel available as first response to all emergencies. BSFD has the maximum capability to respond to one house fire at a time and provide a minimum exterior fire attack only. The likelihood of simultaneous structures fires is low, however, should a concurrent incident occur requiring additional staffing, BSFD will need to depend on outside resources responding from long distances. Those cases, albeit infrequent, may result in an increased potential of property or life loss. ESCI estimates that BSFD staffing, in the current configuration, is unable to *fully* meet staffing demands on its own in the event of a high-risk incident. This estimate takes into account the addition and long distance response of regional assistance.

[6] Benchmark data available through National Fire Protection Association (NFPA) is based primarily on population and does not consider geographical size or population density of the particular area.

Big Sky Fire Department is in a particularly unique situation due to its distance from additional help in the event of a large or a concurrent incident, as well as what can be expected to be a steadily increasing workload. The large construction project currently under way in Spanish Peaks provides one example of how community growth can be expected to continue, and the resultant workload for the fire department. The department will need to address the need for increased full time staffing, as well as identify alternative staffing models or other approaches that may be implemented to supplement existing manpower resources.

It is recommended that the "in district" residency requirement for employment be re-evaluated. However, it is important to note that while hiring out of district personnel may be of value, it does not address the need for locally based off-duty responders, who may be living too far away for effective response to an incident.

As seen in this report, a majority of the department's workload is medical in nature and, given the current resources; the department is situated to handle only one incident at a time. Moving forward, the department will need to carefully monitor operational staffing levels and how actual response performance correlates to identify response goals. Consideration will need to be given to increasing full time staffing levels in the future, relative to response performance history.

SERVICE DELIVERY AND PERFORMANCE

The delivery of fire suppression, rescue, and emergency medical services is no more effective than the sum of its parts. It requires efficient notification of an emergency and rapid response from well-located facilities in appropriate apparatus with a sufficient number of well-trained personnel following a well-practiced plan of action. This section of the report provides an analysis of the current service delivery performance within the Big Sky Fire Department service area.

The section begins with baseline survey tables, containing information upon which the subsequent discussion is built.

Figure 29: Service Delivery and Performance

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Service Demand		
A. Current service demand	589 (2014)	
i) Tracked by incident type and temporal variation	Tracked for Fire vs. EMS-Chief presents an annual report to trustees in January.	
ii) Geographical call distribution	No formal tracking. Personnel are aware.	
iii) Demand zones based on population	Not Applicable. FMZs in CAD-based on risk-hydrant/non-hydrant, Access limitation due to bridge, etc.	
Resource Distribution		
A. Facilities		
i) Total area protected	Taxing district 56.7 square miles. Actual response area larger.	
B. Number of fire stations	2	
i) Number of stations staffed	1	
ii) Number of stations unstaffed	1	
C. Apparatus		
i) Apparatus appropriate to risk (fire, medical, special)	Engines, ambulances, brush engines, aerial. Heavy rescue equipment distributed appropriately.	
D. Staffing		
i) Adequate for initial attack of predominant risk	2 In-2 Out policy in place. Minimum staffing for apparatus.	
Resource Concentration		
A. Effective response force		
i) Defined by call type	Run cards include mutual aid resources. Routine incidents dispatched as a general page for BSFD.	
ii) Actual performance monitored	None	

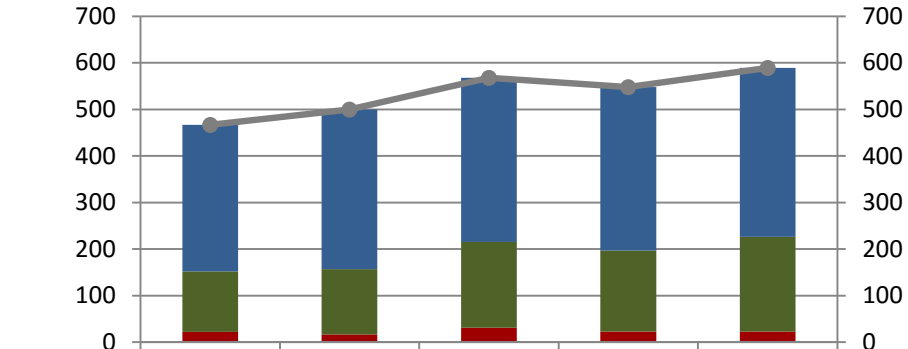
Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Response Reliability		
A. Workload Analysis		
i) Unit hour utilization	Inadequate data points in RMS (Apparatus cleared time not recorded).	
ii) Failure rate by station area or response zone	Not Applicable	
iii) Concurrent calls	Data available in RMS. Not routinely monitored.	
Response Performance		
A. Response Performance		
i) Call processing time	Data available in RMS or from CAD. Not routinely monitored.	
ii) Turnout time	Data is available. No performance standard established. Monitored informally.	
iii) Travel time	Data is available. No performance standard established.	
iv) Total response time	Data is available. No performance standard established.	
B. Response time goals		
i) By response zone	None	
ii) By incident type	None	
iii) Actual response performance documented and published	None	
Mutual/Automatic Aid		
A. Given/Received balance	19 Given/20 Received	
i) Automatic aid incorporated in run cards/dispatch procedures	Yes	
ii) Inter-agency training and SOP's	To some degree. Limited by distance between agencies.	
iii) Signed mutual aid agreements and county plan	Actively participates in county plan and other opportunities.	
Incident Control and Management		
A. Incident Command System		
i) Incorporated in all emergency operations	Yes	
ii) Addressed in SOP or SOG	Yes	
iii) Addressed in training	Yes	

Service Demand Analysis

In the service demand analysis, ESCI reviews current and historical demand by incident type and temporal variation for BSFD. GIS software is used to provide a geographic display of service demand within the study area. Incident data collected in the BSFD records management software (*FireHouse Software®*) is utilized to provide a view of historical service demand and current temporal variations.

The following figure demonstrates historical service demand for the last five full calendar years.

Figure 30: BSFD Historical Service Demand, 2010-2014



	2010	2011	2012	2013	2014
EMS	315	343	353	351	363
Other	130	140	184	174	203
Fire	22	17	31	23	23
Total	467	500	568	548	589

The preceding figure demonstrates that with the exception of 2013, BSFD service demand increased every year from 2010 through 2014. Overall service demand increased by slightly over 26 percent (26.1 percent) during the time period displayed above. Using National Fire Incident Reporting System (NFIRS) incident type codes, ESCI categorizes incidents as *Fires* (structures, vehicle, brush, any 100 series NFIRS code), *EMS* (all calls for medical service, including MVA's and rescues, any 300 series NFIRS code), and *Other* (false alarms, hazmat incidents, service calls, all other NFIRS codes). The following figure displays the nature of service demand within the BSFD study area, summarized as Fire, EMS, or Other incident categories.

Figure 31: BSFD Service Demand by Category, 2010-2014

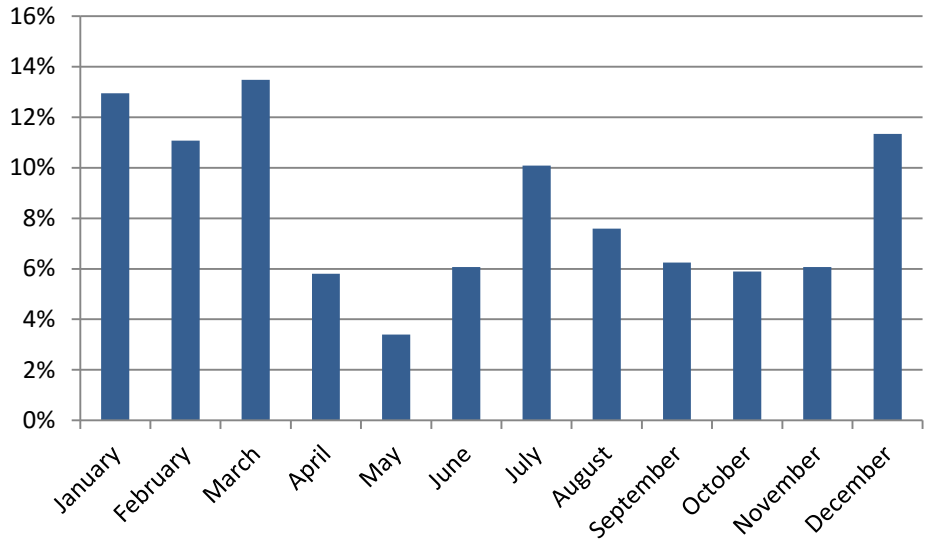
Incidents by Category, 2010-2014	
Incident Category	**Percentage**
EMS	62%
Other	34%
Fire	4%

Overall, EMS incidents represent approximately 62 percent of service demand. False alarms, which includes alarm or detector system malfunctions, represent approximately 50 percent of the "Other" incident category. Alarm systems in vacation homes and rental properties are effective fire prevention tools, but do increase the likelihood of unintentional activations. Actual fires represent four percent of historical service demand. The percentages displayed in the preceding figure are typical for "all hazard" fire jurisdictions such as BSFD.

Temporal Service Demand

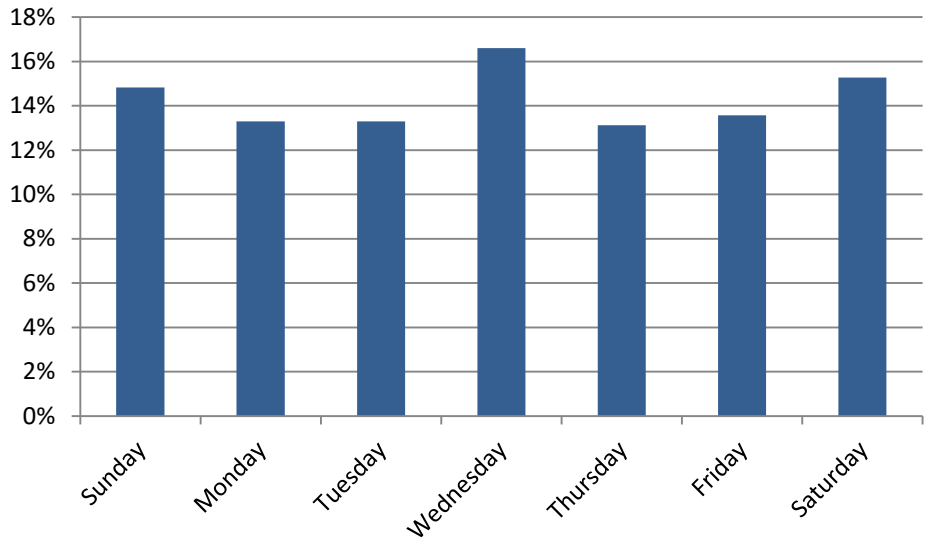
It is also useful to evaluate service demand temporally in order to determine if there are specific trends during certain periods where staffing can be modified to better fit the demand. The following figures display 2013 through 2014 service demand within the BSFD study area; summarized by various measures of time.

Figure 32: BSFD Service Demand by Month, 2013-2014



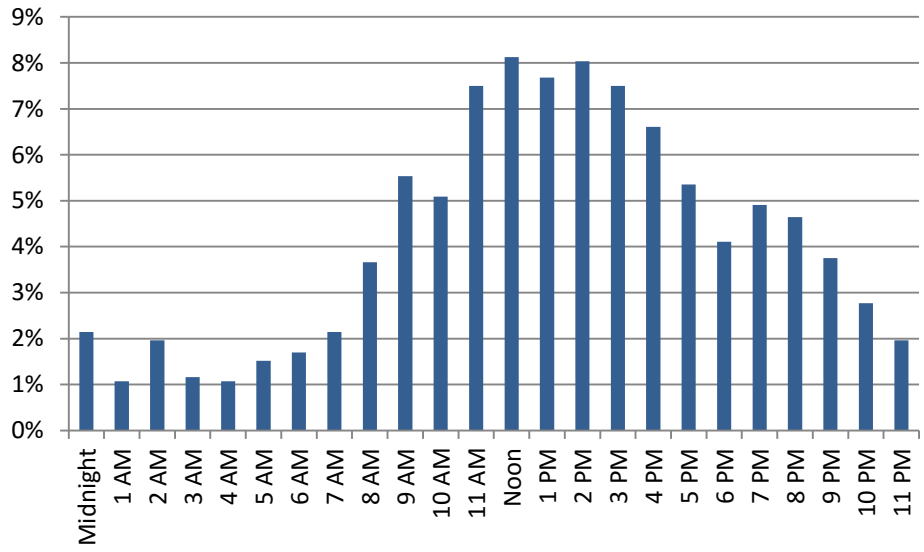
The highest service demand in the study area occurs during the winter tourism season. The period from December through March displays the highest service demand. During 2013 and 2014, BSFD experienced approximately 49 percent of the service demand displayed above. Note that July and August also demonstrate an increase in service demand. An increase of 104 percent was experienced in August of 2015, relative to the prior year, exemplifying the point. BSFD should be prepared for continuously increasing service demand during the summer months.

Figure 33: BSFD Service Demand by Day of the Week, 2013-2014



Service demand fluctuated slightly over a range of approximately three percent during 2013 and 2014. The highest demand for BSFD services occurred on Saturday, Sunday, and Wednesday, with the lowest demand on Thursday. The last analysis of temporal variation demonstrates workload by hour of the day.

Figure 34: BSFD Service Demand by Hour of Day, 2013-2014



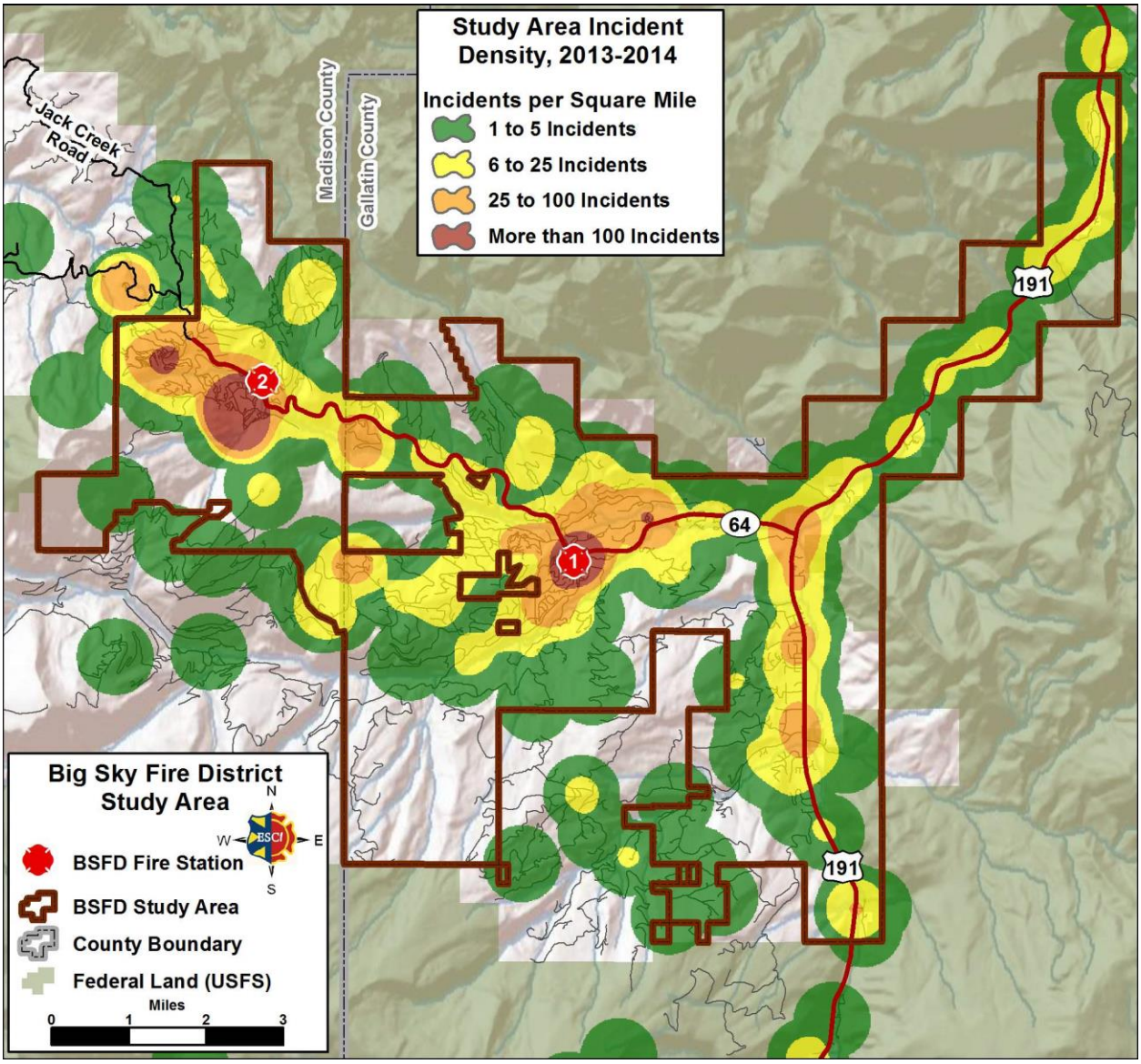
Service demand directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours as shown in the previous figure. Incident activity is at its highest between 9 AM and 6 PM. Nearly 50 percent (49.8 percent) of service demand displayed above occurred between the hours of 9 AM and 6 PM during 2013 and 2014. The pattern displayed in Figure 34 is common for emergency service providers across the country. Agencies such as BSFD, which utilize paid

on call personnel to augment staffing, may experience staffing issues during the workday when demand is highest and on call availability is lowest.

Geographic Service Demand

In addition to the temporal analysis of workload, it is useful to examine the geographic distribution of service demand. ESCI uses geographical information systems software (GIS) and incident location data provided by the Gallatin County 911 Communications Center to plot the location of 2013 through 2014 BSFD incidents and calculate the mathematical density of incidents within the study area.

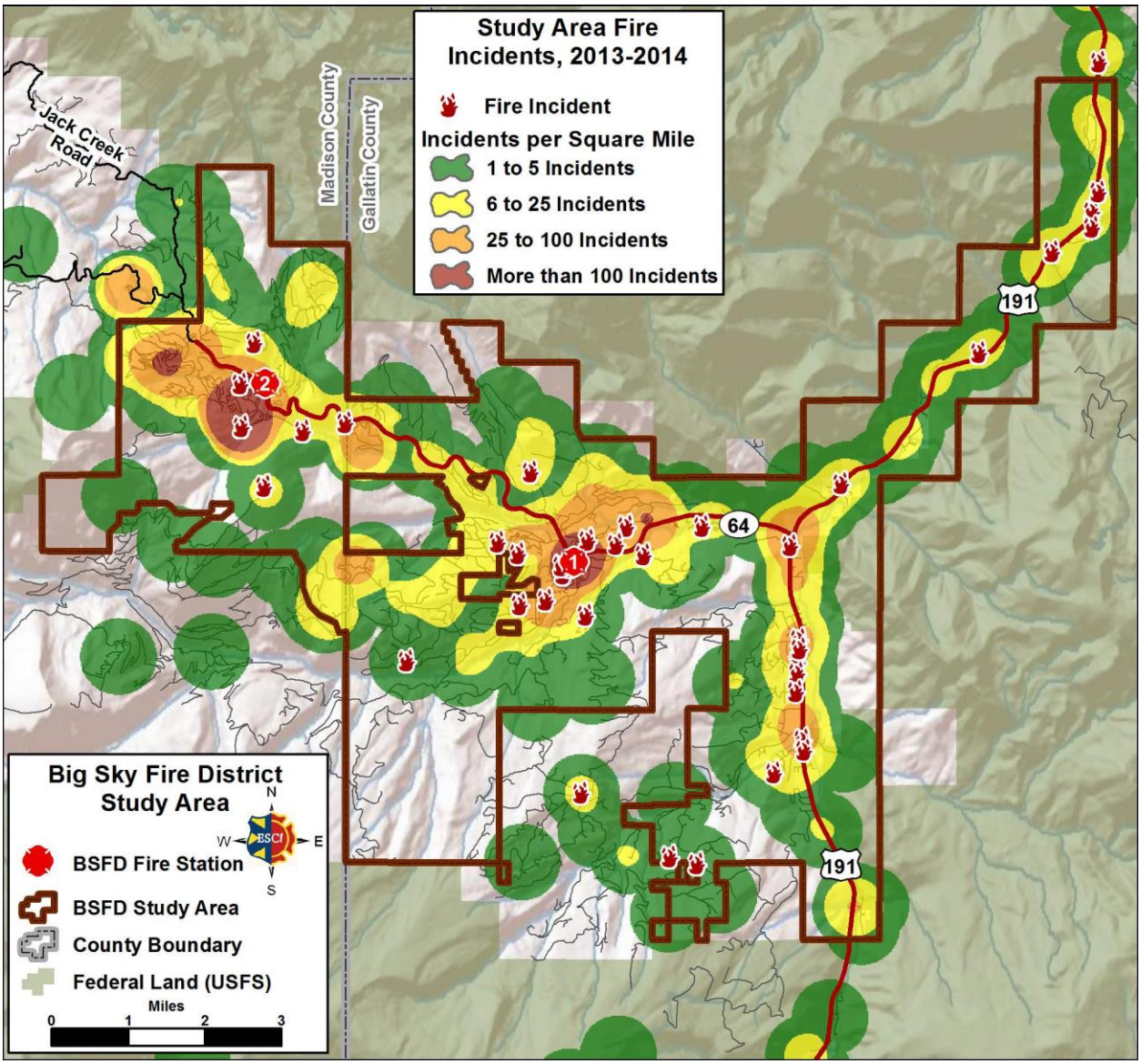
Figure 35: BSFD Geographic Service Demand, 2013-2014



Service demand in the BSFD service area is concentrated in three areas. The Big Sky Mountain Village area and Big Sky Resort account for approximately 45 percent of 2013 and 2014 service demand displayed in this figure. Thirty-two percent of incidents occurred in area from the Gallatin County line to the Highway

64 and Highway 191 intersection. The area within the fire district along either side of Highway 191 accounts for approximately 14 percent of the service demand displayed in the preceding figure. The remaining nine percent of service demand occurred outside of the fire district, primarily on Highway 191. The majority of the service demand displayed in the preceding figure is EMS incidents. The following figure displays the distribution of incidents dispatched as an actual "Fire" incident.

Figure 36: BSFD Study Area Fire Incidents, 2013-2014

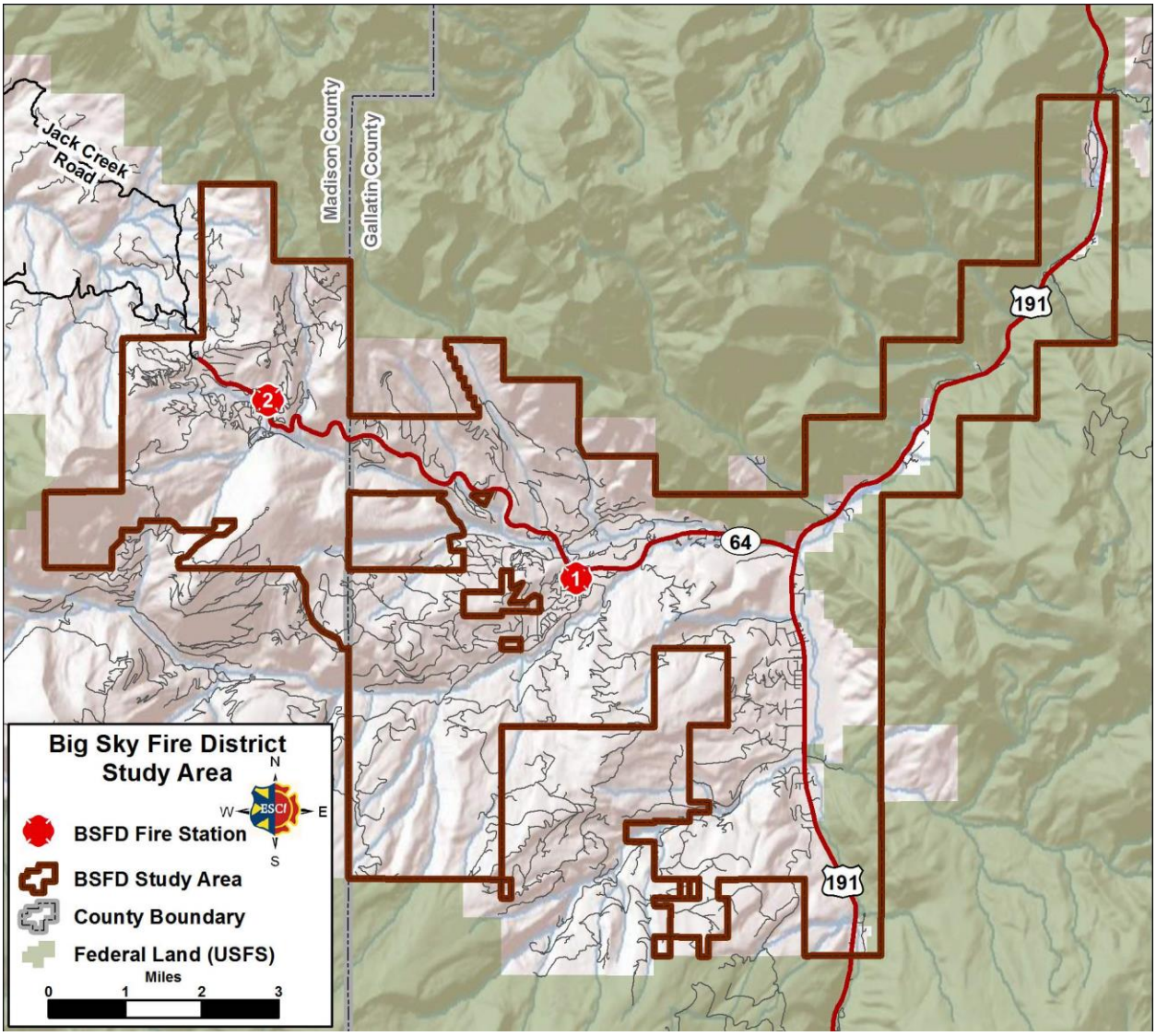


Fire incidents are the least frequent incident type in the data set. However, these incidents are distributed throughout the study area in a pattern similar to overall service demand.

Distribution Analysis

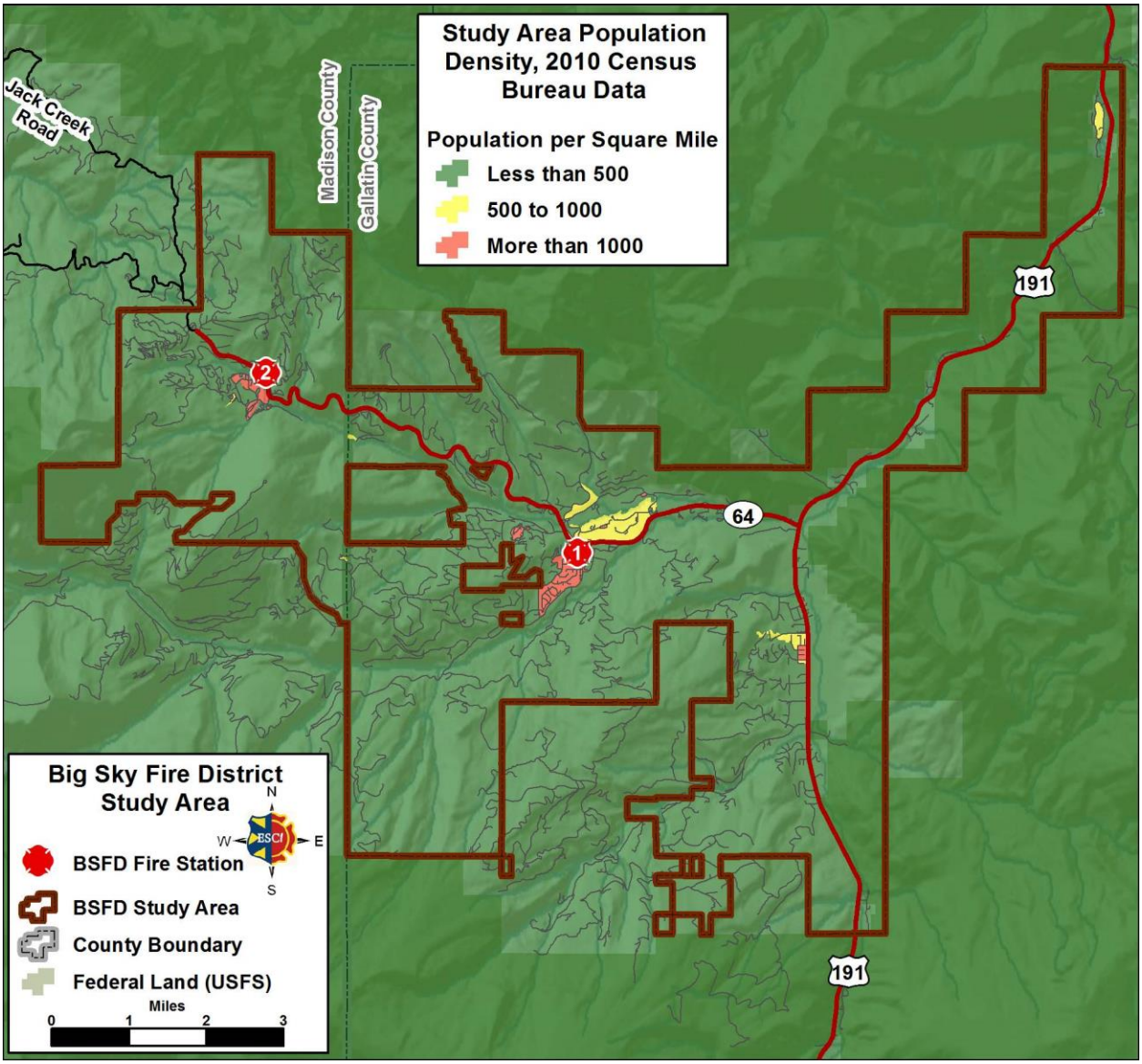
In this analysis, ESCI presents an overview of the current distribution of fire department resources within the Big Sky Fire Department. The following figure displays the BSFD study area.

Figure 37: BSFD Study Area



The study area encompasses approximately 57 square miles. There are no incorporated towns inside the district boundaries. Note that currently, BSFD is waiting for Madison County approval of an annexation into the fire district northwest of Station 2. The area applying for annexation consists of rural commercial and residential property in the Moonlight Basin area. The fire district is composed of the unincorporated community of Big Sky, the Big Sky Resort, and vacation homes and seasonal rental properties; in both Gallatin County and Madison County. Highway 191 runs north to south through the eastern edge of BSFD. Highway 64 (Lone Mountain Trail Road) is the primary east to west route through the area. The fire district is surrounded by United States Forest Service Land (Gallatin National Forest). BSFD also provides fire and EMS first response to a large area outside the fire district boundary. Most of these responses are along Highway 191 north and south of the district boundary. The following figure demonstrates population density within the BSFD study area.

Figure 38: BSFD Study Area Population Density, 2010 Census Data

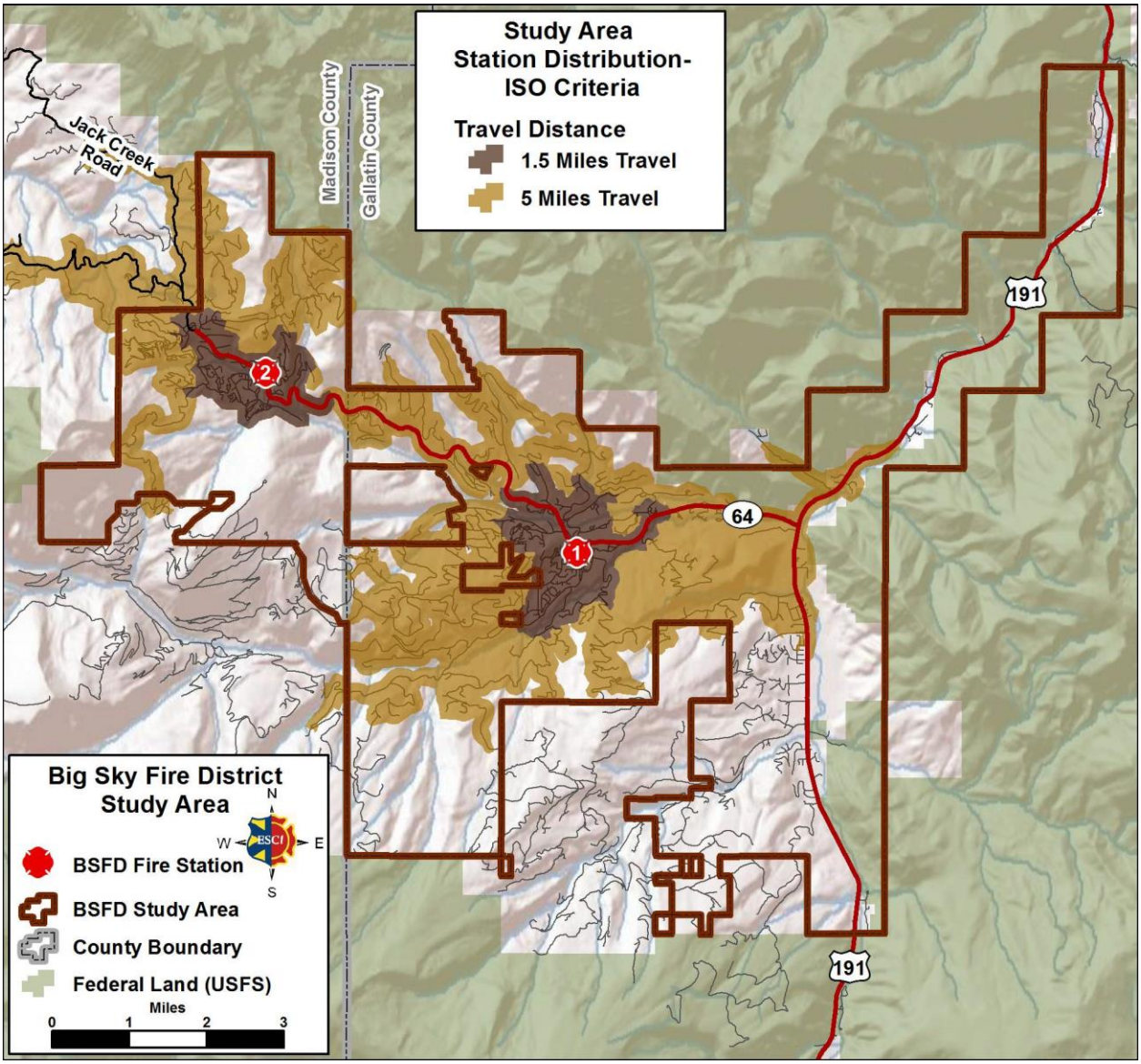


ESCI used census data to estimate the current resident population of the study area as approximately 2,518. As discussed earlier in the Organizational Overview, this does not accurately reflect the population served by BSFD. Seasonal tourism and a transient work force that commutes into the area increases the population served by the department. BSFD estimates that the service population can increase to approximately 15,000 during the ski season. ESCI estimates that the current service demand reflects a population of 7,500 to 10,000; rather than the estimated 2,518 permanent residents. Further discussion of the study area population and demographics occurs later in this report.

As seen in the preceding figure, the resident population is concentrated in the Meadow Village area around Station 1 and the Mountain Village area around Station 2. There is a smaller concentration of population on Highway 191 south of the junction with Highway 64 in the Ramshorn View subdivision.

The Insurance Services Organization (ISO) is a national insurance industry organization that evaluates fire protection for communities across the country. A jurisdiction's ISO rating is an important factor when considering fire station and apparatus distribution; since it can affect the cost of fire insurance for individuals and businesses. For ISO purposes, response areas are measured at 1.5 miles of travel distance for each engine company; and 2.5 miles for a ladder company (aerial apparatus) on existing roadways. For a structure to be in a protected rating for insurance purposes, it must be within five miles of a fire station. The following figures examine current station and apparatus distribution based on credentialing criteria for the Insurance Services Organization (ISO).

Figure 39: BSFD Study Area Station Distribution, ISO Criteria

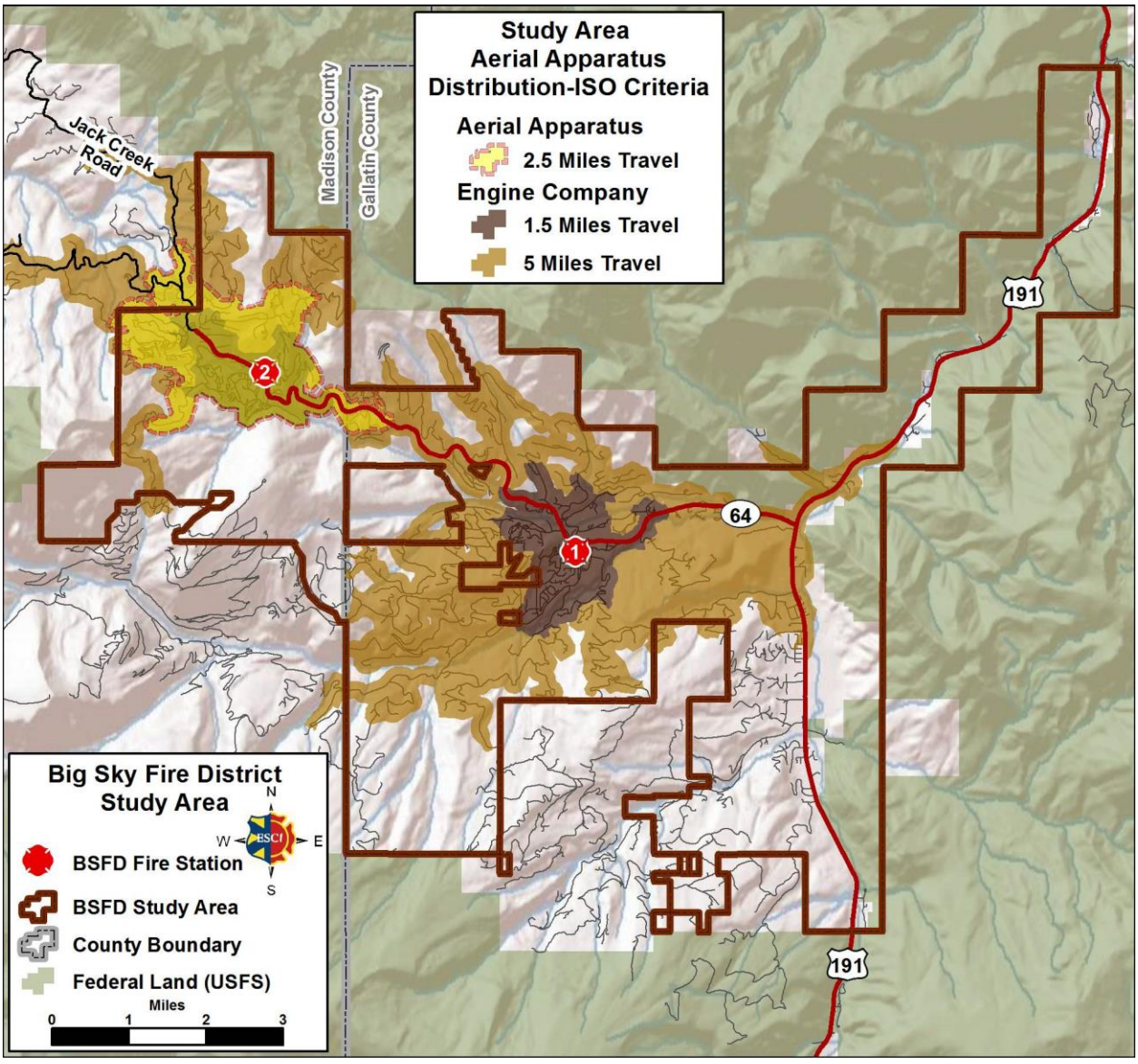


Examination of the GIS data reveals that approximately 56 percent of structures within the study area are within 1.5 miles of a BSFD fire station. Approximately 87 percent of structures are within five miles travel of a fire station. Given the size and diversity of the service area, BSFD fire stations are well located to serve

the majority of properties within the fire district. ESCI notes that a substantial number of properties located along Highway 191 within the fire district are beyond five miles of a BSFD fire station.

Similar to engine company criteria, ISO recommends that truck companies (aerial apparatus) be placed at 2.5-mile intervals in areas with a certain number of buildings over three stories. The BSFD aerial apparatus is located at Station 2. Figure 40 demonstrates the 2.5-mile service area for this station.

Figure 40: BSFD Study Area Aerial Apparatus Distribution, ISO Criteria

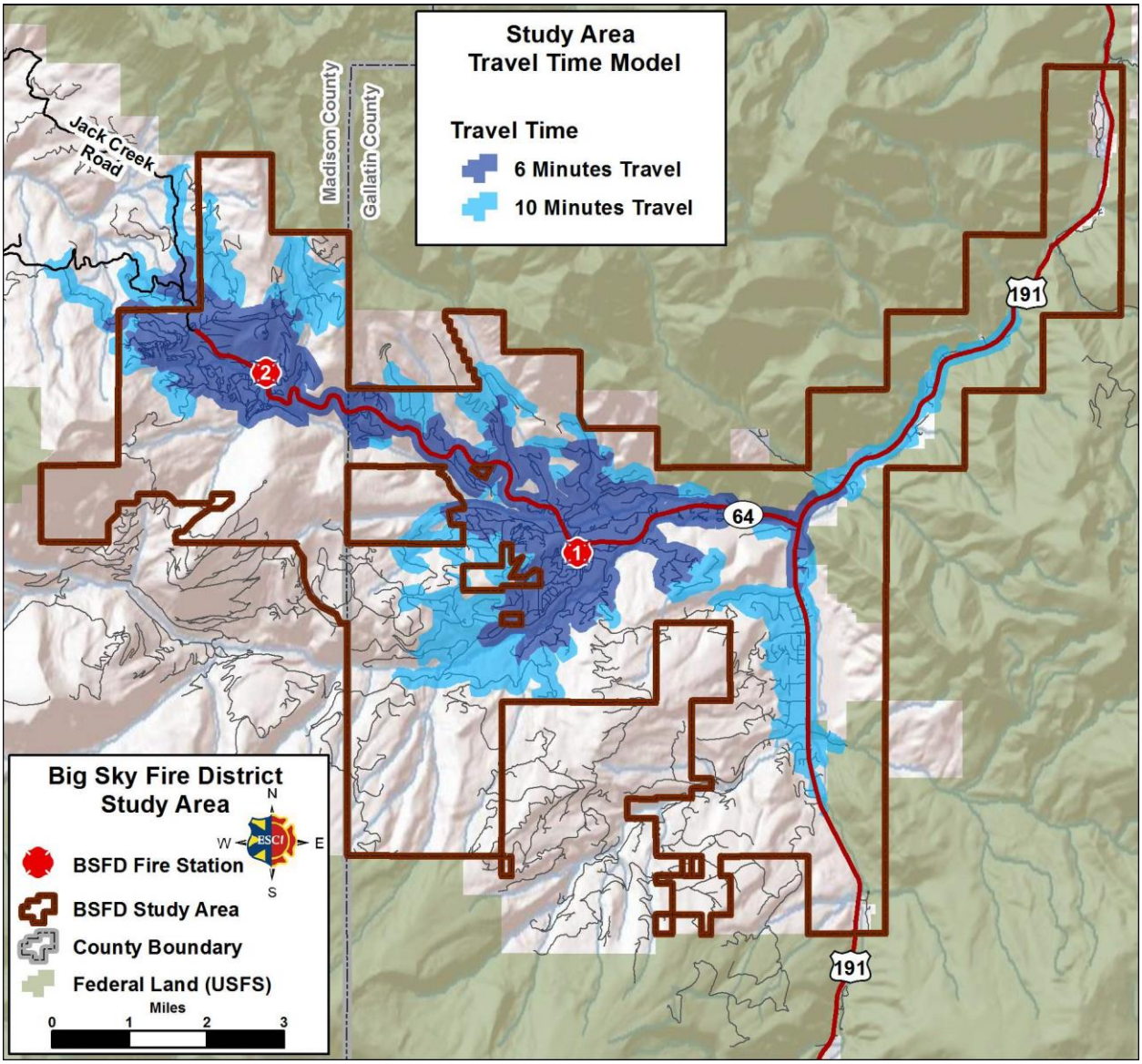


The majority of multi-story structures within the district are located in the Mountain Village and Big Sky Resort area, near Station 2; and the Meadow Village area near Station 1. The BSFD aerial apparatus is housed at Station 2. While the station is well located to serve the Mountain Village area, currently there are no personnel (either career or on call) assigned to this station. This negatively affects response

performance and availability for this apparatus. Further discussion of this situation occurs in the future options section of this report.

The ISO Public Protection Classification criteria only address fire suppression activities and are primarily concerned with the geographic coverage of property. For fire jurisdictions such as BSFD, that respond to all types of emergencies, the travel time required to respond from a fire station to any emergency call for service is of equal importance. The following figures demonstrate travel time over the existing road network. Travel time is calculated using the posted speed limit and adjusted for negotiating turns and intersections.

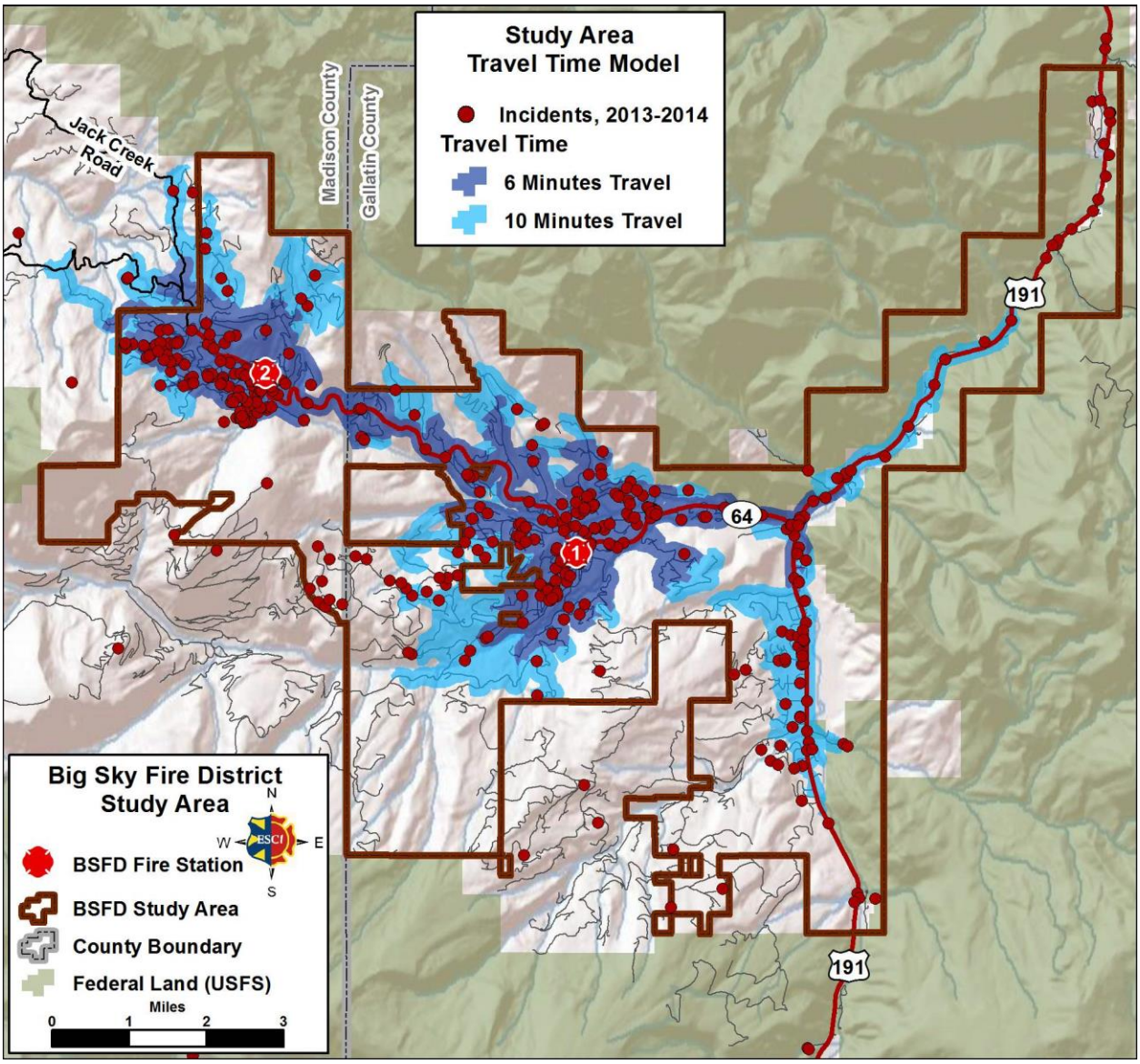
Figure 41: BSFD Study Area Travel Time Model



The preceding figure demonstrates travel time at six and 10 minute intervals from the current BSFD station locations, assuming that apparatus are in quarters and staffed—which does not currently occur at

Station 2—and do not experience traffic delays. The geography of the service area and nature of the road network affects travel time throughout the district. Note that there is an approximately 1,100 foot elevation gain between Station 1 and Station 2. Winter road conditions have the potential to reduce the effective travel time service area from both BSFD stations. The following figure displays 2013 through 2014 incidents, overlaid on the travel time model.

Figure 42: BSFD Study Area Travel Time and Service Demand, 2013-2014 Incidents



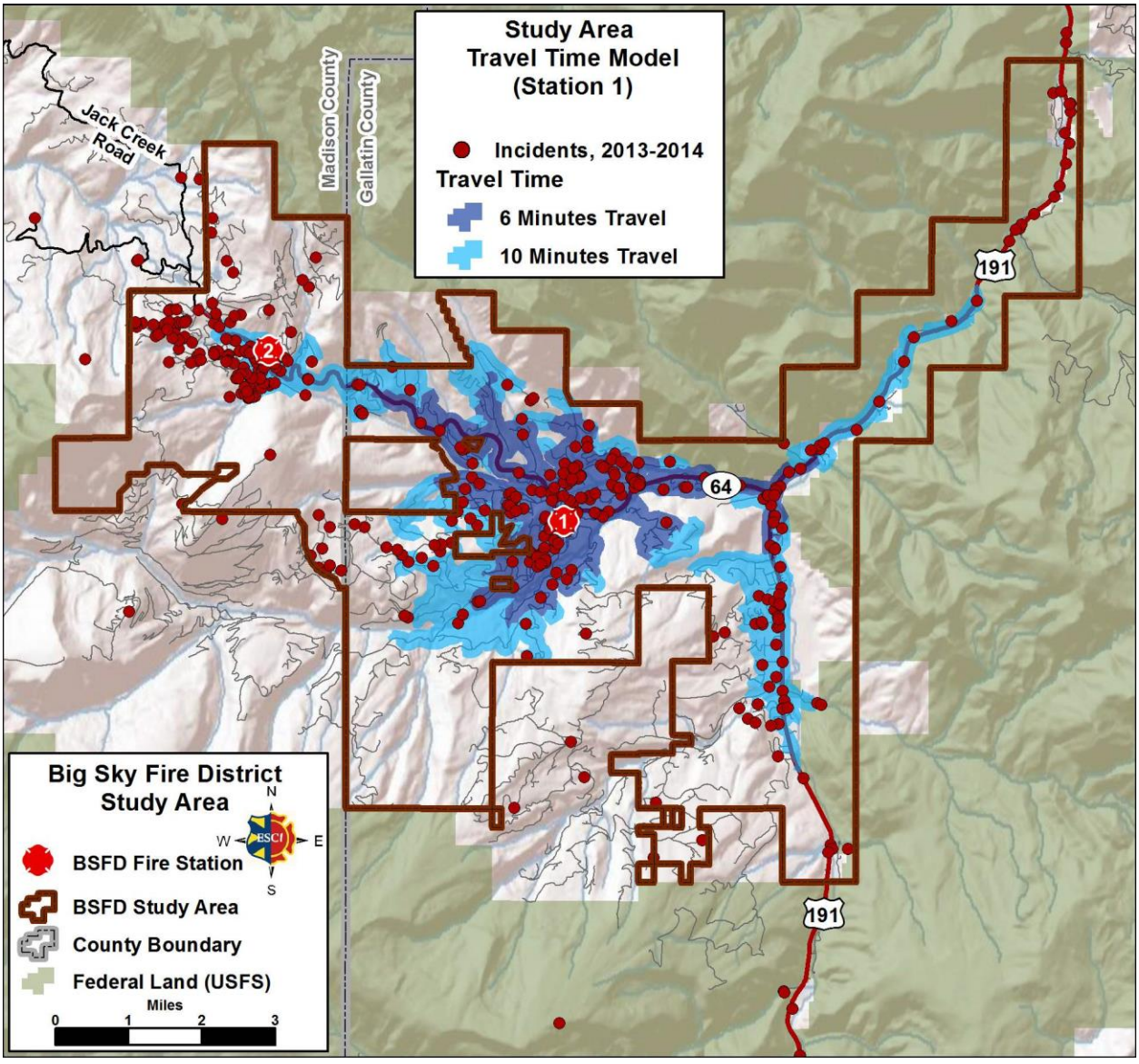
This figure demonstrates that theoretically, BSFD apparatus can reach approximately 79 percent of the service demand displayed inside the district boundaries in six minutes or less travel time. 94 percent of the incidents displayed above occurred less than 10 minutes from a fire station.

The previous figures model travel time from both BSFD stations. However, as discussed, Station 2 is not staffed with career personnel and there are no paid on call personnel available in the Station 2 area. To

provide an accurate picture of response capability for future planning, it is important to factor the current station staffing into discussion of coverage and travel times.

The following figure displays the travel time model from the currently staffed BSFD station (Station 1) and once again, the 2013 through 2014 incident locations.

Figure 43: BSFD Study Area Travel Time and Service Demand-Currently Staffed Station



This figure presents a more accurate picture of current travel time capabilities in the study area. In this figure only 33 percent of the service demand displayed is within six minutes travel (or less) of Station 1. Approximately 65 percent of service demand occurred within ten minutes travel of the personnel and apparatus housed at Station 1. Note that the analysis in the previous figures does not include incidents outside of the BSFD district boundary. Actual BSFD travel time and response time performance is discussed in the Response Performance analysis later in this report.

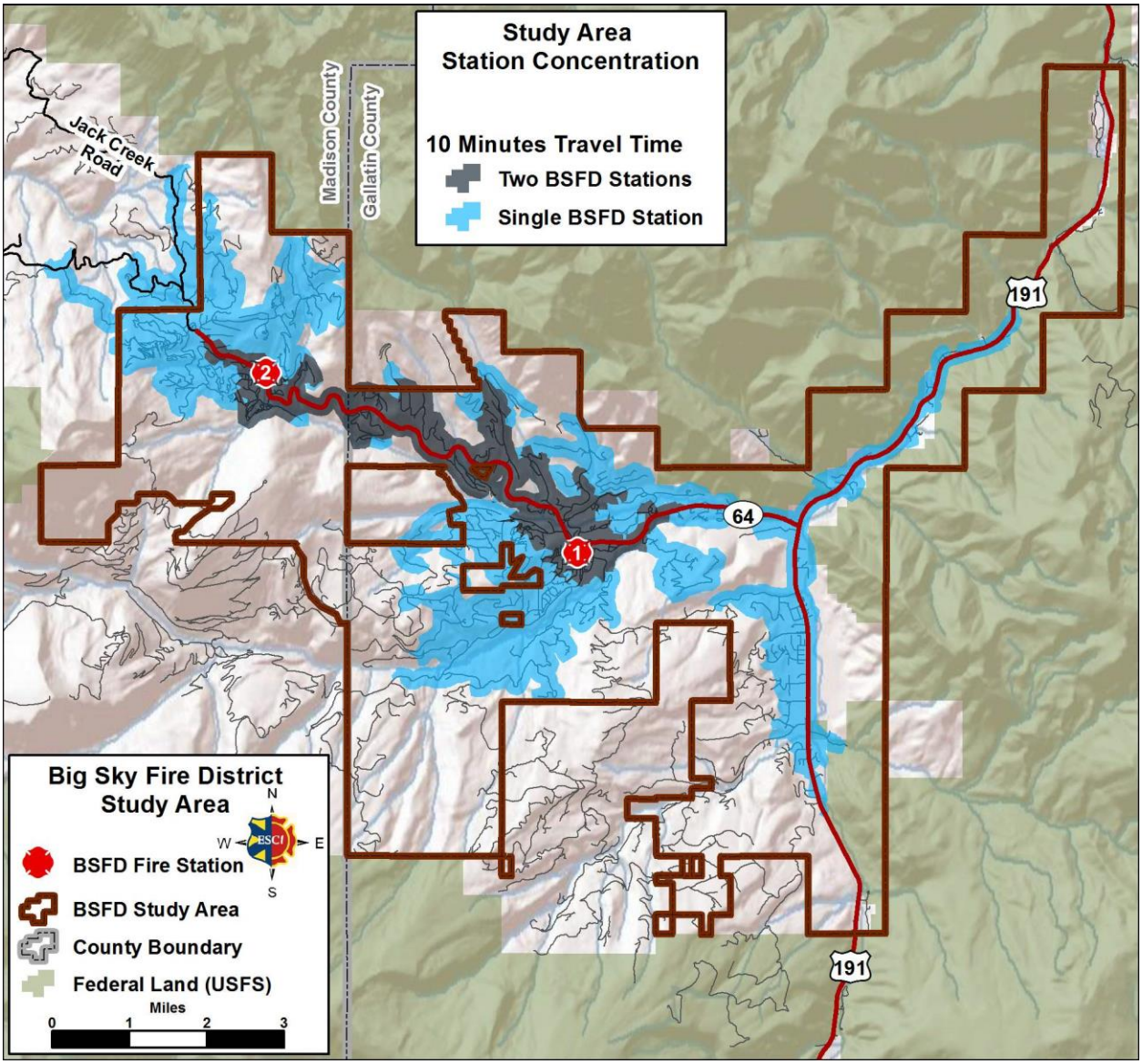
Concentration Analysis

Standard firefighting procedures call for the arrival of the entire initial assignment (sufficient apparatus and personnel to effectively deal with an emergency based on its level of risk) within a reasonable amount of time. This is to ensure that enough people and equipment arrive soon enough to safely control a fire or mitigate any emergency before there is substantial damage or injury. Fire service best practices suggest that 14 to 16 personnel are needed to mitigate a moderate risk structure fire.[7] The Occupational Health and Safety Administration (OSHA) "Two In/Two Out" mandate requires that a minimum of four personnel be assembled to initiate an interior fire attack.

In this analysis, ESCI examines BSFD's ability to assemble multiple resources across the study area. The following figure demonstrates the portions of the study area within 10 minutes or less travel time of both BSFD fire stations.

[7] Center for Public Safety Excellence/Commission on Fire Accreditation (CPSE/CFAI) *Standards of Cover, 5th Edition*.

Figure 44: BSFD Study Area Station Concentration



A limited portion of the BSFD service area on either side of Highway 64 is within 10 minutes or less travel time of both fire stations. This area includes the Mountain Village and Meadow Village commercial areas. As previously discussed, because of the current staffing, multiple station responses are not part of current BSFD operations. While the current minimum staffing usually meets the minimum requirements for an interior fire attack (if no personnel are committed to another incident); BSFD depends on paid on call and off duty career staff to provide additional resources for more complex incidents beyond the capabilities of the on duty personnel. The following figure demonstrates the number of BSFD personnel on the scene of 2013 and 2014 incidents, summarized by incident category.

Figure 45: BSFD Personnel by Incident Category

Incident Category	Average Number of Personnel
EMS	3
Fire	6
Other	4
Overall	4

The preceding figure demonstrates that in general, the current minimum staffing level of four is able to handle routine EMS incidents and incidents such as false alarms or service calls (Other category). However, examination of the incident data reveals that approximately 10 percent of all incidents required additional personnel. Nearly 41 percent of fire incidents required more personnel than the minimum daily BSFD staffing. As discussed in the emergency staffing analysis, the number of emergency personnel available affects the department's ability to safely and effectively deal with moderate or high risk emergency incidents in a timely manner.

Reliability Analysis

The workload of emergency response units can affect unit availability and be a factor in response time performance. Concurrent incidents or the amount of time individual units are committed to an incident can affect a jurisdiction's ability to muster sufficient resources to respond to additional emergencies or muster sufficient resources to deal with complex incidents. The following figure demonstrates the percentage of concurrent incidents experienced by BSFD in 2013 and 2014.

Figure 46: BSFD Study Area Concurrent Incidents, 2013-2014

Concurrent Incidents	Percentage
Single Incident	85.8%
2	12.7%
3 or More	1.5%

Nearly 86 percent of BSFD incidents in 2013 and 2014 occurred as a single event. Over 14 percent of the time, two or more incidents were in progress in the BSFD service area. The percentage of concurrent incidents is comparable to other fire jurisdictions with similar service demand. However, as service demand and the frequency of concurrent incidents increases; BSFD will be challenged to muster adequate resources for additional emergencies when resources are already committed to an incident.

The following figure displays the average time BSFD resources are committed to an incident, summarized by incident category.

Figure 47: BSFD Average Time Committed by Incident Category, 2013-2014

Incident Category	Average Time Committed
EMS	1:51:16
Fire	1:24:53
Other	27:56
All Incidents	1:22:34

Given that the closest definitive care facility is 45 to 60 minutes from Big Sky, it is not surprising that EMS incidents display the longest average time committed in the preceding figure. The average time committed to a fire incident is approximately one hour 25 minutes. The Other incident category which includes false alarms, alarm malfunctions, and cancelled calls demonstrates the shortest average time committed. Examination of the incident data reveals that overall; BSFD resources were committed to an incident approximately 8.7 percent of time during 2013 and 2014.

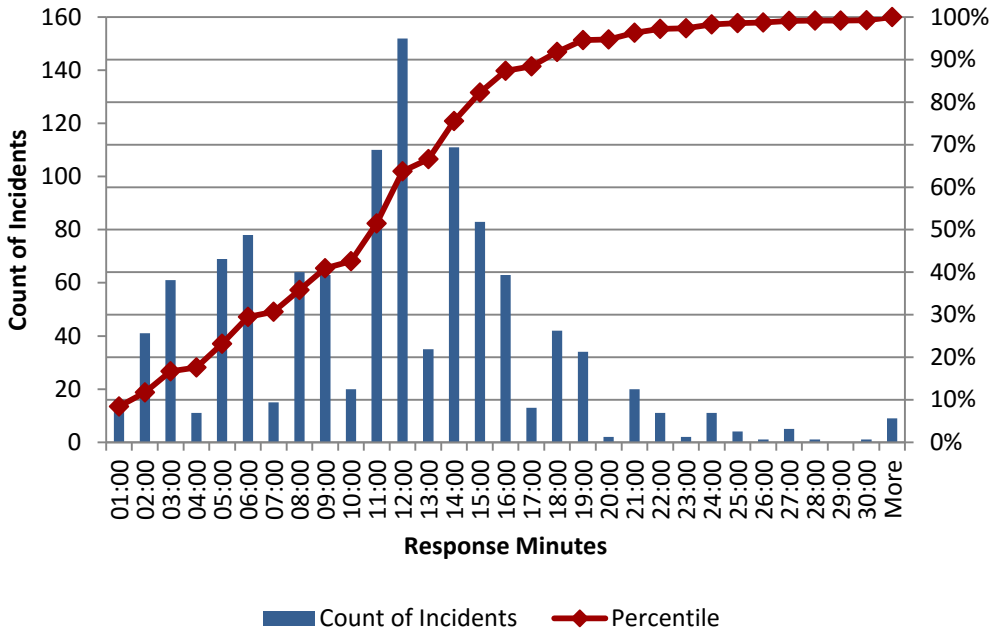
Response Performance

Perhaps the most publicly visible component of an emergency services delivery system is that of response performance. Policy makers and citizens want to know how quickly they can expect to receive emergency services. In the performance analysis, ESCI examines emergency response performance within the BSFD service area. The data for this analysis is 2013 through 2014 incidents extracted from the department's records management software (RMS). Incidents outside the actual BSFD boundary, incidents cancelled prior to arrival, data outliers, and invalid data points have been removed from the data set. Response time is measured from the time BSFD units are dispatched to the arrival of the first unit on scene. ESCI generates average and 80th percentile response times for these incidents. The use of percentile calculations for response performance follows industry best practices and is considered a more accurate measure of performance than "average" calculations.

The most important reason for not using the "average" for performance standards is that it may not accurately reflect the performance for the entire data set and may be skewed by data outliers. One extremely good or bad value can skew the "average" for the entire data set. Percentile measurements are a better measure of performance since they show that the large majority of the data set has achieved a particular level of performance. The 80th percentile means that 80 percent of the values are less than the value stated and all other data is above this level. This can be compared to the desired performance objective to determine the degree of success in achieving the goal.

The following figure graphically represents a percentile measurement of response performance within the BSFD district boundaries. The blue bars show the count of emergency incidents that occurred within a one-minute time increment. The red line (Percentile) demonstrates the cumulative percentage of incidents that occurred in the given time increment or less.

Figure 48: BSFD Study Area Response Time Frequency, 2013-2014



The most frequently recorded response time in the data set is within the 12th minute (11 to 12 minutes). The average response time is 10 minutes five seconds. The first BSFD apparatus was on scene in 15 minutes or less, 80 percent of the time.

Figure 49: BSFD Study Area Overall Response Performance, 2013-2014

2013-2014 Response Time Performance	
Average	**80th Percentile**
10:05	15:00

As discussed, the preceding figures demonstrate response time performance from the time units are dispatched to the arrival of the first BSFD apparatus. This response time continuum is comprised of the following components:

- Turnout Time – The amount of time between when units are notified of the incident and when they are en route.
- Travel Time – The amount of time the responding unit actually spends on the road to the incident.
- Response Time – A combination of turnout time and travel time.

Recording and monitoring each of the components of the response time continuum allows fire jurisdictions to identify trends and correct specific deficiencies. ESCI has utilized incident data provided by BSFD extensively in the Service Delivery Analysis. In general, the data is complete and accurate. However, ESCI finds that the time stamps recorded do not allow for the accurate measurement of the components of the response time listed above.

ESCI identifies the following issues in the BSFD response time data:

- Time stamps are rounded off to the closest full minute.
- The same time stamps are entered for dispatched time and roll time (en route time).
- Inconsistent time stamps for individual apparatus responding to the same incident.
- Inconsistent recording of emergency versus non-emergency responses.

Establishing performance goals and monitoring performance for the various components of response performance listed above, is a vital part of developing emergency response time performance goals. ESCI recommends that BSFD develop a methodology to accurately capture response performance data; and provide department personnel with the training and information necessary to record the data.

Mutual and Automatic Aid Systems

There are numerous mutual aid agreements, both formal and informal, in place between fire, police, and emergency medical agencies in BSFD study area. Mutual aid is typically employed on an "as needed" basis where units are called for and specified one by one through an Incident Commander. Automatic aid agreements differ from mutual aid agreements in that under certain mutually agreed upon criteria, resources from the assisting agency are automatically dispatched as part of the initial response.

The Big Sky Fire Department participates in the Gallatin and Madison County Emergency Plans. BSFD has a signed mutual aid agreement with the Yellowstone Club Fire Department, a private fire jurisdiction adjacent to Big Sky. BSFD works closely with federal and state wildland fire agencies and participates in the Big Sky Fire Management Plan for wildland urban interface (WUI) fire suppression and prevention. BSFD also interacts with local ski patrol and search and rescue organizations. The department pursues training opportunities with other emergency agencies whenever possible, and automatic and mutual aid responses and procedures are incorporated in dispatch protocols.

In many areas of the country, fire jurisdictions utilize mutual and automatic aid resources to augment the resources available for initial attack or specialized equipment, to the mutual benefit of the participating agencies. Other than the Yellowstone Club Fire Department, travel time for other fire resources is roughly 45 to 60 minutes from the Big Sky service area. This limits BSFD's ability to utilize neighboring jurisdictions as part of the initial response for higher risk incidents. In 2014, BFSD received mutual/automatic aid 20 times and provided aid 19 times. This represents 6.6 percent of the 2014 incidents.

Incident Control and Management

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

For a unified incident management approach to be effective, two components are necessary. The first is a process of cross training personnel from each agency collaboratively with their neighboring responders.

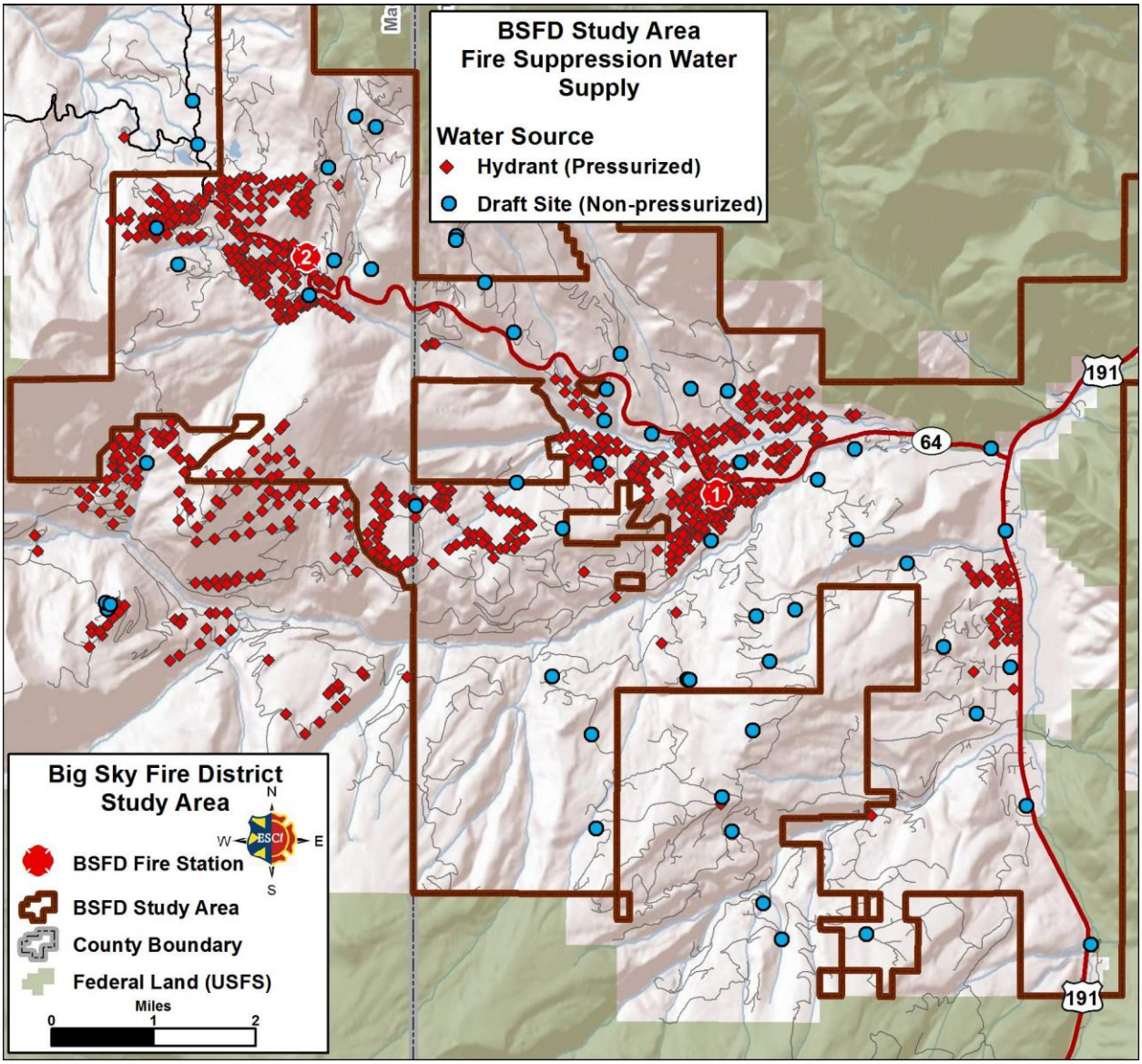
Second, incident management techniques need to be employed as a matter of routine, even during small emergencies, to establish the system as a matter of course.

BSFD employs ICS for emergency scene management when operating singly or with other fire or emergency jurisdictions during joint operations. ICS training for career and paid on call personnel is included in the annual training calendar. ICS and scene safety are addressed in the BSFD Standard Operating Guidelines (SOGs). An emergency scene accountability system (Passport) is used to insure firefighter safety and accountability. BSFD effectively utilizes ICS and NIMS for emergency and non-emergency scene management.

Water Supply

An adequate water supply is vital for successful fire suppression efforts. BSFD depends on a pressurized hydrant system, draft sites, and water tender operations to provide water for fire suppression. The following figure displays the distribution of fire hydrants and developed draft sites in the service area.

Figure 50: Study Area Hydrants and Draft Sites



As seen in this figure, fire hydrants are distributed throughout the BSFD service area; primarily in the commercial and residential development in the Meadow Village, Mountain Village, Spanish Peaks, and Big Sky Resort areas. The Big Sky Water and Sewer District operates and maintains the water system for approximately 30 percent of the Big Sky area. Other private water systems provide pressurized fire hydrants in various areas throughout the BSFD service area. Draft sites range from open ponds or other natural sites to draft hydrants supplied from storage tanks. BSFD houses water tenders at both Station 1 and Station 2 to haul water to areas without adequate fire suppression water. BSFD incorporates water availability and hydrant location information in the dispatch protocols (run cards) to ensure that the proper resources are included in the initial response to non-hydranted areas.

BSFD works proactively with planners, developers, and the Water District to ensure that adequate fire flow is available for fire suppression in new development and existing properties. ESCI notes that these

efforts are critical now and will continue to be critical, given the current fire risks that are present and the projected new development in the BSFD service area.

SUPPORT PROGRAMS – TRAINING

Providing safe and effective fire and emergency services requires a well-trained workforce. Training and education of personnel are critical functions for each study agency. Without quality, comprehensive training programs emergency outcomes are compromised and emergency personnel are at risk. One of the most important jobs in any department is the thorough training of responders. The personnel have the right to expect good training and the department has the obligation to provide it.

Initial training of newly hired firefighters is essential, requiring a structured recruit training and testing process. Beyond introductory training, personnel need to be actively engaged on a regular basis and tested regularly to ensure skills and knowledge is maintained. To accomplish this task, the fire district must either have a sufficient number of instructors within its own organization or work with their regional partners to provide those resources. The training program should be based on a structured annual plan and educational sessions should be formal and follow prescribed lesson plans that meet specific objectives.

In the following pages, ESCI reviews BSFD training practices, compares them to national standards and best practices, and recommends modifications where they are found to be appropriate.

General Training Competencies

For training to be fully effective, it should be based on established standards. There are a variety of sources for training standards. BSFD uses the NFPA, the International Fire Service Training Association (IFSTA), and Jones and Bartlett materials, in part, as the basis for its fire suppression training practices.

Figure 51: Survey Table – General Training Competencies

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
General Training Competency		
A. Incident command system	Yes, all ICS national mandated NIMS based programs for staff, all full time staff "blue card" certified. One paid on call has blue card. Paid on call staff receives same training. Fire chief has limited integrated training with crews as incident commander, mainly due to time restrictions.	Establish a minimum of monthly incident command training with fire chief and crews.
B. Accountability procedures	Passport used on every incident requires an SCBA. Monthly training effective in use of system.	
C. Policy and procedures	SOGs need to be reviewed and upgraded, and the current operations and training far exceed the SOGs.	
D. Safety procedures	Included in ongoing training	
E. Recruit training	Total required training hours for new recruits is 120 hours Recruit classes follow National Firefighter I curriculum, on line videos, skills testing and assessment with shift Captain when assigned. State testing for Firefighter I is not required by state law, instituted as a quality assurance and liability control. In house recruit academy for full time, weekdays until released and assigned on duty with a captain, Ongoing training continues through a developed curriculum during probationary period. Paid on call is not assigned on a duty position until they reach "proficiency level." Is a slower process, as hours for training are limited to the number of days the paid on call attends training Phase One: On line, support Phase Two: In house, captain led, departmental tested Phase Three: State tested	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
F. Special rescue (high angle, confined space, etc.)	Swift water Low angle Ice Rescue No confined space Full time are technical level Swift water all members are at operational level High angle training-Gallatin County Sheriff and Big Sky Search and Rescue (a local volunteer organization)	
G. Hazardous materials	Yes, Operations Level	
H. Wildland firefighting	All members trained/certified in the following: S100; S120, S230, S290	
I. Vehicle extrication	Vehicle extrication, and advanced vehicle extrication Annual training off site at tow yard in Belgrade. Classroom and manipulative training ongoing in house.	
J. Defensive driving	120 hour driver operator curriculum includes EVOC and driver/operator training Follows national standard system, core curriculum, skills sheets, evaluated, then submitted to State.	
K. Use and care of small tools	Yes	
L. Radio communications & dispatch protocol?	Yes	
M. EMS skills and protocol	Yes, all County and BSFD EMS skills protocols followed, skills training ongoing, daily, monthly. All EMT continuing education requirements are met. Paramedic continuing education is provided by an EMS Training Officer and other sources.	

Key Recommendation:

- Establish minimum monthly incident command training with fire chief and crews.

Discussion

New Personnel Training

Proper training of emergency services personnel starts prior to being hired or joining an agency. Specific knowledge and skills must be obtained to achieve a basic understanding of the roles and responsibilities of an emergency responder. The BSFD recruit-training program affords the new recruit a total of 120 hours in a wide variety of areas.

As a result of current work levels, the fire chief has limited engagement in incident command training. ESCI believes the fire chief will be able to prioritize and participate in regularly scheduled training with all crews, including all incident command level activities, once additional administrative positions are filled.

The BSFD is commended for a very robust, well managed, well led and effective overall training program that includes all requisite elements.

Training Program Administration and Management

To function effectively, a training program needs to be managed. Administrative program support is important, though often weakly addressed. An additional element of effective administration is the development of program guidance in the form of training planning, goals, and defined objectives.

Figure 52: Survey Table – Training Program Administration and Management

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Training Administration		
A. Directors of training programs	Training management is divided among two separate fire captain positions, EMS training officer, and fire training officer.	
i) EMS Training	Yes, robust training and appears to be adequate. The BSFD has a very active and wide ranging training program.	
B. Education or background	Each of the training officers possess an array of certifications, experience and are involved in a variety of local, regional, state, and national organizations, including leadership positions. EMT Training Officer formerly from large city department and brings extensive experience and training to BSFD.	
C. Program Goals and objectives identified	Objectives and program goals are clearly identified and utilized month to month. There is no formal annual training plan. EMS: Monthly Training briefs are developed, published, posted and distributed for each month Training is broad and is regularly coordinated with, County EMS, and other departments in state All materials available on line and in station. Subjects focus on core skills. Fire Training Monthly briefs publicized, distributed to staff each month and distributed 60 days out. Includes various modes of delivery including: Videos, skills sheets, program manuals, online tools.	Develop and memorialize an annual, training plan and update as needed. Plan should outline training priorities for the year and each month's subject matter.

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
D. Governing body support and concurrence	There is adequate governing and regulation support, and institutional polices in the BSFD related to EMS training. Dr. Eric Lowe, Local Medical Director Dr. Harry Sibold, State Medical Director Ken Threet, State Medical Office Dr. Eric Lowe regulates protocol, QA issues, licensing, medical treatments development.	
E. Personnel knowledge and understanding	BSFD leadership maintains a high priority on training. Training priority is widespread and active with members.	
Recordkeeping		
A. Individual training files maintained	Records submitted to training officers then input and tracked in Firehouse software. BSFD keeps records online and some cases hard copies are scanned and kept electronically. All records are eventually computerized and inserted into both online/in house system and Firehouse.	
B. Records and files computerized	Minimal paper work, online or computerized. Scanning documents a problem, cumbersome.	Migrate training records onto single software cloud based software.
C. Daily training records	Each shift the captain submits training records to one of the Training officers. Training officers then input into system.	Assign duty captains to input daily training hours directly into system for each shift crew.
D. Company training records	Yes	
E. Lesson plans used	Yes, sourced and developed both internally and externally.	
F. Pre-fire planning included in training	Yes, crews expected to pre plan one business each shift.	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Administrative Priority		
A. Budget allocated to training	Annual budget development includes a specific line item for training. Should needs arise the training officers and fire chief discuss and make necessary adjustment to budget if needed. Training budget is sub split between EMS and fire.	
B. Using certified instructors	Yes	
C. Annual training report produced	No EMS annual training report, although information is available. There is a monthly training report that is published and provided to Board and FC.	Create a detailed report for a specific training section as part of the annual FD report.
D. Adequate training space/facilities and equipment	Station 1 has an adequate, large training room, Staff would like an expanded SIM area. Outside training activities are conducted at Station 2, outside Station 1, or empty housing units when available.	Plan, budget and equip more robust SIM tools. Explore joint purchase/training of SIM tools with Yellowstone Club Fire Department.
E. Maintenance of training facilities	Appears adequate	
F. Training Program Clerical Support	Handled by training officers, there is no administrative support.	Administrative and clerical workloads will be decreased on training officers if training record input is made the responsibility of each captain.

Key Recommendations:

- Develop and institutionalize an annual training plan, update as needed. Plan should outline training program goals and activities for the year.
- Create a detailed report for a specific training section as part of the annual fire department report.
- Assign each shift captain the responsibility to input training hours daily to reduce workload on training officers.

Discussion

The training program is staffed with two operational, shift-based fire captain positions managing training as an additional assigned duty. Training management and administration is divided into EMS and fire subject areas, one assigned to each captain. The workload is nearly at maximum on each of these individuals.

An annual training plan should be developed and published. The plan can be modified, but it is more effective to have staff members prepared and aware as to what subject matter will be covered throughout the year.

Consideration should be made to find ways to reduce/shift workloads, e.g. assign each captain to input training hours for the entire crew. Training officers should collect and review month and year-end data, then prepare a publish quality training report for insertion into a BSFD annual report.

Training Resources and Methodology

To be able to deliver effective training to fire and EMS personnel, some resources are necessary to arm the trainer with the tools needed to provide adequate educational content. In addition to tools, effective methodologies must be employed for delivery to be sufficient to meet needs.

Figure 53: Survey Table – Training Resources, Scheduling, and Methodology

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Training Facilities and Resources		
A. Training facilities (tower, props, pits)	No training tower EMS/ALS-training tools appear adequate.	Consider long-term planning for a dedicated training facility.
i) Live fire prop	Once a year obtain burn trailer from State	
ii) Fire and driving grounds	Only at fire stations	
B. Classroom facilities	Yes, Station 1 only.	
C. VCR, projectors, computer simulations	Yes	
D. Books, magazines, instructional materials, online materials	Yes, robust.	
Training Procedures Manual		
A. Manual developed and used	BSFD Rookie Manual BSFD Operational Readiness Manual Specific job duties are listed for every position and are bi-annually reviewed. Captain's manual in draft form	Complete the planned implementation of a captain's manual.
B. IFSTA manuals used	Yes, moving to Jones and Bartlett, but sometimes use IFSTA.	
Training Scheduling		
A. Career-full time staff training schedule	Yes, monthly Posted a month in advance	Develop an annual training calendar.
B. Paid on call staff training schedule	Yes, monthly Posted a month in advance	Develop an annual training calendar.
C. Minimum training hours, competencies	Yes	
Methodology Used for Training		
A. Manipulative	Yes Weekly drills scheduled and performed each Tuesday evening	
B. Task performances	Yes, tasks are observed, measured and trained to.	
C. Annual training hours	Yes, are kept on line in each employee's record. Monthly records are published for fire chief and BOT.	
D. Use of lesson plans	Yes	
E. Night drills	Not regularly	Schedule two night drills per year each shift.

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
F. Multi-agency drills	Yes, Central Valley, Rae Sourdough, and Yellowstone Club FD's. Once per year BSFD, Central Valley, and Rae Sourdough have a large drill. Once per month Yellowstone Club is invited to training, however attendance is low.	Implement discussion with Yellowstone Club FD staff to explore enhancement of joint training and emergency operations.
G. Physical standards or requirements	All evolutions are timed and members must perform to the time standard.	
H. Annual performance evaluation conducted	Yes	
I. Employee Development program	Yes, an employee development program is currently implemented to the firefighter level. Succession plan for firefighter and above.	
Operations and Performance		
A. Disaster drills conducted	Annual disaster drill at Bozeman airport sponsored by Central Valley FD. Annually with Big Sky Ski Patrol MCI.	Explore formal training with Big Sky Resort staff; target a minimum of three times per year, per shift.
B. Attention to safety	Yes	
C. Post incident critique (After Action Review)	Yes, held after significant events. Captains and crews perform individual crew level review. Stress debrief component available, BS Chaplain.	
D. Priority by management toward training	Has tremendous support and fire chief is more than willing to modify through budget year if needs change.	

Key Recommendations:

- Initiate long term planning for a dedicated training site to include a tower, and requisite training props. Consider joint use and funding with Yellowstone Club.
- Finish implementation of captain's manual.
- Schedule night drills two times per year each shift.
- Explore more formal training opportunities with Big Sky Resort staff, target a minimum of three times per year, per shift.

Discussion

ESCI learned that dedicated training facilities are limited in the area. As a result, most training has to be completed using available buildings and parking lots. Classroom instruction is an essential component of preparing emergency responders with knowledge and skills. A training facility or drill ground is a second indispensable element. Training facilities provide a controlled and safe environment to simulate emergencies, developing and testing the skills of emergency workers.

ESCI recommends planning for a dedicated training site, when funding and space becomes available. ESCI further recommends a joint effort to include Yellowstone Club Fire Department in the planning, financing, and shared use of a training site.

Beyond the regular training offered to general staff, certain individuals should be offered specific officer development training in order to prepare them for more responsibility as they progress through the agency's command structure. Placing individuals in positions of authority without first giving them the tools to succeed often ends in failure and discouragement by both the officer and their subordinates. ESCI recommends that the BSFD work with the training officers and staff to establish standardized professional development program at the captain level, which includes completion of the captain's manual.

Night drills for BSFD staff should be formally scheduled and placed the annual training calendar/plan. In addition, BSFD should initiate formal, regularly scheduled training with Big Sky Resort staff to ensure smooth operations between entities.

In conclusion, ESCI finds that the BSFD training program has many of the foundational structural elements that are found in a fully effective program for an organization of this size. The leadership personnel are capable, appropriately educated, and executing a quality program. The department is encouraged to continue assigning a high level of priority to training program improvements.

SUPPORT PROGRAMS – LIFE SAFETY SERVICES (FIRE PREVENTION)

An aggressive risk management program, through active fire and life safety services, is a fire department's best opportunity to minimize the losses and human trauma associated with fires and other community risks.

> The National Fire Protection Association recommends a multifaceted, coordinated risk reduction process at the community level to address local risks. This requires engaging all segments of the community, identifying the highest priority risks, and then developing and implementing strategies designed to mitigate the risks.[8]

A fire department needs to review and understand the importance of fire prevention and public education, appreciating its role in the planning process of a community with diversified zoning including residential, commercial, and industrial properties.

The fundamental components of an effective fire prevention program are listed in the following figure, accompanied by the elements needed to address each component.

Figure 54: Fire Prevention Program Components

Fire Prevention Program Components	Elements Needed to Address Program Components
Fire Code Enforcement	Proposed construction and plans review New construction inspections Existing structure/occupancy inspections Internal protection systems design review Storage and handling of hazardous materials
Public Fire and Life Safety Education	Public education Specialized education Juvenile fire setter intervention Prevention information dissemination
Fire Cause Investigation	Fire cause and origin determination Fire death investigation Arson investigation and prosecution

Fire and Life Safety Code Enforcement

The most effective way to combat fires is to prevent them. A strong fire prevention program, based on effective application of relevant codes and ordinances, reduces loss of property, life, and the personal disruption that accompanies a catastrophic fire. The impacts of fire are significant; it is reported that nearly 50 percent of all small businesses that are forced to close due to fire, never re-open. The economic consequence of a fire is estimated to be 2.5 times the actual damage that the fire causes to a structure and its contents.

A fire department should actively promote fire resistive construction, built-in warning and fire suppression systems, and maintenance of fire safe buildings to minimize risk to fire and health challenges. BSFD fire prevention efforts are detailed in the following figures.

[8] Kirtley, Edward, *Fire Protection Handbook*, 20th Edition, 2008, NFPA, Quincy, MA.

Figure 55: Survey Table – Fire Prevention Code Enforcement

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Code Enforcement		
A. Fire codes adopted	International Fire Code adopted	
i) Code used – year/version	2012 version of International Fire Code	
B. Local codes or ordinances adopted, amendments	None	
C. Sprinkler ordinance in place	No, but residential sprinkler requirements applied as a trade-off or voluntary basis as a part of the permit process.	
New Construction Inspections and Involvement		
A. Consulted in proposed new construction	Residential: consulted and comments on access, water supply related considerations. Commercial: Processed by state fire marshal with no formal input by the fire department. Madison County has no building permit process. BSFD completes a "pre-construction safety review" reviewing access and water supply concerns. Recommendations only, no enforcement authority.	Seek to increase the district's involvement and influence on new construction plans review and approval where possible.
B. Perform fire and life safety plan review	Water supply, access considerations only.	
C. Sign-off on new construction	On all commercial and residential land use permits, not building permits, and in Gallatin County only.	
D. Charges for inspections or reviews	County review fees are partially shared with BSFD.	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
General Inspection Program		
A. Perform existing occupancy inspections	Duty crews and the fire chief complete inspections annually	Continue to attain annual completion of commercial existing occupancy inspections.
B. Special risk inspections	Completed by the fire chief	
C. Storage tank inspections	Completed by the state fire marshal as well as the fire chief	
D. Key-box entry program in place	Knox Box system is in place	
E. Hydrant flow records maintained	Maintained by water purveyors	
F. Self-inspection program in place	No	
G. Frequency of inspections	All commercial occupancies are inspected annually	
H. Citation process in place and formally documented/adopted	None. Voluntary compliance is generally obtained.	
i) Court-cited to	N/A	
I. Inspections computerized	Recorded in Firehouse Software inspection module	
J. Number of personnel devoted to program	Line personnel only[9]	
K. Fees for specialty inspections	No	

Key recommendations:

- Increase involvement in the new construction plan review process to the extent feasible.
- Encourage and support the adoption of a building permit process in Madison County.
- Address the need for a dedicated fire marshal position in the future.

Discussion

The district has adopted the 2012 edition of the International Fire Code and has not supplemented the code with additional local code amendments or ordinances. However, despite the code adoption, the district has been able to establish only limited code enforcement ability. The currently adopted fire and life safety code is the most current available, as is appropriate. The district may also want to consider adoption of the Wildland Urban Interface Code given the considerable wildland risk exposure that is present.

Fire code enforcement and administration in the district is the responsibility of the fire chief, in the absence of a fire marshal or other prevention staffing. The 2014 data provided by the district indicates that 90 code-related inspections were completed in the reporting year, inclusive of both new and existing construction reviews.

[9] A Fire Protection Consultant position was in place previously, but was vacated immediately following ESCI's initial field work.

New Construction Plan Review and Inspection

An essential component to a fire prevention program is new construction plan reviews. When a new building is proposed within a fire department's boundaries, the structure is the protection responsibility of that department for the life of that building. If it is not constructed according to code, it may become a problem for the firefighters in the future and a risk to the community. Consequently, the fire department has a fundamental interest in ensuring a structure is properly constructed.

Within the Gallatin County portion of the BSFD service area, new construction code enforcement activities consist of review of building plans for code compliance, which is completed by the state building official. The district's fire chief is provided with plans for residential construction and is able to comment on concerns related to access, water supply, and related areas of concern. For commercial new construction, the chief has no input on the plan review process.

It is not uncommon for a fire district to have limited involvement in the new construction review process when permits are processed at the state level. Even so, there is considerable value to a fire department having the highest degree of participation possible, given their interest in assuring the buildings are safely designed. Further, it needs to be considered that, after the new building is completed, the fire department assumes responsibility for future and ongoing fire and life safety inspections in that structure. Should the district conduct an inspection after construction is completed and find code related deficiencies that need to be addressed, findings may result in unnecessary cost to the building owner. For this reason, ESCI recommends that the district take steps to increase its level of involvement in the new construction plan review process, to the largest extent allowable, and acceptable, to the state building department.

The process in the Madison County portion of the district differs. The county does not have a building permit process, so there is effectively not new construction plan review procedure. However, BSFD is informed of new buildings and completes a "pre-construction safety review," in which the fire chief evaluates access, water supply, and related concerns. He is able to make recommendations only, but has no enforcement authority.

The lack of a building permit process in Madison County limits the fire district's ability to address new construction matters and, in the absence of a more structured system, the safety review represents the best that can be done. ESCI met with Madison County planning staff and discussed the matter. The county indicated openness to considering the establishments of a building permit practice, which warrants consideration by the fire district in encouraging the concept.

As the Big Sky Fire District continues to grow and experience continued new construction activity, the need for a more formal, structured role in residential and commercial plan review process will be an ongoing challenge. Because the new structures will become the fire protection responsibility for the life of the buildings, every effort should be made to increase involvement in the approval process.

However, it is also noted that doing so will significantly impact the administrative workload placed on the fire chief, which will need to be addressed. At the time of ESCI's initial field work, a fire protection consultant position was in place, filled by a contract employee who managed fire and life safety plan

reviews and related concerns. Subsequently, the position was vacated, leaving the work for the fire chief to address. Given the increase in new construction activity that is forecast, combined with the fire chief's current workload, meeting this workload will need to be addressed with a dedicated fire prevention position in the near future, most appropriately configured as a fire marshal.

Existing Occupancy Inspection Program

Property inspections to find and eliminate potential fire hazards are an essential part of the overall fire protection system. These efforts can only be effective when completed by individuals having the proper combination of training and experience, and when completed with appropriate frequency.

The district has a stated goal of inspecting all commercial occupancies on an annual basis, which is appropriate, given the occupancy types found in the jurisdiction. Despite the time and workload related challenges with doing so, they are generally successful. ESCI commends BSFD's commitment in the essential undertaking.

BSFD completed 90 existing occupancy inspections in 2014 (the most recent data provided). To meet the inspection workload, the fire chief conducts higher risk inspections and concerns that are identified in routine inspections. On duty responders are used to complete the balance of the lower risk inspections, a practice that is appropriate and effective. ESCI encourages the district to take steps to assure that response personnel are adequately trained in fire code enforcement to assure that the inspections are completed properly.

Fire and Life Safety Public Education Program

Providing fire safety education to the public to minimize the occurrence of fire and train the community in appropriate actions to take when faced with an emergency is a particularly important fire protection strategy. Fire safety education provides the best chance for minimizing the effects of hostile fire. Public educational outreach in BSFD is discussed in the following figure.

Figure 56: Survey Table – Fire Safety and Public Education

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Fire Safety and Public Education		
A. Public education/information officer in place	No dedicated public education officer. School programs during fire prevention week reaches all grade levels.	Establish a public education officer position.
B. Feedback instrument used	No	
C. Public education in the following areas:		
i) Calling 9-1-1	Yes	
ii) EDITH (exit drills in the home)		
iii) Smoke alarm program	Yes	
iv) Fire safety (heating equipment, chimney, electrical equipment, kitchen/cooking, etc.)	Yes	
v) Injury prevention (falls, burns/scalding, bike helmets, drowning, etc.)	Burn prevention included	
vi) Fire extinguisher use	Yes	
vii) Fire brigade training	N/A	
viii) Elderly care and safety	No	
ix) Curriculum used in schools	NFPA materials	
x) Baby-sitting classes offered	No	
xi) CPR courses, blood pressure checks offered	Provide CPR, first aid, and blood pressure checks.	
D. Publications available to public	Yes	
E. Bilingual information available	No	
F. Annual report distributed to community	No	
G. Juvenile fire setter program offered	No active program	Recommended
H. Wildland interface education offered	Materials available, HOA education outreach, outreach during new construction.	

Key Recommendation:

- Establish a dedicated public education position to enhance current outreach efforts.

Discussion

BSFD has prioritized public education appropriately. Despite the workload involved and staffing limitations, the majority of the fundamental elements listed above are being addressed. There is no single person assigned to the function so it is, instead, tasked to the duty personnel and fire chief as an additional assigned duty. Because of the importance of public education, ESCI recommends the addition of a public education officer. If necessary, the role may be filled by a non-combat volunteer position. BSFD's efforts

to deliver public education include annual programs in the schools, which reach all grade levels, is more than what is found in many similar sized agencies. The district's efforts are commendable.

Fire Cause and Origin Investigation

Accurately determining the cause of a fire, while often not viewed as an element of a fire prevention program, is important. When fires are set intentionally, identification and/or prosecution of the responsible offender is critical if additional fires are to be prevented. Further, if the cause of fires is accidental, it is also of great importance because knowing and understanding how accidental fires start is the most effective way to identify fire prevention and public education requirements.

Figure 57: Survey Table – Fire Investigation

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Fire Investigation		
A. Fire origin and cause determination	Initial cause and origin completed by the fire department. Suspicious referred to county level fire investigation team and state fire marshal, if warranted.	
B. Arson investigation and prosecution	Via county sheriff and county attorney	
i) Arson investigation training provided	Limited content is included in the training program	
C. Person responsible for investigations	Fire chief	
D. Local FIT membership (fire investigation team)	County level FIT team is in place	
E. Process for handling juvenile suspects	Process via county court system	
F. Liaison with law enforcement	Fire chief	
G. Scene control practices in place	Yes	
H. Adequate and appropriate equipment issued/supplied	Yes	
I. Evidence collection process in place	Yes	
J. Reports and records of all incidents made	Yes	
K. File, record, and evidence security	Retained in Firehouse Software and secured	

Fire Investigation

The results of fire investigations not only identify incidences of arson but, if used accordingly, directly reflect public education focus areas, the need for code modifications and changes, and adjustment of fire department deployment and training emphasis. Definition of the community's fire problem can be achieved via effective fire cause determination.

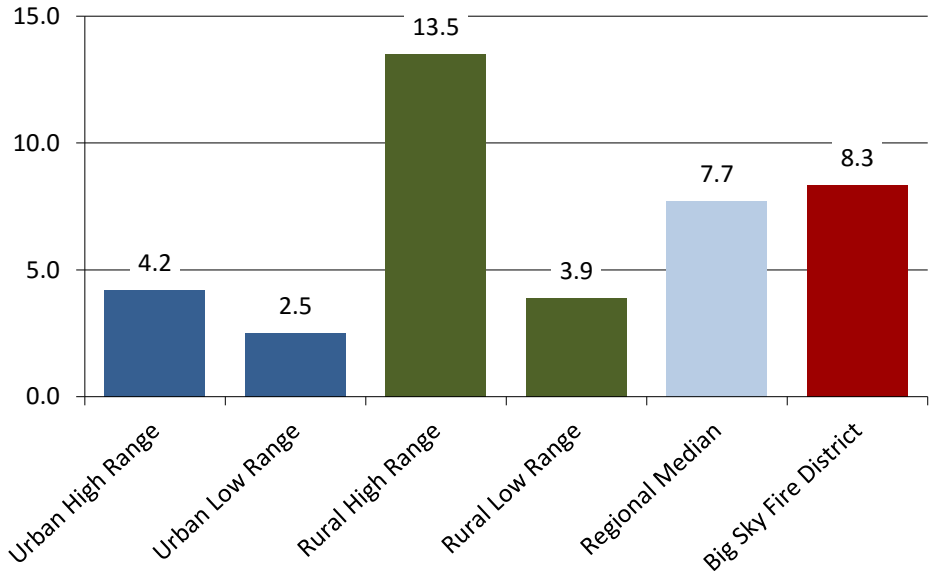
In the district, fire cause and origin determination starts with the fire officer on the scene. At a small incident, it may be a captain that determines whether a fire is accidental or suspicious. If on-scene

personnel view a fire as of suspicious origin, or are unsure about the fire's cause, they will request assistance from the fire chief and, if necessary, resources from a county level Fire Investigation Team (FIT) and/or the state fire marshal are engaged. The district processes accidental fires and any suspicious fires are referred to law enforcement for prosecution. The existing practices are appropriate.

Data collection and processing with regard to fire cause determination is completed appropriately and reported via the National Fire Incident Reporting System (NFIRS) as required at the state level. Greater use of available data regarding how fires are occurring for the targeted development of community educational outreach is recommended.

As a comparative measure of fire prevention and public education effectiveness, ESCI analyzed BSFD's reported fire experience on a per 1,000 population basis, mirrored against national and regional comparators.

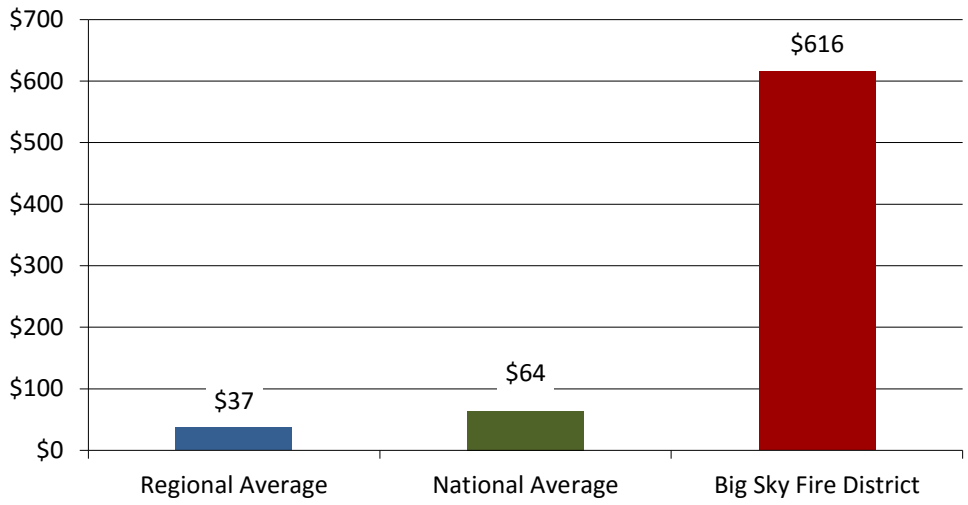
Figure 58: Fires per 1,000 Population



BSFD's fire occurrence falls slightly above regional medians, and within rural data ranges, suggesting effective prevention efforts. The acceptable ratio of fires historically may be a result of effective prevention efforts in the past, which underscores the importance of continued emphasis on the program.

To offer an additional comparison, ESCI calculated dollar losses as a result of fires as compared to regional and national averages on a per-capita basis. The results appear in the following figure.

Figure 59: Comparison of Fire Losses per Capita, 2014



The fire loss chart paints a very different picture in Big Sky. The high value shown above, however, is due to a single, large fire loss that occurred at a home in the winter. The home was inaccessible to fire department responders due to snow and steep roads. While the incident may be viewed as a statistical anomaly, it demonstrates that a single fire loss can be financially significant and also underscores the importance of effective fire code and emergency access enforcement.

Figure 60: Survey Table – Planning and Documentation

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Pre Incident Planning		
A. Pre-plans completed	Yes, for all commercial occupancies.	
B. Frequency of review	Reviewed annually as a part of the existing occupancy inspection process.	
C. Accessibility of plans	Accessible in mobile computers and linked via computer aided dispatch system.	
Statistical Collection and Analysis		
A. Records kept by computer	Yes	
i) Type of operating platform	Windows based	
ii) Software used	Firehouse Software	
B. Information collected in the following areas:		
i) Fire incidents	Yes	
ii) Time of day and day of week	Yes	
iii) Method of alarm (how received)	Yes	
iv) Dispatch times	Yes	
v) Response times	Yes	

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
C. Information analyzed & used for planning	No, due to low frequency.	Periodically review fire cause data to identify patterns that may warrant additional public education focus.
D. Reports made & distributed	Incident reporting only	
E. FTEs used in data collection & analysis	Administrative staff additional assigned duty	

Discussion

BSFD has appropriately identified the importance of pre-incident planning, resulting in plans that have been completed on all identified target hazards. Commendably, they are reviewed regularly and readily accessible to field crews in the fire apparatus. Statistical documentation of emergency incidents is completed appropriately.

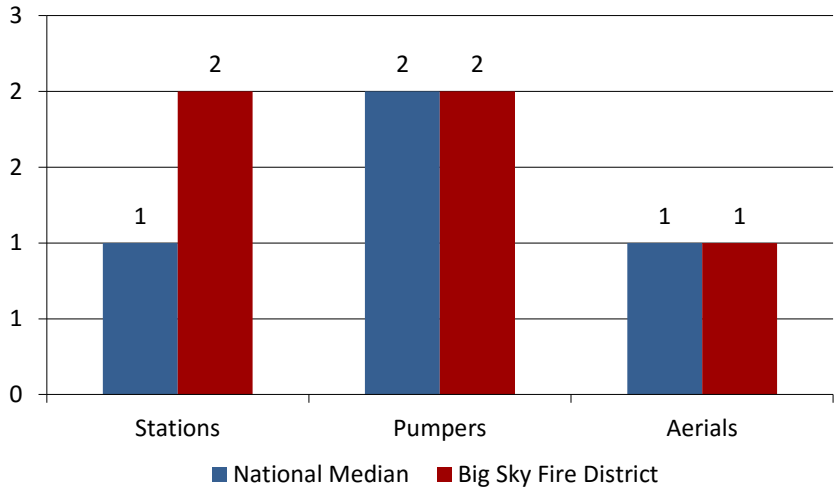
CAPITAL ASSETS AND CAPITAL IMPROVEMENT PROGRAMS

Regardless of an emergency service agency's financial capabilities, if appropriate capital equipment is not available for the use by responders, it is impossible for a fire department to deliver services effectively. Two primary capital assets that are essential to the provision of emergency response are facilities and apparatus (response vehicles).

BSFD maintains a balance of three basic resources needed to carry out its emergency mission: People, equipment, and facilities. Because firefighting is an extremely physical pursuit, the adequacy of personnel resources is a primary concern; but no matter how competent or numerous the firefighters are, the department will fail to execute its mission if it lacks sufficient fire apparatus distributed in an efficient manner.

The department maintains two fire stations and millions of dollars' worth of capital assets. These assets are necessary to provide service and must be maintained and replaced as needed. A comparison of major capital assets, fire stations, pumpers (engines) and aerial trucks are displayed in the following figure, mirrored against national median data.

Figure 61: Capital Assets per 1,000 Population



As stated earlier, relative to national comparators, BSFD compares similarly in regard to number of fire stations and pumpers than similar-sized organization, based on population.

The following discussion reviews the department's facilities and apparatus and provides recommendations as necessary.

Facilities

Fire stations play an integral role in the delivery of emergency services for a number of reasons. A fire station's location will dictate, to a large degree, response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure. Fire stations also need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization, the community served, and the personnel assigned to these stations. It is important to research need based on call volume, response time, types of emergencies, and projected growth prior to making a station placement commitment. The following figures summarize ESCI's non-engineering/non-architectural review of each facility within the BSFD study area.

Figure 62: BSFD Station 1

Station 1 is located in the Meadow Village neighborhood of Big Sky. The station serves as the headquarters for BSFD and houses the district's administrative offices. Career staff is stationed at this facility. The station consists of six single depth, back-in bays, which house two engines, two ambulances, a wildland engine, and a water tender. Command vehicles are parked outside. The facility appears to be well maintained, however available space in the station is maximized.

1. Structure	
A. Construction type	Two story conventional framed structure. Cedar siding with a metal roof.
B. Date Built	1986; remodeled in 2007
C. Square Feet	Approximately 12,500
D. Seismic protection/energy audits	None
E. Auxiliary power	Automatic starting propane fired generator in place.
F. Condition	Good
G. Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	Public areas are ADA compliant. Living quarters are mixed gender appropriate. Apparatus bays are fully occupied and storage is maximized.
3. Facilities Available	
A. Exercise/workout	Well-equipped exercise area is available.
B. Kitchen/dormitory	A good sized kitchen and day room is present. Five separate sleeping areas with storage.
C. Lockers/showers	Separate shower room and locker area.
D. Training/meetings	There is a large training room upstairs. Six offices and three working areas for shift use available. There is a reception area and a small conference room in the office area.
E. Washer/dryer	Washer/dryer is available for on-duty personnel. Extractor for PPE cleaning and decontamination.
4. Protection Systems	
A. Sprinkler system	The facility is protected with a sprinkler system with a flow alarm.
B. Smoke detection	The station is fully protected by a central smoke detection system.
C. Security	Building is secured with key pad security locks.
D. Apparatus exhaust system	Point of use exhaust system in place.

Figure 63: BSFD Station 2

BSFD Station 2 is located on Lone Mountain Trail Road in Madison County. The station is approximately six miles from Station 1. The facility consists of three back-in, double bays, housing the BSFD aerial apparatus (quint), a water tender, an ambulance, and a wildland engine. The department's breathing air trailer is also placed at Station 2. No personnel are stationed at this facility and there are no living quarters. The station is in good condition overall.

1. Structure	
A. Construction type	Single story masonry block and conventional frame structure.
B. Date Built	1997
C. Square Feet	Approximately 4,800 square feet
D. Seismic protection/energy audits	None
E. Auxiliary power	Automatic starting, propane fired, generator in place.
F. Condition	Good
G. Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	Public areas are ADA compliant. There are no living quarters at this station. Some storage is available in the apparatus bay.
3. Facilities Available	
A. Exercise/workout	None
B. Kitchen/dormitory	A kitchen area and day room is present. No living quarters or dormitory area.
C. Lockers/showers	Two individual restrooms with a separate shower.
D. Training/meetings	There is large open room that serves as a meeting/training room. There is a single office space.
E. Washer/dryer	None
4. Protection Systems	
A. Sprinkler system	The facility is protected by a sprinkler system with a flow alarm.
B. Smoke detection	Residential smoke detectors are installed.
C. Security	Building is secured with key pad security locks.
D. Apparatus exhaust system	Point of use exhaust system in place.

Discussion

In general, the Big Sky Fire District facilities are in good physical condition and they are well maintained. The BSFD stations are well located to serve the current needs of the district. Station 1 services the commercial and residential properties in the Big Sky Meadow area; and the properties within the district along Highway 191. As discussed, the BSFD career staff and administrative offices are housed at

Station 1. ESCI notes that the station was not originally designed for 24-hour personnel. Living and sleeping areas have been added to the second floor area, these areas are not compliant with current life safety code. BSFD has identified this deficiency and plans are being developed to address this issue.

Station 2 is located approximately six miles west of Station 1 and serves the Big Sky Resort and Lone Mountain area. There is approximately 1,100 feet of elevation difference between the two stations. The station was designed for apparatus storage and a meeting place for paid on call personnel. However, as discussed elsewhere in this report, the availability of paid on call personnel is limited. This presents a challenge for BSFD emergency operations, especially when there is a need for the department's aerial apparatus; which is located at Station 2. ESCI provides further discussion concerning stations and apparatus in the Future Options section of this report.

Apparatus

The district maintains a sizeable fleet of response vehicles that are generally in good condition and clearly well maintained. An inventory of fire apparatus, configuration, and condition is provided below.

Figure 64: Big Sky Fire Department Major Apparatus

Station 1 – Meadow Village							
Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 12-2	Structure Engine	2005	Pierce/ Arrow XT	Good	2	1000 GPM	1800 GAL
Engine 12-1	Structure Engine	1997	Pierce/Dash	Good	2	1250 GPM	750 GAL
Tender 12-2	Water Tender	2002	General/ Freightliner	Good	1	1250 GPM	2500 GAL
Brush 12	Wildland Engine		Hypro/ Dodge	Good	2	150 GPM	250 GAL
Ambulance 12	ALS Ambulance	2008	Medtec/ Ford	Good	2	N/A	N/A
Ambulance 12-2	ALS Ambulance	2012	Medtec/ Ford	Good	2	N/A	N/A
Utility 12-4	Utility SUV	2008	Chevrolet Suburban	Good	1	N/A	N/A
Command 1201	Fire Chief's SUV	2008	Chevrolet Suburban	Good	1	N/A	N/A

Station 2 – Mountain Village							
Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Ladder 12	85' Tower Ladder	2001	Pierce	Good	2	2000 GPM	400 GAL
Tender 12-1	Water Tender	1997	Pierce	Good	1	500 GPM	1800 GAL
Brush 12-5	Wildland Engine	2014	Dodge	Good	2	150 GPM	250 GAL
Ambulance 12-1	ALS Ambulance	1995	Lifeline/ Ford	Good	2	N/A	N/A
Air 12	Air Cascade Trailer	2011	N/A	Good	N/A	N/A	N/A

Discussion

ESCI observed the BSFD vehicles to be well maintained and in good condition generally. As with the Big Sky fire stations, ESCI found the appearance and general condition of the department's apparatus to be very good, reflecting the department's pride in ownership.

Apparatus Replacement Planning

In the following figure, ESCI reviews the key elements that are needed to assure a fire department adequately meets it need for capital replacement planning.

Figure 65: Survey Table – Capital Assets and Capital Improvement Planning

Survey Components	Big Sky Fire Department Observations	Comments and Recommendations
Fire Stations/Structures		
A. Replacement Plan maintained	No specific plan for structures.	
i) Period of plan (from – to)	As needed only	
ii) Funding mechanism	Not defined	
B. Station construction or improvement plans		
i) 2015	None planned	
ii) 2016	None planned	
iii) 2017	None planned	
iv) 2018	None planned	
Apparatus		
A. Replacement Plan maintained	Yes-plan includes equipment and turnouts	
i) Period of plan (from – to)	2012 through 2030	
ii) Funding mechanism	Operating Budget and Resort Tax	
B. Purchase or refurbishment schedule		
i) 2015, planned	2 cardiac monitors (completed) Turnouts	
ii) 2016, planned	Replace chief's vehicle, Ambulance 12-1	
iii) 2017, planned	None planned	
Support Equipment		
A. Replacement Plan maintained	None	
i) Period of plan (from – to)	N/A	
ii) Funding mechanism	N/A	
Methods of Financing		
A. General revenue	As available	
B. Reserve fund(s)	None	
C. Revenue fund(s)	Resort Tax funding	
D. General obligation bond	Not used	
E. Lease-Purchase	Not used	
F. Grants or gifting	As available	
G. Special fees	Not used	

Discussion

In general terms, BSFD fire apparatus is in good condition. Even so, due to the considerable cost and importance of fire apparatus, management, maintenance, and replacement planning is essential. Vehicles have readily predictable service lives and replacement costs that can be easily forecast. For this reason an apparatus replacement schedule and funding mechanism is important.

However, Big Sky's apparatus replacement planning differs from most fire departments. Rather than depending on property or sales tax revenue, reserve funds, or grant funding, a significant portion of BSFD's apparatus needs are met by way of the resource provided by the Big Sky Resort Tax.

The district has established a capital replacement schedule that identifies anticipated lifespan and projected costs for vehicles and equipment including turnout gear, self-contained breathing apparatus,

and cardiac monitors. The schedule is well thought out and, commendably, provides a higher level of planning than what is found in many fire departments. In the Future Delivery Systems Models section of this report, ESCI offers an example of a typical apparatus replacement schedule for use as an internal comparison to the district's existing efforts.

Future System Demand Projections

Future service demand is largely dependent on changes over time to population, economics, and the local infrastructure. Data from the United States Census Bureau data, State of Montana economic data, planning documents from Gallatin and Madison County, information from the 2014 Big Sky Housing Development Plan (*Economic & Planning Systems, Inc.* prepared for the Big Sky Chamber of Commerce), and information from Big Sky area developers gathered in June 2015 is utilized in this section of the report.

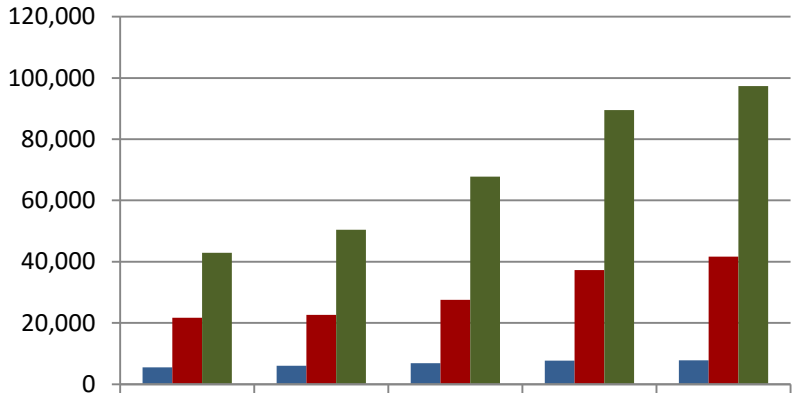
POPULATION GROWTH PROJECTIONS

The Big Sky Fire District's primary service area is the unincorporated resort community of Big Sky. Like other resort communities, Big Sky is comprised of a relatively low number of permanent residents and a high number of vacation homes and day visitors during the tourism season. It is still useful to examine population growth in the area.

Population History

The following figure demonstrates historical population change in Madison County, Bozeman, and Gallatin County from 1980 to 2014.

Figure 66: Historical Population Growth, 1980-2014 (US Census Bureau)

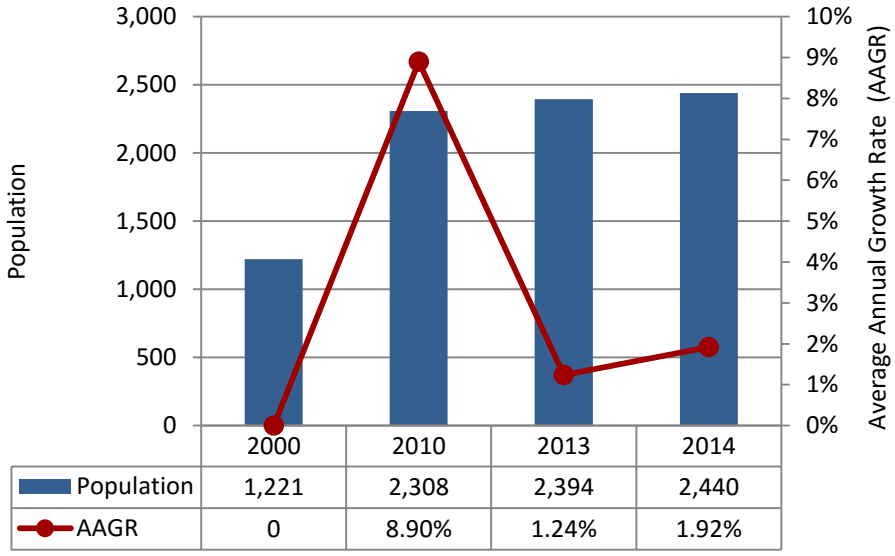


	1980	1990	2000	2010	2014
Madison County	5,448	5,989	6,851	7,691	7,820
Bozeman	21,645	22,660	27,509	37,280	41,660
Gallatin County	42,865	50,463	67,831	89,513	97,308

The BSFD service area includes portions of Madison and Gallatin County. Bozeman is the closest metropolitan center to Big Sky; and approximately 83 percent of the daily workforce in Big Sky commutes from the Bozeman area. All three of the jurisdictions displayed in the preceding figure experienced positive population growth over the last 34 years. The Big Sky area became a census designated place

(CDP) between the 1990 and 2000 decennial census dates. The Big Sky CDP includes most but not all of the Big Sky Fire District. There are no census records available for the Big Sky CDP prior to 2000. The following figure displays the census data available for the Big Sky CDP.

Figure 67: Big Sky CDP Population Growth, 2000-2014 (US Census Bureau)



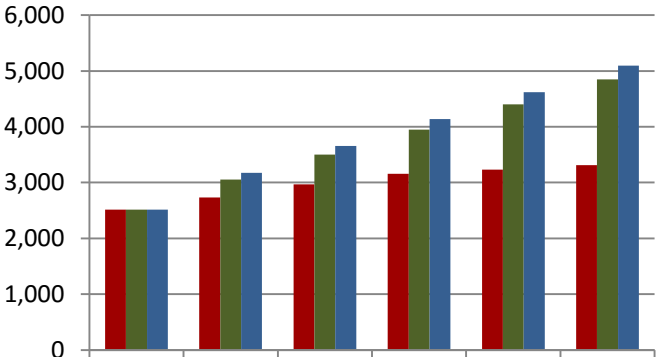
	2000	2010	2013	2014
Population	1,221	2,308	2,394	2,440
AAGR	0	8.90%	1.24%	1.92%

The resident population in the Big Sky area doubled between 2000 and 2014. The average annual growth rate (AAGR) was highest between 2000 and 2010. While population growth has slowed since 2010, growth has remained positive. The overall AAGR during the 14 years displayed is slightly over seven percent annually.

Population Projections

There is no Census Bureau or local data projecting future population growth for the Big Sky CDP. Utilizing the data available since 2000 and anecdotal information gathered from various documents; ESCI provides three possible scenarios for future population growth in the following figure.

Figure 68: BSFD Population Projections



	2015	2020	2025	2030	2035	2040
Gallatin County Projection	2,518	2,731	2,966	3,155	3,230	3,312
Forecast Model	2,518	3,054	3,503	3,951	4,399	4,847
Big Sky CDP Historical Growth	2,518	3,176	3,656	4,137	4,617	5,097

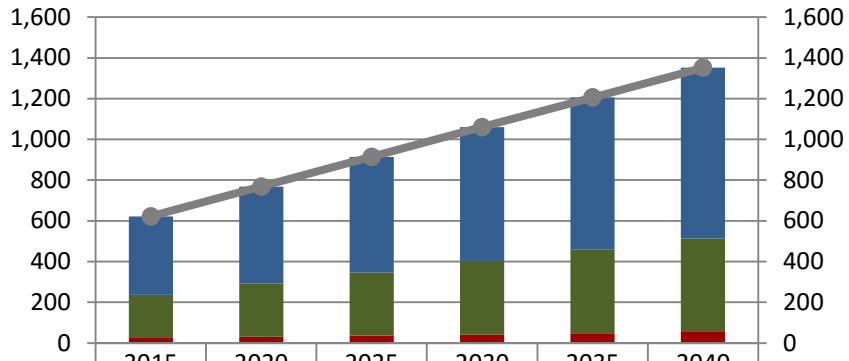
The first projection is based on the Montana Department of Commerce population projection for Gallatin County; the second is based on a mathematical forecast model; and the third is based on the historical annual growth rate in the Big Sky CDP from 2000 to 2014. These population projections show the resident population of Big Sky growing to somewhere between approximately 3,300 to nearly 5,100 by 2040.

SERVICE DEMAND PROJECTIONS

In evaluating the deployment of facilities, resources, and staffing, it is imperative to consider potential changes, such as population growth, that can directly affect workload and the effectiveness of the organization. Changes in service demand can require changes and adjustments in the deployment of staff and resources in order to maintain acceptable levels of performance.

As discussed earlier in this report, call volume in the BSFD service area far exceeds what would be expected based on national benchmarks and the current residential population in the service area. BSFD leaders are well aware of the affect that vacation homes, tourism, and the transient work force have on service demand. BSFD experienced an approximately 26 percent increase in service demand between 2010 and 2014. In the following figure ESCI uses a forecast model based on historical service demand (2010-2014) to provide a projection of BSFD service demand through 2040. Future demand is summarized by incident category.

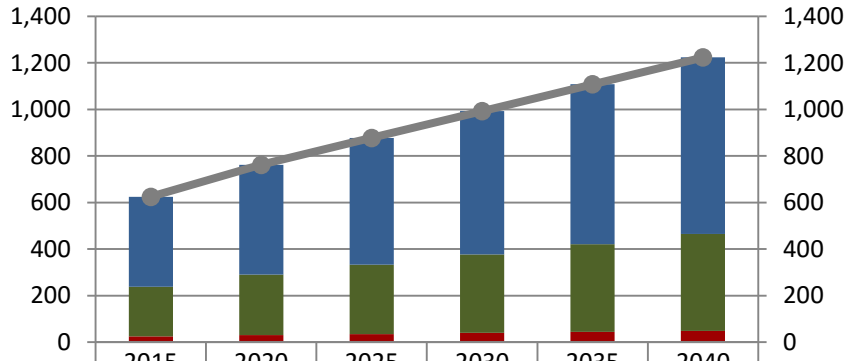
Figure 69: BSFD Forecast Model Projected Service Demand, 2015-2040



	2015	2020	2025	2030	2035	2040
EMS	386	476	567	657	748	838
Other	211	261	311	360	410	460
Fires	25	31	37	42	48	54
Overall	622	768	914	1,060	1,206	1,352

This model demonstrates overall service demand more than doubling by 2040. The next figure displays another picture of possible future service demand based on the historical population change in the Big Sky CDP. ESCI uses the Big Sky CDP historical population growth projection from Figure 68 and applies a per capita incident rate derived from the 2010-2014 historical incident data, to arrive at the results displayed in the following figure.

Figure 70: BSFD Historical Population Growth Model Projected Service Demand, 2015-2040



	2015	2020	2025	2030	2035	2040
EMS	388	473	544	616	687	758
Other	213	259	298	338	377	416
Fires	25	30	35	40	44	49
Overall	625	762	878	993	1,108	1,223

Figure 70 illustrates a similar rate of growth to the previous model. This demonstrates that there is some correlation between the resident population of the service area and service demand. In both of the preceding figures, EMS incidents represent the majority of service demand, while actual fires are the least frequent incident category.

ESCI believes that several factors point to a period of increased, rapid growth in the BSFD service area. These include:

- A consolidation of resort property ownership and property available for development. Information obtained in during ESCI's site visit (June 2015) reveals plans for extensive development of currently undeveloped properties and an ample supply of property.
- Increased emphasis on year round activity. This is a state wide and local goal according to the Montana Office of Tourism. Tourism and non-resident visits to Montana have increased every year since 2010.
- Recent capital projects such as the new high school and the Big Sky Medical Center indicate increased growth and possibly a more permanent population base. The Big Sky Housing Development Plan indicates a concern over workforce housing and an interest in developing year round housing for a less transient workforce.
- Recent growth and increased employment opportunities in Bozeman will most likely increase recreational activity in the Big Sky area.

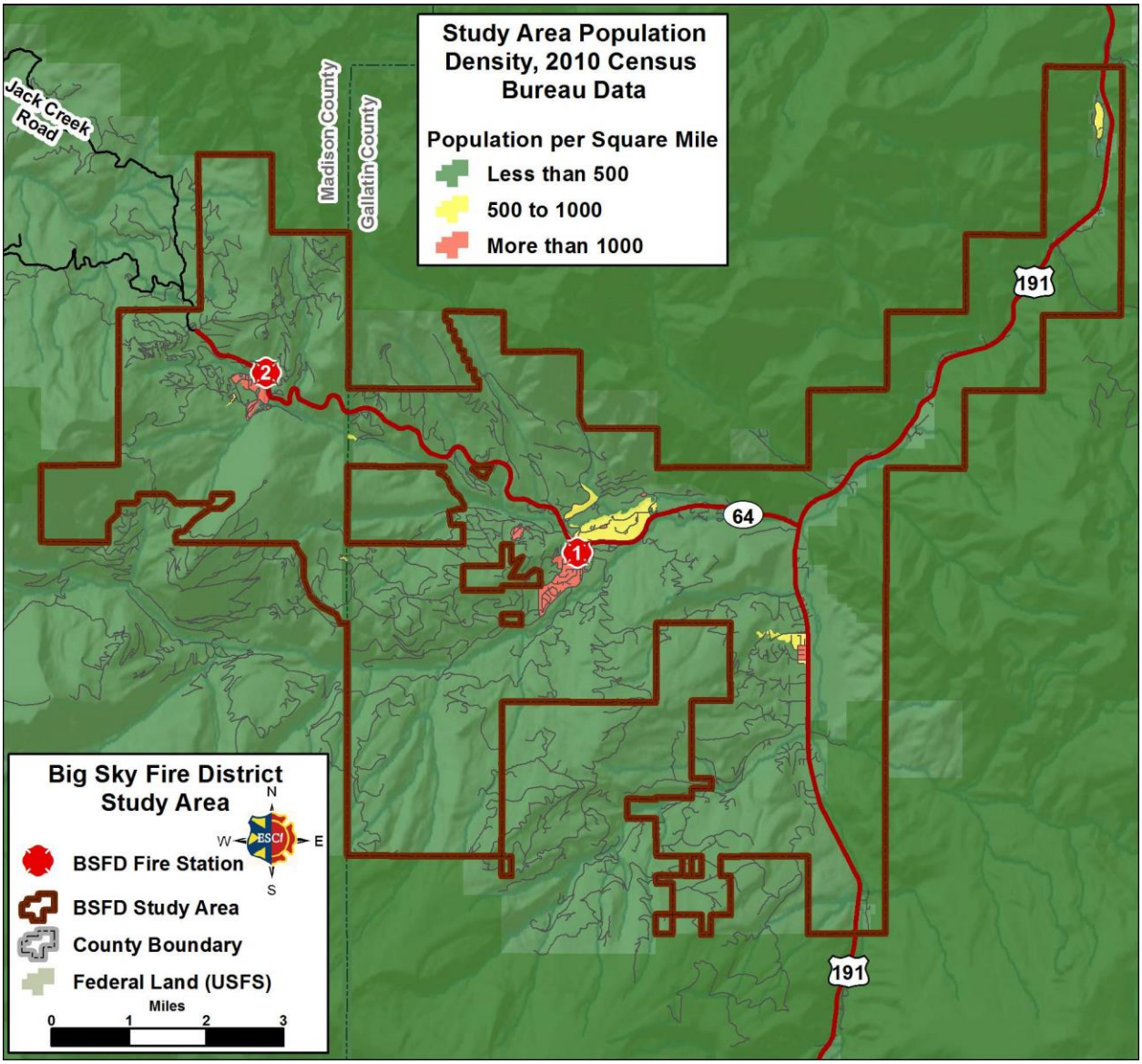
These factors and others, point to a community that may be transitioning from a destination resort area to a diversified year round resort community. This will undoubtedly affect the nature and frequency of service demand in the BSFD service area.

There is no doubt that BSFD service demand will fluctuate over the next 25 years. ESCI regards the future service demand projections presented as base line values. Service demand in the future may well exceed the projections at some point during over the next 25 years. Planning should begin now to maintain the resources necessary to meet the current and future demand for BSFD services.

COMMUNITY RISK ANALYSIS

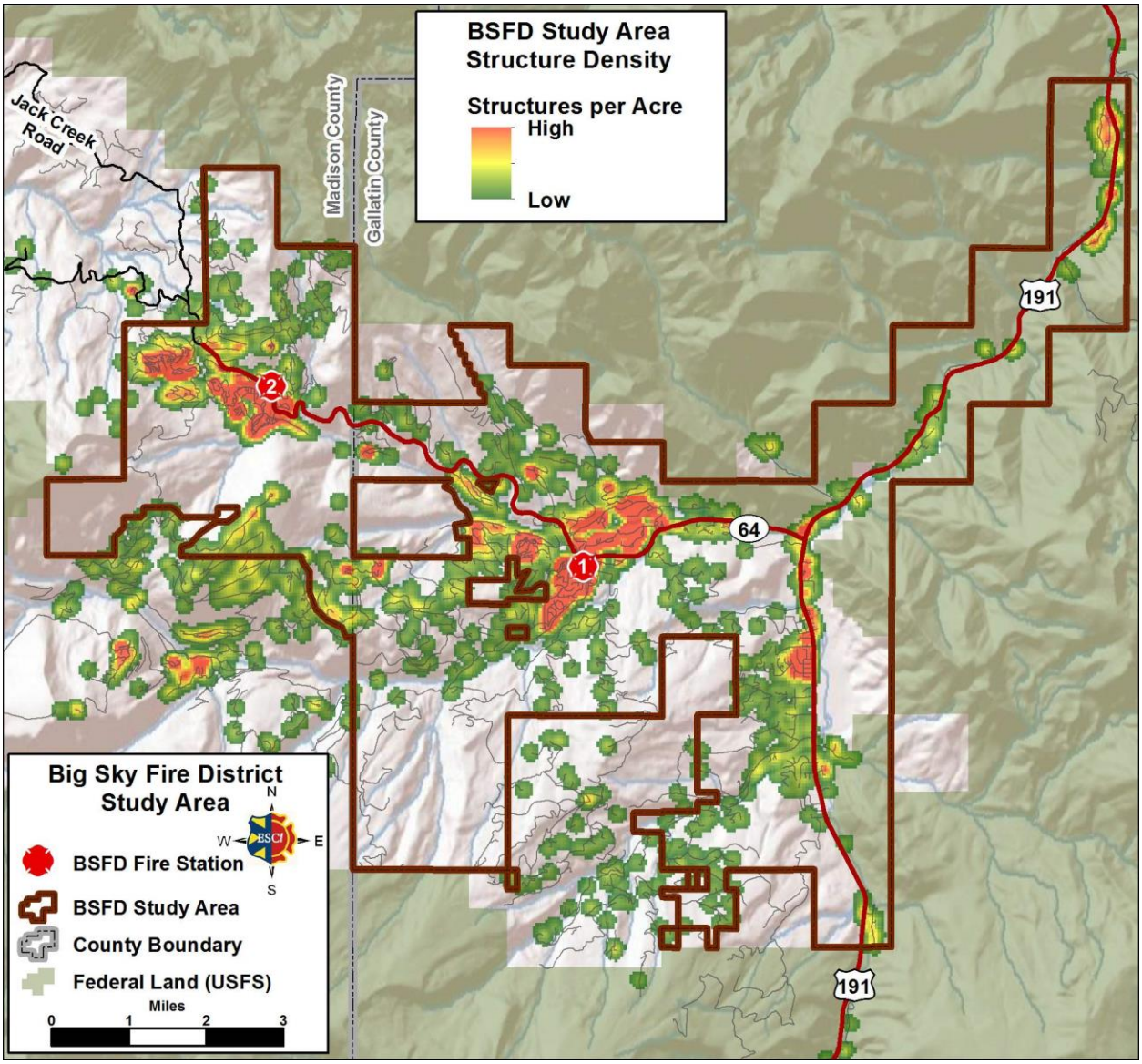
Community risk is typically assessed based on a number of factors; the service area population and population density, the demographics of the population served, local land use and development, and the geography and natural risks present within the service area. These factors affect the number and type of resources (both personnel and apparatus) necessary to mitigate an emergency. ESCI begins the risk analysis by examining the population density map from the service delivery analysis.

Figure 71: BSFD Study Area Population Density, 2010 Census data



In most fire jurisdictions, the analysis of census data and population density provides agencies with a method to predict service demand and risk based on human activity. This is not the case in the BSFD service area. Small portions of the district demonstrate higher population density. However, the census data fails to capture the non-resident population and the density of structures within the BSFD service area. The following figure uses Gallatin County GIS data (includes Madison County) to demonstrate the relative density of structures in the service area.

Figure 72: BSFD Study Area Structure Density



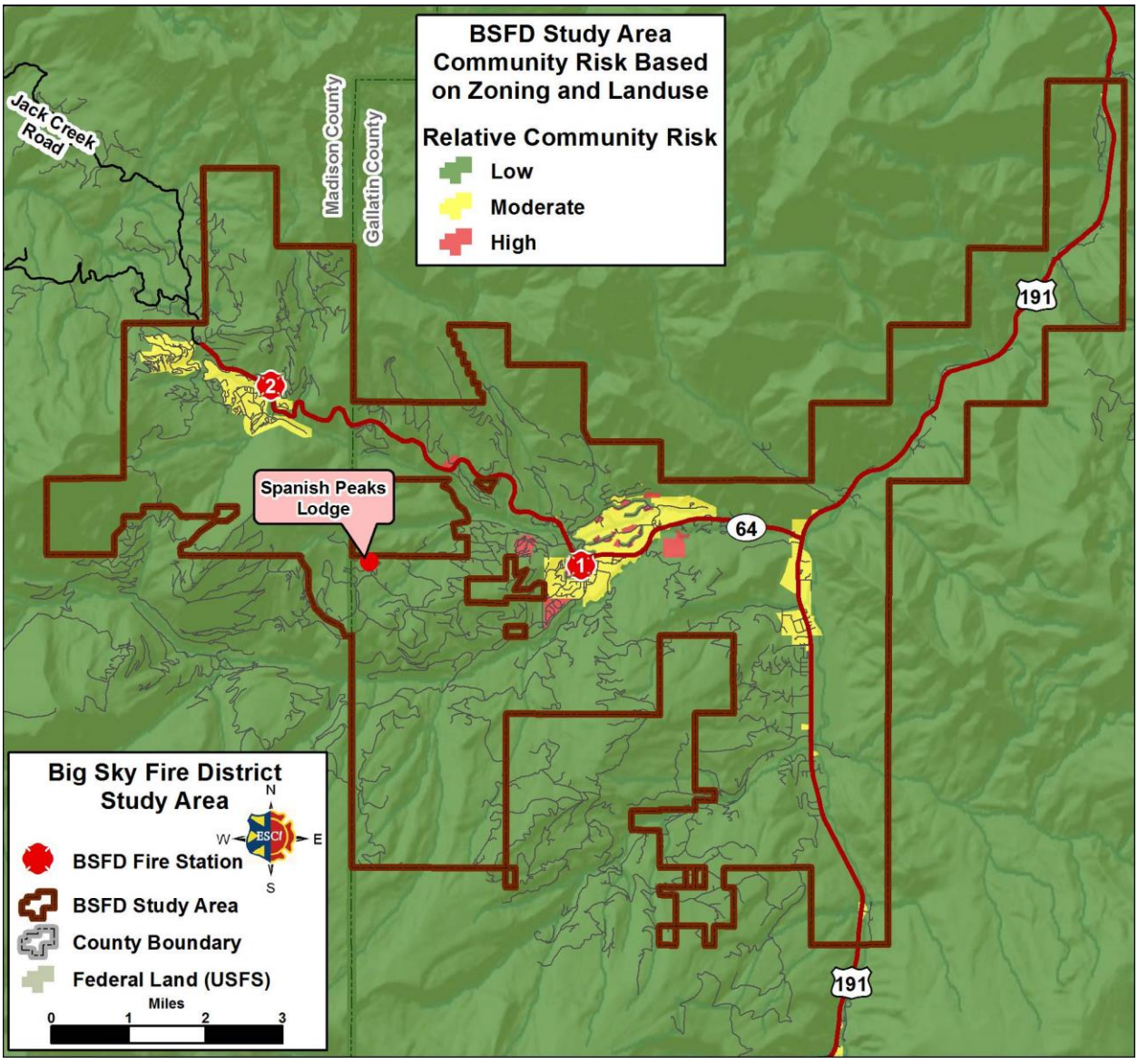
The greatest density of structures occurs in clusters, primarily in Meadow Village, the Mountain Village/Big Sky Resort area, and along Highway 191. Comparing this figure to the Incident Density map in the Service Delivery analysis demonstrates that there is a correlation between structure density (and the associated human activity) and service demand. Examination of the GIS data reveals that approximately 84 percent of the structures in the study area are residential and eight percent are commercial properties. The remaining structures include government buildings, schools and churches, recreational buildings, and other types of structures. Approximately 45 percent of the residential structures are classified as condominiums or multi-family structures.

ESCI uses GIS software and zoning classifications for Madison County (Big Sky Zoning District) and land use data for Madison County tax lots to examine current land use in the study area. Risk is assigned to the zoning classifications to present a view of relative community risk.

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

The following figure displays community risk within the BSFD service area using the criteria listed above.

Figure 73: BSFD Community Risk

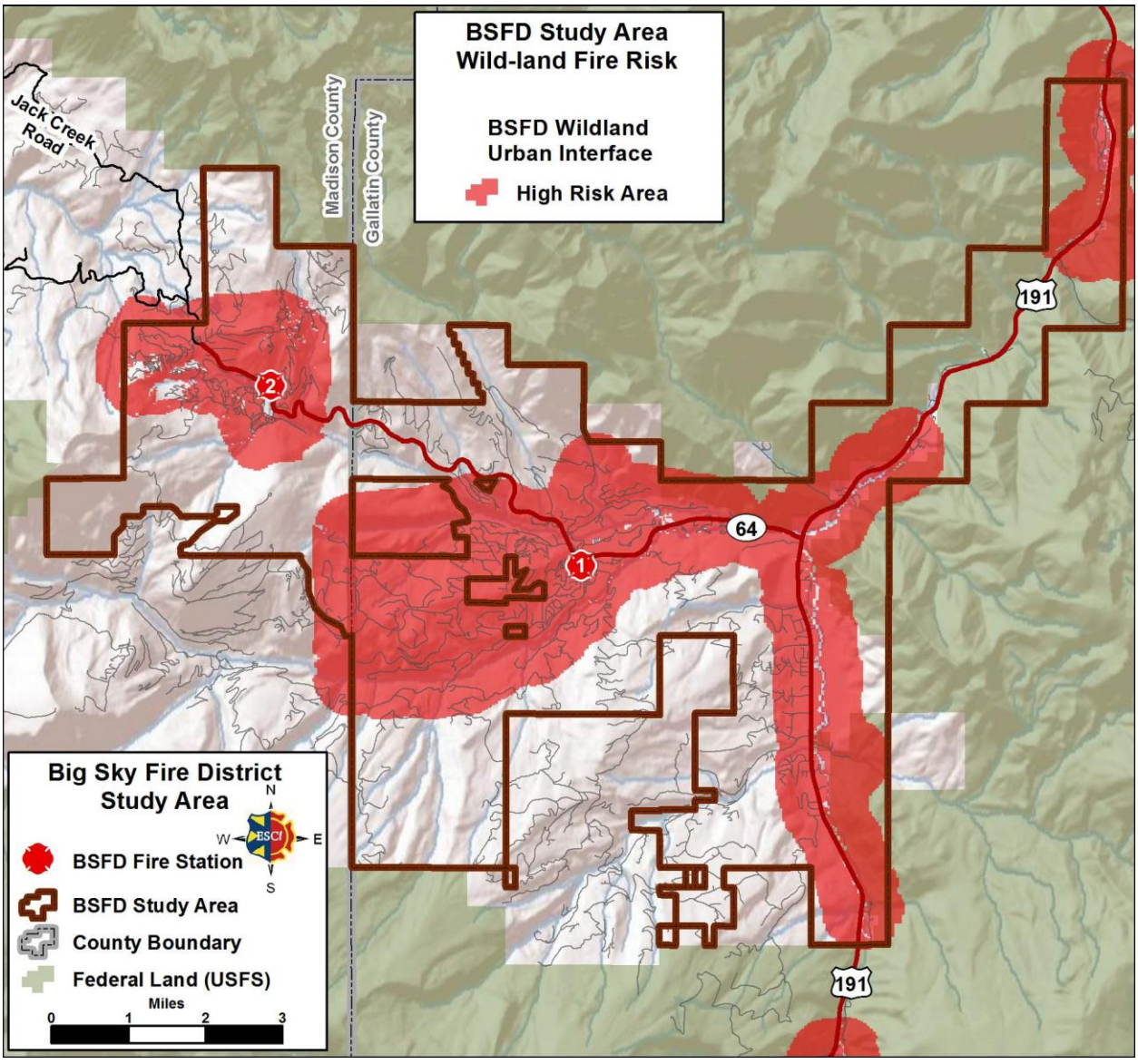


The BSFD service area is mix of low, moderate, and high risk properties based on zoning and land use. Low risk areas are primarily single family dwellings and open land. The moderate risk areas are comprised of predominately medium density housing and condominiums and commercial areas. The moderate risk areas along Highway 191 are primarily commercial properties, with some light industrial zoning. The areas

identified as high risk are zoned as high density residential areas. Note that ESCI has identified the location of the proposed Spanish Peaks Lodge as a high risk property. Current plans call for a 500,000 square foot multi-story mixed use structure. This represents a maximum level of risk; which requires the aggressive application of fire and life safety codes and preplanning, to effectively mitigate the risk. ESCI notes that the BSFD fire chief works proactively with developers and planners (both Gallatin and Madison County) to lessen risk in the district through code enforcement, land use planning, and fire prevention methods. ESCI commends these efforts; and encourages BSFD leaders to support these practices which reduce risk within the district.

Like many fire jurisdictions in the Montana and the western United States; wild-land fire risk is a factor in the BSFD service area. The following figure uses federal and Montana Department of Natural Resources and Conservation (DNRC) GIS data to examine wild-land fire risk in the Big Sky Area.

Figure 74: BSFD Study Area Wild-land Fire Risk



The data displayed in this figure models the probability of a fire occurring, the expected fire behavior, and the relative risk to the community for catastrophic loss from wildfire. While the entire BSFD service area could be considered a wild-land urban interface area; the portions of the service area classified as "High Risk Area" represent the highest likelihood of a wild-land fire impacting the community. Both Gallatin and Madison counties have adopted Community Wildfire Protection Plans (CWPP) as part of the county growth policies. BSFD works cooperatively with state and federal wild-land fire agencies (Montana DNRC, Gallatin National Forest, and Beaverhead-Deerlodge National Forest), both in an initial attack capacity and wild-land fire prevention and education.

Geographic and Other Risk Factors

The geography and location of the Big Sky area affects all the components of community risk in the BSFD service area to some degree. Much of the service area is located in an alpine valley and the surrounding hillsides, along the Middle Fork of the Gallatin River. There is an approximately 1,100 foot elevation change between BSFD Station 1 and Station 2. This, along with winter time road conditions can delay emergency response performance. The mountainous terrain in the area and the curvilinear nature of the road network creates travel time and access issues throughout the BSFD service area. Additionally, the area experiences occasional localized flooding along the Gallatin River and its tributaries. Highway 191 along the eastern edge of the district creates significant demand for BSFD fire and EMS services due to the activity on this state highway. Highway 191 also represents the only main transportation route into or out of the area. A significant event such as a wild fire, flooding, landslide, or even a motor vehicle accident could severely affect the fire department's ability to bring additional emergency resources to the area.

Future Community Risk

As discussed in the Future Service Demand projections, the Big Sky area appears to be entering a period of increased growth and development. Much of the new development will occur inside the current boundaries of the fire district. However, considerable development is slated for the Moonlight Basin and Jack Creek area west of the current BSFD boundary. The 2013 update to the Madison County Growth Policy projects a 150 percent increase in developed lots in the Big Sky area by 2030. State and local planning regulations require that new development in wild-land areas be provided with structural fire protection. Options for home owners include forming a new fire district, annexing into an existing fire district, or contracting for services with an existing fire district. ESCI encourages BSFD to continue working with developers, land owners, and local government officials to monitor development and insure that adequate infrastructure is in place in areas that may become part of the Big Sky service area in the future.

Summary

The purpose of this community risk assessment is to provide an overview of the nature of community risk in the BSFD service area. ESCI recommends that BSFD develop a Community Risk Assessment Plan that includes the following components:

- Identification of risks
- Categorization of risks (Low, Moderate, High)
- Development of strategies and tactics to mitigate risks
- Determination of the appropriate level of fire department resources (apparatus and personnel)
- Monitoring, evaluation, and modification of the Community Risk Plan

Future Delivery System Models

To effectively identify and develop future system demand models and long range strategies, BSFD will need to establish a definition and understanding of its current response capabilities and how they align with both their risk exposure and their community's expectations. Due to geography, demographics, and lack of substantial mutual aid assistance service delivery in the Big Sky area is very unique, differing substantially from what is found in most fire and EMS systems of similar size.

To make good future decisions, the organization must first identify the performance targets that it is striving to achieve. From there, it will need to establish systems by which it can measure actual performance, relative to the identified targets, accommodating decision making on future changes. To that end, the following discussion of development of response standards and targets is offered.

DEVELOPMENT OF RESPONSE STANDARDS AND TARGETS

ESCI emphasizes the importance of the establishment of response performance metrics by the BSFD. Once established, these standards launch measurable goals for service delivery, which then form the foundation upon which planning for deployment of resources is based. Absent these processes, the organization is not able to determine where it needs to go, nor is it able to know when it is achieving its goals and meeting the community's expectations.

Response standards have to be developed by the individual community, based on the expectations of elected officials and citizens balanced against the financial aspect of what a community is able and willing to afford. For this reason, ESCI cannot establish these standards for BSFD but rather will provide guidance and examples of what we consider to be acceptable metrics. In the following figure, ESCI offers sample statements that may be representative of community expectations for various common types of emergency services provided by the district.

Figure 75: Community Expectations-Response Objectives[10]

Service	Community Outcome Expectations
Fire Suppression	For all fire incidents, responders shall arrive in a timely manner with sufficient resources to stop the escalation of the fire and keep the fire to the area of involvement. An effective concentration of resources shall arrive within time to be capable of containing the fire, rescuing at-risk victims, and performing salvage operations, while providing for the safety of the responders and general public.
Wild-land Fire Suppression	For all wildfire incidents, the district shall arrive in a timely manner with sufficient resources to first protect homes and other buildings, then to begin controlling the rate of fire spread.
Emergency Medical Services	For emergency medical incidents, the district shall arrive in a timely manner with sufficient trained and equipped personnel to provide medical services that will stabilize the situation, provide care and support to the victim, and reduce, reverse, or eliminate the conditions that have caused the emergency while providing for the safety of the responders. When warranted, timely transportation of victim(s) to appropriate medical facilities shall be accomplished in an effective and efficient manner.
Hazardous Materials Response	For all hazardous materials incidents, responders shall arrive in a timely manner with sufficient resources to stabilize the situation and establish an action plan for the successful conclusion of the incident. For incidents requiring more extensive technician-level functions, personnel will call for and support additional specially trained and organized regional resources to perform the necessary containment, stabilization, and/or clean-up functions while providing for the safety and security of the responders, public, and the environment.
Vehicle Extrication	For vehicle accidents where rescue of victims is required, responders shall arrive in a timely manner with sufficient resources to stabilize the situation and extricate the victim(s) from the emergency situation without causing further harm to the victim, responders, public, and the environment.
High-Angle Rescue	For all high-angle rescue incidents, the district shall arrive in a timely manner with sufficient resources to stabilize the situation and establish an action plan for the successful conclusion of the incident. Working in conjunction with additional specially trained and organized regional resources, the district will perform the necessary rescue functions while providing for the safety and security of the responders, public, and the environment.
Swift-Water Rescue	For all swift-water rescue incidents, responders shall arrive in a timely manner with sufficient resources to stabilize the situation and establish an action plan for the successful conclusion of the incident. Working in conjunction with additional specially trained and organized regional resources, the district will perform the necessary rescue functions while providing for the safety and security of the responders, public, and the environment.

[10] Note: Based on examples provided in the publication Commission on Fire Accreditation International, Inc. (now Center for Public Safety Excellence), *Creating and Evaluating Standards of Response Coverage for Fire Departments*, 5th edition.

Note that the response objectives presented in Figure 75 do not address specific staffing or response time performance. Defining and identifying the critical tasks, the staff, and the response time necessary to meet the response goals is something that should be accomplished by the fire jurisdiction.

Critical Tasks, Risk, and Staffing Performance

The ultimate goal of any emergency service delivery system is to provide sufficient resources (personnel, apparatus, and equipment) to the scene of an emergency in time to take effective action to minimize the impacts of the emergency. This need applies to fires, medical emergencies, and any other emergency situation to which the fire department responds.

As the actual or potential risk increases for any particular emergency, the need for higher numbers of personnel and apparatus also increases. With each type of incident and corresponding risk, specific critical tasks need to be accomplished. The following figures are provided as an example of critical tasking.

Figure 76: Example Structure Fire-Interior Attack Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Water Supply[11]	1
Primary Attack Line	2
Back-Up Line	2
Rapid Intervention Team (RIT)	2
Ventilation	2
Search and Rescue	2
Utilities/Exposures	2
Total	**15**

[11] Additional personnel required for rural water supply operations using water tenders for water supply.

Figure 77: Example Non Structure Fire/Structure Fire-Exterior Attack Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Total	**4**

Figure 78: Example Hazardous Materials Incident Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Back-Up Line	2
Support Personnel	7
Total	**13**

Figure 79: Example Motor Vehicle Collision with Entrapment Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Extrication	3
Patient Care	2
Total	**9**

Figure 80: Example Emergency Medical Incident Critical Tasking

Task	Personnel
Ambulance Transport	2
First Responder	4
Total	**6**

Figure 81: Example EMS Incident-Cardiac Arrest Incident Critical Tasking

Task	Personnel
Direct Patient Care (Command)	1
CPR	2
ALS Patient Care	2
Transport (Driver)	1
Total	**6**

Again, these critical tasks are presented as examples. ESCI recommends BSFD conduct field validation exercises with its crews to verify the critical task analyses provided. After field validation is complete, the department may find that the critical tasking can be adjusted appropriately upward or downward.

Critical tasks are those activities that must be conducted in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, or initiate patient care. BSFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner.

Response Time Performance Objectives

Once BSFD has established response objectives and identified the critical tasks and number of personnel necessary to achieve those critical tasks; the department can begin the process of defining emergency response time performance objectives.

The process of setting response time performance objectives will include two primary questions:

- What are the expectations of the community and elected officials with regard to initial response times of the fire department to an emergency incident? What is the public's perception of quality emergency services where response time is concerned?
- What response time performance would be reasonable and effective in containing fire, stopping the loss, and saving lives when considering the common types of incidents and fire risks faced by BSFD.

During ESCI's site visit in June 2015, internal and external BSFD stakeholders were interviewed and an open public meeting was held, surveying the services provided by the district. In general, findings were that BSFD is meeting the expectations of the community. The findings are provided in further detail in Appendix B of this report.

National consensus standards such as NFPA 1710 and NFPA 1720 contain response time goals for career fire jurisdictions (NFPA 1710) and combination/volunteer fire jurisdictions (NFPA 1720).[12] The NFPA 1710 standard is primarily suited for heavily developed and densely populated urban areas. The NFPA 1720

[12] See: *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* (National Fire Protection Association 2010) and *NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* (National Fire Protection Association 2014).

standard recognizes that many fire jurisdictions serve diverse large areas; and contains response time standards based on population density. The CPSE/CFAI Standards of Cover document recommends that response performance goals and standards are developed considering the current capabilities of the jurisdiction, historical service demand, risk analysis and exposure, and community expectations.[13] Although none of these standards are mandates or codified, the overarching goal of all these documents is to offer response time goals that provide for the arrival of the appropriate fire department resources in time to safely and effectively mitigate the emergency.

BSFD serves a large geographic area that consists of different risks; and experiences extended travel times. ESCI recommends that BSFD develop tiered response performance objectives based on risks present and travel time from an existing BSFD fire station. This methodology would allow BSFD leaders to develop risk zones (fire management zones) based on current conditions and track performance within these zones. The following are examples of response time goals for "first due" apparatus.

> ***For 80 percent of all emergency incidents (within 6 minutes travel of a fire station), the first due apparatus shall arrive within nine minutes response time (time dispatched to apparatus on scene). The first due apparatus shall be capable of advancing the first line for fire control or providing basic life support for medical incidents.***
>
> ***For 80 percent of all emergency incidents (within 10 minutes travel of a fire station), the first due apparatus shall arrive within 13 minutes response time (time dispatched to apparatus on scene). The first due apparatus shall be capable of advancing the first line for fire control or providing basic life support for medical incidents.***

The discussion presented in the Development of Response Standards and Targets, and the findings in the Service Delivery analysis, provides BSFD with the information necessary to begin the process of establishing response zones and response performance goals. The district is encouraged to begin the process as soon as feasible in order to assist with future planning needs.

Moving forward, the following discussions build upon the baseline established in the Evaluation of Current Conditions section, considering the observations and recommendations discussed therein, and, where applicable, include consideration of community expectations; and the development of response standards and target factors provided above.

[13] Center for Public Safety Excellence/Commission on Fire Accreditation (CPSE/CFAI) *Standards of Cover, 5th Edition.*

SHORT AND MID-TERM STRATEGIES

The previous sections of this report detail a considerable volume of observations and recommendations relating to BSFD management and operations. The process of understanding, prioritizing, and implementing the recommended enhancements can be daunting, simply due to the amount of work that may be involved. To help the organization navigate through the process, the following discussion further defines the short and mid-term priorities that ESCI has identified as the most important initially. BSFD is encouraged to undertake an ongoing process of reviewing and prioritizing recommendations with eventual adoption.

Short and Mid-Term Recommendations

The following list summarizes the most important recommendations based on the agency evaluation contained within this report that are achievable in the short or mid-term; typically within a range of three to five years. These recommendations have been compiled into a prioritized list for easy reference. The prioritization system is as follows.

- *Priority 1 – Items Involving Immediate Internal Safety Concerns*
- *Priority 2 – Considerations That May Present Legal or Financial Exposure*
- *Priority 3 – Matters That Address a Service Delivery Issue*
- *Priority 4 – Considerations to Enhance the Delivery of a Service*
- *Priority 5 – An Important Thing to Do*

Priority 1 – Items Involving Immediate Internal Safety Concerns

The recommendation deals with an improvement or initiative that solves an issue affecting the safety of firefighters and/or other personnel. These are not matters that simply make it easier to do a particular function but, in fact, change a currently unsafe situation into a safe one.

- Standard Operating Guidelines (SOGs) are developed and provided as policies and protocols for department activity, operations and personnel rules and regulations. ESCI reviewed BSFD SOGs and has found, in some cases, SOGs are out of date, out of compliance, or out of relevance. ESCI recommends a complete review of all SOGs for accuracy, modify as necessary, implement a district wide training effort for a full review of all SOGs by all personnel, and provide for an annual SOG review process.
- Radio and cell phone communications are a key element to firefighter and community safety. Historically in the Big Sky region, law and fire agencies have experienced gaps in secure, functional communications. A recent study has suggested that Gallatin County would need to expend approximately $29 million on system upgrades primarily centered on replacement of out dated equipment. This upgrade, once approved and budgeted, is reported to take up to five years to complete. BSFD should examine and exploit any short-term systems and policies to improve reliability of operational communications radio systems in order to support safe operations.

Priority 2 – Considerations That May Present Legal or Financial Exposure

The recommendation resolves a situation that is creating or has the potential to create an opportunity for legal action against the entity or its officials. It also may be a situation that could subject the entity to a significant expense or risk.

- Develop a financial tracking and planning model to continually monitor revenue and expenditure trends, enabling the district to foresee conflicts and adjust accordingly.
- Implement a second computer records server in an off-site, secure, location or cloud based backup.
- Establish formal, annual administrative performance objectives.

Priority 3 – Matters That Address a Service Delivery Issue

The recommendation addresses a service delivery situation that, while it does not create an immediate safety risk to personnel or the public, it does affect the department's ability to deliver service in accordance with its standards of performance. For example, adding a response unit to compensate for a growing response workload or delivering training needed to allow personnel to deal effectively with emergency responses already being encountered.

- Explore and address a potential need for increased full time staffing as growth and demand affect service levels.
- Establish a board approved staffing document detailing both full and minimum staffing requirements and place in Policy Manual.
- Regularly examine system response times and the assembly timing of an Effective Response Force (ERF). Should demand begin to increase, response times or the assembly of ERF become protracted beyond performance objective targets, the BSFD should adapt and/or modify staffing to ensure quick, efficient response.
- Stabilize fluctuating full time and paid on call staffing. The BSFD should fill any vacant authorized positions to ensure a full staffing.

Priority 4 – Considerations to Enhance the Delivery of Services

Recommendations that improve the delivery of a particular service. For example, relocating a fire station to improve response times to a particular part of town or adding a piece of equipment that will improve the delivery of a service.

- Develop and memorialize an annual training plan, update annually or as needed. Plan should outline training priorities for the year.
- Explore formalized drill scheduling with Big Sky Resort, a minimum of three times per year per shift.
- Explore formalized training with Yellowstone Club Fire Department staff.

Priority 5 – An Important Thing to Do

The recommendation does not fit within any of the above priorities, but is still worth doing and can enhance the department's morale and/or efficiency.

- Seek to have Board of Directors formally support, fund, and adopt the BSFD Master Plan.
- Seek to have Board of Directors support, fund, and adopt a BSFD Strategic Plan to facilitate and prioritize implementation of the recommendations included in this Master Plan.
- Establish formalized weekly, monthly, and quarterly administrative staff and first line supervision staff meeting dates to improve internal communications.
- Establish incident command training to regularly include the fire chief and crews.
- Develop and implement a captain's manual for professional development for the first line supervisor level.
- Develop a more aggressive public education plan to deliver information across a variety of channels to the widest audience possible. Including a formal citizen complaint process to obtain user feedback.

RECOMMENDED LONG-TERM STRATEGIES

The short and mid-term strategies discussed will move the organization forward substantially. A longer-term, high-level view of future needs is also important to provide a fully comprehensive view of how the organization needs to continue with future initiatives. Primarily, long-term strategies are centered on community growth, related workload, and how both impact the future deployment of fire stations and personnel.

Big Sky Resort Tax Dispersal Policies

As discussed earlier in this report, financial stability for the BSFD presents a significant challenge to the district. Even though the Big Sky Resort Tax Board has consistently and dependably approved financial requests from the Big Sky Fire Department, the current year-to-year funding model limits the ability for BSFD managers to develop and implement mid or long-term plans.

It would certainly be preferable for BSFD to have ongoing and dedicated funding from the Resort Tax Board, however, due to the configuration of the taxing system, the expectation is unreasonable. The current board cannot be expected to commit subsequent boards to funding that is based on unknown future resort tax revenues.

Conceptually, a three to five year funding plan and commitment from the Resort Tax Board would provide the fire department with a considerably more stable funding base, and the ability to plan more effectively for the future. ESCI cannot advise on whether such an approach is feasible or acceptable to the Resort Tax Board, but offers the concept of a multi-year financial strategy as an option that we recommend be discussed.

Future Staffing and Deployment

The development of effective current and future staffing strategies is a critically important undertaking for the department. As stated throughout this report, BSFD is presented with a highly unusual situation in regard to staffing by virtue of its limited mutual aid resources, large geographic coverage area and distance from outside assistance in the event of a large incident, and lack of adequately staffing an on call firefighter work force. As structured today, the department can most often meet manpower demands for a single, smaller incident. However, more importantly, BSFD lacks resources to adequately field an Effective Response Force in a protracted, complex incident or an adequate staffing capacity to accommodate multiple concurrent incidents. The shortcoming is viewed as a serious one that needs to be addressed.

BSFD staffs its emergency responses primarily career personnel. There are 15 full time line staff assigned to three duty shifts and are supplemented by seven on call responders.[14] There are no volunteers or other supplemental staff.

Historical calls for service data, should be viewed in the light of potential increases in locally based population, increases in transient/tourist population, area plans for higher density housing/hotels, additional development near ski base areas such as Spanish Peaks, and more commercial development in the Meadow and Town Center areas. The above factors combine to result in a situation that places BSFD at a crossroads regard to staffing levels. In the Moonlight area alone, development is planned across approximately 8,000 acres, with over 1,500 residential units that will extend into Madison County.

As the district continues to grow, BSFD will experience increasing service demands. When service demands reach thresholds at which they may compromise the ability of the fire department to achieve identified response targets, staffing will need to be adjusted to meet these demands. To do so, ESCI recommends an incremental, planned approach to increasing full time staffing, based on a scientific analysis of community needs and the district's financial capacity. It is further emphasized that planning ahead for staffing additions is critical, given the cost that personnel represent to a fire department's operating budget.

Full time firefighter staffing should increase to match current and anticipated future demand and community expectations for service, but the timing of changes will be challenging and dependent upon availability of funding. BSFD must fully understand the cost associated with adding additional full time staff. To execute, BSFD leaders, the Board, and the community will need to immediately plan for increased operational annual budgets and/or seeking additional funding streams to support increasing on duty staff. It is not financially possible at this time to add staff, however budget and funding plans should be started now. Capital budgets will also need to be developed and supplanted to support additional or improved fire station infrastructure, equipment, tools, and training equipment.

Some organizations the size of Big Sky, with similar call volume, rely to a greater extent on volunteer, paid on call, resident, or other staffing methodologies to support the core career staffing element. In Big Sky,

[14] Paid on call responder numbers have declined from 12 to 7 since ESCI's initial field work was completed.

doing so is far more difficult. By virtue of being a resort community, there are fewer residents that are willing to serve as paid on call responders despite aggressive efforts by BSFD management to incentivize the paid on call programs. As a result, BSFD is forced to continue to pursue a staffing model that is primarily career based.

In some agencies, an option to full dependence on career staffing sometimes includes working with other area fire agencies and community college fire science programs to place qualified intern or student personnel as first responders. An additional or alternative approach is the establishment of a resident firefighter, volunteer, or apprentice programs, any of which conceivably improve on the existing situation. However, Big Sky is geographically remote from the above strategies and those options are much more difficult to implement.

The on call staffing model has worked on and off over the years, however current demand for service coupled with planned growth has underlined the need to incrementally move to a fully staffed model of service. While the program has been a good thing, it is a failing effort in Big Sky. ESCI commends the BSFD staff and members for the multiple strategies that have been attempted to stabilize this staffing pool. However, it is evident that the paid on call based system is simply not sustainable into the future.

Determining what adequate staffing levels are for a fire department is more elusive that it would seem. Agencies typically staff according to the normally expected service demands and, if possible, include some reserve capacity for multiple or larger incidents. However, agencies typically depend on outside assistance for major, manpower-intensive incidents that occur on an infrequent basis. It is simply impractical to fully staff for every contingency.

Staffing decisions are best made in consideration of what the organization seeks to accomplish in terms of response performance. Community expectations and an agency's financial capacity have to be balanced to achieve an acceptable level of service delivery. Staffing allocation is then based on meeting targeted needs and expectations, within the organization's ability to afford new hires. The development of response time standards and performance targets as discussed within this report will assist BSFD with future staffing decisions.

While the addition of full time staffing will enable the organization to meet current and future needs, the timing of when to do so cannot readily be determined at this point. ESCI suggests that planning to implement these additions should be initiated at this time. The decisions about how many positions to add, and when to add them, should be based on analysis of collected data relative to identified and defined response time standards and targets. Those targets have not yet been established, and doing so is necessary for BSFD to make appropriate staffing decisions. The organization's leadership is again referred to the preceding discussion on development response standards.

To begin the process of addressing future staffing needs, ESCI recommends the following steps:

1. Develop and institutionalize clearly defined response standards and targets as outlined previously.
2. Establish a data driven methodology for measuring response metrics and how they relate to established targets.
3. Annually track and report response performance to identify trends.
4. Once information is available to make decisions regarding staffing adjustments necessary to address response performance needs, make the needed changes.

The following discussion is offered only as an example of how the BSFD could plan needed staffing increases. A strategy should be based upon incrementally adding full time staff as financial conditions allow while stabilizing the remaining on call staffing work force. For example, it may take a one-year plan to a have a new fully staffed company ready for deployment. Planning should also allow for sufficient time for budget development in order to match personnel expenses. In addition, there needs to be time for recruitment, training, providing equipment, and preparing new personnel for deployment. A planned approach, similar to the following example will support effective deployment of new personnel including all facilities and apparatus.

In the following figure, an example plan illustrates one phased hiring and deployment approach. The BSFD may not use this example approach and elect to seek another plan for staffing increases. By using this approach, the agency budget is less stressed compared to an accelerated full company hiring process.

Figure 82: Example Chronology for Phased Staffing and Deployment

ACTION	FY Year 1	FY Year 2	FY Year 3	FY Year 4
Station 1 staffing	Fill additional position to fill out B Shift staffing, 1 position, 3 FTE			
Relocate and staff Ladder 12	Move Ladder 12 to Station 1.	Staff Ladder 12 with 2 FF positions, 6 FTE		
Ladder 12 Station 1 additional staffing			Add 1 FF/PM position-3 FTE Upgrade one position to Captain	
Engine 2 staffing		Staff Engine 2 with 2 FF positions, 6 FTE	Add 1 FF/PM position Engine 2, 3 FTE Upgrade one position to Captain	
ALS Ambulance Activation				Staff ALS ambulance with 2 FF/PM positions, 6 FTE Location of unit to be determined

Administrative and Support Staffing

With the predicted growth, in both the community and the fire department itself, the capacity of the existing administrative and support staff to adequately manage the increasing workload is a critical consideration. It has been previously established that the existing administration, consisting only of the fire chief and the office administrator, is exceeding its capacity to address the multiple support needs of today. The problem will need to be addressed in concert with the organization's expansion.

BSFD is in the process of filling a newly created deputy chief's position. The new chief will be able to accept a considerable portion of the workload placed on the fire chief today. As a result, considerable relief will be realized, however, the new position alone will not fully address future workload concerns. BSFD is advised to continue to monitor and evaluate administrative and support capacity on an ongoing basis and plan accordingly. Included in the monitoring should be the office administrator's capacity, which will need to be supplemented at some point in time.

Of specific note is the fire and life safety, or fire prevention, function. The earlier assessment of new construction plans reviews, compliance inspections, and existing occupancy code enforcement demonstrates the complexity involved in that component of the fire department's services. What also needs to be considered, however, is the high level of importance that the function has in instance of the Big Sky area.

Earlier in this report ESCI stated:

> When a new building is proposed within a fire department's boundaries, the structure is the protection responsibility of that department for the life of the building. If it is not constructed according to code, it may become a problem for the firefighters in the future and a risk to the community. Consequently, the fire department has a fundamental interest in ensuring a structure is properly constructed.

The point is restated here to underscore its importance, but the reader is also reminded that the concern is it is considerably more focused in Big Sky due to the current volume of new construction and, to an even greater extent, that which is forecast.

A fire protection consultant position was in place in BSFD until very recently. The consultant, working on a contractual basis, was instrumental in processing new construction building plan reviews along with other related fire prevention tasks. That position is now vacant and the function is assumed by the fire chief.

There are no existing personnel to whom the duties previously assumed by the fire protection consultant can be assigned. Additional analysis will be needed to determine the best approach to meet this need, however, it is ESCI's finding that a dedicated fire prevention position is needed. There is more work involved than what can be assumed by an on duty shift member and a full time equivalent position is warranted, most logically serving under either a fire marshal or a deputy chief/fire marshal title.

Truck Company Relocation/Deployment

Ladder trucks, or aerials, are unique pieces of equipment that serve in a very specifically focused, and important operational role on the emergency scene. Aerials provide two primary functions: First they can fulfill an essential rescue capacity in taller buildings and secondly, they provide an elevated water stream that often makes the difference between losing and saving a larger structure.

At an emergency incident, if a ladder truck is needed, it is important that it be on the scene as early as possible. By virtue of its mission of rescue and/or providing an elevated stream, it has to be close to the involved structure. If the truck is arriving after other fire apparatus, it is not likely to be able to be positioned in a manner that effectively leverages its capabilities.

BSFD's sole aerial ladder truck is housed at Station 2, in Mountain Village. However, the greater need for the ladder truck's capabilities is often in the Station 1 response area. Further, Station 2 is not staffed, so there is not a crew available to respond with the aerial. When the truck is needed, a crew has to respond from Station 1 to Station 2 to retrieve it and respond. As a result, response times can be delayed.

While the situation is clearly less than optimal, it exists because of a physical limitation at Station 1. The building simply does not have space for the ladder truck, so it is housed at Station 2. The situation presents a difficult challenge, however one that needs to be addressed. Two solutions are realistically available. One is the modification of Station 1 to accommodate the ladder truck. The other is one of staffing Station 2 so that a crew, most likely cross-staffing an ambulance, is available to respond with the ladder truck.

Modifying Station 1 would require an extensive remodeling and may even necessitate re-location to a different site due to the limited space available at the existing location. Neither option represents an easy, or inexpensive solution, but it is ESCI's opinion that the matter needs to be addressed as a mid to long-term planning priority.

Future Fire Station Considerations

In the following discussion, ESCI examines considerations relative to BSFD's current fire stations.

Station 1

As stated previously, Station 1 is not configured in a manner that accommodates the aerial ladder truck. Were it to be moved to the station, modification of the building will be required. Also, noted in the Evaluation of Current Conditions section of this report, Station 1 was not originally designed to house 24-hour staffing as it does today. Modifications that have been made in the past to add crew quarters are not adequate nor are they compliant with applicable fire and life safety codes.

The property upon which Station 1 is located offers little, if any, room for expansion of the building. As a result, either the facility will need to undergo a substantial remodeling to meet future needs, or it will need to be relocated. Either way, ESCI encourages the department to identify options that accomplish two things: First, keeping response resources in the same area, generally, because of its effective response location. Second, station plans should include the provision of adequate and safe crew accommodations as well as room for additional personnel in the future.

Station 2

Station 2 serves the Big Sky Resort and Lone Mountain area. The station consists of apparatus storage and a meeting area, with no accommodations for on-duty crews. The availability of volunteer or on call personnel is sporadic, at best, so the station is marginally functional at this time. Further, the department's aerial apparatus is located at Station 2, requiring that personnel from Station 1 generally have to travel to Station 2 to retrieve the vehicle.

At this time, incident frequency in the Station 2 response area is greater than some of the other portions of the district. A large percentage of the calls occur on the ski mountain with the majority medical in nature. In these cases, the Big Sky Ski Patrol provides first response and triage, and then requests the BSFD as needed.

Future service demand projections indicate that Station 2 will need to be staffed at some point in time. In preparation, ESCI recommends BSFD complete a facility improvements review at Station 2 to potentially support future staffing. The review should consider improvements to support staffing of career, paid on call, or volunteer responders. A variety of staff configurations should be examined including: staffing a single resource, cross-staffing an ambulance and an aerial ladder truck, or ultimately staffing multiple units.

Should capital improvements of Station 2 proceed, consideration should be given to a fire station's ability to support the department's mission, as it exists today and in the future. The activities that take place within the fire station should be closely examined to ensure the structure be adequate in both size and function. Examples of these functions may include:

- The housing and cleaning of apparatus and equipment
- Residential living space for on-duty crew members and dual gender appropriate
- Administrative or management office(s)
- Training, classroom, and library areas
- Firefighter fitness area

While this list may seem elementary, the lack of dedicated space compromises the ability of the facility to support all of these functions and can detract from its primary purpose.

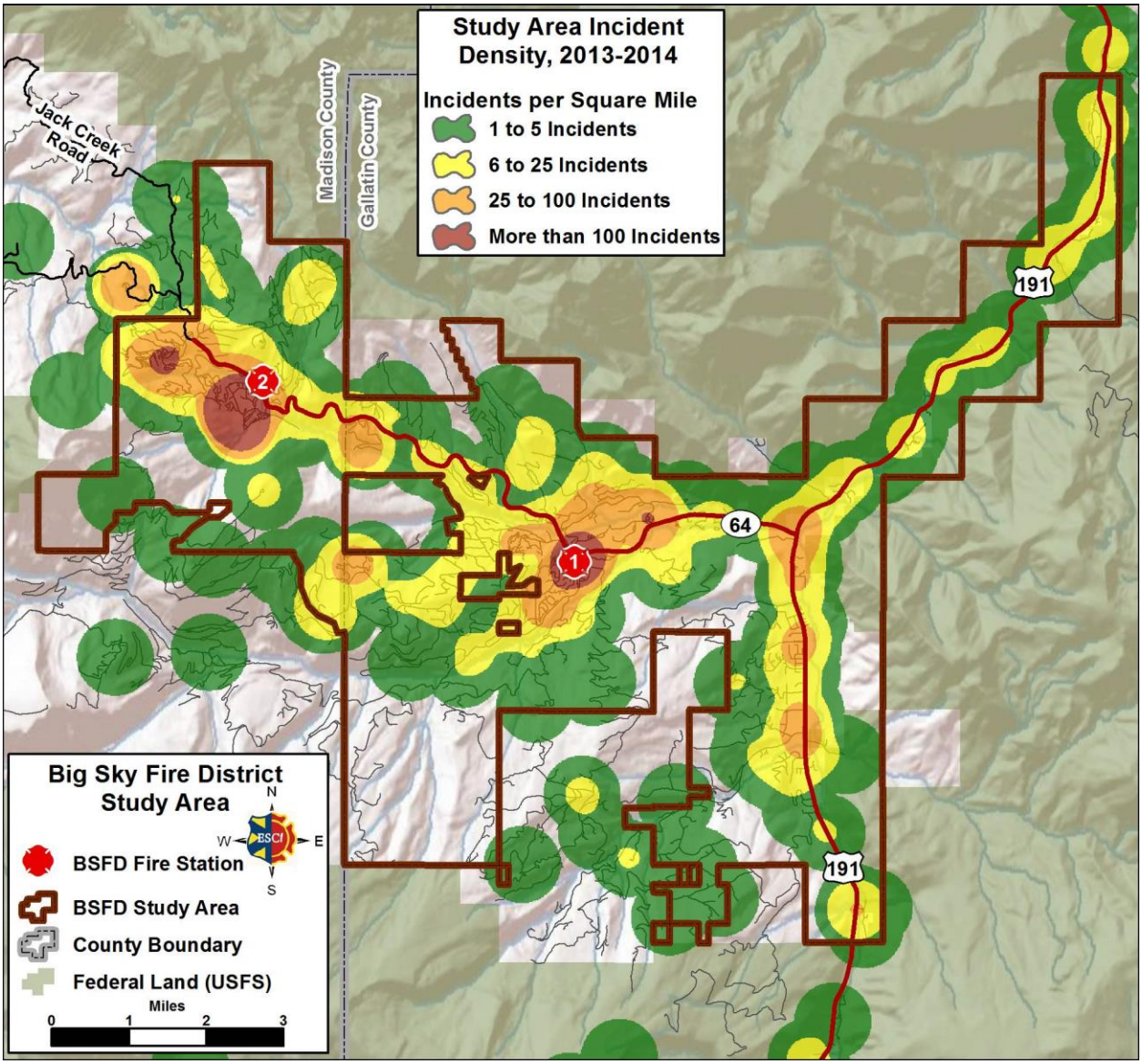
Additional Long Range Future Station Location Considerations

The previous recommendations for future station and apparatus deployment address changes or additions to current stations. The following discussion identifies possible future station locations, viewed as long-range considerations.

As discussed previously, the current BSFD station locations provide adequate geographic coverage to meet current and future service demand in portions of the service area that experience the highest call volume, given the current rate of growth in the area. However, as conditions change and new growth occurs, additional fire stations may be required. Specifically, long-range projections indicate that, at some point in time, the addition of a station in the Highway 191 corridor may be warranted. Further, in the course of ESCI's stakeholder interviews, a number of interviewees identified a station in this area as an important future consideration.

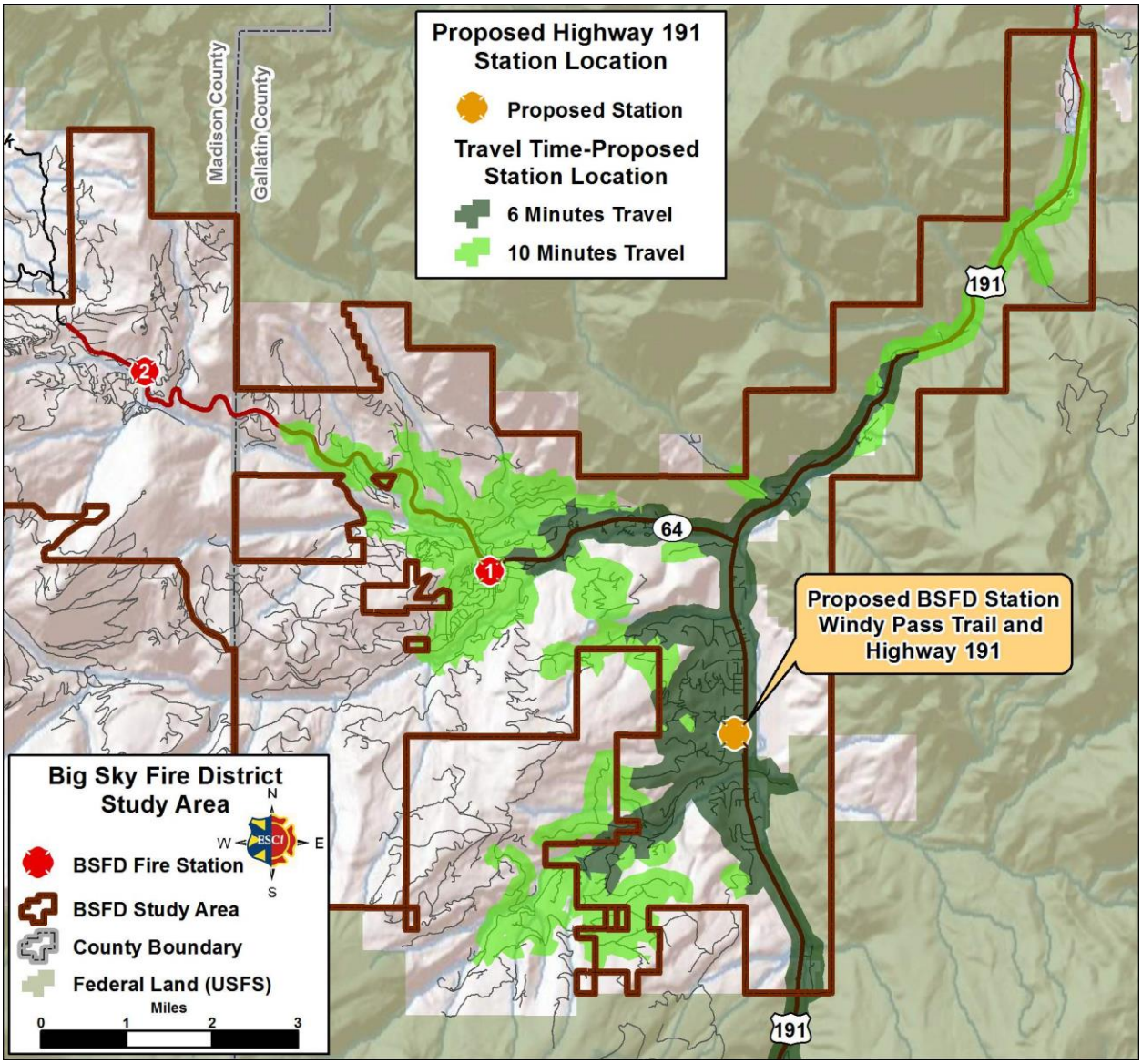
The identified station site is a general location only and may be moved, based on multiple factors including the availability of land. Incident density, as mapped earlier, is higher along the Highway 191 corridor due to vehicle traffic, but still lower than that found in the Station 1 and 2 response areas. A review of geographic service demand in the following figure indicates incident density along Highway 191.

Figure 83: BSFD Geographic Service Demand, 2013-2014



The following figure displays a possible future fire station location.

Figure 84: Possible Future BSFD Fire Station Location



The potential station location is approximately 2.5 miles south of the Highway 191 and Highway 64 junction, just north of the Ophir School. A station in the vicinity would serve the residential and commercial development along Highway 191.

Approximately 160 incidents occurred inside the district along Highway 191. 81 percent of those incidents are within six minutes travel or less of the proposed station location. Except for the far northern portion of the fire district (Karst area), the entire Highway 191 corridor within the district is within 10 minutes travel or less.

There is additional benefit, especially for commercial properties in regard to ISO rating consideration. Additional properties would fall within the five mile travel distance threshold, which is roughly equivalent to the six minute travel time shown in the map.

Finally an additional staffed fire station (using either paid on call or career personnel) increases the district's depth of resources and ability to assemble and Effective Response Force.

ESCI regards the construction of a third fire station as a long-term future strategy. Changes in the direction and type of development in the Big Sky service area may necessitate further study or modification to future stations, e.g. the Spanish Peaks development area.

Protection in Areas Outside of Big Sky Fire District

The Big Sky Fire District has clearly defined boundaries, within which it collects tax revenue and has an obligation to provide fire protection services pursuant to state law. However, the fire department also provides services to areas that fall outside of jurisdictional boundaries and in which revenue is not collected with which to pay for the availability of fire protection.

In some instances, areas outside of the district, but receiving services are sub divisions or housing developments, such as the "Big EZ" development. In other cases, properties that are outside of any organized development are being served.

The areas stated above were not included in the original development of the fire district boundaries. Most likely the situation occurred because the properties were not developed at the time and there was no anticipation that they would. However, as they did develop, the fire department began to provide them with service, absent tax revenue. As often seen, the decision to provide services is made because, at the time, the impact in terms of service demand is very low and, typically, because there is simply no other agency that is available to respond to emergencies.

The situation results in properties, or areas, that benefit from fire and EMS services at no cost. These services come at the expense of those that live within the district and additional burden on revenues such as the Big Sky Resort Tax. The fire department may invoice a property owner for an emergency response, and often does, but payment is not always received.

When residents pay their property taxes for fire protection, they are paying for the *availability* of the service, not for the actual use of the service. Fortunately, the vast majority of those that pay for fire protection never have to use it. Even so, residents pay annually for its availability, whether utilizing services or not. When a fee for service is applied to a property that has an emergency and is not paying taxes, the invoice for a response typically does not recover the actual cost to the fire district for providing services.

ESCI finds that a very significant portion of the area in which BSFD has decided to provide services, is not within the district and is not being taxed for services.

There are a few potential solutions to the problem, none of which offer easy or readily attainable answers. Those that may be considered are complex and analysis of their feasibility falls outside of the scope of this report, however, ESCI identifies potential approaches as follows:

Annexation: Property owners that are adjacent to the fire district's boundaries can request annexation into the fire district. However the district is not allowed by statute to annex on its own.

Revised district formation: A new and larger district can be formed to include the unprotected areas. However doing so means dissolving the existing district and forming an entirely new one, again requiring voter approval.

Formation of a new separate district: A new and separate district can be formed which would, in turn, enter into a mutual aid agreement with BSFD or, conceptually, simply contract for services from the existing district.

Fees for service: Charging fees for specific services is a practice that is exercised in Big Sky currently. While doing so recovers some cost, the shortcoming of the approach is twofold. First, collecting fees for a response is often difficult. Secondly, the fees may recover actual cost for the response, but do not contribute to the overall cost of making fire protection available.

Subscription service: Subscription based systems are in place in some communities and can be effective. Subscription fees are based on a correlated cost of service. If the approach is offered, it should be provided only inclusive of all properties within a given area. If individual properties are allowed to subscribe, the fire department has a very difficult challenge in identifying which property is covered and which is not, and in developing policy on how they will, or will not, respond to non-subscriber properties.

Contract for services with HOAs: A potential option is that of contracting for services with existing homeowner's associations or similar groups, where they exist. A baseline cost of service is identified and applied to a contracted level of service delivery.

As stated, the alternatives listed do not offer simple, or easily achievable options. ESCI offers them for consideration, but notes that determining the feasibility of the various options is a study unto itself.

Apparatus Replacement Planning

As stated earlier, Big Sky's vehicle replacement practices differ from those typically found in fire departments, wherein the dependence on funding for major apparatus is that of property or sales tax, bonded debt, reserved funding, grants, or other sources of financial support. Instead, in Big Sky, a significant portion of BSFD's apparatus replacement needs is funded by way of the Big Sky Resort Tax.

The district is fortunate to have access to the resort tax for financial support. However, planning for capital replacement becomes more challenging, because tax funding can only be requested and approved on an annual basis, compromising the ability of the fire district to develop and fund a long range replacement schedule.

Despite this challenge, the district has established a replacement schedule for its major apparatus, which also includes small equipment. Due to the need to request funding in each annual resort tax cycle, the schedule is not tied to a dedicated funding source or reserve fund, however.

The accepted best practice for fire apparatus replacement planning is to identify a vehicle's projected service life, calculate its anticipated replacement cost, and fund a replacement plan accordingly. Incrementally, funds are then set aside so that when the vehicle becomes due for replacement the funds are available without the need to finance the purchase or ask the voters for supplemental financial support.

Because BSFD's major vehicles are, to a large extent, replaced using funds provided by the Big Sky Resort Tax, the aforementioned replacement scheduling approach does not apply easily, but projecting and planning for long range future financial demands is still important. The following is an example vehicle replacement schedule for the district, projecting the useful life of vehicles and scheduling the replacement date for these vehicles based on the remaining useful life. Actual planned service lives and apparatus purchase prices may differ from those used here. Should the district wish to update this schedule, ESCI will do so if provided with updated information, or will provide a spreadsheet tool to the department with which to make future calculations.

The replacement date assumes that vehicles will be placed in reserve status for five years prior to disposal. The following figure provides an example of vehicle useful life for developing future replacement plans.

Figure 85: BSFD Vehicle Replacement Useful Life

Description	Useful Life	Replacement Cost
Engine	20	500,000
Aerial Ladder Truck	25	950,000
Wildland Engine	15	75,000
Rescue	15	75,000
Water Tender	25	300,000

Utilizing vehicle estimated lives and replacement cost, the following example vehicle replacement plan was developed for BSFD.

Figure 86: BSFD Vehicle Replacement Plan Summary

Vehicle Number	Model Year	Useful Life	Replacement Year	Replacement Cost	Reserve Required@ 12/31/15	Annual Reserve Requirement
Engine 12-2	2005	15	2020	$550,000	$293,333	$36,667
Engine 12-1	1997	15	OVERDUE	$550,000	$550,000	NA
Tender 12-2	2002	15	2017	$340,000	$249,333	$22,667
Brush 12	2003	15	2015	$140,000	$93,333	$9,333
Ladder 12	2001	20	2021	$900,000	$540,000	$45,000
Tender 12-1	1997	15	OVERDUE	$340,000	$340,000	NA
Brush 12-5	2014	15	2029	$140,000	-$9,333	$9,333
Ambulance 12	2008	10	2018	$155,000	$77,500	$15,500
Ambulance 12-2	2012	10	2022	$155,000	$15,500	$15,500
Ambulance 12-1	1995	10	OVERDUE	155,000	$155,000	NA
Total Requirement					**$2,304,667**	**$154,000**

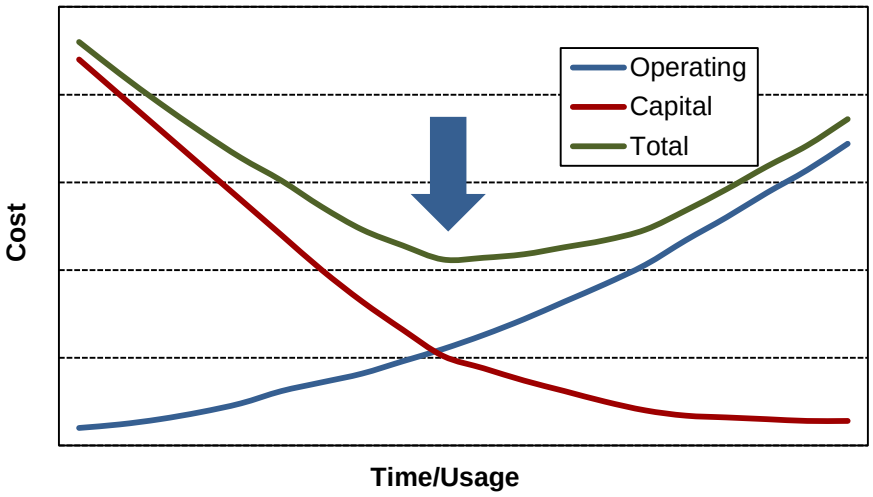
If this schedule was utilized by the district, and *fully funded,* a current reserve amount of $2,304,667 would need to be on hand and each year $154,000 (adjusted for inflation) would need to be encumbered for future purchase of replacement vehicles.

Currently, the Big Sky Resort Tax board calculates the anticipated financial needs and reserve dollars in a dedicated fund for the purpose. As a result, it is not necessary for BSFD to duplicate the effort.

Economic Theory of Vehicle Replacement

A conceptual model that may be used when a replacement cycle is considered is the *Economic Theory of Vehicle Replacement*. The theory states that, as a vehicle ages, the cost of capital diminishes and its operating cost increases. The combination of these two costs produces a total cost curve. The model suggests the optimal time to replace any piece of apparatus is when the operating cost begins to exceed the capital costs. This optimal time may not be a fixed point, but rather a range of time. In the following figure, the flat spot at the bottom of the total curve represents the replacement window.

Figure 87: Economic Theory of Vehicle Replacement



Shortening the replacement cycle to this window allows an apparatus to be replaced at optimal savings to the department. If an agency does not routinely replace equipment in a timely manner, the overall reduction in replacement spending can result in a quick increase of maintenance and repair expenditures. Officials who assume that deferring replacement purchases is a good tactic for balancing the budget need to understand two possible outcomes that may happen because of that decision:

1) Costs are transferred from the capital budget to the operating budget.

2) Such deferral may increase overall fleet costs.

Regardless of its net effect on current apparatus costs, the deferral of replacement purchases unquestionably increases future replacement spending need.

Future Training Site Development

ESCI's earlier evaluation of BSFD's training resources identified the need for a dedicated training facility. In order to conduct safe, meaningful training, a fire agency should have ready access to dedicated training props, a training structure, and drill yard. Classroom and outdoor instruction is an essential component of preparing emergency responders with knowledge and skills. A training facility or drill ground is an indispensable element. Training facilities provide the controlled and safe environment used to simulate emergencies to develop and test the skill sets of emergency workers. Training involves both individual and group manipulative skills development in the operation of firefighting equipment and fire apparatus.

There are limited options available to BSFD for training props and drill facilities, with a dependency largely on area occupied or vacant buildings and parking lots. Furthermore, land upon which to develop a facility is a precious resource in the Big Sky area.

NFPA 1402: Guide to Building Fire Service Training Centers, is a standard that addresses the design and construction of facilities for fire training.[15] The document covers the features that should be considered when planning a fire training facility. ESCI finds that absent the availability of suitable training facilities, some fire departments may forego essential training with potentially associated safety degradation.

Proficient emergency responders must have confidence in their own abilities in handling the emergencies they encounter. Best practices suggest that emergency workers have regular access to training grounds for repetitive drills and to develop new skills. Training is identified as a vital part of a fire department's safety and accident prevention program. An effective and continuous training program results in safer, more efficient, and effective emergency operations.

Training props can be "home-made" and many agencies use the talents and skills of their staff to create these props. In addition, training structures can be constructed relatively inexpensively. While training towers can be ornate and costly, a basic structure can be as simple as an open scaffolding structure to simulate multiple stories. Stacked shipping containers welded together can create enclosed training structures to simulate virtually any structure type.

These structures also serve multiple purposes in that law enforcement and emergency management can both use the training facility for their needs. Examples of simple training facilities are included in the following figure.

Figure 88: Sample Training Facilities

Constructing a single training facility to comply with industry standards concerning classroom, practice grounds, training tower, live-fire building, and training props in the long term, although fiscally prudent, can be a high capital investment depending on design and land acquisition. In addition, the on-going cost of operating and maintaining a training facility further advances the case for joint ownership.

[15] National Fire Protection Association, *Standard 1402: Guide to Building Fire Service Training Centers*, 2007 Edition.

BSFD has a clear need, but will be challenged to finance the full build-out of the training facility on its own. The following alternatives may be available: First, entering into a cooperative partnership with a regional perspective, including not only fire agencies, but also law enforcement, emergency management, and other neighboring agencies can be valuable in cost sharing. Secondly, grants and additional private funding can be pursued. The likelihood of success in receiving grants is dramatically increased when an effort is cooperative and inclusive of regional partners.

ESCI recommends initiating mid-term planning efforts to secure a training site and facility. ESCI further recommends exploring a joint effort that includes the Yellowstone Club Fire Department, and other regional public safety partners in this process.

Conclusion

The ESCI project team began collecting information concerning the Big Sky Fire District in June of 2015. The team members recognize this report contains a large amount of information and ESCI would like to thank the Big Sky Fire District members and many board members, volunteers, and employees for their tireless efforts in bringing this project to fruition. ESCI would also like to thank the various individuals and external organizations for their input, opinions, and candid conversations throughout this process. It is ESCI's sincere hope that the information contained in this report is used to its fullest extent and the emergency services provided to the citizens of Big Sky and the surrounding area will be improved by its implementation.

Appendices

APPENDIX A: TABLE OF FIGURES

APPENDIX B: COMMUNITY FORUM MEETING SUMMARY

In order to dedicate time, energy, and resources to the functions most desired by its customers, BSFD needs to understand the customers' priorities and expectations. To develop an appreciation for community needs, ESCI facilitated a citizen forum in Big Sky, following the annual Big Sky Resort Tax distribution meeting, which resulted in a considerable number of attendees.

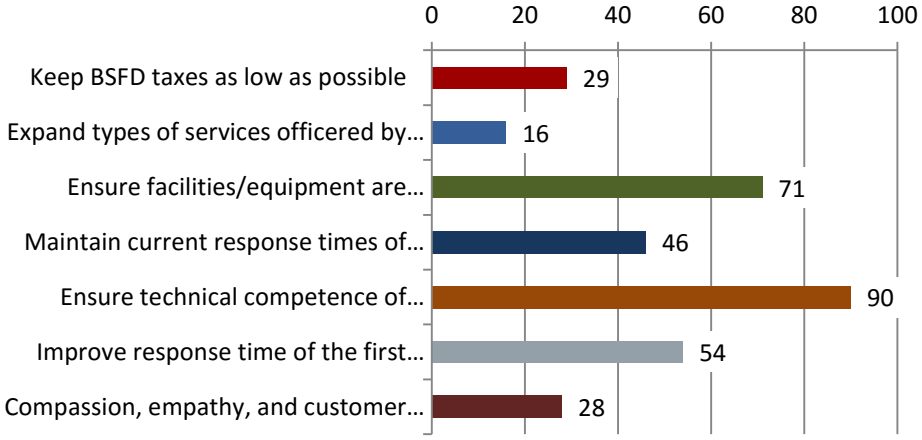
Feedback was solicited regarding:

- The appropriateness of the current mission, vision, and guiding principles;
- Expectations, concerns, and organizational strengths;
- Prioritization of current services; and
- Cost, staffing, and response performance.

Forum participants were asked to fill out several survey instruments pertaining to how they think BSFD should plan for the future. The planning priorities were presented to the citizens as a forced ranking of the ten separate dimensions, allowing the citizens to list those dimensions each citizen felt was more important than the others and so on. These were then compiled as a group to reflect the consensus ranking of planning priorities.

The first survey instrument was utilized to determine what the citizens served by the BSFD saw as important planning priorities. The following figure displays the individual and collective feedback regarding planning priorities that was received at the citizen forum:

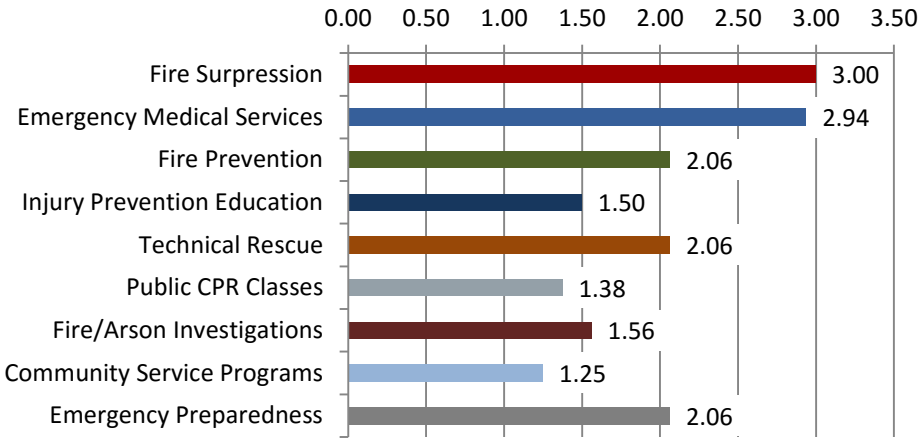
Figure 89: Citizen Planning Priorities



Forum participants felt it was most important to center BSFD planning efforts on the technical and professional competence and safety of their fire service provider and communities served. The next level of planning priorities was to ensure the BSFD provides adequate apparatus and maintenance of equipment, facilities, and response times resulting in an effective response force.

Next, forum participants were asked to identify the most important functions and services the fire department provides based on the list of services currently provided, and rank those services as a critical priority, an important priority, or a low priority. In this case, the participants could elect to assign a single priority to multiple services. The following figure describes the forum participants' service priorities.

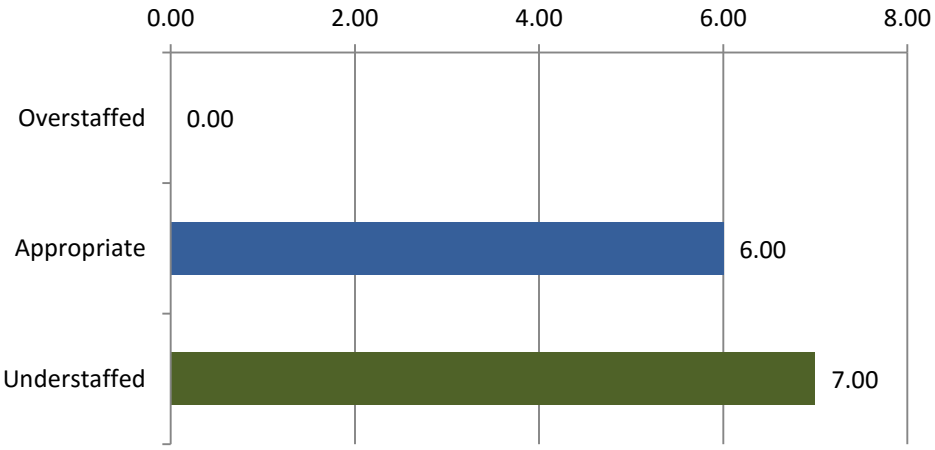
Figure 90: Citizen Service Priorities



Forum participants were consistent in their desire to have BSFD center their service efforts on their core mission of fire and EMS services. The next tiers of service priorities were centered on fire prevention, technical rescue services, and community preparedness. Lastly, while everyone enjoyed and felt community education classes and community service programs were important, they were considered optional given limited resources. However, there was support for a continued presence and interaction with the communities served.

Next, the forum participants were asked to rate and compare the staffing, response performance, and cost of services with their expectations and desired service levels. The following figures describe the results.

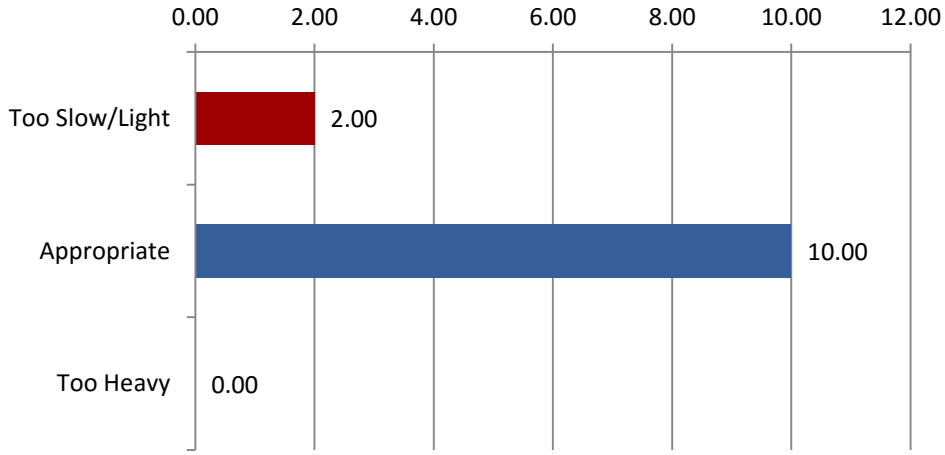
Figure 91: Citizen Ranking of Staffing Levels



Forum participants indicated that they do not feel that BSFD is overstaffed. The group was divided in identifying the need for additional personnel to meet existing and anticipated future service delivery needs, as opposed to those that felt that current staffing levels are appropriate.

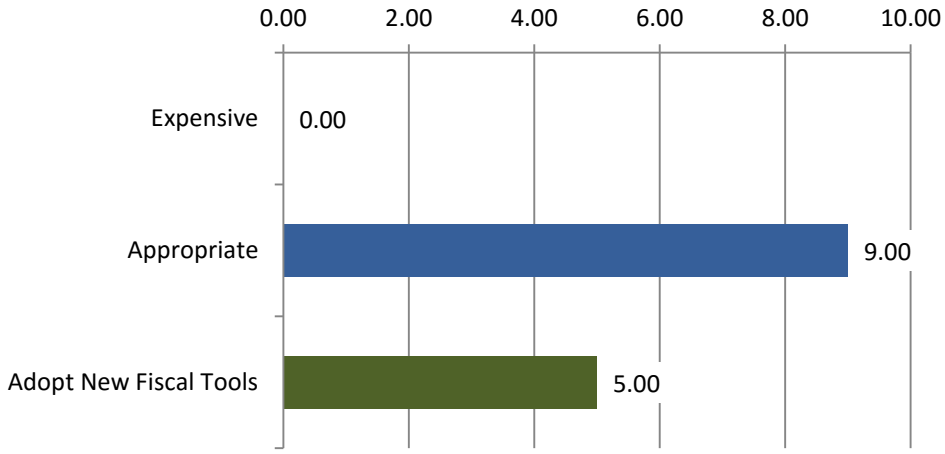
Next, based on their own perceptions, and information provided by Chief Farhat at the beginning of the session, participants ranked current BSFD performance in response to emergency calls, in regard to the resources that are sent to incidents.

Figure 92: Citizen Ranking of Response Levels



Participants, by a large margin, felt response levels by BSFD were appropriate. While this seems somewhat inconsistent in light of staffing level responses, it is understandable that the participants feel they are adequately protected by BSFD.

Figure 93: Citizen Ranking of Cost of Services



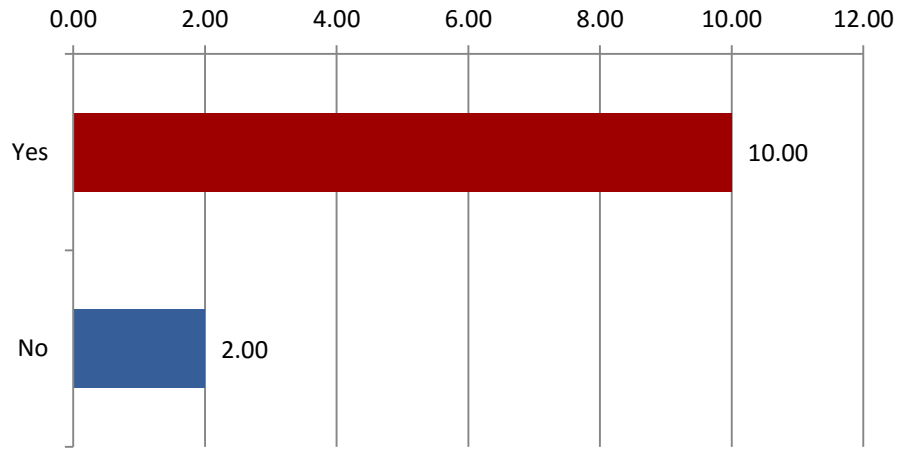
While cost was a consideration for all in attendance, the overwhelming perspective was that the resources allocated to BSFD are managed well and maximized for efficiency and effectiveness. There was also

support for adopting new fiscal tools such as grants and other revenue measures to ensure adequate service levels and capabilities are maintained.

Lastly, forum participants were instructed to share with ESCI what their desired response time is given their understanding and observation of response times by BSFD. These responses are based on the personnel perceptions and biases of the forum attendees and did not take into consideration past performance data or comparison to fire service industry best practices or standards.

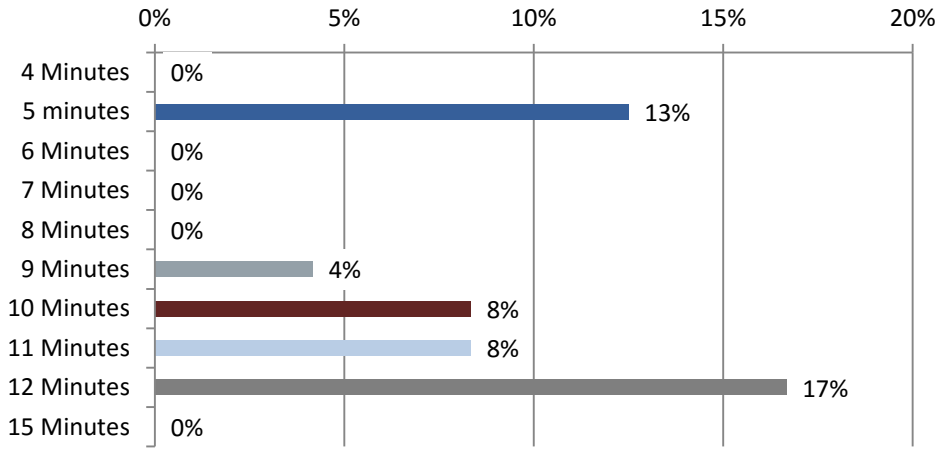
They were first asked whether current response performance is meeting their expectations.

Figure 94: Citizen Ranking of Response Expectations



Forum participants were then asked what they viewed as an acceptable response time, with the following result.

Figure 95: Citizen Ranking of Preferred Response Time



There was significant deviation between what stakeholders viewed as an acceptable response time. There was a nine-minute difference between the 17 percent vote and the 13 percent categories and a one-minute variation between the two response time categories receiving eight percent. The deviation can most likely be attributed to the fact that some respondents live in the immediate Big Sky area, while others live in more remote portions of the service area and have different expectations.