



# Big Sky Fire Department

## Montana



# EMERGENCY SERVICES MASTER PLAN UPDATE

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## Executive Summary

In 2015, Emergency Services Consulting International (ESCI) completed an Emergency Services Master Plan for the Big Sky Fire Department (BSFD) in Big Sky, Montana. The final report was provided to the BSFD Board of Trustees upon completion and included a detailed analysis of the Department's current operations and service delivery, future service demand projections, and multiple future service delivery strategies and recommendations. This report revisits the 2015 Master Plan, indicating changes that have occurred and recommendations that have been implemented, and provides new and updated future strategy recommendations.

The Master Plan Update is introduced with an Evaluation of Current Conditions. It is important to note that the evaluation is a snapshot in time, based on ESCI's findings in our data collection process in late 2018 and 2019. Inevitably, changes have taken place since that time, so the reader will find that some information has deviated since the project was initiated.

### EVALUATION OF CURRENT CONDITIONS

The Evaluation of Current Conditions section of the report includes seven 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 is explored with an introductory explanation of the subject area and a discussion of desirable outcomes and identified best practices. In addition, the report reviews both conditions and recommendations that were found in the 2015 report, changes that have occurred since, and restates recommendations that are still in need of attention.

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.

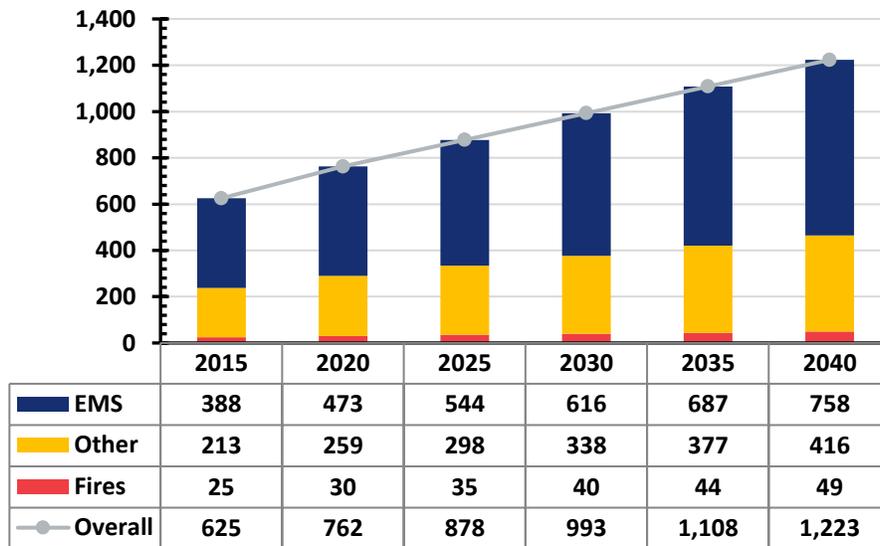
It is noted that a Master Plan is typically expected to provide guidance that will be valid for a time span of 10 to 15 years before it needs updating. However, it was found that the rapid growth, and substantive changes within the Department that have occurred since 2015, necessitated the review and update of the previous plan. Further, the update is necessary because BSFD has addressed, completed, or modified essentially all of the recommendations included in the previous report and implemented most of the future strategies provided.

It is rare, in ESCI's experience, to find that so much of a Master Plan's content to be addressed in a span of less than five years. The 2015 document presented the organization with an extensive "things to do list," and ESCI acknowledges and commends the Board of Trustees, Fire Chief, and staff of Big Sky Fire Department for the admirable efforts that have been undertaken since that report was completed.

### Projected Service Demand

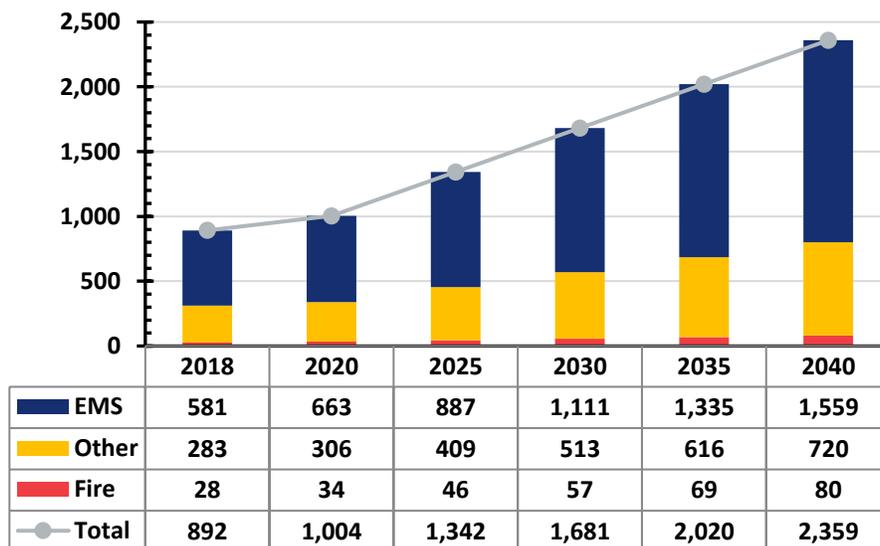
A key driver to this update is the substantial growth in population and fire department service demand that has occurred since 2015. In 2015, ESCI chronicled the existing populations found in Bozeman, Gallatin County, and Madison County, and provided forecasts of expected future growth.

That information was translated into forecast future service demand that could be expected at BSFD, and the following figure was generated.



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

In this report, ESCI updated the preceding graph based on new projections with the following result:



It is clear that service demand projections from 2015 have been substantially exceeded and future projections are higher than offered in the original report. This underscores the critical importance of assertively planning for future needs as recommended previously.

### *Service Delivery and Response Performance*

As a component of the Evaluations of Current Conditions, ESCI provides a detailed analysis of current response performance, the key measure of how well the fire department is serving its community from an emergency response standpoint.

As in the 2015 Master Plan, the most frequently recorded response time in the 2017–2018 data is between 11 and 12 minutes. Approximately 67.4 percent of emergency incidents were answered in 12 minutes or less. The average response time is 10 minutes, 23 seconds. The first BSFD apparatus arrived at 80 percent of emergency incidents in slightly over 14 minutes (14:14) or less. The following figure summarizes the changes in overall emergency response-time performance between the 2015 Master Plan and this update.

**BSFD Study Area Overall Emergency Response-Time Performance**

Time Period	Average	80th Percentile
<b>2017–2018</b>	10:23	14:14
<b>2013–2014</b>	10:05	15:00

On average, BSFD emergency response performance, from the time BSFD was dispatched to the arrival of the first apparatus arrived on scene, increased by 18 seconds between the 2013–2014 data used in the 2015 Master Plan and the 2017–2018 data used in this update. However, measured at the 80th percentile, response times improved by 46 seconds during the same time period.

### *Future Fire and EMS Delivery and Station Locations*

One of the most important reasons for updating the 2015 plan was to evaluate future system design needs in the light of new future service demand projections. A key element of that review was future fire station locations and deployment.

The update provides analysis of multiple future system design alternatives, including both short-term and long-term priorities, necessary to ensure that future system integrity is maintained. Each initiative is discussed in detail, and guidance provided.

ESCI focused on the future location, configuration, and design of fire stations, along with the planned relocation of existing Station 1, which has been outgrown and is being remodeled at this writing. However, relocation of the station will be necessary in the future. Further, plans are in place to modify the staffing configuration at Station 2 pending completion of current remodeling work.

This report details the following future options:

- Possible Future Fire Station in the Spanish Peaks Development
- Relocation of Station 1
- Future Fire Station in Moonlight Basin
- Future Fire Station in the area of Highway 191 and Windy Pass Road
- Future Deployment Models
- Future Staffing Deployment

Current and forecast population and service delivery growth is the most important, and pressing, challenge facing the Big Sky Fire Department. Substantial progress has been made, more effectively than expected, since the 2015 report that has positioned the department well to manage future needs. However, it is imperative that the Board and leadership of BSFD remain focused on staying ahead of the clearly predicted demands to avoid falling behind the anticipated growth. This report will assist the department in doing so.

## Evaluation of Current Conditions

The Big Sky Fire Department (referenced herein as BSFD, Department, or District) Emergency Services Master Plan Update begins with ESCI's Evaluation of Current Conditions, an assessment of the Department as it was found to operate upon initiation of the project in June 2015, and subsequently revisited and updated in this 2019 report. Using organizational, operational, staffing, and geographic information system (GIS) models, this phase of the study focuses on 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 initial data collection and 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 pertinent conditions. Observations are supported by data provided by BSFD and collected as part of the review and interview process. Recommendations from the initial report are identified, and new recommendations are provided where applicable. The evaluation begins with a baseline review of the BSFD organizational composition.

### ORGANIZATIONAL OVERVIEW

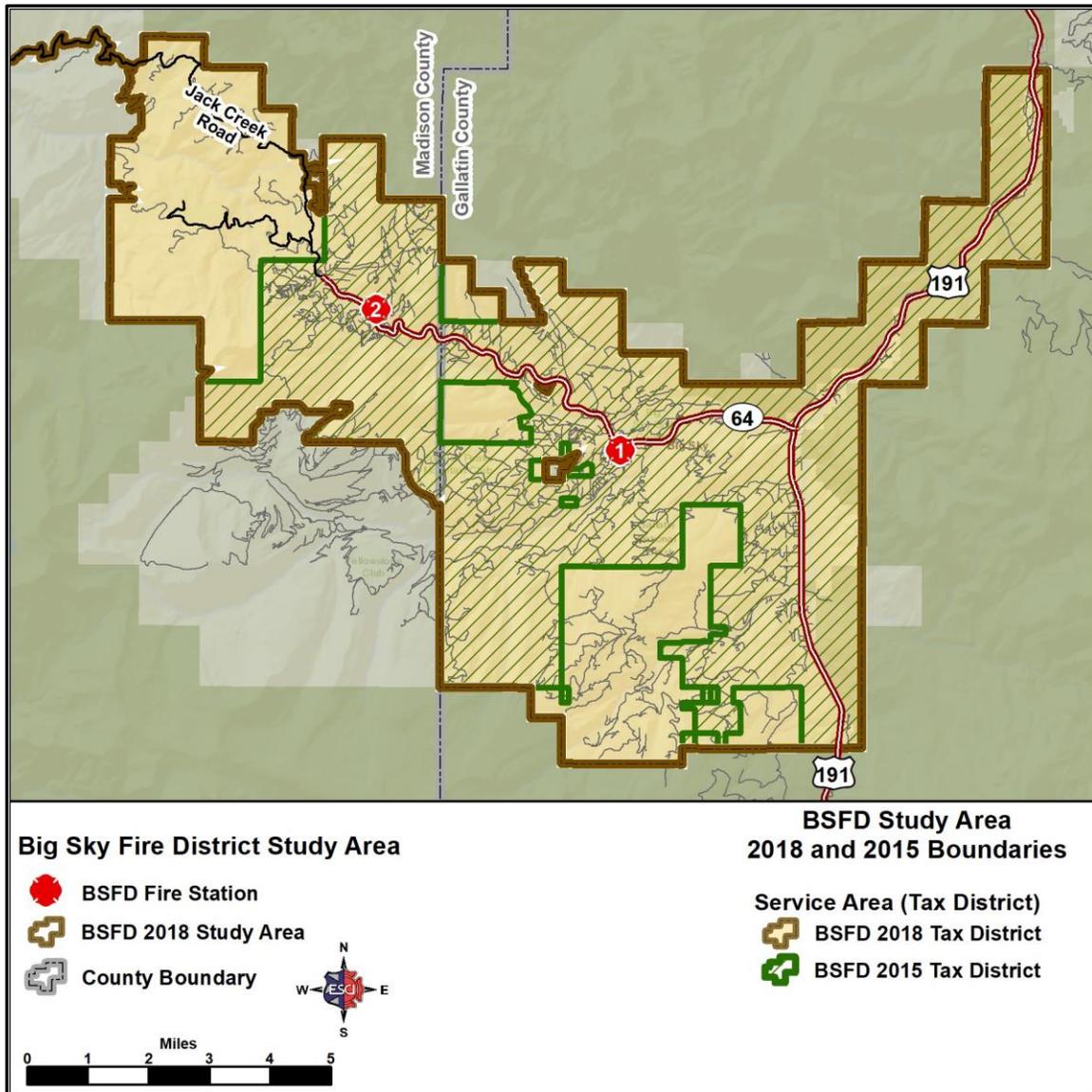
The first report section provides an overview of the organization, discussing its configuration and the services that are provided. Data provided by Big Sky Fire Department staff were compared to the 2015 Master Plan report to identify changes that have occurred since that time to develop the following 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 originally developed and subsequently updated. 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.

### Service Area

Figure 1 depicts the Big Sky current service area.

Figure 1: Service Area Map, 2019



The service area has grown considerably since the 2015 Master Plan based on annexations that ESCI recommended at the time and that the Fire Chief has completed. The service area now includes 80.4-square-miles, increased from the 57-square-miles in 2015. The changes in the service area are detailed further later in this report section, as well as in the Service Delivery and Response Performance section.

## 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 next. The following figure provides a general overview of the Big Sky Fire Department's governance and lines of authority elements.

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 operations of the District.

ESCI reviewed the District's operational configuration and viewed what are considered to be the fundamental attributes that are found in similar, and successful, fire departments. Observations found that the requisite foundational elements are in place in Big Sky upon which a successful organization is structured. In 2015, ESCI identified recommendations regarding some observations in the governance review. Those recommendations are listed in the following section with a review of steps taken regarding them since the previous report.

### 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). Although 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.

In 2015, ESCI reviewed the District's foundational documents, finding that the appropriate baseline elements were in place. However, some were outdated and in need of review and revision, which is discussed in further detail later in this report. At that time, it was recommended that the documents be reviewed, and that process was completed in 2016 with some SOGs still under review at this writing.

It was also recommended at the time that the Board of Trustees review and formally institutionalize the Board of Trustees Policy Manual by resolution. That process has not been completed at this writing, and the District is operating under its Bylaws that are dated 2009.

Finally, the previous report found that there was not a regular and structured process of all foundational documents. ESCI recommended that the District establish a schedule of regular review of foundational documents. Since that time, the District reports that the documents are typically reviewed annually, as recommended.

## Strategic Planning

An important recommendation in the 2015 study was the completion of a strategic planning process by the District. The recommended concept was used to develop a strategic plan that would identify, prioritize, and plan for the implementation of the findings and recommendations in the Master Plan document.

In 2016, the District produced a document titled *Big Sky Fire Department Master Plan/ISO Risk Mitigation*. ESCI reviewed the report in the light of our recommendation to develop a strategic plan. Although titled differently, and inclusive of Insurance Services Office recommendation that were not part of the ESCI report, it was found to be generally equivalent to a strategic plan, addressing the short- and mid-term recommendations from the Master Plan and creating a roadmap for their accomplishment. The District is commended for this follow through.

## Financial Controls

Information gathered from field interviews for the 2015 report indicated that appropriate purchasing practices were in place. The approach appears to be a transparent and appropriate financial control system. The same holds true at this time.

## Performance Review

At the time of the original Master Plan, the Fire Chief was not receiving an annual performance review from the Board of Trustees, as was recommended by ESCI. Subsequently, a process has been established that exceeds minimum standards for annual performance assessment and includes input from both internal and external sources, reporting to the Board of Trustees. The practice is commendable.

Following is a summary of previous recommendations and actions that have been taken since 2015.

*Key 2015 Recommendation:*

- Review and institutionalize the Board Policy Manual.
  - ✓ Action: Not completed at this time.

*Other Recommendations:*

- Ensure that the Fire Chief receives regular performance reviews from the Board of Trustees.
  - ✓ Action: The Fire Chief now receives an annual review, completed by the Board and including interviews with peers, other organizations, and internal and external stakeholders.
- Conduct a review of the agency's guiding documents to ensure currency and accuracy. Amend as needed.
  - ✓ Action: Personnel policies were updated and adopted in 2016. SOGs were adopted and have been made available by hard copy and via shared drive digitally. Additional updates are currently being processed.
    - Recommendation: Ensure completion of the current SOGs update process.
- Establish a schedule of regular review of foundational documents.
  - ✓ Action: Foundational documents now undergo an annual review.

## *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.

Since 2015, numerous changes have occurred in the organization, based on findings and recommendations in the Master Plan, as well as advances that have been identified and implemented by BSFD leadership, outside of the Master Plan

The following discussion focuses on findings from the 2015 document and modifications that have been implemented as a result.

### **Employment and Personnel Management**

ESCI found that existing job descriptions were being reviewed and updated only on an as-needed basis and recommended that all descriptions be revisited on an annual and scheduled basis. In review of information for this Master Plan update, it was stated that all job descriptions have, in fact, been updated since the previous Master Plan and they are reviewed annually.

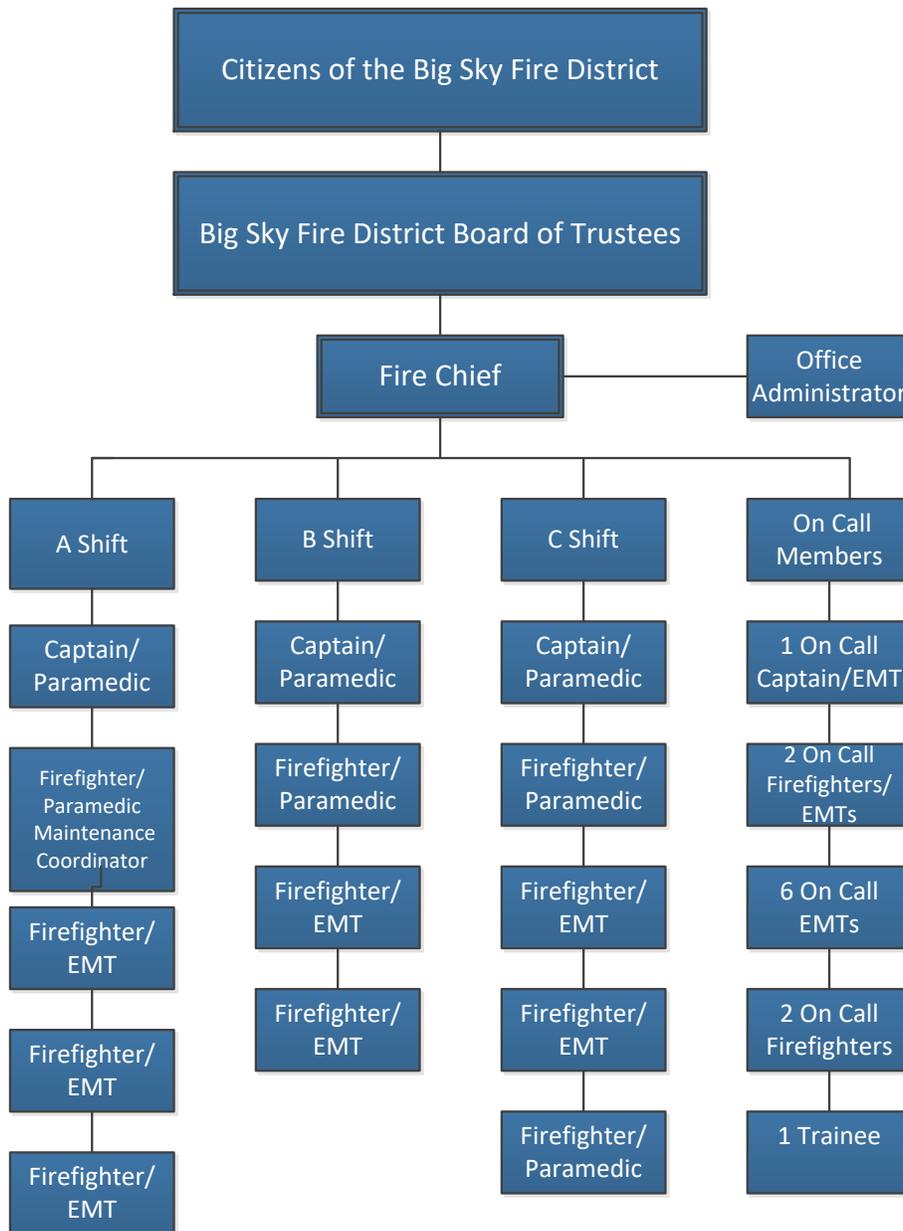
### **Organizational Chart**

BSFD's organization has been configured in a top-down hierarchy, typical of most fire departments. The organizational structure defines lines of authority and establishes protocol by which employees and members understand to whom they should report.

In 2015, ESCI observed that the Fire Chief's span of control exceeded acceptable limits, with all shifts, on call members, and office administration configured as direct reports. Since that time, a new organizational chart has been established, and reporting has been substantially improved, as discussed in the next section.

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 ensure that communication flows appropriately and limits opportunities to circumvent the reporting structure. The 2015 BSFD organizational chart is shown in the following figure, followed by today's updated structure.

**Figure 2: BSFD Organizational Chart, 2015**



The 2015 organizational chart accurately reflects the reporting hierarchy at the time. A Captain was assigned to supervise each of the three shifts, one of which is on duty at a time. Firefighters reported 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 or paid-on-call members, and some other situations.

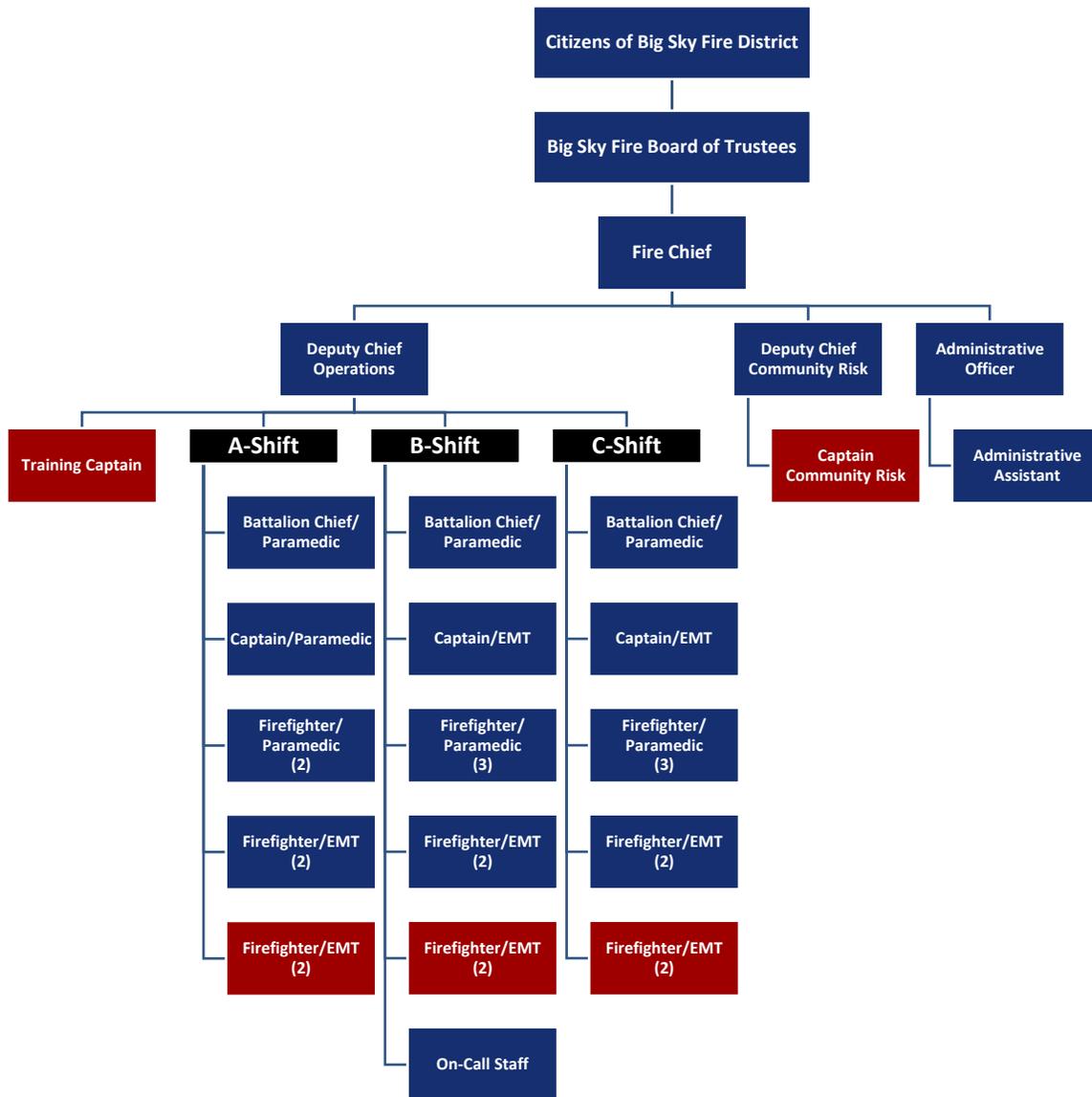
The three Captains and the Office Administrator reported directly to the Fire Chief, and, further, all of the paid-on-call members of the department also reported directly to the Fire Chief as far as administrative matters, outside of emergency operations. Adding paid-on-call employees to the Chief's direct reports took 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 was higher than appropriate.

ESCI recommended that the span of control issue be addressed by the establishment of supervisory positions within the on-call ranks. However, since that writing, the District has reduced the number of paid-on-call personnel from 12 in 2015 to four today, with a considerably reduced dependence on these members. For this reason, the previous recommendation is no longer applicable.

As the 2015 report was being completed, a Deputy Chief position, which was not in place, was being considered. Shortly thereafter, that new position was approved, funded, and filled with the goal being to address the span of control concern that ESCI had discussed.

Today's organizational chart is reflected in the next figure.

Figure 3: BSFD Organizational Chart, 2019



Fast forward to today, multiple and significant changes have taken place at BSFD, steps taken to address the identified span of control concerns, as well as overall workload issues. Each shift has now added a Battalion Chief position, overseeing the shift Captain that was previously in place. The two supervise a staff of operational personnel that, in 2015, was 14 and today is 21, with plans to add another six line personnel in 2021, if not sooner. As the organization continues to grow at a rapid pace, it is apparent and appropriate that BSFD has added the Battalion Chief positions to maintain an effective span of control at the line level. Additional detail is provided in the Staffing and Personnel Management section later in this report.

In addition, the Deputy Chief position just discussed is now reflected on the organizational chart as a Deputy Chief of Operations, effectively addressing the Fire Chief's span of control. But also added is a second Deputy Chief, assigned to oversee community risk assessment and management. The latter position is not often seen in smaller fire organizations; however, it is important and forward thinking in the instance of BSFD because of its very unique demographics, geography, and risk exposure.

*Key 2015 Recommendations:*

- Schedule and complete an annual review of job descriptions for all positions.
  - ✓ Action: Job descriptions are now being reviewed annually.
  
- Address multiple span of control issues.
  - ✓ Action: Two Deputy Chief positions have been added since 2015, along with newly created Battalion Chiefs. Additional line level personnel have been added, and more planned for 2019/2020, underscoring the importance of the supervisory changes.

## *Service Area and Infrastructure*

The size and composition of a fire department's service area affect 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.

### Service Area and Response History

In 2015, the BSFD service area consisted of more than 57 square miles of a geographically diverse region. But the department responded beyond the District boundaries, into a larger service area, which was outside of the District and for which BSFD did not receive tax or alternate revenue. Since that time, the Department has implemented ESCI's recommendation to annex the majority of the extended service area.

The 2015 service area and extended service area are depicted in the following figure, followed by a map of the current District boundaries.

Figure 4: Extended Service Area Map, 2015

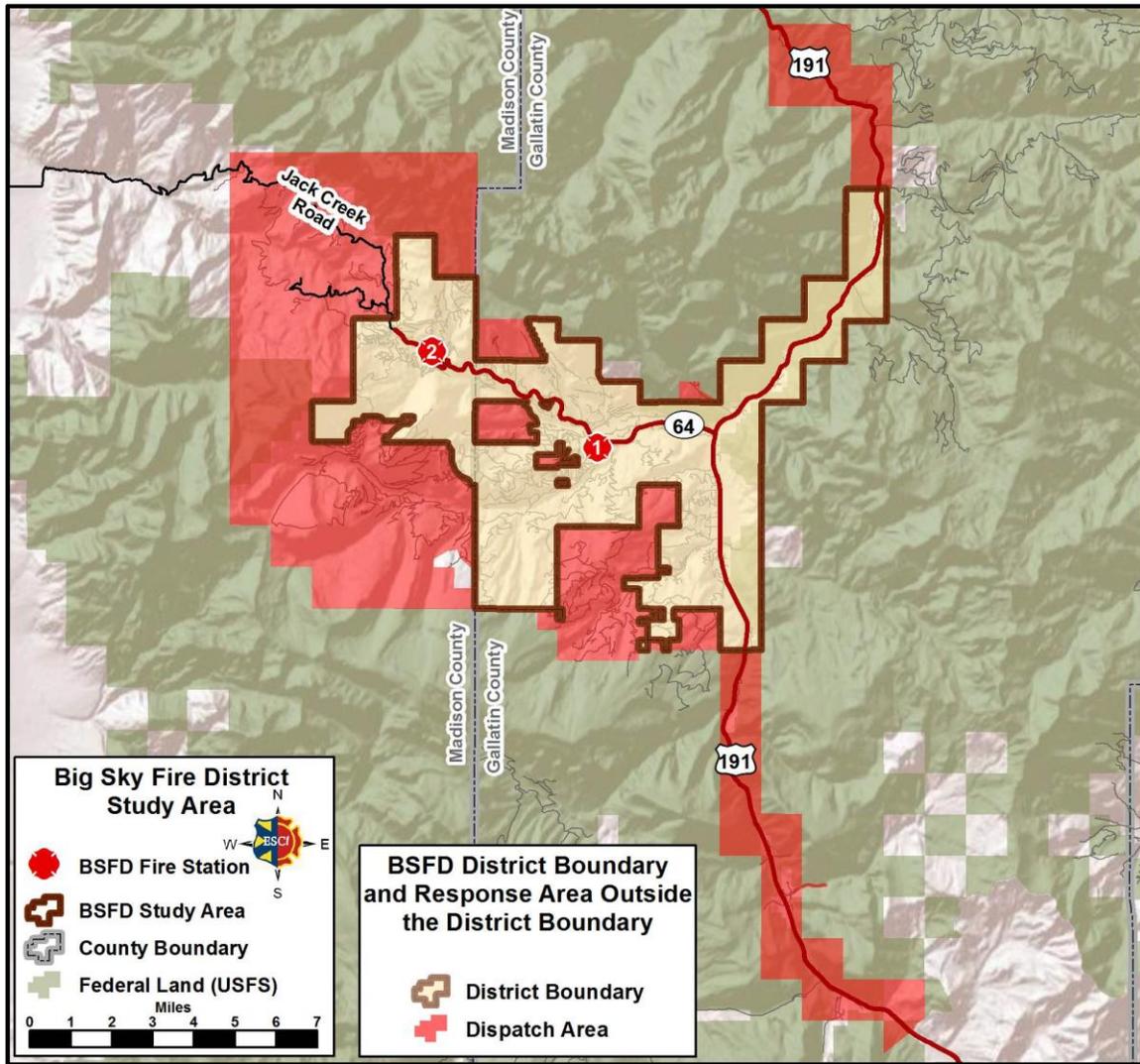
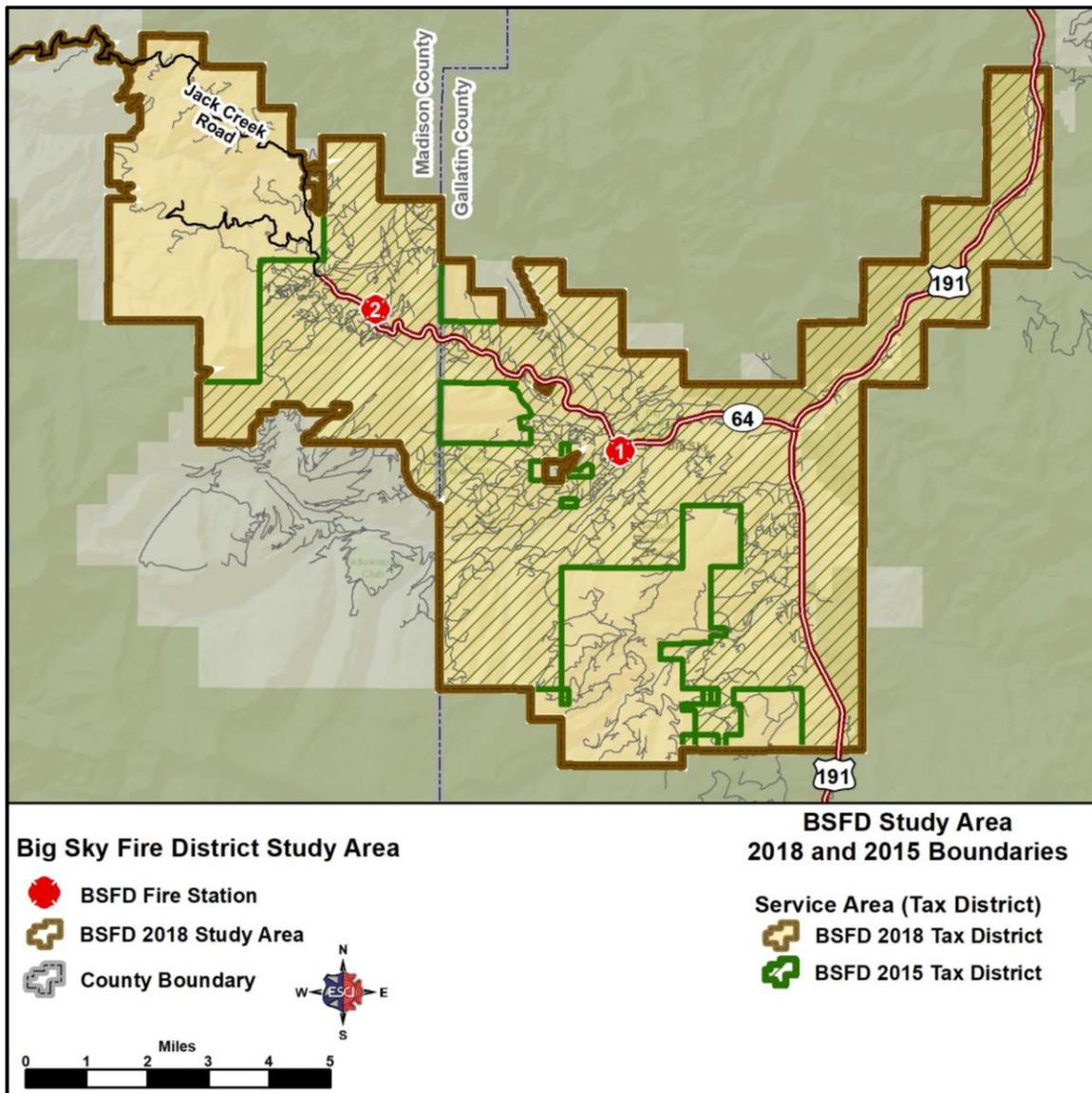


Figure 5: Current Service Area Map, 2019



As detailed in the 2015 service area map, the Big Sky Fire District served an area of approximately 57 square miles, located in Gallatin and Madison Counties, Montana, composed primarily of a destination residential and winter recreational community. The resident population in the BSFD service area was calculated to be 2,518, as reported in the previous Master Plan, but the actual number of people in the response area increases significantly during peak recreation periods, estimated by the District to exceed 20,000.

At the time of the previous report, the District encompassed a 57-square-mile response area; however, services were provided to the extended service area, which is considerably larger, surrounding the fire district. Since that time, BSFD has expanded the service area by way of annexations, as shown in the map in Figure 1. Today, the District's service area consists of 80.4 square miles with an estimated resident population of 2,904, based on the Big Sky Census Designated Place (CDP). CDP includes most of the populated portions of the fire district. This does not include transient daytime population (workers) and seasonal vacation/recreational population. Additional discussion of population will be provided later in this report.

Population served is a factor that can be of value in a community with a relatively constant number of people in a residential environment, but not as valuable in Big Sky because of the significant numbers of properties that are not full-time residential occupancies. 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 jurisdictions because of the highly unique demographic configuration. Another approach is to observe incident volumes in addition to population. ESCI reviewed the most recent two years of incident data with the following findings:

In the year 2017–2018, BSFD responded to 759 total incidents. In 2018–2019, the number of incidents increased to 892. As a further comparison, data from 2014 were compared to 2018 incidents, and the percentage increase over those four years was found to be 51.4 percent.

### Fire Stations

BSFD currently staffs two fire stations, one in Meadow Village and a second station in Mountain Village. Multiple recommendations were included in the original Master Plan, including addition/expansion of crew quarters in both facilities to accommodate increased station staffing needs. Today, both stations are in the process of being remodeled as recommended. Additional future station locations are being considered and will be detailed later in this report.

### Population Served

ESCI estimated the 2015 service area resident population to be 2,518, noting that the actual served population increases remarkably during peak seasonal activity, estimated as up to 20,000. U.S. Census data from 2016 stated that the resident population is 2,767 with the noted increase in seasonal/transient population.

### Engines

The number of fire engines operated by the District has not changed since 2015; however, new engines have been purchased since that time. The new engines are classified as "Type 1 Rescue Engines."

### Engine, Reserve

The District did not maintain a reserve fire engine in the past that could be placed in service when one of the front-line engines was out of service. Today, a Type 1 Fire Engine is held in reserve for this purpose.

**Ambulance**

BSFD operates three ambulances. Two are located at Station 1 and another at Station 2. This is the same number of ambulances that were on hand at the time of the original Master Plan.

**Ambulance, Reserve**

A new ambulance has recently been placed in service. The unit that it replaced is being moved to Station 2 as a reserve.

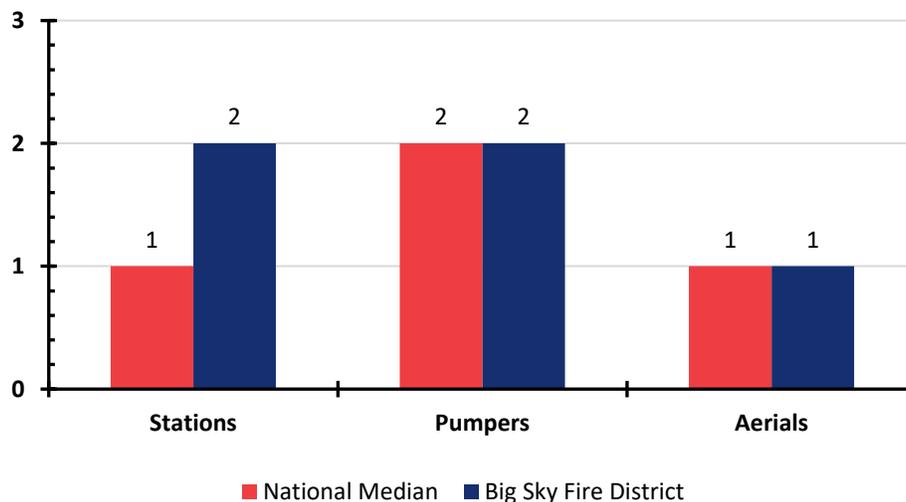
**Quick Response Unit**

The Battalion Chief’s vehicle is Advanced Life Support (ALS) equipped. The Fire Chief and Deputy Chief vehicles are Basic Life Support (BLS) equipped.

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 6: BSFD Capital Asset Summary**



The ratio of capital assets to population has not changed since the previous Master Plan report. Relative to national comparators, BSFD compares similarly in regard to number of fire stations and engines, based on population. It was noted in the earlier report that the District’s only aerial ladder truck was 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 still exists today and is of concern because it compromises the Department’s ability to make effective use of the vehicle. However, previous Master Plan recommendations have been implemented, and modifications to both stations are currently in progress to address the concern.

### ISO (Insurance Services Office) Rating

BSFD was rated by the Insurance Services Office (ISO) in 2003, resulting in a mixed protection class rating of 5/9/10. Subsequently, in 2016, the District was rereated, resulting in a protection class of 4/4Y/10.

### Total Fire Department Personnel, Uniformed and Civilian

Significant staffing changes have been implemented as a result of the Master Plan. As of June of 2015, the District employed 16 full-time personnel, including administrative staff. Since that time, additional staff have been added as listed in what follows, taking the total staffing to 26 at this time, with one more to be added in 2019 and an additional six to seven in 2021.

The full-time administrative and support personnel totaled two in 2015, causing ESCI to express concerns about administrative span of control. Subsequently, three additional administrative staff were placed on the payroll, two Deputy Chiefs and an Administrative Assistant, bringing the total to five administrative staff. Further, plans are in place to add two Captain's positions, one in training and the other in community risk, in 2019 and 2021.

Operational personnel, meaning the emergency response personnel, exclusive of administrators, consisted of 14 full-time employees in 2015, supplemented by 12 paid-on-call, or part-time responders. As of October 2018, the number of career responders had increased to 21 with plans in place to add six additional personnel in 2021. Further, the District has transitioned away from its dependence on paid-on-call responders with those numbers declining from twelve in 2015 to four today.

### 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 7: Emergency Response Type and Frequency**

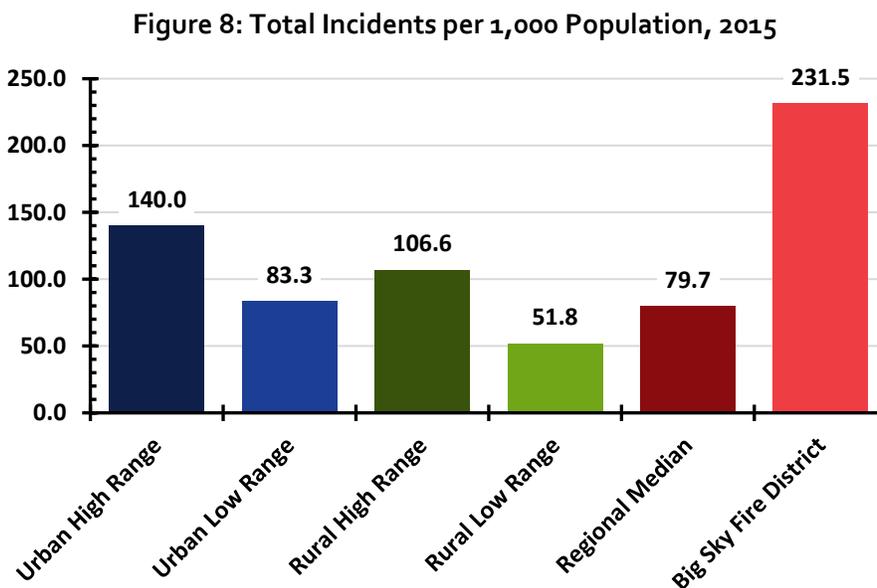
Response Type	2014 Data	2018 Data
<b>Fire</b>	23	28
<i>Value of property exposed to fire</i>	Not tracked	\$2,001,000
<i>Value of property lost to fire</i>	Not tracked	\$11,000
<b>Rupture or Explosion</b>	0	1
<b>EMS/Rescue</b>	363	581
<i>Number of EMS transports</i>	230	419
<b>Hazardous Condition</b>	25	36
<b>Service Call</b>	12	46
<b>Good Intent Call</b>	65	31
<b>False Call</b>	101	166
<b>Severe Weather</b>	0	1
<b>Other</b>	0	2
<b>Total</b>	<b>589</b>	<b>892</b>

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.

In reviewing 2018 response data, a significant increase in incidents is reflected in the preceding figure. Total responses went from 589 in 2014, to 892 in 2018. This represents an increase of 51 percent in the four-year time span.

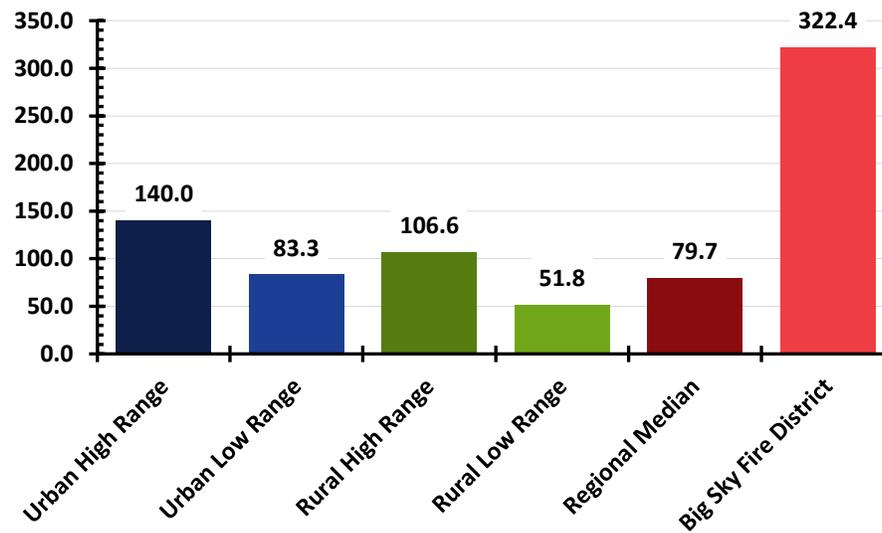
In 2014, it was noted that the District was not tracking the value of property lost to fire and the value exposed to fire. At that time, it was recommended that those items be tracked. As a result, BSFD is, in fact, tracking the fire loss data; however, the exposure value is not yet being tracked. It is recommended that steps be initiated to address the latter.

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.



Using updated data (the most current full year's data from July 1, 2017, through June 30, 2018), ESCI ran the same comparison for this report with the following results.

Figure 9: Total Incidents per 1,000 Population, 2019



BSFD's total incidents, on a per 1,000 population basis, have increased from 231.5 in 2015 to 322.4 today. Both numbers are substantially above the urban and rural median ranges that are calculated from the national data.

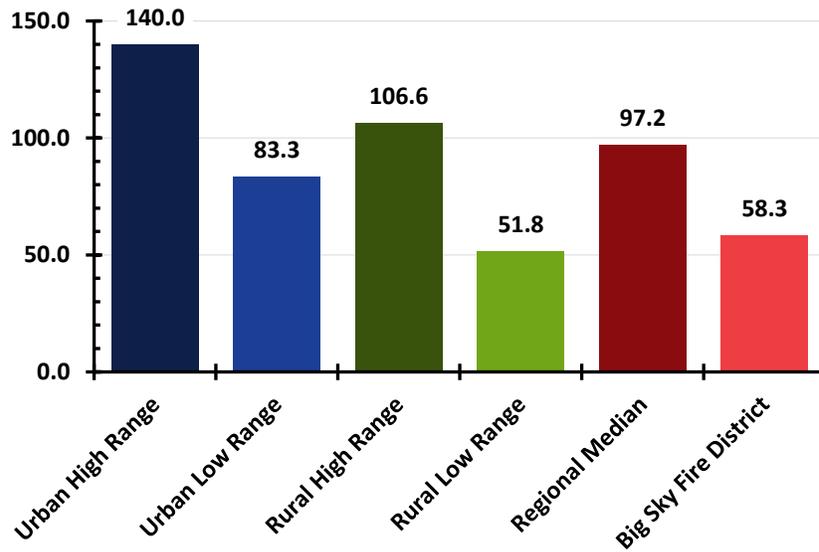
However, this comparison needs to be put into perspective. Benchmark data available through NFPA are based primarily on population and do not consider geographical size or population density of the particular area. The data from which these comparable figures are extracted do not delineate between volunteer or career departments nor do they 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. Therefore, the variation in the preceding chart should be considered from that perspective.

To add clarification for a point of reference, the NFPA benchmark data indicate 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 these 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 workforce factors are considered.

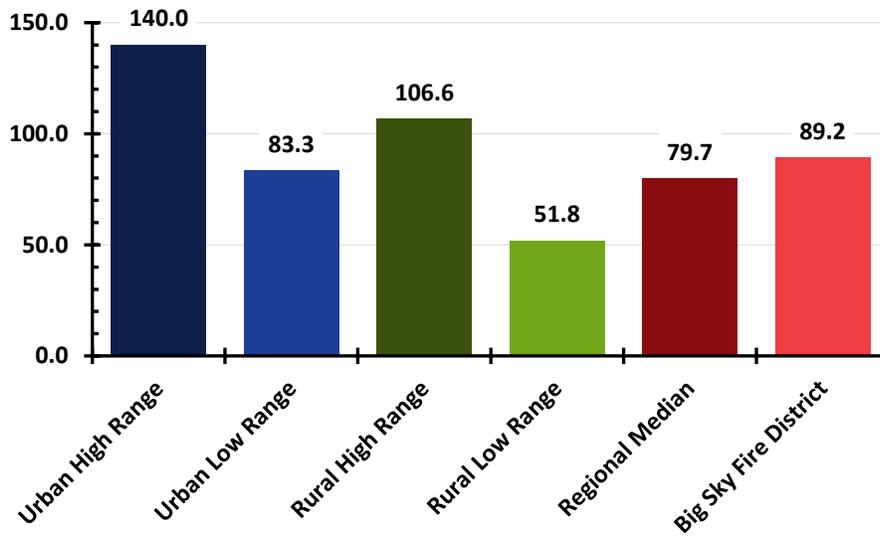
As a comparison, the incidents per 1,000 population figures were recalculated using a population of 10,000 and the modified population category from the NFPA data, resulting in the following:

Figure 10: Total Incidents per 1,000 Population Based on 10,000 Population, 2015



Using the adjusted population data, BSFD’s incident occurrence is more closely aligned with regional medians. However, when the data were updated with 2018 incident data, the following result was found:

Figure 11: Total Incidents per 1,000 Population Based on 10,000 Population, 2019



The adjusted population category increases the incidents per 1,000 population from 58.3 to 89.2 for the current reporting period.

*Key 2015 Recommendation:*

- Track the value of property that is exposed to fire annually.
  - ✓ Action: The value of property exposed to fire is not being tracked.
  
- Annually track the value of fire property loss.
  - ✓ Action: The value of fire damage is now being tracked.

## FINANCIAL OVERVIEW

In the original 2015 Master Plan ESCI prepared for the Big Sky Fire Department, it was recommended that the BSFD periodically assess its short- and long-term financial condition. An important part of this ongoing assessment is the development and review of tools to project and compare recurring revenue and expense and the impact of net operating gains or losses on fund balance. Further, because sales taxes received from the Big Sky Resort Area District (BSRAD) are a major portion of the BSFD funding stream, routine and open exchange of financial and planning data with the BSRAD Board are critical. The department has taken significant steps towards these goals and now has a multi-year agreement with the BSRAD board to provide a known recurring funding stream for operating expenses of the District. Further development of this agreement would enable both entities to better project needs, particularly capital improvement spending program (CIP) capital needs, and abilities to fund them appropriately.

Financial projections made in the 2015 study and planning steps taken by the Department subsequently have resulted in service-level improvements and a voter-approved (November 2017) increase in mill levy. This increase, which impacted the FY 2019 revenue stream, was intended for several capital improvement projects and, ultimately, the recurring expense of adding 11 new positions, which were to be phased in over several years following retirement of the Montana Department of Investments INTERCAP loan (for both station remodeling projects) most likely in 2021 or 2022.

Increased call volume has exceeded projections from the 2015 study, accelerating the need for additional resources and the funding to support them. The department is positioning itself to accommodate this additional workload through the study update. A status quo financial model is provided, which shows that additional financial capacity as a result of the increased mill levy is available to fund recurring expenses such as short-term debt service and, ultimately, additional personnel needed to address the increased service level demand.

The Department operates as an independent Rural Fire District under Title 7, Chapter 33, Part 21 of the Montana Code Annotated and is a separate political entity from Madison and Gallatin Counties governed and managed by an elected Board of Trustees. The largest source of department revenue is ad valorem property tax, which has generally increased from 50 percent of the total annual revenue stream in FY 2010 to approximately 60 percent as proposed in FY 2020. The Department has one fund, the General Fund, which accounts for all department revenue and expense and is the subject of the following discussion. The Department operates on a July 1 to June 30 fiscal year using the economic resources measurement focus and an accrual basis for budgeting and accounting purposes.

The following figure provides a comparison of several key metrics between the 2015 and current studies. The fire district is a rural resort community supported by tax revenues through both Gallatin and Madison Counties with a combined assessed property value that has increased from \$49 million to \$55.2 million since that last study. This represents an increase of 12.7 percent over the period or approximately 3 percent annually mirroring the rate of increase reported in the previous master plan. The District's operating budget has more than doubled since the 2015 study, increasing from approximately \$2.1 million in FY 2015 to \$5.1 million in the FY 2019 adopted budget. Property tax revenue has increased from \$1.8 million to a projected \$3.4 million. These increases correlate with the increase in assessed values and mill rates for Gallatin and Madison Counties that have increased from 22.71 to 66.65 mills and 19.38 to 59.2 mills, respectively.

Another very important revenue source is the Resort Tax historically provided to the Department through an annual application process to the BSRAD board and used for both operating and capital expenses. This revenue source has varied considerably from a low of 14 percent of the total revenue stream in FY 2015 to a high of 38 percent in FY 2018. However, it has generally averaged between 15 and 24 percent.

**Figure 12: Operating Budget and Financial Resources**

Finance Resources	2015	2019 Update
<b>Designated Fiscal Year</b>	July 1–June 30	
<b>Assessed Property Value</b>	\$23 M (Gallatin County) \$26 M (Madison County)	\$25.2 M (Gallatin County) \$30 M (Madison County)
<b>Operating Budget</b>	\$2.1 M	\$5.1 M
<b>Property Taxes</b>	\$1.8 M	\$3.4 M
<i>Levy Rate (FY 2012–15 and FY 2016–19)</i>	<b>Gallatin:</b> 22.71, 22.82, 23.43, 23.77 <b>Madison:</b> 19.38, 19.66, 19.28, 20.06	<b>Gallatin:</b> 47.28, 46.75, 37.19, 66.65 <b>Madison:</b> 34.48, 35.31, 40.58, 59.2
<i>Collection Rate</i>	Approximately 99%	
<b>Resort Tax</b>	\$382,000	\$952,471

ESCI completed an updated analysis of historical revenues and expenses for the fire district for the period FY 2010 through FY 2018 actual. Data for the actual revenue, expense, and fund balance were derived from the Department's annual financial audits while adopted FY 2019 and proposed FY 2020 budget data as provided by department staff are shown for comparison.<sup>1</sup> This analysis helped identify relevant financial trends, strengths, and weaknesses and informed the status quo financial forecast presented later in this section.

<sup>1</sup> Annual financial audits for the period FY 2014 through FY 2016 were completed by the firm of Holmes & Turner, CPA located at 1283 North 14th Avenue, Suite 201, Bozeman, Montana. Annual financial audits for the period FY 2017 through FY 2018 were completed by the firm of Rosie Barndt, CPA, P.C. located at 3382 Monida Street, Bozeman, Montana.

## Revenue

The following figure shows recurring and nonrecurring revenues for the period FY 2014 through FY 2018 actual as well as adopted FY 2019 and proposed FY 2020. Recurring revenues are those that can be reasonably expected to continue on a year-to-year basis in a generally predictable manner such as property and other taxes, resort tax funding, investments/interest, and billing for various services such as ambulance transport. Nonrecurring revenues are those that are finite in nature, such as grants and sales of surplus equipment, or difficult to predict year to year, such as loan proceeds, impact fees, donations, interest, and other miscellaneous income.<sup>2</sup>

**Figure 13: BSFD Revenue: FY 2014 Actual through FY 2020 Proposed**

Revenue	2013-14 Actual	2014-15 Actual	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Adopted	2019-20 Proposed
Tax Revenue	\$ 1,247,727	\$ 1,833,293	\$ 1,557,235	\$ 1,710,222	\$ 1,687,895	\$ 3,438,814	\$ 3,562,859
Entitlement Levy	\$ 19,315	\$ —	\$ —	\$ —	\$ —	\$ 24,000	\$ 24,500
Resort Tax	\$ 494,000	\$ 382,000	\$ 563,891	\$ 658,850	\$ 1,520,430	\$ 952,471	\$ 916,971
Amb/Other Charges	\$ 274,402	\$ 481,204	\$ 413,853	\$ 430,724	\$ 556,858	\$ 429,600	\$ 475,000
Investment	\$ 6,059	\$ 7,384	\$ 11,272	\$ 13,692	\$ 10,408	\$ 12,000	\$ 12,000
<b>Recurring Revenue</b>	<b>\$ 2,041,503</b>	<b>\$ 2,703,881</b>	<b>\$ 2,546,251</b>	<b>\$ 2,813,488</b>	<b>\$ 3,775,591</b>	<b>\$ 4,856,885</b>	<b>\$ 4,991,330</b>
Impact Fees/Intergov	\$ 17,000	\$ —	\$ —	\$ 31,650	\$ 203,791	\$ —	\$ —
Grants	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 219,847	\$ 219,847
Sales of Assets	\$ 7,000	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Loan Proceeds	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 1,863,592	\$ —
Miscellaneous	\$ 14,946	\$ 7,637	\$ 36,156	\$ 19,365	\$ 16,788	\$ 8,500	\$ 8,500
Donation	\$ 1,490	\$ 37,353	\$ 6,375	\$ 1,730	\$ 5,200	\$ —	\$ —
<b>Nonrecurring Revenue</b>	<b>\$ 40,436</b>	<b>\$ 44,990</b>	<b>\$ 42,531</b>	<b>\$ 52,745</b>	<b>\$ 225,779</b>	<b>\$ 2,091,939</b>	<b>\$ 228,347</b>
<b>Total Revenue</b>	<b>\$ 2,081,939</b>	<b>\$ 2,748,871</b>	<b>\$ 2,588,782</b>	<b>\$ 2,866,233</b>	<b>\$ 4,001,370</b>	<b>\$ 6,948,824</b>	<b>\$ 5,219,677</b>

The bulk of the Department's revenue sources are recurring in nature, and the following figure shows total revenue (dashed line) for the historical period with recurring revenue shown as light blue bars and non-recurring as dark blue bars. Total annual revenue has generally increased from just over \$2 million in FY 2014 to just over \$4 million in FY 2018 for an average annual increase of approximately 17.8 percent although total revenue remained generally flat between FY 2015 and FY 2017. The large increase in total revenue between FY 2017 and FY 2018 resulted from a more than doubling of the resort tax amount from \$658,850 to \$1,520,430. Nonrecurring revenues were generally less than \$50,000 annually through FY 2017 after which they increased to over \$200,000 due to the addition of intergovernmental revenue in FY 2018, receipt of \$1,863,592 in FY 2019 from a State of Montana INTERCAP loan, and receipt of a federal SAFER Act Grant of approximately \$220,000 in FY 2019 and FY 2020, respectively.

<sup>2</sup> Impact fees are generally considered a recurring revenue source in growing communities. However, this source has been very sporadic and is no longer in place. Access to residual impact fee funds collected under the prior ordinance and still available is dependent upon the department requesting funds as needed.

Figure 14: BSFD Recurring vs Nonrecurring Revenue, FY 2014 Actual through FY 2020 Proposed

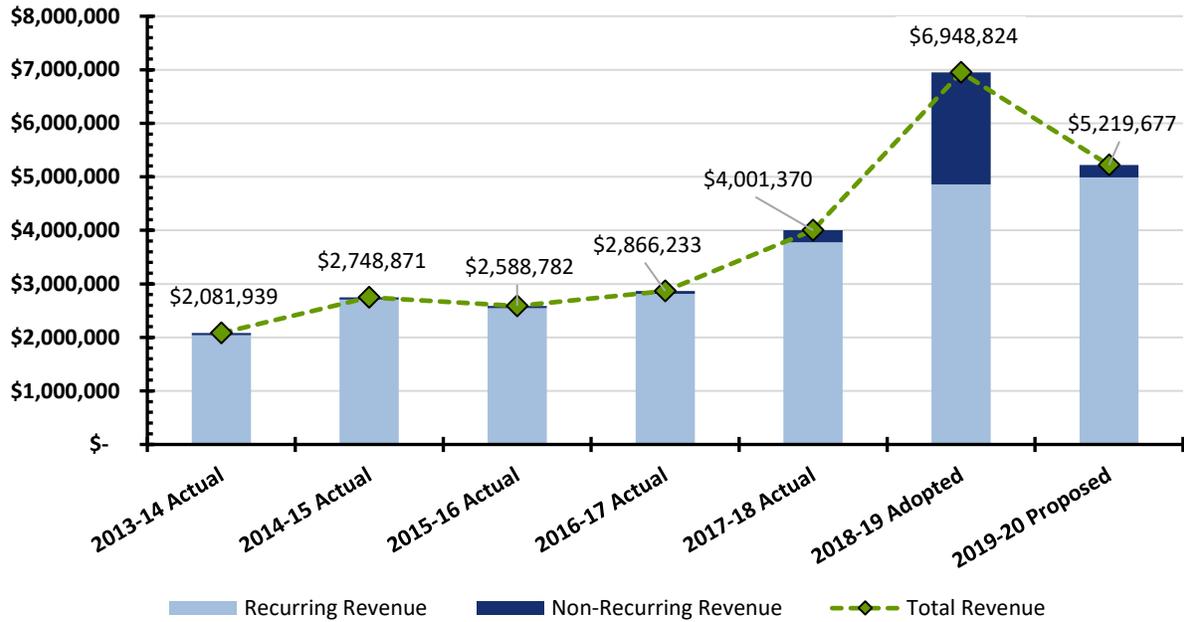
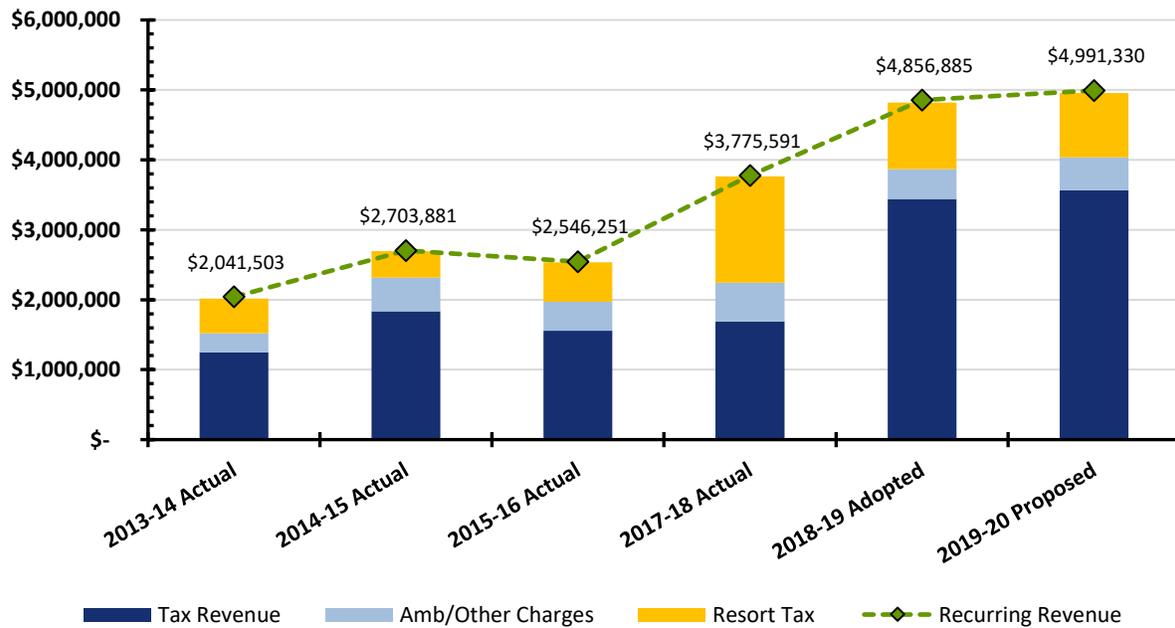
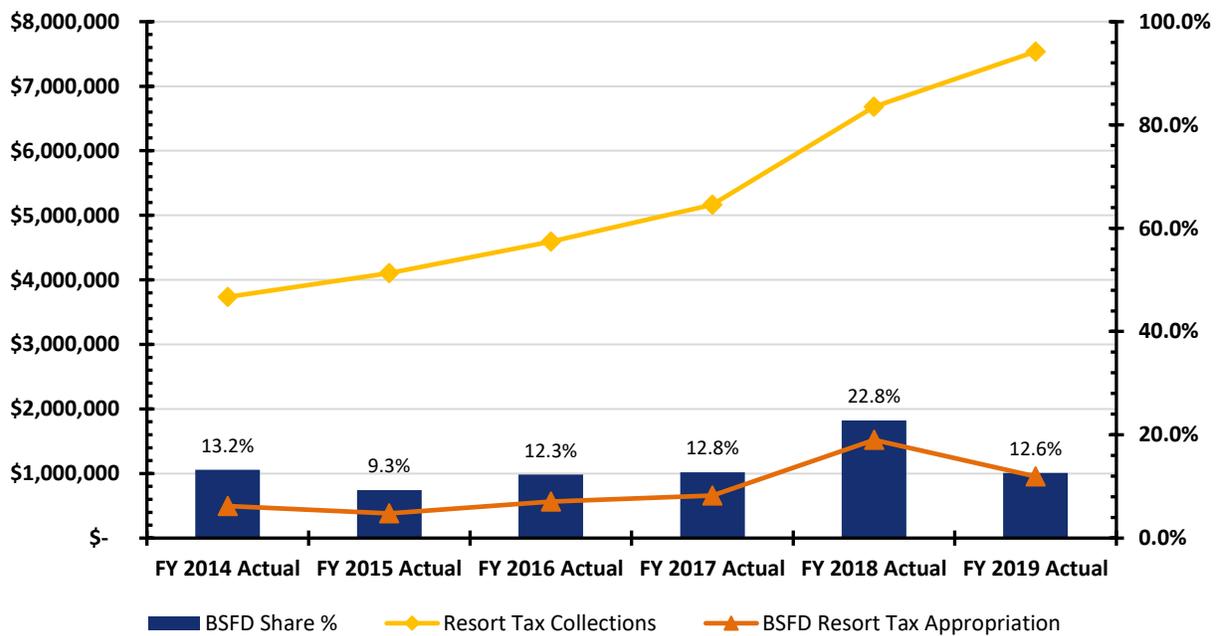


Figure 15: BSFD Major Recurring Revenue Sources, FY 2014 Actual through FY 2020 Proposed



One of the more significant recurring revenue sources as shown in the preceding figure is the Resort Tax provided each year by the Board of Directors of the Big Sky Resort Area District (BSRAD), which was formed by the voters in 1998 to disburse the 3 percent tax on luxury goods and services first approved by voters in 1992. This tax is used to fund various key community services such as public safety, water and sewer, transportation and housing, tourism development, and many others and is allocated by the board on annual basis through an application process. Each year, the various community service providers and programs apply to the Board for funding based upon their needs for operational and capital funding support. The Big Sky Fire District funds its CIP program exclusively through this revenue source with occasional equipment purchases from its other general revenues. Estimated funds available are publicly noticed on June 3 and then appropriated at the June 10 board meeting just ahead of the District’s start of the fiscal year on July 1.

**Figure 16: Big Sky Resort Area District Revenue Share, FY 2014 through FY 2019 Actual**



The preceding figure shows total Resort Tax collections for the period FY 2014 through FY 2018 actual and unaudited for FY 2019 (yellow line). The total annual appropriated amount may vary from actual collections in any given year. For example, the final total appropriation for FY 2019 (\$8,413,051) included \$876,278 in reserve funds from prior year collections. Also shown is the amount provided to the BSFD (orange line) through the appropriation process and its percentage of the total Resort Tax collected each year by the BSRAD (blue bars). The percentage of total Resort Tax annual collections received by BSFD has varied from a low of 9.3 percent in FY 2015 to a high of 22.8 percent in FY 2018. Resort Tax share is based each year on the Department’s proposed operating budgetary needs and the adopted CIP as approved for funding by the BSRAD Board of Directors and must be balanced against the other community needs funded by the Resort Tax.

Because of the tight timing of Resort Tax spending approval and the adoption of the BSFD budget, a high degree of uncertainty exists every year with respect to department revenue and the ability to fully fund operating needs. This uncertainty leads to difficult long-range financial planning. However, in 2018, the BSFD signed a Memorandum of Understanding (MOU) with the Big Sky Resort Area District wherein the BSRAD Board agreed to increase the amount of the Resort Tax it would remit to BSFD by three over the preceding year's amount in FY 2020 and again in FY 2021. According to BSFD staff, the MOU only covers operational costs, and the staff must still seek additional funding approval for CIP expenditures. The BSFD provides an updated CIP annually to BSRAD and has historically, fully funded annual BSFD requests.

### Expense

The following figure shows recurring and nonrecurring expenditures for the period FY 2014 through FY 2018 actual as well as adopted FY 2019 and proposed FY 2020. Recurring expenses are those that can be reasonably expected to continue on a year-to-year basis in a generally predictable manner such as employee costs, various operating costs, debt service (excluding voluntary one-time note payoffs), and routine equipment replacement. In some cases, an annual amount for capital apparatus replacement is budgeted and can be considered a recurring expense based upon an approved long-range apparatus replacement program. Nonrecurring expenses are those that are finite in nature such as fire station construction (or renovation) and associated costs, major capital apparatus and equipment purchases, and early payment or payoff of prior debt (for example, partial repayment of INTERCAP loan in FY 2020).

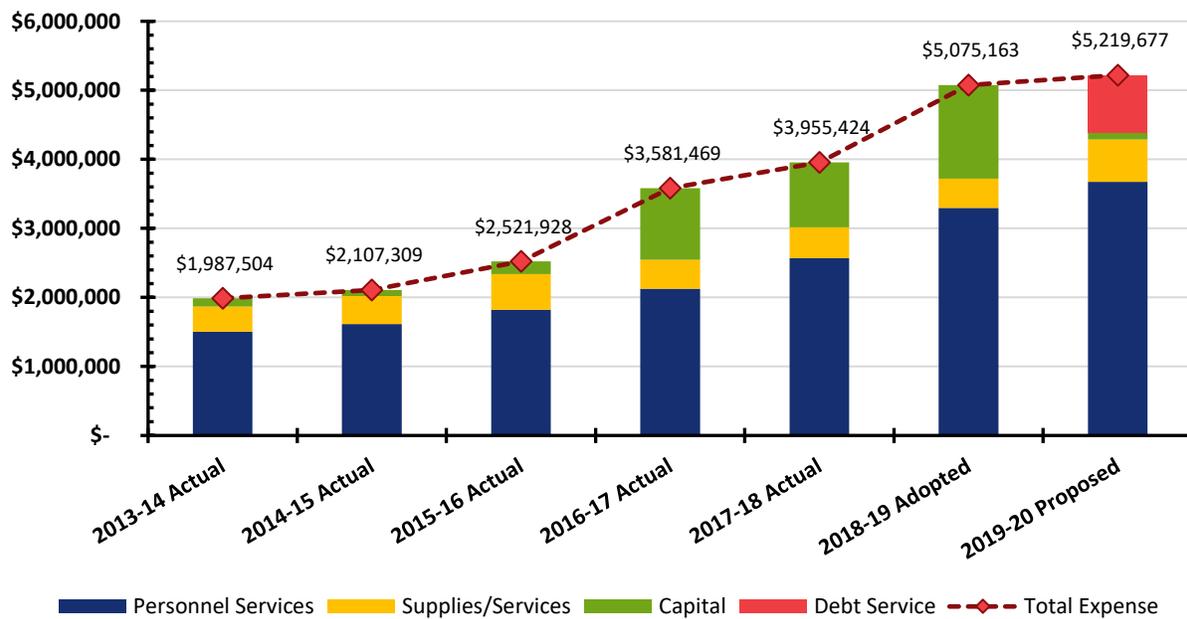
**Figure 17: BSFD Expense, FY 2014 Actual through FY 2020 Proposed**

Expense	2013-14 Actual	2014-15 Actual	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Adopted	2019-20 Proposed
Pers Services	\$ 1,505,230	\$ 1,615,880	\$ 1,823,015	\$ 2,124,236	\$ 2,567,161	\$ 3,298,526	\$ 3,672,500
Supply/Services	\$ 361,629	\$ 405,494	\$ 516,357	\$ 420,488	\$ 448,031	\$ 420,000	\$ 613,500
Debt Service	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 833,677
Capital	\$ 120,645	\$ 85,935	\$ 182,556	\$ 1,036,745	\$ 940,232	\$ 1,356,637	\$ 100,000
<b>Total</b>	<b>\$ 1,987,504</b>	<b>\$ 2,107,309</b>	<b>\$ 2,521,928</b>	<b>\$ 3,581,469</b>	<b>\$ 3,955,424</b>	<b>\$ 5,075,163</b>	<b>\$ 5,219,667</b>

Between FY 2010 and FY 2016 and prior to the large capital apparatus replacement and building projects funded in FY 2017 and FY 2018 actual and in the adopted FY 2019 and proposed FY 2020 budgets, the department averaged \$156,000 in capital spending annually. This can be considered a recurring expense and when added to the total Personnel Services and Supplies/Services categories of spending resulted in 26.7 percent average annual increase in recurring spending between FY 2014 and FY 2018. Part of this increase in Personnel Services included the addition of new staff but also included increases in wages and benefits.

The large increase in capital spending begun in FY 2017 and shown in the following figure was accomplished through use of excess fund balance and the acquisition of an INTERCAP loan. The District has been diligent in building its financial reserves in order to meet a goal of maintaining a 25 percent reserve for cash forward as recommended by its auditor and to assist in funding capital facilities projects. The bulk of BSFD capital expenditures for apparatus and equipment replacement as shown in the 20-year CIP are funded entirely through Resort Tax revenue from the BSRAD. Minor and sporadic capital purchases have been made using other general revenues.

**Figure 18: BSFD Expense by Major Category, FY 2014 Actual through FY 2020 Proposed**



Except capital projects and replacement apparatus and equipment acquisition, which are funded through excess fund balance, loan proceeds, and Resort Tax revenues, Personnel Services costs (payroll and benefits) are the largest recurring expenditure category and represent approximately 75 percent of total budgeted operating expenses through FY 2016. Personnel costs include 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 as well as payroll taxes.

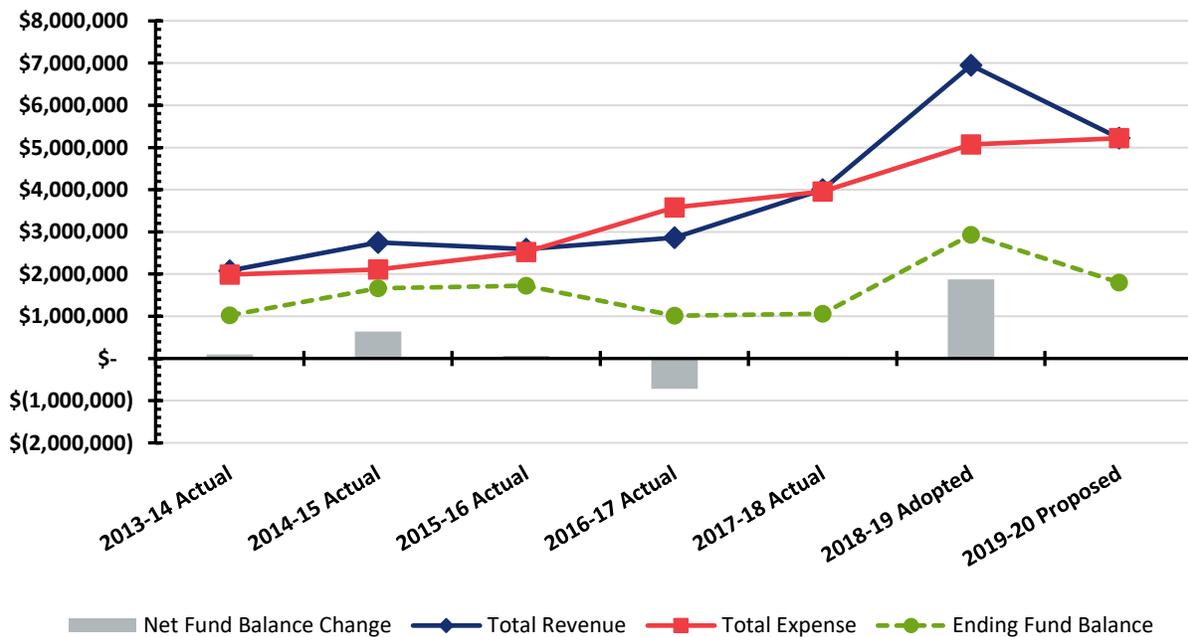
The next largest expense category is Supplies and Services (almost 20 percent), which include supplies, maintenance, subscriptions, utility services, etc.

### Net Operating Gain (Loss)/Fund Balance

The following figure shows revenue, expense, net operating gain or loss, and ending fund balance for FY 2014 through FY 2018 actual and as budgeted in the adopted FY 2019 and proposed FY 2020 budgets. Total revenue is shown in blue, total expense in red, and the net gain or loss is shown as bars. Ending fund balance is shown as a dashed line. If expense exceeds revenue in any given year, such as in FY 2017, there is a net loss reducing ending fund balance and reducing beginning fund balance and thus total financial resources in the subsequent year unless other revenue sources are increased. Conversely, when revenue exceeds expense, there is a net gain in ending fund balance as seen for most years in the figure.

The department has generally kept a fund balance of not less than \$1 million. Financial best practice as recommended by the Government Financial Officers Association (GFOA) provides guidance on how to account for fund balance and how much is recommended for various purposes.<sup>3</sup> All fund balance is currently considered unrestricted by BSFD. Formal BSFD policy should explain the level of unrestricted fund balance to be maintained, how it should be used, and how and over what time period it should be restored if used. Risk of various types, whether natural or man-made should be accounted for when developing fund balance policy. Specifically, GFOA recommends that governments maintain at least two months or just under 17 percent of operating revenues or expenditures at a minimum. As shown in the following figure, BSFD has maintained a fund balance between 31.9 and 66.6 percent of its annual recurring expenses for the period FY 2014 through FY 2018 well above the recommended 17 percent.

**Figure 19: Revenue, Expense, Net Change, and Ending Fund Balance, FY 2014 Actual through FY 2020 Proposed**



<sup>3</sup> <http://www.gfoa.org/fund-balance-guidelines-general-fund>.

### Status Quo Projection

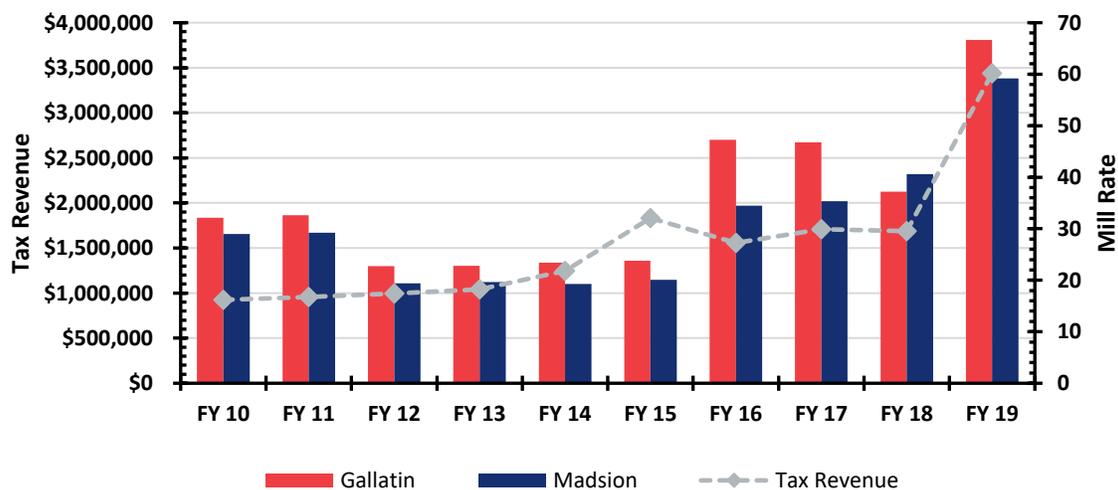
As part of this Master Plan update, ESCI developed baseline projections utilizing trend data, industry standards, department plans to the extent they are known, and inflation estimates. The following forecasts are not predictions based on future policy direction, nor are they recommendations as to what revenue 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 the Big Sky Fire District to review and revise as necessary its future forecasting model on an annual basis. The status quo forecast assumes no change to current service level even though there likely will be a need to add staff or make other changes. It does incorporate recommended capital equipment and replacement needs as defined in the capital improvement plan (CIP) as well as an annual amount needed each year for future capital replacement as discussed elsewhere in this report. The forecast can be used to determine the excess recurring revenue capacity available to accommodate those service-level upgrades.

The following key revenue and expenditure assumptions were utilized to develop the status quo forecast.

#### Revenue Assumptions

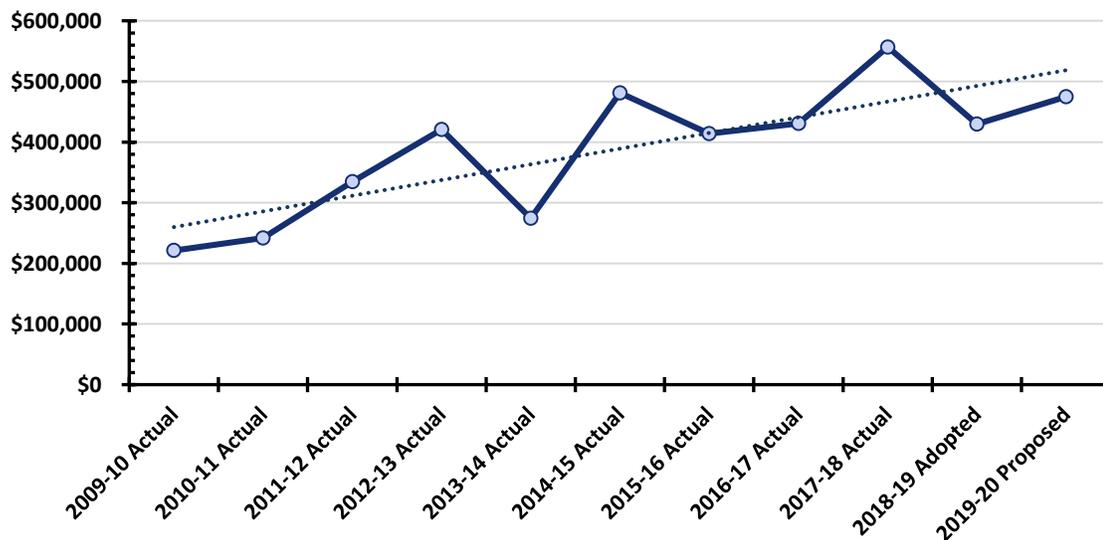
- Ad Valorem Tax** revenue has historically increased at an average annual rate of 7.8 percent between FY 2010 and FY 2018. (This is an average of two trends; a 4 percent increase from FY 2010–FY 2013 and a 10 percent increase from FY 2013–FY 2018.) Millage rates varied over the period as assessed values fluctuated in order to maintain a relatively consistent increase in revenue to fund the operating budget as shown in the following figure. The forecast assumes no increase in millage rate over the forecast period with an average annual increase in assessed value of 4 percent per year. The proposed FY 2020 revenue is used as the basis for the projection. Staff anticipates several large property developments added to the tax rolls, which will significantly increase assessed values. Thus, a 4 percent increase in assessed value would equate to a 4 percent average annual tax revenue increase with static mill rates.

**Figure 20: Gallatin/Madison County Historical Mill Rates vs. Combined Tax Revenue, FY 2010 Actual through FY 2019 Adopted**



- **Entitlement Levy**, although not reported in the annual financial audits from FY 2015–18, has historically grown by 4 percent annually. It is shown in adopted FY 2019 and FY 2020 budgets and is expected to be collected in the forecast period. The forecast assumes the FY 2020 amount in FY 2021 escalating at 4 percent per year.
- **Resort Tax**, appropriation based upon the MOU, is expected to increase at 3 percent annually over the FY 2020 proposed amount. The Resort Tax has been used to fully fund the CIP, and the MOU amount is only to be used for operational expenses. Given the limited revenue stream and competition for this revenue source, no additional funding beyond the FY 2020 amount (increased at 3 percent annually) has been forecast. It is understood that the BSRAD has the BSFD 20-year capital plan and is aware of the funding needs for this expense as well as the operational funding and will likely fully fund the CIP.
- **Ambulance/Service Fees**, although fluctuating from FY 2010–FY 2018 actual, have generally increased in a linear fashion by approximately 11 percent per year when the adopted and proposed amounts for FY 2019 and FY 2020 are considered, respectively. Staff reports that revenue fluctuations are due to several factors such as rate adjustments, a change to rate tiering for residents and nonresidents, and the significant growth in transport volume. The forecast assumes an average annual increase of 11 percent from the proposed FY 2020 amount.

**Figure 21: Historical Trajectory of Ambulance/Service Fees, FY 2010 Actual through FY 2020 Proposed**



- **Investment** income is expected to grow annually at a rate of approximately 1 percent per year from the proposed FY 2020 amount.
- **Impact Fees/Intergovernmental Revenues** have been very sporadic over the 10-year historical period since Gallatin County discontinued impact fees 10 years ago and the only revenue received since then has been due to variable intergovernmental revenues up to \$203,791 in FY 2018. Impact fee residual balance shown in the FY 2017 annual audit was reported as \$8,216. The forecast assumes neither additional impact fees nor further intergovernmental revenues.

- **Grant** revenue has been very limited over the 10-year historical period with approximately \$220,000 in SAFER Act funding in the FY 2019 and FY 2020 fiscal years expected. No additional grant funding is assumed in the forecast period.
- Loan Proceeds of \$1,863,592 were received by the District in FY 2019 to be used for the remodeling of two fire stations. This loan was obtained from the State of Montana INTERCAP revolving program and the District had a total available amount of \$1,863,592; all of which had been received as of the end of FY 2019.
- **Miscellaneous** revenue has averaged \$15,000 annually over the ten-year period and is assumed at that rate through the forecast period.
- Surplus property sales revenue is assumed to be zero during the forecast period.
- **Donations** have varied but are assumed to be approximately \$1,500 per year through the forecast period.

### Expenditure Assumptions

- **Personnel Services** are assumed to grow at an annual rate of 4.62 percent with no additional staff added although there are plans to add a Training Captain in FY 2019 and a Community Risk Captain and six firefighters after the INTERCAP loan is retired (timing not certain so these have not been added to forecast). Between FY 2010 and FY 2015, benefits were approximately 30.3 percent of total compensation. This has grown to an average of 32.3 percent between FY 2015 and the present. Benefits are expected to increase at an annual rate of 8 percent (and remain at 32.3 percent of total compensation) whereas payroll expenses are expected to increase at an average of 3 percent annually (while remaining at 67.7 percent of total compensation).
- **Supplies and services** have historically risen in an almost linear fashion from FY 2010 actual through FY 2018 actual at an annual rate of 6.5 percent. Projection assumes FY 2021 expenditure of \$525,000 (down from FY 2020 proposed of \$613,500) increasing at 6.5 percent annually thereafter.
- **Debt Service** payment schedule for the INTERCAP loan requires two payments each year, one in August and one in February. The first payment of \$19,630 is due August 2019 with the second of \$80,216 in February 2020. The total principal and interest (P&I) on the first draw is \$72,310 according to the repayment schedule. However, the District has budgeted \$833,677 towards this loan in the FY 2020 proposed budget. According to staff, full repayment is likely in either FY 2021 or FY 2022. The forecast assumes full repayment of the principal and additional interest (estimated at \$38,000/year) in FY 2021. The amount of P&I is estimated at \$584,419.

- Capital** apparatus replacement funding for future needs was estimated at \$154,000 annually (adjusted for inflation) in the 2015 Master Plan in order to maintain sufficient reserve funds to provide for cash purchases of needed apparatus according to the long-range apparatus replacement program. However, the CIP has been funded exclusively through BSRAD Resort Tax revenue rather than fund balance and only minor and sporadic capital equipment purchases have been made using other general revenues. Between FY 2010 and FY 2016, the department averaged \$156,000 annually in capital equipment and other expenditures in addition to the capital apparatus replacement program. The following figure shows the anticipated department capital equipment and apparatus needs in FY 2019 dollars through FY 2025. ESCI has observed industry costs, which have been built into the CIP needs estimate in the forecast, increasing at approximately 4 percent annually for apparatus and 2–3 percent for equipment. The forecast assumes that the department will purchase the equipment and apparatus shown in the CIP that follows.

**Figure 22: BSFD Capital Equipment/Apparatus Replacement Plan, FY 2020 through FY 2025**

Fiscal Year	Equipment	Lifespan	Number	FY19 Unit Cost	FY19 Total Cost
2020	Firefighter Turnout Clothing & Helmets	5	25	\$4,000	\$100,000
2021	Ambulance 1214 Remount	10	1	\$160,000	\$160,000
2022	Engine 1241/1997 Pierce Replacement	20	1	\$850,000	\$850,000
2023	Tender 1235/1997 Pierce Replacement	25	1	\$425,000	\$425,000
	Self-Contained Breathing Apparatus	10	30	\$8,000	\$240,000
2024	Brush 12/2003 Dodge/Hypro Replacement	20	1	\$130,000	\$130,000
	Cardiac Monitor/Defibrillator Replacement	8	4	\$37,000	\$148,000
2025	Command 1202 & 1204/2017 Vehicles	7	2	\$42,600	\$85,200
	Firefighter Turnout Clothing & Helmets	5	32	\$3,500	\$112,000

### Status Quo Forecast Results

Based upon the historical review of BSFD finances, the following status quo forecast uses the assumptions just outlined to assess the sustainability of operations at the current level through FY 2025. The forecast is based upon historical actual revenues and expenditures and informed assumptions about how those revenues and expenditures will change in the future. This scenario is considered a “current burn rate” service-level scenario with no new positions added and comparative year-over-year growth assumptions in revenues and expenses with anticipated future needs in capital improvements based upon the current apparatus replacement plan. The following figure shows the adopted FY 2019 and proposed FY 2020 budget figures as presented by BSFD staff along with the forecast revenues for the period FY 2021 through FY 2025. Total revenue is projected to increase from \$5.1 million in FY 2019 (excluding loan proceeds) to \$6.3 million by FY 2025 with the bulk of that growth coming in recurring revenue, which makes up 99 percent of the total revenue.

**Figure 23: Status Quo Revenue Forecast, FY 2021–2025**

Revenue	2018–19 Adopted	2019–20 Proposed	2020–21 Forecast	2021–22 Forecast	2022–23 Forecast	2023–24 Forecast	2024–25 Forecast
Tax Revenue	\$ 3,438,814	\$ 3,562,859	\$3,705,373	\$ 3,853,588	\$ 4,007,732	\$ 4,168,041	\$ 4,334,763
Entitlement Levy	\$ 24,000	\$ 24,500	\$ 25,480	\$ 26,499	\$ 27,559	\$ 28,662	\$ 29,808
Resort Tax	\$ 952,471	\$ 916,971	\$ 944,480	\$ 972,815	\$ 1,001,999	\$ 1,032,059	\$ 1,063,021
Amb/Other Charges	\$ 429,600	\$ 475,000	\$ 527,250	\$ 585,248	\$ 649,625	\$ 721,083	\$ 800,403
Investment	\$ 12,000	\$ 12,000	\$ 12,120	\$ 12,241	\$ 12,364	\$ 12,487	\$ 12,612
<b>Recurring Revenue</b>	<b>\$ 4,856,885</b>	<b>\$ 4,991,330</b>	<b>\$ 5,214,703</b>	<b>\$ 5,450,391</b>	<b>\$ 5,699,278</b>	<b>\$ 5,962,332</b>	<b>\$ 6,240,606</b>
Impact Fees/Intergovernmental	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Grants	\$ 219,847	\$ 219,847	\$ —	\$ —	\$ —	\$ —	\$ —
Sales of Assets	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Loan Proceeds	\$ 1,863,592	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Miscellaneous	\$ 8,500	\$ 8,500	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000
Donation	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
<b>Nonrecurring Revenue</b>	<b>\$ 2,091,939</b>	<b>\$ 228,347</b>	<b>\$ 15,000</b>				
<b>Total Revenue</b>	<b>\$ 6,948,824</b>	<b>\$ 5,219,677</b>	<b>\$ 5,229,703</b>	<b>\$ 5,465,391</b>	<b>\$ 5,714,278</b>	<b>\$ 5,977,332</b>	<b>\$ 6,255,606</b>

As shown in the preceding figure, by FY 2025 forecast tax revenues make up 69 percent of the total revenues. Resort Tax revenues are forecast to make up 17 percent of the total revenues by FY 2025 with ambulance/service fees anticipated to reach 12.8 percent.

**Figure 24: Status Quo Expense Forecast, FY 2021–2025**

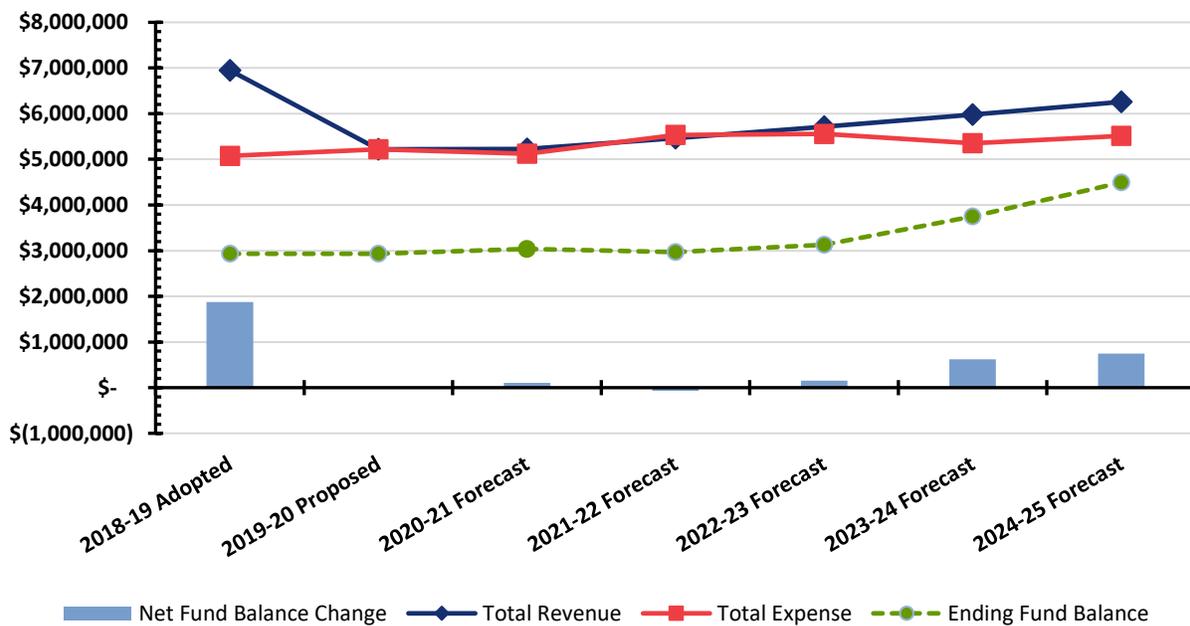
Expense	2018–19 Adopted	2019–20 Proposed	2020–21 Forecast	2021–22 Forecast	2022–23 Forecast	2023–24 Forecast	2024–25 Forecast
Personnel Services	\$ 3,298,526	\$ 3,672,500	\$ 3,841,986	\$ 4,019,294	\$ 4,204,784	\$ 4,398,835	\$ 4,601,841
Supplies/Services	\$ 420,000	\$ 613,500	\$ 525,000	\$ 559,125	\$ 595,468	\$ 634,174	\$ 675,395
Debt Service	\$ —	\$ 833,677	\$ 584,419	\$ —	\$ —	\$ —	\$ —
Capital	\$ 1,356,637	\$ 933,677	\$ 223,056	\$ 1,008,134	\$ 811,054	\$ 377,812	\$ 292,428
<b>Total Expense</b>	<b>\$ 5,075,163</b>	<b>\$ 6,053,354</b>	<b>\$ 5,174,461</b>	<b>\$ 5,586,553</b>	<b>\$ 5,611,306</b>	<b>\$ 5,410,820</b>	<b>\$ 5,569,664</b>

As shown in the preceding figure, expenses are forecast to increase from \$5.1 million in FY 2019 to approximately \$5.6 million by FY 2025. Personnel Services will make up 82.6 percent of total expenditures in FY 2025 while Supplies/Services will comprise 12.1 percent and annual capital need will comprise 5.3 percent. Note that the forecast does not show any major capital facilities projects expenditures that would require utilization of reserve funds. The only capital expenses shown in the status quo forecast are the specific capital equipment and apparatus replacement expenditures identified in the Department's CIP.

While revenue grows at a steady rate from FY 2021, forecast expenditures as driven by the CIP and early loan repayments will vary from amounts increasingly less than revenues as in FY 2023 through FY 2025 to slightly greater than revenues as in FY 2022 and shown in the following figure. The ending fund balance hovers around \$3.0 million through FY 2023 after which it increases to \$4.5 million by FY 2025. This suggests the District has the capacity in recurring revenue to add positions by FY 2023 to FY 2024. This also assumes an early loan payoff. Should the District extend the debt service, staff could be added earlier in the forecast period without a negative impact on fund balance.

If the BSFD adopted a fund balance policy requiring a 2.5-month operating reserve, that would equate to approximately 20 percent of beginning fund balance each year. In that case, the difference between 20 percent of beginning fund balance and the actual amount would be available either for one-time capital replacement or construction costs or for recurring expenses such as the addition of staff. The next figure shows the forecast revenue, expense, net operating gain or loss, and impact on ending (or beginning for the subsequent fiscal year) fund balance. Beginning fund balance remains at approximately \$3.0 million a year through the beginning of FY 2024 and exceeds 20 percent of operating expenses by almost \$2 million through FY 2024 after which beginning fund balance increases significantly suggesting that there may be sufficient revenue to add additional personnel, at least incrementally, without increasing revenue.

**Figure 25: Revenue, Expense, Net Change, and Ending Fund Balance, FY 2018 Actual through FY 2025 Status Quo Forecast**



It is clear from the status quo forecast shown in the preceding figure that BSFD has some capacity and flexibility with the latest mill rate increase and potential new development (thereby increasing assessed values) for the addition of personnel and associated operating cost increases given the assumptions. However, importantly, the financial forecast is variably sensitive to assumptions regarding property values and associated mill rates, resort tax changes and the share received from the BSRAD, ambulance and other service fee variations, personnel and benefit costs (particularly health care and retirement changes), and other operating and capital expenses. The key to a successful financial future is constant vigilance while maintaining a conservative approach to spending and financial projection. ESCI recommends that BSFD utilize modeling like that just presented to make adjustments as financial data are updated each year or economic conditions change.

*Key 2015 Recommendation:*

- Develop a financial tracking and planning model to continually monitor revenue and expenditure trends, enabling the District to foresee conflicts and adjust accordingly.  
✓ Action: Completed.

*Other Recommendations:*

- Continue joint long-range planning with Big Sky Resort Area District's Board of Directors, and implement long-range sustainable funding plan through revised contractual relationship.
- BSFD should formally adopt a complete fund balance policy following GFOA best practices, which specify fund balance categories and minimums as well as replacement for funds used.
- Utilize financial modeling and update annually to maintain situational awareness and inform fiscal policy.

## MANAGEMENT COMPONENTS

In the earlier report, ESCI pointed out that, as an all-hazards emergency services provider in a growing community, BSFD faces challenges to organizational growth and management. It was predicted that community growth would continue, and accelerate, in the future, and the importance of the organization assuring that it prepares for future needs was underscored.

The management of the agency needs to be properly positioned to address current needs, as well as be prepared and nimble in regard to future, growing needs. Operational challenges will continue, and it will be essential that the management of the fire department address 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 managing itself, recommendations from the 2015 report, and changes that have been implemented since that writing.

### *Foundational Management Elements*

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.

The first, and most important, element of effective management is long-range master planning. BSFD had the considerable foresight to identify this need, engaging ESCI in the process in 2015. Typically, a master plan establishes a look into the future using a 10-to-15-year planning window. However, changes and growth in the Big Sky Fire District have moved so quickly that the Fire Chief found that the 2015 plan was already in need of updating, resulting in this study.

Another key element of effective planning is a strategic planning process. The strategic plan results in a three-to-five-year work plan, intended to guide the work effort of the entire organization toward a common set of goals and objectives. The process includes representation from every major interest group in the organization. Each person in the department should feel that their interests are represented by someone in attendance on the planning team.

ESCI recommended that the District complete a strategic planning process, to include the development, review, and annual update of its mission, values, and vision statements.

In response to the recommendation, BSFD has completed a plan titled "Big Sky Fire Department Master Plan/ISO Risk Mitigation Operations, Training, and Station Construction/Renovation Proposals." ESCI reviewed the document and found that, to a large extent, it serves the agency as a Strategic Plan, including very clearly defined goals and objectives in multiple areas, as well as financial projections and funding plans. The document is well done.

The plan goes beyond what is typically included in a Strategic Plan. Specifically, detailed information is included that identifies and quantifies the department's challenges in regard to staffing and station locations, as well as a summary of findings of a 2016 review by the Insurance Services Office (ISO), which lists a number of significant shortcomings that negatively affect the community insurance ratings.

While the document serves well in its intended purpose as a Strategic Plan, it lacks some fundamental elements that are typically included in such a plan. Specific recommendations from ESCI that are not detailed include the following:

- Completing an annual review of the organization's Mission, Vision, and Core Values statements
- Establishing administrative performance objectives
- Developing a stated Code of Ethics

ESCI notes that these elements may have been established in other processes and documents in the organization.

*Key 2015 Recommendations:*

- Undertake a strategic planning process.
  - ✓ Action: "Big Sky Fire Department Master Plan/ISO Risk Mitigation" plan has been developed and serves as the agency's Strategic Plan.
- Initiate an annual review of mission, values, and vision statements.
  - ✓ Action: Not included in the provided plan.
- Establish formal, annual administrative performance objectives.
  - ✓ Action: Not included in the provided plan.
- Develop a stated code of ethics.
  - ✓ Action: Not included in the provided plan.

### *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.

ESCI reviewed the BSFD's foundational documents and processes in 2015 and provided numerous recommendations regarding them. The recommendations fell in several areas including the process of updating and development of Standard Operating Guidelines (SOGs), the development of a structured planning process, which has been completed. Additionally, recommendations were made regarding increased public education outreach, maximizing availability of existing staff for emergency response and improving internal communications. All recommendations have been addressed at this time.

### *Challenges and Critical Issues*

As a part of the 2015 data collection, ESCI completed a survey to identify challenges that were facing the organization based on interviews with district leadership and staff. The following figure reflects the challenges that were identified at that time with the addition of updates that have occurred since that report to address the critical concerns.

**Figure 26: Challenges of the Future**

Challenge	BSFD Observations	2015 Comments and Recommendations	2019 Updates
<b>First Challenge</b>	BSFD operates 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.	11 additional full-time positions have been funded through a mill levy increase to improve response capabilities.
<b>Second Challenge</b>	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.	Hired Deputy Chief of Community Risk Management who is going to follow the Strategic Fire Vision 20/20 Community Risk Reduction standards to create a more targeted approach to the outreach and education.
<b>Third Challenge</b>	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.	Big Sky Medical Center (BSMC) opened to provide local emergency room coverage, decreasing out-of-district transports. Air ambulance has begun colocating at the BSMC during certain peak times, but ground transport routes remain fragile and easily compromised.
<b>Fourth Challenge</b>	Communications infrastructure—radios, phones, pagers—is failure-prone; Frequent failures occur.	Examine all methods to improve consistency and reliability of operational communications systems.	New 800-mHz radio site and microwave link are funded by the Resort Tax. Dual-band radios have been purchased. ROIP system is being used for phone radio control in the near future.
<b>Fifth Challenge</b>	Provide additional external training for further employee development and training.		Training funds have been expanded, and employees are routinely sent out of the area to obtain best practice training.

**Record Keeping and Documentation**

Also identified in 2015 was the absence of adequate document security. ESCI explained the need to implement an offsite computer server or backup system.

Additionally discussed was the lack of an annual report that is routinely distributed to elected officials, internal membership, and, most importantly, the general public. It was recommended that the District document response data, accomplishments, needs, and future challenges in the form of an Annual Report.

Generally, ESCI finds that all of the 2015 recommendations have been accomplished, or modified as needed, as summarized next:

*2015 Key Recommendations:*

- Conduct scheduled review and update as needed of rules and regulations.
  - ✓ Action: Review is currently underway and is ongoing.
- Identify a written process for the development and adoption of new SOGs.
  - ✓ Action: Established within SOGs.
- Establish a formal planning process to understand current and future critical issues/impacts.
  - ✓ Action: This Master Plan update is a portion of the planning process, along with the "Big Sky Fire Department Master Plan/ISO Risk Mitigation Plan" just discussed and multiple other planning and analysis communications.
- 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.
  - ✓ Action: New Deputy Chief of Community Risk Management who is actively addressing public education and community risk reduction areas.
- Maximize effort to leverage increased availability of existing staff (full-time or paid-on-call) for response.
  - ✓ Action: New full-time positions have been established with additional positions planned and funding identified.
- Improve internal communications systems within BSFD, administrative processes, staff meetings, minutes, etc.
  - ✓ Action: Regular officers' meetings and command staff meetings are being conducted and minutes distributed appropriately.
- Implement second computer records server either off site or cloud based.
  - ✓ Action: Completed.
- Create and publish a BSFD Annual Report noting all accomplishments, response data, and future challenges. Distribute throughout the community.
  - ✓ Action: An annual report is now produced, presented publicly, and posted on the Department's website.

## 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 workforce's commitment and sacrifice are key components impacting job satisfaction. This section provides an overview of BSFD's staffing configuration and management practices.

As stated earlier, ESCI found that multiple changes have taken place in the last few years, primarily aimed at addressing span of control concerns raised in the original report, as well as seeking to meet workload issues.

### *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 the 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.

In the previous report, ESCI expressed concerns with the Fire Chief's span of control and recommended that addition of a Deputy Chief's position to mitigate the concerns. Since that writing, a new Deputy Chief of Operations has been established, effectively addressing the Fire Chief's span of control. However, in addition, the District has also added a second Deputy Chief, assigned to oversee community risk assessment and management. The latter position is not often seen in smaller fire organizations; however, it is important, and forward thinking, in the instance of BSFD because of its very unique demographics, geography, and risk exposure.

### Discussion

The level of administration and support staffing was found to be 8 percent of the total BSFD staff in 2015. 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. The ratio will also generally be higher in agencies that provide EMS transport and undertake their own billing process, as BSFD does.

The Fire Chief was tasked with multiple responsibilities in 2015, including the majority of administrative work, emergency management, training oversight, support and logistic tasks, exceeding the capacity of one individual to address them all effectively. ESCI pointed out that the Fire Chief and Office Administrator were the only available office staff, at the time of the earlier plan, and indicated that both were overloaded. Since that time, the two Deputy Chief positions have been added, and three Battalion Chiefs are now in place and are assigned areas of responsibilities that effectively manage administrative demands on the other chief officers. The Administrative Officer now has an assistant, and additional tasks have been assigned to line captains in several instances. The result is effectively addressing workload but in addition has proven to have the side benefit of increasing individual interest and participation in district business and noted “buy in” to operations that was not present in the past.

Today, the Fire Chief, Office Administrator, and chief officer workload concerns expressed by ESCI have been addressed. The ratio of administrative and support staff has increased from 8 to 19 percent. The changes made since the previous recommendations have been necessary and are effective.

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

*Key 2015 Recommendation:*

- The Fire Chief should prioritize workload based on priority and increase delegation of operational and administrative responsibilities to other staff members.
  - ✓ Action: Duties and responsibilities have been effectively reconfigured to address concerns expressed by ESCI regarding span of control.
- Continue recruitment of Deputy Chief position.
  - ✓ Action: Deputy Chief of Operations position has been established and filled.
  - ✓ Action: An additional Deputy Chief position assigned to community risk management has also been established.

### *Emergency Response Staffing*

Adequate and effective staffing of a fire department requires an adequate number of properly trained emergency responders if an emergency is to be safely mitigated. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to the individuals involved.

Tasks that must be performed at a structure 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 the following:

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

Multiple improvements have taken place with the District’s staffing approach. Each shift now has a battalion chief position that was not in place in the past. As the organization continues to grow at a rapid pace, it is apparent and appropriate that BSFD has added the battalion chief positions to maintain an effective span of control at the line level.

Under the new staffing model, the Battalion Chief and Captain supervise an operational staff of 21 line personnel, an increase from 14 in 2015. Additionally, plans are in place, and funding is identified to add another six line personnel, which will occur when the current debt for fire station remodeling projects is satisfied, which is anticipated to occur in 2021 or 2022.

In the following figure, ESCI documents the staffing levels that existed in 2015, compared to current levels, and anticipated future staffing numbers.

**Figure 27: Staffing History and Projections\***

Staffing type	2015	2019	Projected by 2020	Projected by 2022
<b>Administrative and Support Staffing</b>	1 Fire Chief 1 Office Administrator	1 Fire Chief 2 Deputy Chiefs 1 Administrative Officer 1 Administrative Assistant	1 Fire Chief 2 Deputy Chiefs 1 Administrative Officer 1 Administrative Assistant 1 Training Captain	1 Fire Chief 2 Deputy Chiefs 1 Administrative Officer 1 Administrative Assistant 1 Training Captain
<b>Emergency Response Staffing</b>	15 full-time response personnel 12 paid-on-call personnel	21 full-time response personnel 4 paid-on-call responders	21 full-time response personnel 3 to 4 paid-on-call responders	27 full-time response personnel 0 paid-on-call responders

\*Note: A Community Risk Captain will be added at a later date in 2021 or 2022.

## Minimum Staffing Levels

Minimum staffing levels are those that are established by the agency as the least number of emergency responders that will be on duty at a given time. Although total personnel numbers are always higher, it is the minimum levels that must be considered in the analysis of the fire department's staffing adequacy.

In 2015, BSFD reported that there were five responders assigned to each shift, with a minimum staffing level of four personnel. That minimum enabled the District to staff one fire engine, or two ambulances, at any given time.

Today, there are 21 full-time personnel assigned as seven per shift. The minimum staffing level is five; however, that number is increased to six during peak winter periods, specifically Thanksgiving through late April. In 2019 and 2020, the addition of six full-time personnel will assign two more responders to each shift and will increase minimum staffing levels to seven.

## Discussion

When determining how many response personnel a fire department needs to have, there is no mandated requirement or no absolute rules for staffing numbers. There are, however, standards that are discussed in detail in this report. The published standards regarding firefighter staffing 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" (EFF) or "Effective Response Force" (ERF), is a determination that is made at the community level based on risk, capability, and citizen expectations.

Later, in the Service Delivery section of this report, resource concentration is identified and evaluated, and in 2015 it was found that BSFD was 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. That problem has improved considerably with the addition of full-time staff since the previous study and will improve further with the future addition of six responders. Even so, BSFD will remain challenged to field an effective response force in a timely manner.

Big Sky Fire Department is presented with a particularly unique situation due to its distance from mutual aid assistance in the event of a large incident or concurrent emergencies. Further, the ongoing and planned construction projects throughout the District are indicative of the pace of community growth and how that growth can be expected to continue, resulting in a steadily increasing workload for the fire department. The Department has, and will need to continue, to address staffing needs.

Finally, of particular note is the workload associated with emergency medical responses. Because BSFD is the sole provider of ambulance transport, EMS calls that require transportation to a hospital commit responders to sometimes lengthy trips, during which the ambulance and the crew are unavailable for other responses. With the number of EMS calls increasing, along with concurrent incidents, the staffing challenge is further complicated.

*Recommendations:*

- Continue to closely monitor the agency's ability to assemble an ERF in a timely manner.
- Make adjustments based on ERF capacity by adding full-time personnel as financial conditions allow.

## SERVICE DELIVERY AND RESPONSE 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. Additionally, ESCI highlights changes that have occurred between the 2015 Master Plan and the writing of this update.

The discussion begins with a baseline survey containing information upon which the subsequent discussion is built.

**Figure 28: Service Delivery and Performance**

Survey Components	Big Sky Fire Department, 2015 Observations	2019 Updates
<b>Service Demand</b>		
Current service demand (incidents)	589 (2014)	892 (2018)
<i>Tracked by incident type and temporal variation</i>	Tracked for Fire vs. EMS; Chief presents an annual report to trustees in January	Tracked in new RMS, data entry appears to have improved since 2015 report.
<i>Geographical call distribution</i>	No formal tracking. Personnel are aware.	Incident location (latitude/longitude) included in new RMS data.
<i>Demand zones based on population</i>	Not Applicable. FMZs in CAD-based on risk-hydrant/non-hydrant, Access limitation due to bridge, etc.	
<b>Resource Distribution</b>		
Facilities		
<i>Total area protected</i>	Taxing district 56.7 square miles. Actual response area larger.	Taxing district 80 square miles, respond to over 200 square miles total.
Number of fire stations	2	
<i>Number of stations staffed</i>	1	Station 2 will be staffed in second half of 2021.
<i>Number of stations unstaffed</i>	1	1
Apparatus		
<i>Apparatus appropriate to risk (fire, medical, special)</i>	Engines, ambulances, brush engines, aerial. Heavy rescue equipment distributed appropriately.	Engines, ambulances, brush engines, aerial. Heavy rescue equipment distributed appropriately.
Staffing		
<i>Adequate for initial attack of predominant risk</i>	2-In/2-Out policy in place. Minimum staffing for apparatus.	2-In/2-Out policy in place. Minimum staffing for apparatus.

Survey Components	Big Sky Fire Department, 2015 Observations	2019 Updates
<b>Resource Concentration</b>		
Effective response force		
<i>Defined by call type</i>	Run cards include mutual aid resources. Routine incidents dispatched as a general page for BSFD.	At current staffing level, BSFD can meet "2-In/2-Out" requirement at a structure fire. Cannot meet recommended ERF of 14–16 personnel for structure fire.
<i>Actual performance monitored</i>	None	
<b>Response Reliability</b>		
Workload analysis		
<i>Unit hour utilization</i>	Inadequate data points in RMS (Apparatus cleared time not recorded).	New RMS and better data entry allow tracking of UHU.
<i>Failure rate by station area or response zone</i>	Not Applicable	Track reliability and performance by station area, once Station 2 is staffed 24/7.
<i>Concurrent calls</i>	Data available in RMS. Not routinely monitored.	New RMS and better data entry allow tracking of concurrent calls.
<b>Response Performance</b>		
Response performance		
<i>Call processing time</i>	Data available in RMS or from CAD. Not routinely monitored.	Tracked in RMS.
<i>Turnout time</i>	Data available. No performance standard established. Monitored informally.	Invalid time stamps may be preventing accurate tracking. BSFD desires to comply with NFPA 1710.
<i>Travel time</i>	Data available. No performance standard established.	Invalid time stamps may be preventing accurate tracking.
<i>Total response time</i>	Data available. No performance standard established.	Dispatched to first unit on scene: All emergencies, 2017–2018, Average—10:23 80th percentile—14:14
Response-time goals		
<i>By response zone</i>	None	Consider using FMZs to establish performance goals based on risk and travel time.
<i>By incident type</i>	None	
<i>Actual response performance documented and published</i>	None	Tracked and reported in Chief's report to Fire District Board.
<b>Mutual/Automatic Aid</b>		
Given/received balance	19 Given/20 Received	26 Given/15 Received (2017–2018)
<i>Automatic aid incorporated in run cards/dispatch procedures</i>	Yes	Yes
<i>Interagency training and SOPs</i>	To some degree. Limited by distance between agencies.	Yes
<i>Signed mutual aid agreements and county plan</i>	Actively participates in county plan and other opportunities.	Yes

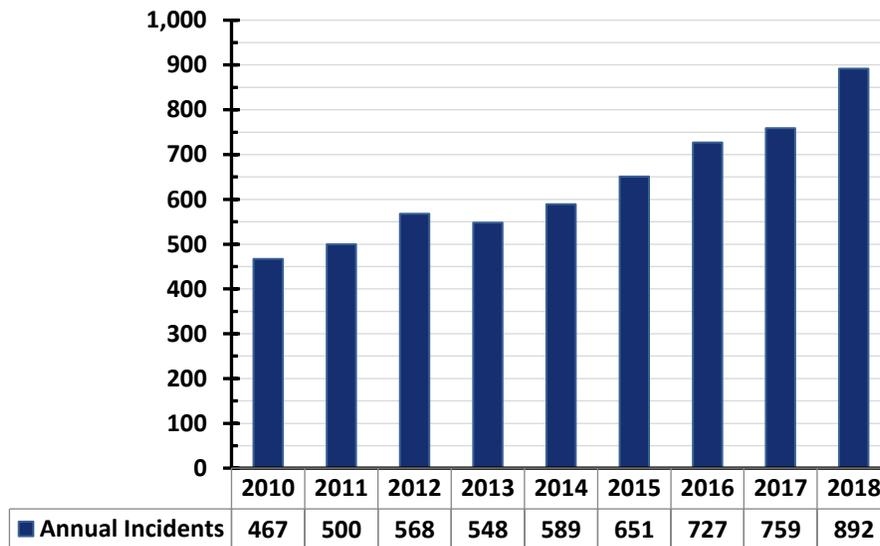
Survey Components	Big Sky Fire Department, 2015 Observations	2019 Updates
<b>Incident Control and Management</b>		
Incident command system		
<i>Incorporated in all emergency operations</i>	Yes	Yes
<i>Addressed in SOP or SOG</i>	Yes	Yes
<i>Addressed in training</i>	Yes	Yes

### 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 from the 2015 Master Plan and current data for 2017 and 2018 collected in the BSFD records management software (*Emergency Reporting Systems®*) are utilized to provide a view of historical service demand and current temporal variations.

The following figure demonstrates historical service demand from 2010 through 2018.

**Figure 29: BSFD Historical Service Demand, 2010–2018**



Between 2010 and the end of 2014, service demand increased by over 26 percent (26.1%). The preceding figure demonstrates that demand for BSFD services increased by over 51 percent (51.4%) between 2014 and the end of 2018. The average annual growth rate has increased from approximately 6.5 percent between 2010 through 2014 to nearly 13 percent between 2014 and the end of 2018. Overall, service demand grew by approximately 91 percent between 2010 and 2018 at an average annual rate of over 11 percent (11.4%).

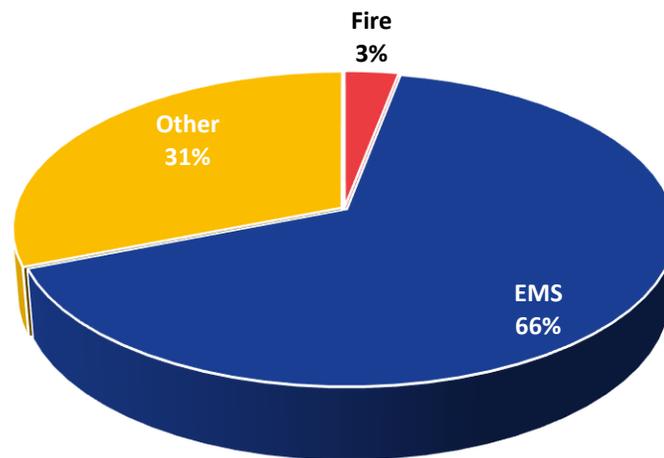
The next figure displays the nature of current service demand based on National Fire Incident Reporting System (NFIRS) incident categories.

**Figure 30: BSFD Service Demand by NFIRS Category, 2017–2018**

NFIRS Category	2017	2018	% of 2017–2018 Total
1—Fire	21	28	3.0%
2—Rupture/Explosion	0	1	0.1%
3—Rescue/EMS	515	581	66.4%
4—Hazardous Condition	29	36	3.9%
5—Service Call	23	46	4.2%
6—Good Intent Call	41	31	4.4%
7—False Alarm	122	166	17.5%
8—Severe Weather/Natural Disaster	1	1	0.1%
9—Special Incidents	6	2	0.5%
<b>Annual Incidents</b>	<b>758</b>	<b>892</b>	

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 MVAs 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 Incident Type, 2017–2018**

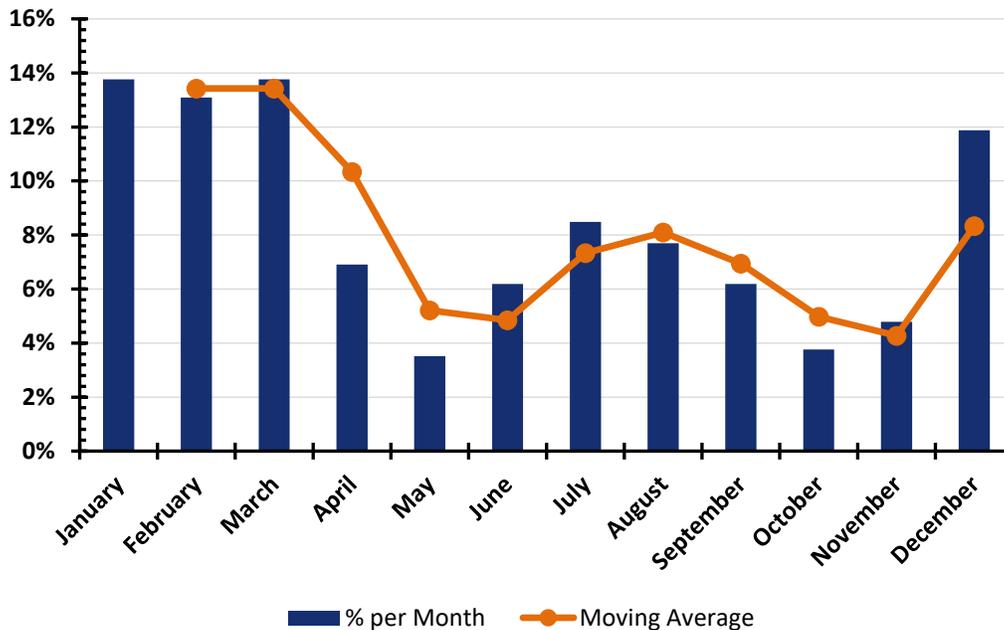


Overall, EMS incidents represent approximately 66 percent of current service demand. This is an approximately 4 percent increase since the end of 2014. As in the 2015 report, fires represent the smallest percentage of current service demand. The percentage of other incidents has decreased slightly since 2014. However, false alarms (NFIRS Category 7), which includes alarm or detector system malfunctions, still represent a majority (57 percent) of the “other” incident category. Overall, in 2017 and 2018, false alarms made up over 17 percent of BSFD service demand.

### Temporal Service Demand

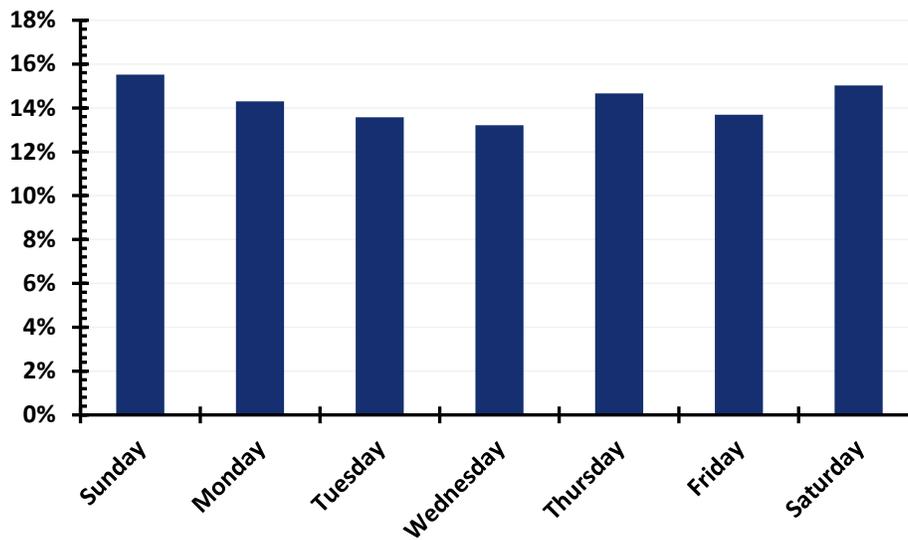
It is also useful to evaluate service demand temporally in order to determine if there are specific trends during certain periods where staffing can be modified to better fit the demand. The following figures display 2017 through 2018 service demand within the BSFD study area summarized by various measures of time.

Figure 32: BSFD Service Demand by Month, 2017–2018



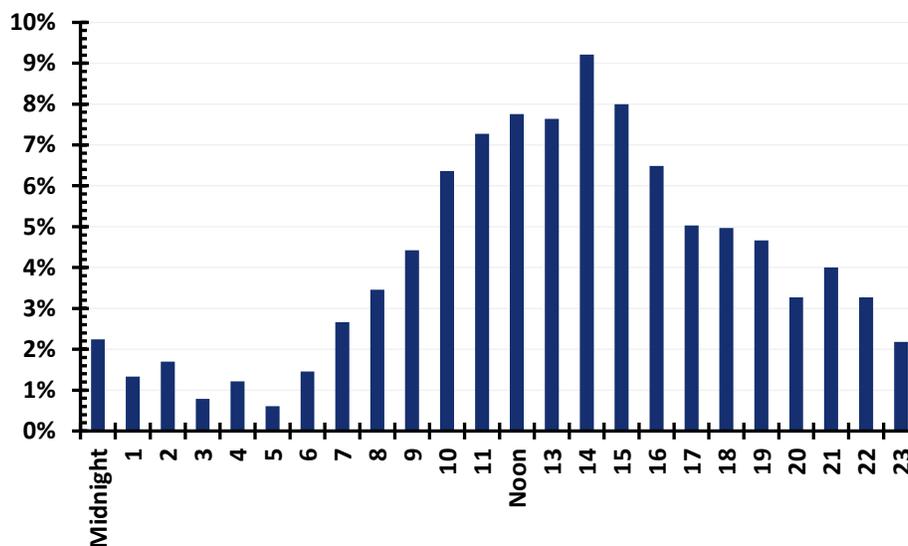
Over 52 percent (52.5%) of service demand displayed in this figure occurred in the months of December through March. Incidents exceeded 10 percent of total service demand in each of these months. The trend of increasing service demand during summer tourism season identified in the 2015 Master Plan also continued in the 2017 through 2018 data. The number of incidents between June through September increased by approximately 41 percent in the current data (2017–2018) when compared to the 2013 through 2014 data used in the 2015 Master Plan.

Figure 33: BSFD Service Demand by Day of the Week, 2017–2018



The highest demand for BSFD services occurred on Sunday, Saturday, and Thursday, with the lowest demand on Wednesday. The range is approximately 2.3 percent and is similar to the range seen in the 2013 through 2014 data.

Figure 34: BSFD Service Demand by Hour of Day, 2017–2018

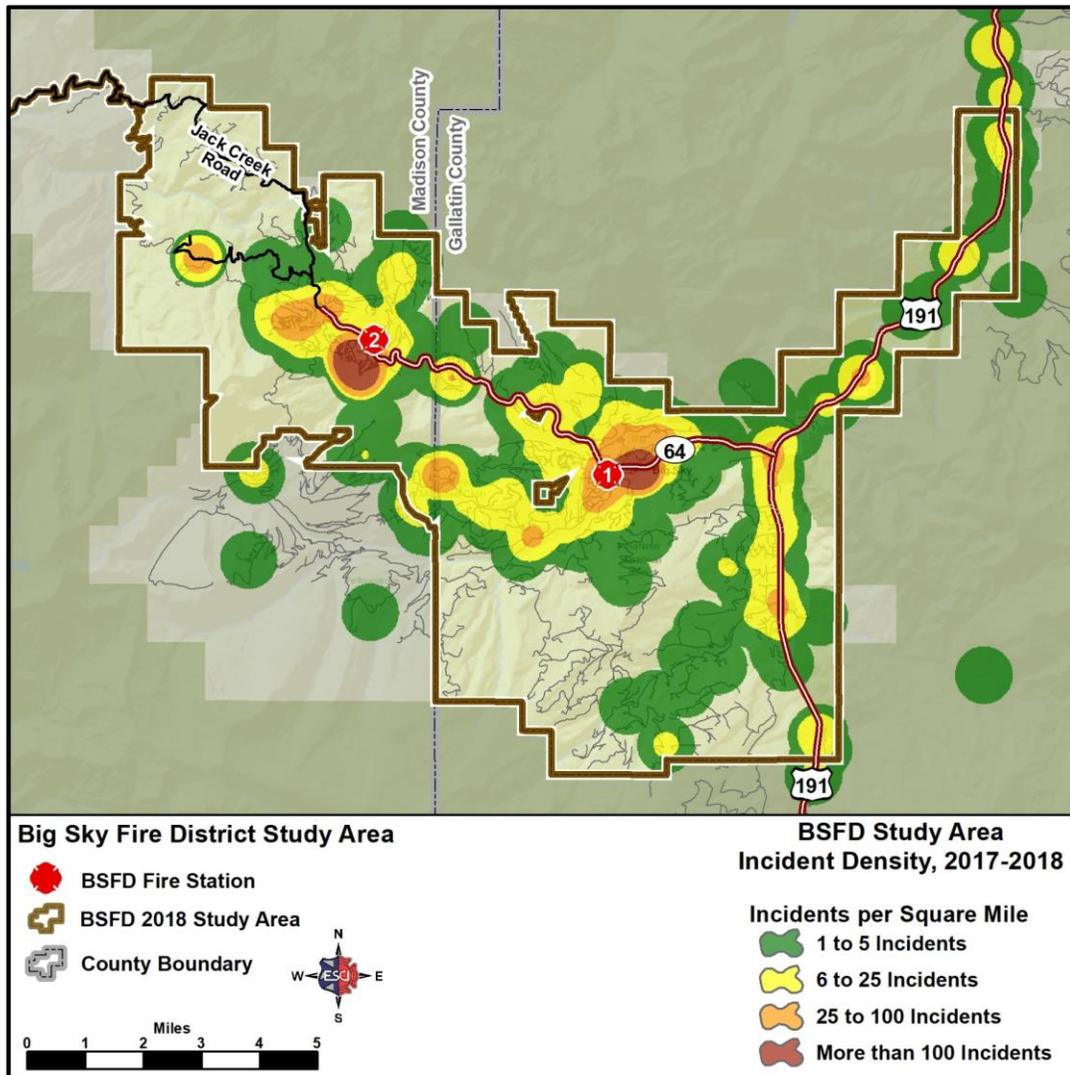


The pattern displayed in the preceding figure shows that service demand begins increasing throughout the workday and gradually decreases in the evening through the early morning hours. Approximately 75 percent of BSFD service demand occurred between 8 a.m. and 8 p.m. in 2017 and 2018. This pattern is common for fire and EMS jurisdictions across the country, and there has been no significant change in the pattern between the 2015 report and this update.

### Geographic Service Demand

In addition to the temporal analysis of workload, it is useful to examine the geographic distribution of service demand. ESCI uses incident location data from the BSFD RMS to plot the location and display incident density (incidents per square mile) in the BSFD service area in 2017 and 2018.

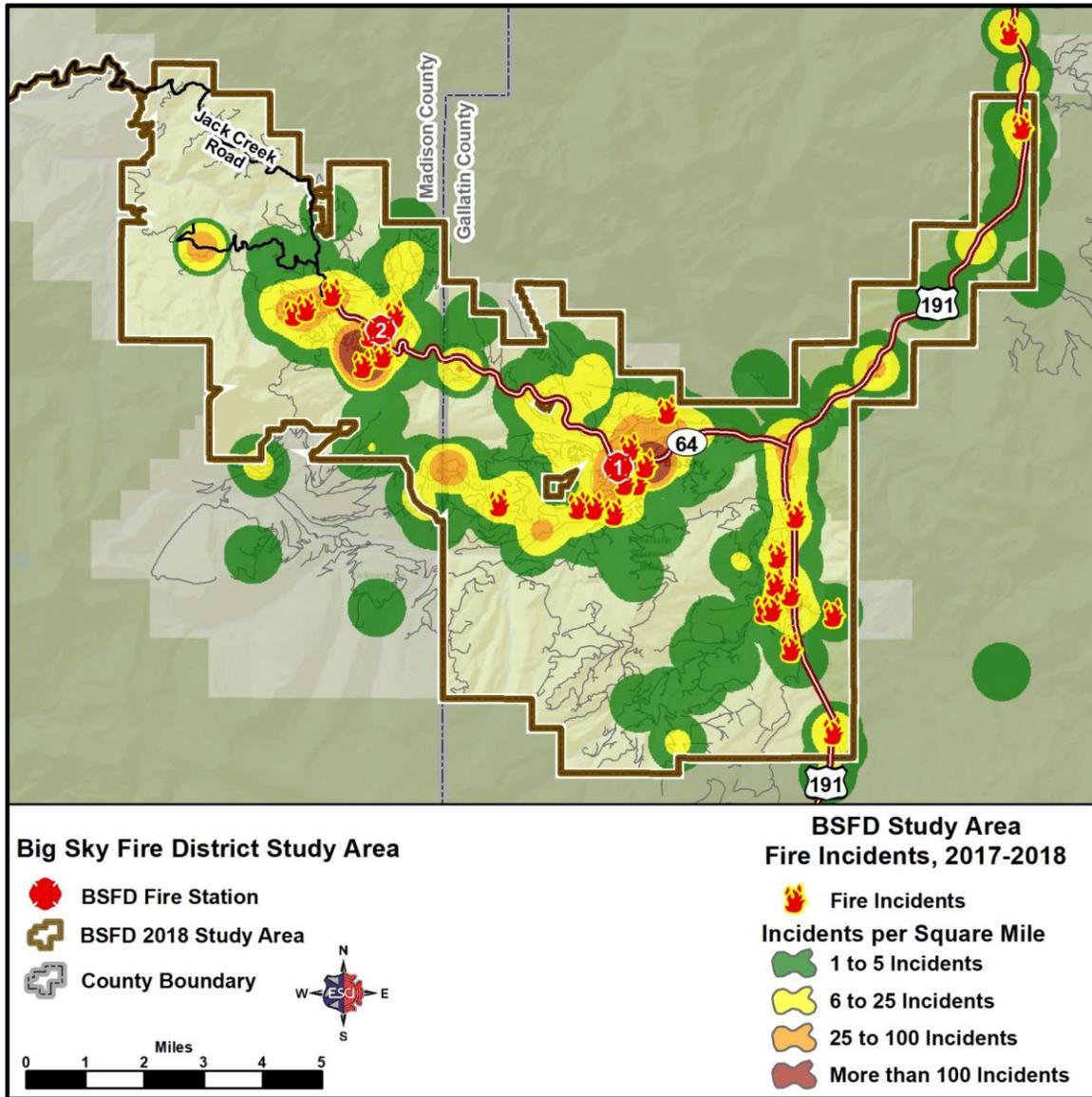
**Figure 35: BSFD Geographic Service Demand, 2017–2018**



Overall, there has been little change in the distribution of service demand in the BSFD service area between the 2015 Master Plan and the data displayed in this figure. Approximately, 46 percent of service demand inside the fire district boundary occurred in the area around Station 1 and the Big Sky Meadow Village area in Gallatin County. The area around Station 2 and the Big Sky Mountain Village and Resort in Madison County accounted for approximately 43 percent of service demand. Incidents along Highway 191 comprised approximately 11 percent of BSFD service demand in the District in the 2017 through 2018 data. Note that in 2017 through 2018, BSFD responded to 123 incidents (approximately 8 percent of total service demand) outside of the fire district boundary, primarily to the north and south of the District on Highway 191.

Most of the service demand displayed in Figure 35 are EMS incidents; the following figure displays the distribution of incidents coded as NFIRS Category 1—Fire in the BSFD 2017 through 2018 incident data.

Figure 36: BSFD Study Area Fire Incidents, 2017–2018

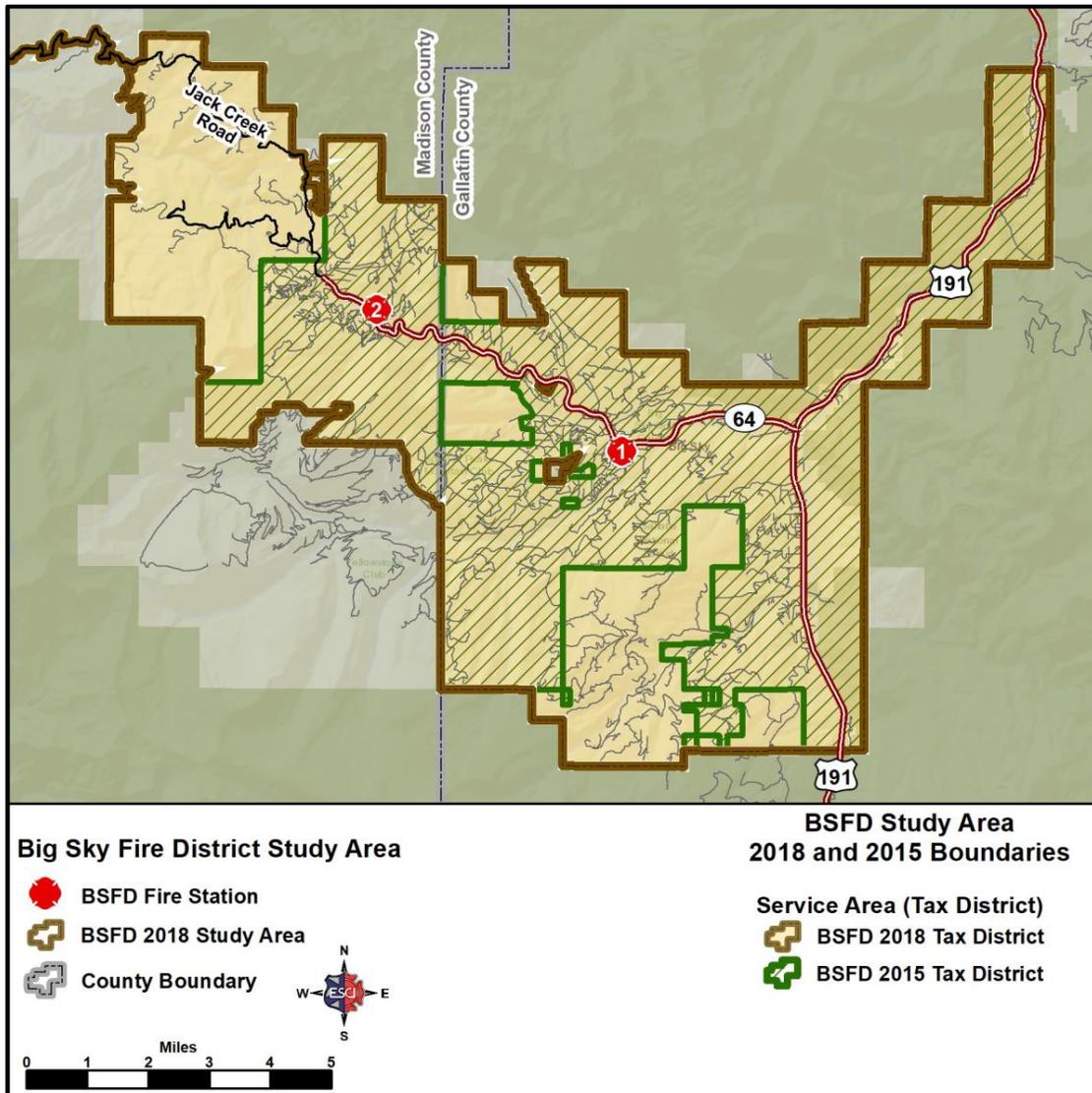


As in the 2015 report, fire incidents are the least frequent incident type in the data set. However, these incidents are distributed throughout the study area in a pattern similar to overall service demand.

### Distribution Analysis

The distribution analysis presents an overview of the current distribution of fire department resources within the Big Sky Fire Department service area. The following figure displays the current BSFD taxing district and the boundary as it existed in 2015.

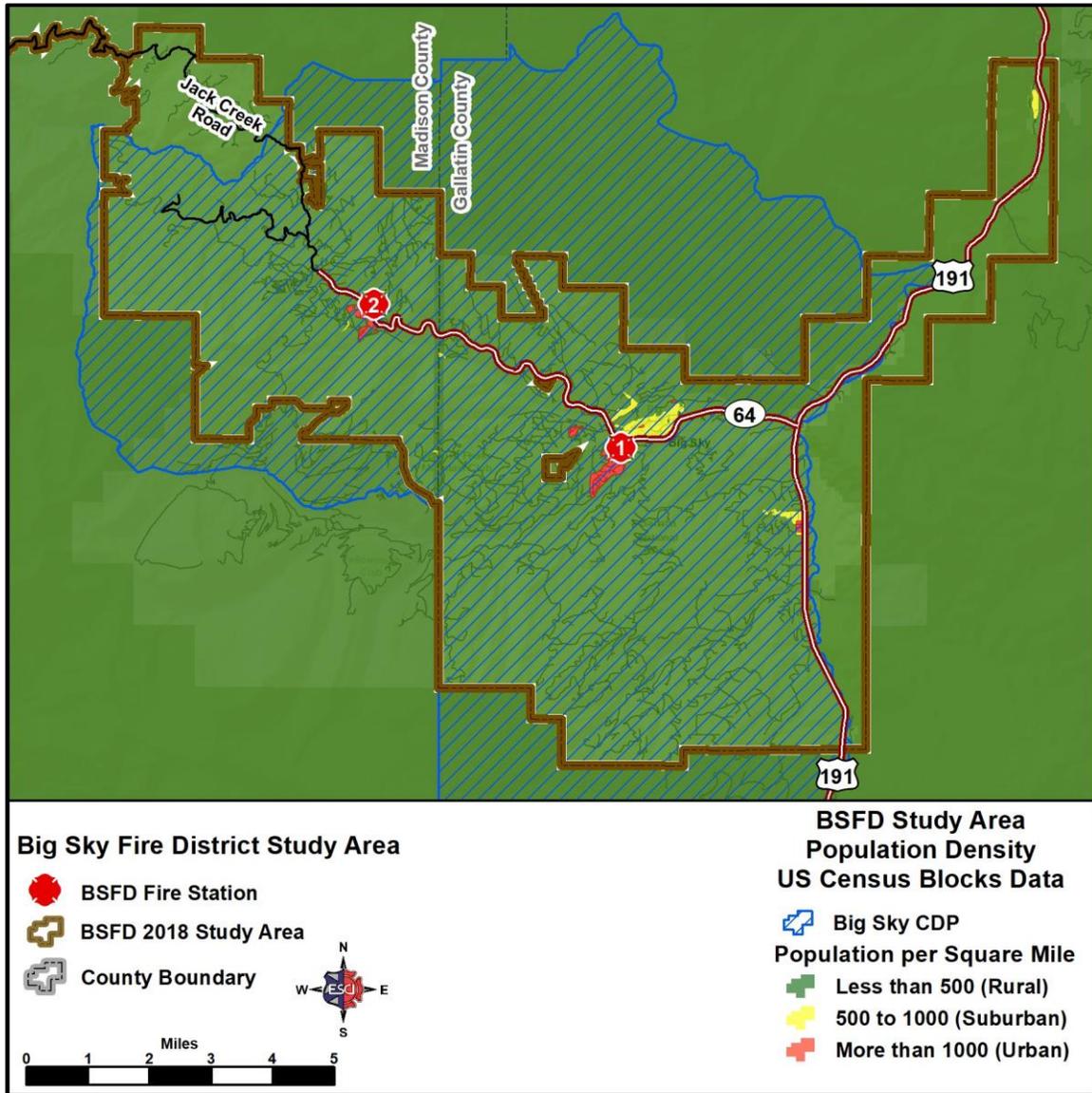
Figure 37: BSFD Study Area (2018)



As discussed in the Organizational Overview, the BSFD tax district grew from approximately 57 square miles to over 80 square miles (80.4 square miles) in 2018 as the result of annexations in Gallatin County and Madison County. The study area currently includes the unincorporated community of Big Sky, the Big Sky Resort, the Moonlight Basin development, vacation homes and seasonal rental properties, and rural residential areas. Highway 191 runs north to south along the eastern edge of the District, and Highway 64 (Lone Mountain Trail Road) runs east to west from Highway 191 to the Moonlight Basin area. The private Yellowstone Club Fire Department borders BSFD on the southwest, and the remainder of the District is surrounded by the Gallatin National Forest.

The following figure displays population density in the Big Sky Area, based on U.S. Census Bureau block data.

Figure 38: BSFD Study Area Population Density, U.S. Census Blocks

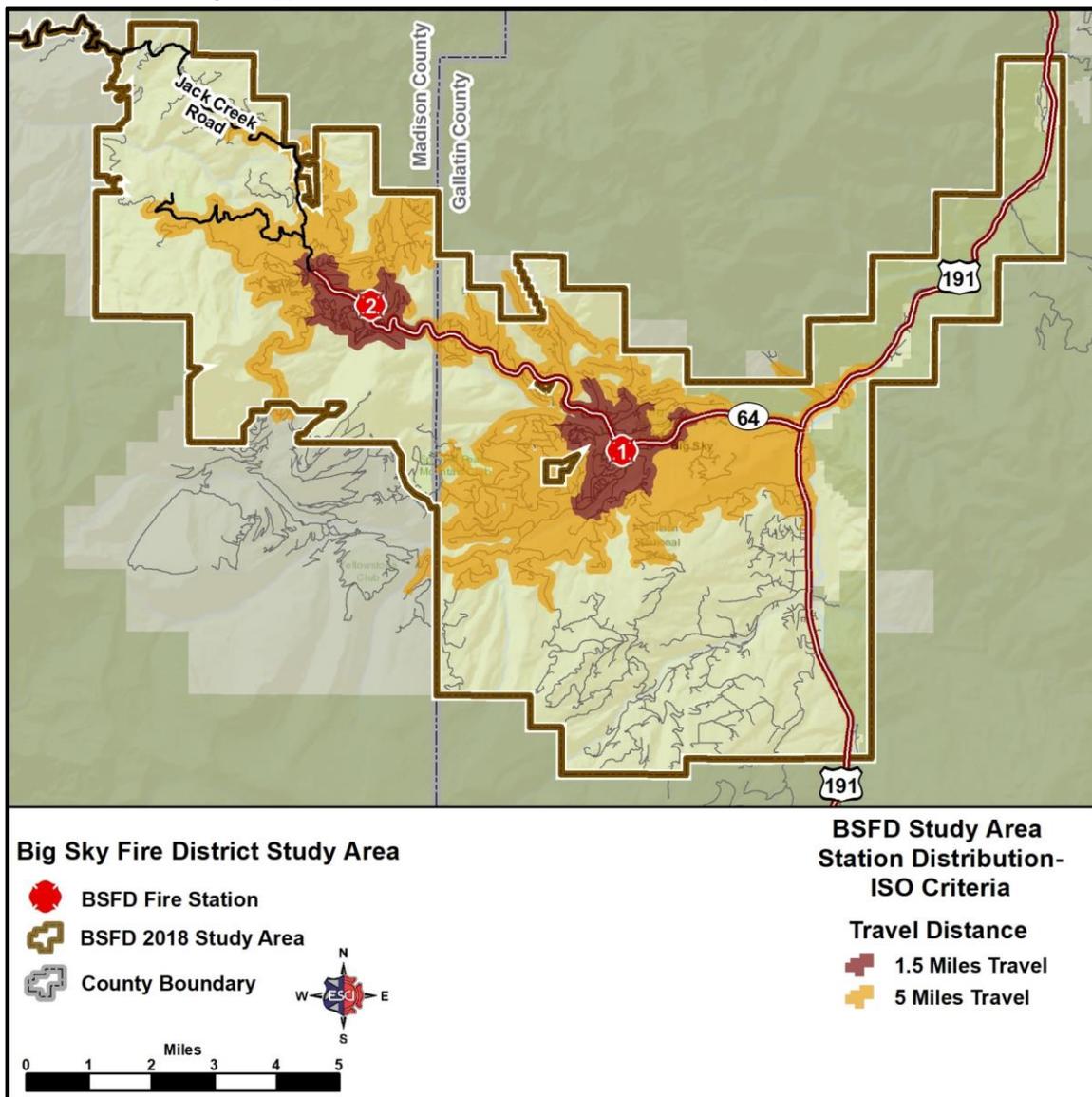


In general, the residential population in the service area is concentrated in the Meadow Village area around Station 1, the Mountain Village area around Station 2, and to a lesser degree along the Highway 191 corridor.

In 2015, ESCI estimated the residential population in the BSFD study area as slightly over 2,500 (2,518). The most current U.S. Census Bureau population estimate (July 1, 2017) for the Big Sky census designated place (CDP) is approximately 2,904. The Big Sky CDP roughly corresponds to the BSFD service area and captures most of the populated portions of the service area. The 2017 estimate represents an 8 percent increase over the 2014 Census Bureau estimate for the CDP and an increase of approximately 15 percent based on ESCI's estimate. As discussed in 2015, the residential population does not accurately reflect the population served by BSFD. Seasonal tourism and a work force that commutes into the area are still primary drivers of service demand in the BSFD service area. It is likely that much of the increased service demand experienced by BSFD since 2015 can be attributed to increased development activity and tourism. Additionally, future development such as that planned in Moonlight Basin and other areas and the resultant increase in tourism will continue to be primary drivers of service demand in the BSFD service area. Future population, demographics, and service demand are discussed later in this report.

The Insurance Services Office (ISO) is a national data analytics provider 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 because 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 ISO.

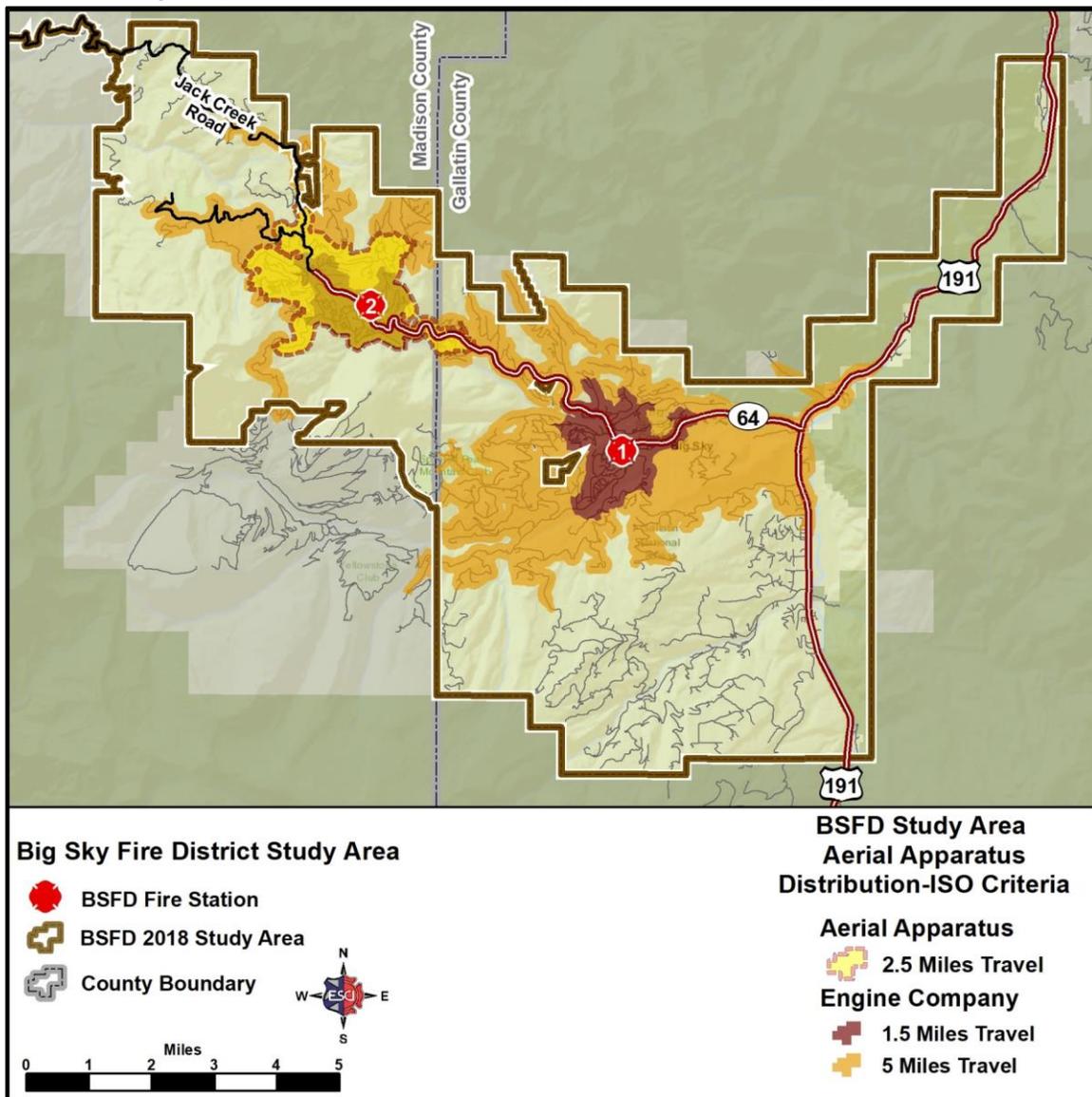
Figure 39: BSFD Study Area Station Distribution, ISO Criteria



Between 2015 and 2018, the percentage of structures within 1.5 miles of a fire station decreased slightly from 56 percent in 2015 to approximately 54 percent in 2019. Presently (2017–2018), 86 percent of structures are within 5 miles of a fire station compared to 87 percent in 2015. This can be attributed to increased building activity and to the annexations into the BSFD fire district.

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 or with high fire flow requirements, based on square footage. 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



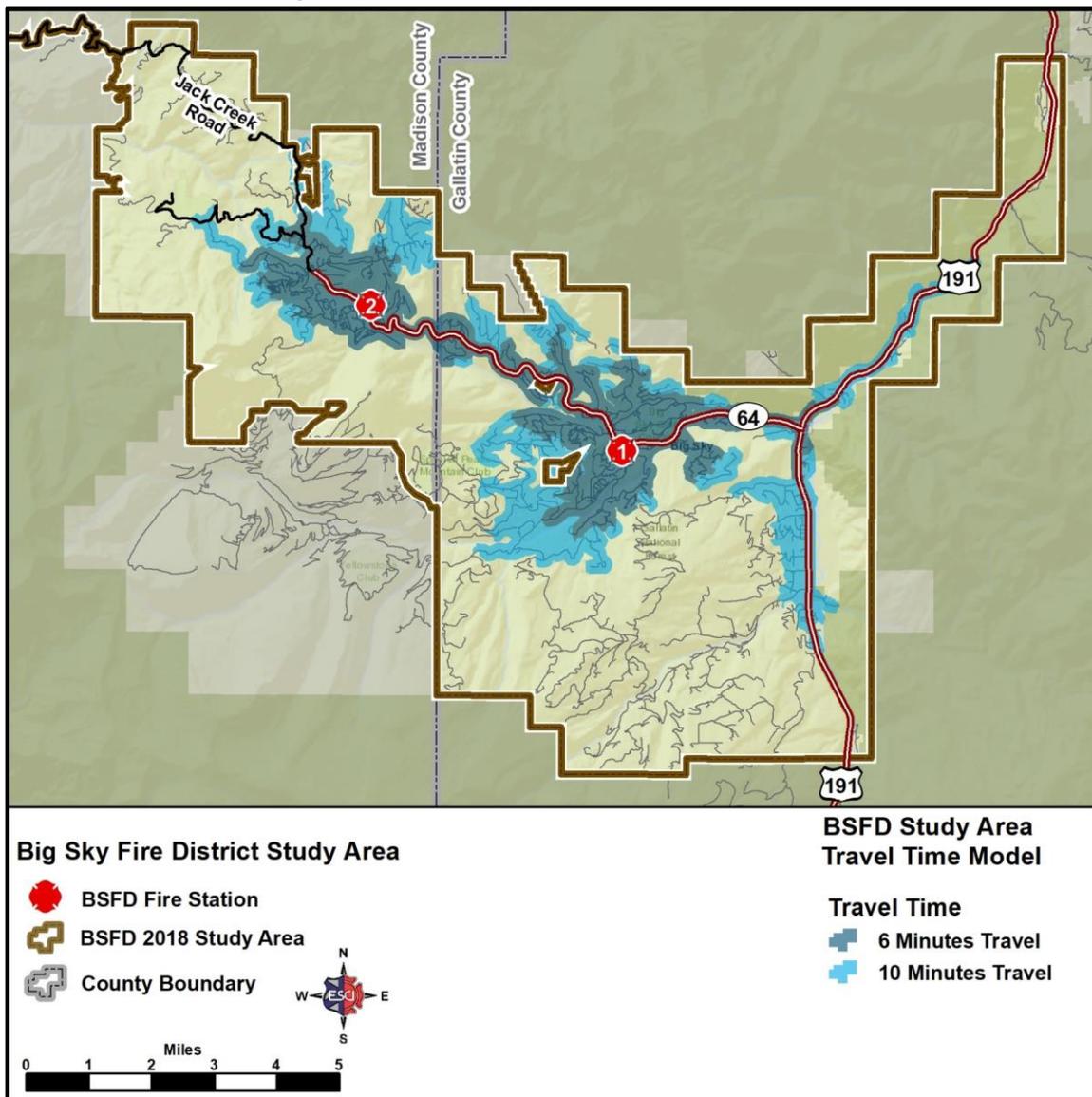
Most of the multistory structures within the District are in the Mountain Village and Big Sky Resort area near Station 2 and the Meadow Village area near Station 1. The BSFD aerial apparatus is housed at Station 2. In 2015, BSFD Station 2 was an unstaffed facility with no living quarters. BSFD is currently remodeling Station 2 to accommodate 24-hour personnel. Additionally, BSFD has budgeted for six additional career personnel in 2019, with the intention of staffing Station 2. Staffing this station will increase the effectiveness the aerial apparatus at Station 2 and positively affect response time performance in the Station 2 response area.

BSFD was evaluated by the ISO in 2016 and received an ISO Public Protection Classification (PPC) of 4/4Y/10, with 1 representing exemplary fire protection and 10 being no fire protection. This is an improvement from the previous PPC rating of 5/9/10. In Big Sky, the rating of 4 refers to properties within 5 miles of a fire station and 1,000 feet of a fire hydrant. The 4Y applies to properties within 5 miles of a station, but more than 1,000 feet from a fire hydrant. The Class 10 rating refers to properties beyond 5 miles of a fire station.

Considering the size and geographic barriers present in the service area, the BSFD stations are well placed to serve most of the properties within the District. As noted in the 2015 Master Plan, there is a significant number of properties that are beyond 5 miles of a fire station. Perhaps the most prominent of these is the 500,000-square-foot hotel and convention center currently under construction in the Spanish Peaks development west of Station 1 (5.1 road miles west). In 2015, this structure and other development in the area were in the planning stage. BSFD is working with the developer to identify a suitable location and construct a fire station to meet the future need for fire protection in this area. Further discussion of this area occurs in the Future Options section of this report.

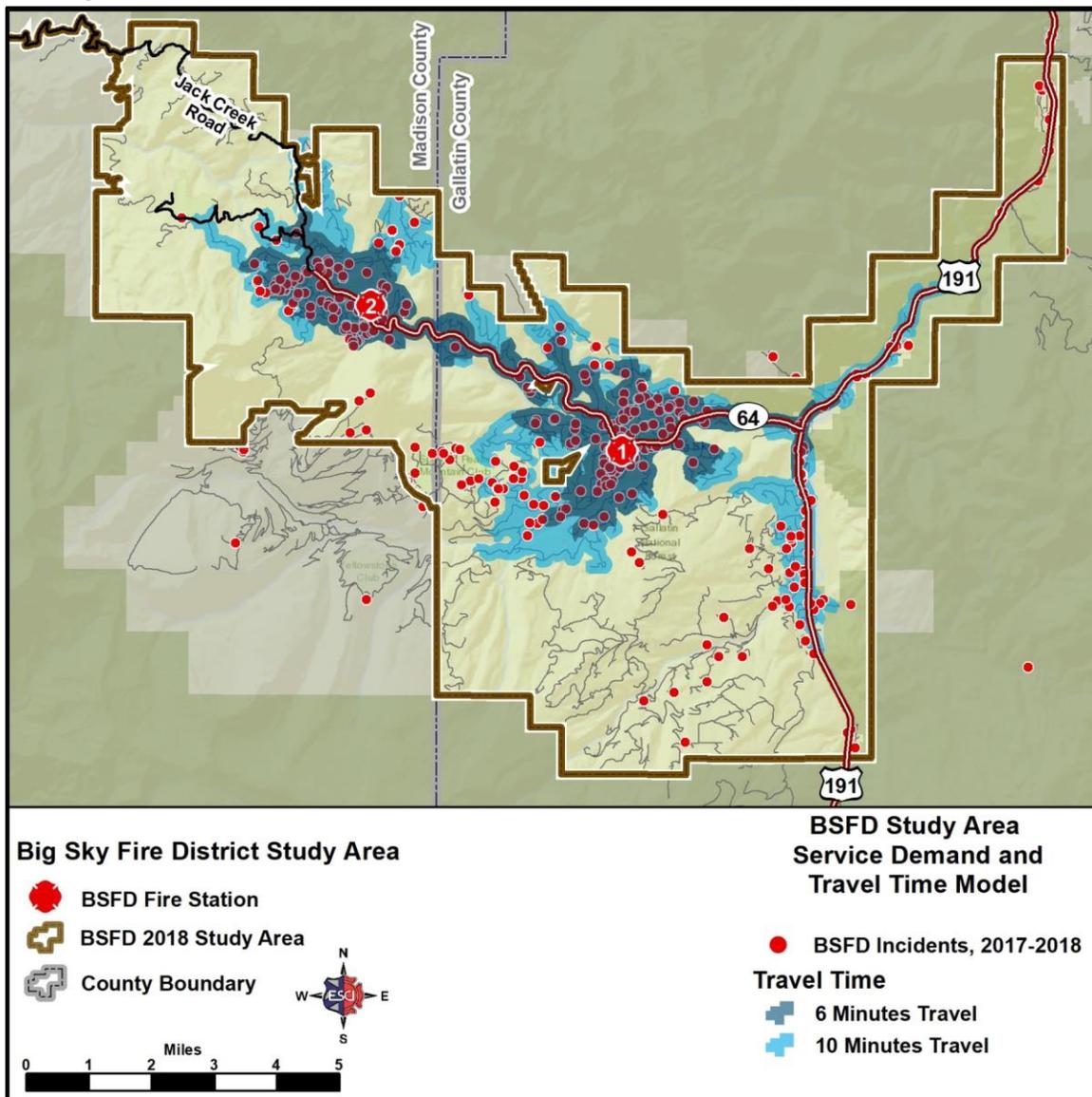
The ISO Public Protection Classification criteria only address fire suppression activities and are primarily concerned with the geographic coverage of property. For fire jurisdictions such as BSFD, which respond to all types of emergencies, the travel time required to respond from a fire station to any 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



Since 2015, there has been little change to the road network within the BSFD service area. Although the District grew from 57 to 80 square miles, the areas annexed are either not developed yet, or the road network was in place in 2015. Figure 42 displays travel time from the current BSFD stations modeled at 6 and 10 minutes' travel. The geography of the service area and nature of the road network affect travel time throughout the District. Note that there is an approximately 1,100-foot elevation gain between Stations 1 and 2. Winter road conditions have the potential to reduce the effective travel time service area from both BSFD stations. The following figure displays 2017 through 2018 incidents overlaid on the travel-time model.

Figure 42: BSFD Study Area Travel Time and Service Demand, 2017–2018 Incidents



Like the ISO coverage of structures, the percentage of incidents inside the District within 6 minutes' travel or less of a fire station decreased slightly from 79 percent in 2013 and 2014 to approximately 77 percent in the 2017 through 2018 time period. At 10 minutes' travel, 87 percent of incidents occurred within 10 minutes' travel or less compared to 94 percent of incidents in 2013 through 2014.

Note that the analysis of potential travel-time capability this figure models assumes that resources are available in quarters, staffed, and ready to respond. Travel-time coverage from Station 2 is included even though this station is not currently staffed. Actual travel-time and total response-time performance based on incident data are discussed in the Response Performance analysis. ESCI expects that actual travel-time and total response-time performance will improve not only in the Station 2 area, but overall once Station 2 is operating as a staffed station.

### *Concentration Analysis*

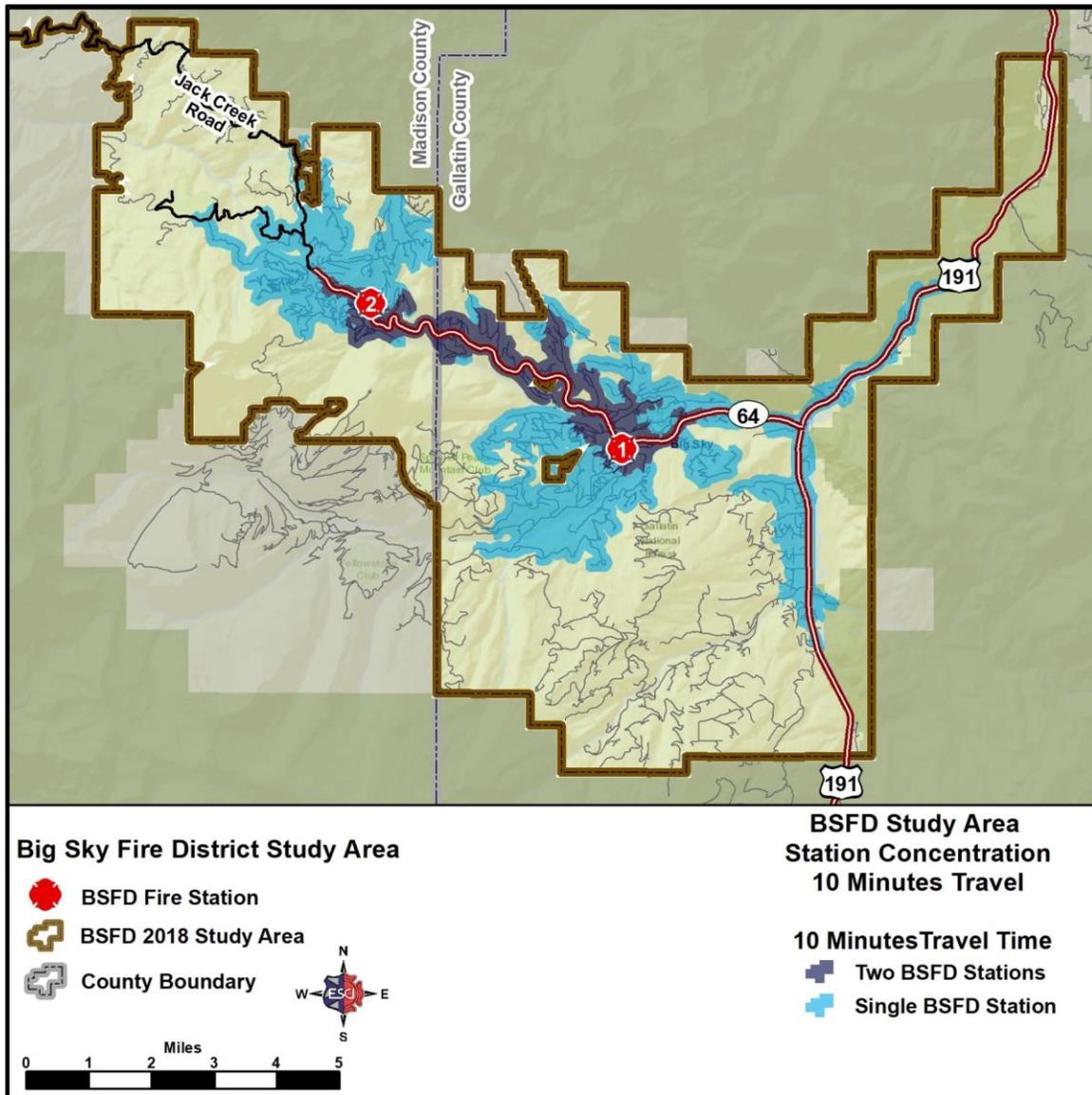
The concentration analysis examines the ability of the BSFD to assemble multiple resources (both apparatus and people) so that sufficient resources are available to safely and effectively mitigate an emergency in a timely manner. Fire service best practices suggest that 14 to 16 personnel are needed to mitigate a moderate risk structure fire.<sup>4</sup> 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. Fire jurisdictions usually depend on resources from other stations to assemble multiple resources to mitigate incidents beyond the capacity of a single apparatus. It is important to identify the portions of a jurisdiction that can be reached in a similar amount of time by multiple stations.

The following figure displays the portions of the service area within 10 minutes’ travel of both BSFD fire stations.

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<sup>4</sup> 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 2016); and the Center for Public Safety Excellence (CPSE) *Community Risk Assessment: Standards of Cover, 6th Edition*.

Figure 43: BSFD Study Area Station Concentration



Currently, as in 2015, a limited area along Highway 64 between the two BSFD stations is within 10 minutes' travel of both stations. This area includes the residential and commercial properties in the Mountain Village and Meadow Village areas. Currently, multiple station responses are not part of current BSFD operations because Station 2 is only staffed during certain peak activity periods. The Department is currently remodeling Station 2 to accommodate 24-hour career staff in anticipation of increased staffing in 2019.

The following two figures examine the number of personnel and apparatus responding to BSFD incidents in 2017 and 2018.

**Figure 44: BSFD Personnel per Incident, 2017–2018**

Personnel per Incident	2017	2018	Overall
One Personnel	3.2%	4.6%	<b>3.9%</b>
2 Personnel	44.8%	47.0%	<b>46.0%</b>
3 Personnel	10.4%	16.9%	<b>13.9%</b>
4 Personnel	21.7%	11.0%	<b>15.9%</b>
5 Personnel	12.2%	9.2%	<b>10.6%</b>
6 or More Personnel	7.6%	11.3%	<b>9.6%</b>

Overall, two personnel handled nearly 50 percent of BSFD service demand in 2017 and 2018. This is not surprising given that over 60 percent of service demand is EMS-related incidents that are typically handled by a single EMS unit. Approximately 40 percent of incidents required three to five personnel to respond, and six or more personnel responded to nearly 10 percent of incidents. A small percentage of service demand was handled by a single BSFD responder.

**Figure 45: BSFD Apparatus per Incident, 2017–2018**

Apparatus per Incident	2017	2018	Overall
Single Apparatus	54.5%	62.8%	<b>59.0%</b>
2 Apparatus	30.1%	21.3%	<b>25.3%</b>
3 Apparatus	12.0%	11.5%	<b>11.8%</b>
4 or More Apparatus	3.4%	4.4%	<b>3.9%</b>

A single apparatus responded to nearly 60 percent of service demand in 2017 and 2018. Two or three BSFD units responded to over 37 percent of incidents, and nearly four percent of service demand required four or more BSFD units to respond.

It is difficult to quantify changes in BSFD's ability to assemble multiple resources between the 2015 Master Plan and this update because the data points required to make this comparison were not available in 2015. However, there is no doubt that increased minimum staffing and the addition of the Battalion Chief position provide BSFD more operational flexibility and resilience when responding to emergencies. Staffing Station 2 will provide even more benefits. ESCI notes that even with the anticipated additional staffing in 2019, BSFD will be challenged to assemble an ERF adequate to mitigate high-risk, complex incidents with on-duty personnel.

### Reliability Analysis

The reliability analysis examines the workload of BSFD emergency response units. The workload of emergency response units can negatively affect unit availability and emergency 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 enough resources to respond to additional emergencies or muster enough resources to deal with complex incidents.

The following figure demonstrates the percentage of concurrent incidents experienced by BSFD in 2017 and 2018.

**Figure 46: BSFD Study Area Concurrent Incidents, 2017–2018**

Concurrent Incidents	2017 Percentage	2018 Percentage
Single Incident, No Overlaps	74.3%	70.0%
2 Overlapping Incidents	24.1%	28.6%
3 or More Overlapping Incidents	1.6%	1.5%

Overall, in 2017 and 2018 approximately 28.1 percent of service demand occurred while at least two or more incidents were in progress. The number of concurrent incidents increased from 196 (25.7 percent) overlapping incidents in 2017 to 268 (30.1 percent) in 2018. Between the 2015 Master Plan and this update, the percentage of concurrent incidents more than doubled from approximately 14 percent in 2013 and 2014, to over 30 percent in 2017 and 2018.

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, 2017–2018**

Incident Category	Average Time Committed
EMS	55:07
Fire	55:22
Other	27:27
<b>All Incidents</b>	<b>45:30</b>

Overall, the average time BSFD units were committed to an incident fell from approximately 1 hour, 22 minutes in 2013 and 2014, to less than 1 hour (45:30) in 2017 and 2018. The average time units were committed to an EMS or Fire incident was approximately one hour. The Other incident category, which includes false alarms, alarm malfunctions, and cancelled calls, demonstrates the shortest average time committed in this figure.

Although service demand increased by approximately 51 percent between the end of 2014 and 2018, the average time committed to an incident has decreased. Much of the decrease in the average time committed for EMS incidents may be attributed to the opening of the Big Sky Medical Center Emergency Room in Big Sky. This facility is equipped to provide a certain level of definitive care in Big Sky, which has reduced the number of EMS transports out of the area to definitive care facilities in Bozeman. Because EMS incidents represent over 60 percent of BSFD service demand, it is not surprising that the overall time committed has also decreased.

It is also useful to evaluate how busy an organization is relative to the total amount of available time. This is known as unit hour utilization (UHU). UHU is calculated by measuring the amount of time individual apparatus are committed to an incident and dividing the result by the total number of hours in a year (8,760). The following figure illustrates BSFD UHU in 2017 and 2018, expressed as a percentage of the total hours in the year. Additionally, the figure displays the average time each unit was committed to an incident.

**Figure 48: BSFD UHU, 2017–2018**

Unit	2017				2018			
	# of Incidents	Avg. Time Committed	Total Time Committed	UHU	# of Incidents	Avg. Time Committed	Total Time Committed	UHU
Command 1201	57	38:39	36:42:59	0.42%	48	43:00	34:24:08	0.39%
Command 1202	36	34:47	20:52:02	0.24%	25	51:04	21:16:48	0.24%
Command 1203	62	26:50	27:44:01	0.32%	212	33:05	116:53:01	1.33%
Command 1204	N/A	N/A	N/A	N/A	1	00:16	0:00:16	0.00%
Ambulance 1211	325	52:54	274:12:31	3.13%	459	55:58	428:12:27	4.89%
Ambulance 1215	231	52:19	201:26:00	2.30%	162	1:40:27	115:30:35	1.32%
Ambulance 1214	37	1:15:46	46:43:39	0.53%	69	1:04:41	174:37:52	1.99%
Engine 1241	69	21:55	24:49:55	0.28%	12	49:39	9:55:52	0.11%
Engine 1242	274	28:45	131:19:45	1.50%	267	26:09	116:22:42	1.33%
Engine 1243	N/A	N/A	N/A	N/A	136	28:59	65:40:45	0.75%
Brush Engine 1268	4	54:34	3:38:16	0.04%	4	23:56	1:11:49	0.01%
Tender 1232	14	42:54	10:00:35	0.11%	15	1:05:29	15:16:40	0.17%
Tender 1235	18	36:40	11:00:04	0.13%	2	6:51:34	13:43:08	0.16%
Ladder 1257	3	59:49	2:59:28	0.03%	7	44:04	5:08:28	0.06%
Utility 1289	7	35:08	2:55:41	0.03%	4	2:18:25	9:13:41	0.11%

Not surprisingly, the ambulances and engines at BSFD Station 1 demonstrate the highest UHU rates in this figure. Overall, BSFD units were involved in response activity approximately 10 percent of the total hours of the year in 2017, and nearly 14 percent in 2018. This compares to an overall UHU rate of approximately 8.7 percent in 2013 and 2014. Note that this analysis only looks at incident activity and does not measure the amount of time dedicated to training, public education events, station duties, or any other activities.

Total service demand has increased significantly between the 2015 Master Plan and this update. This has led to the increase in the frequency of overlapping incidents and the workload of individual units discussed in this section. UHU rates for an individual unit in excess of 20 percent can negatively affect response performance, unit availability, and staff morale. Currently, the workload of individual BSFD units is not at a level that would usually be a cause for concern. However, currently this workload is handled by a minimum staff of five operational personnel functioning out of a single station. Additionally, the frequency of overlapping (concurrent) incidents has increased dramatically since 2015. BSFD is typically able to immediately respond to two simultaneous emergencies without significant delays, depending on the type of emergency, but immediately mustering resources to mitigate a high-risk incident for a third emergency remains a challenge for the Department.

### *Response Performance*

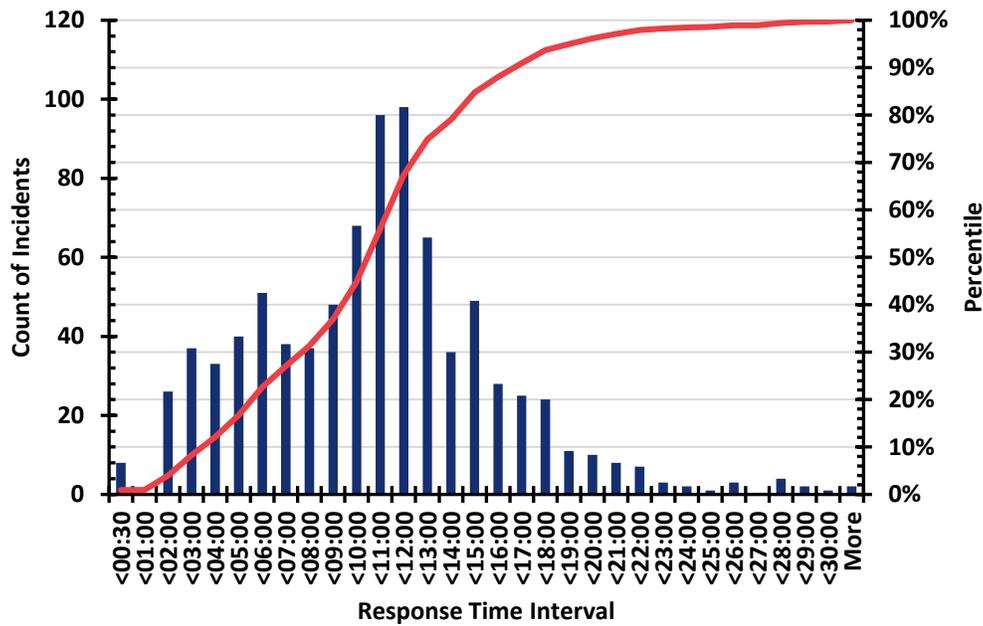
In the performance analysis, ESCI examines emergency response performance within the BSFD service area. The data for this analysis is 2017 through 2018 emergency incidents extracted from the department's records management software (RMS)—Emergency Reporting Systems (ERS). Only incidents coded as emergencies ("responded with lights and siren") in the ERS data are included. 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. This measurement of emergency response-time performance is comprised of turnout time and travel time.

ESCI generates average and percentile response times for these incidents. The use of percentile calculations for response performance follows industry best practices, such as the NFPA 1710 Standard for Career Fire Departments (2016) and the CPSE Community Risk Assessment: Standards of Cover (6<sup>th</sup> Edition) 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 because 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 are 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 emergency response performance within the BSFD district boundaries. The blue bars show the count of emergency response times (Count of 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 49: BSFD Study Area Response Time Frequency, 2017–2018



As in the 2015 Master Plan, the most frequently recorded response time in the 2017–2018 data is between 11 and 12 minutes. Approximately 67.4 percent of emergency incidents were answered in 12 minutes or less. The average response time is 10 minutes, 23 seconds. The first BSFD apparatus arrived at 80 percent of emergency incidents in slightly over 14 minutes (14:14) or less. The following figure summarizes the changes in overall emergency response time performance between the 2015 Master Plan and this update.

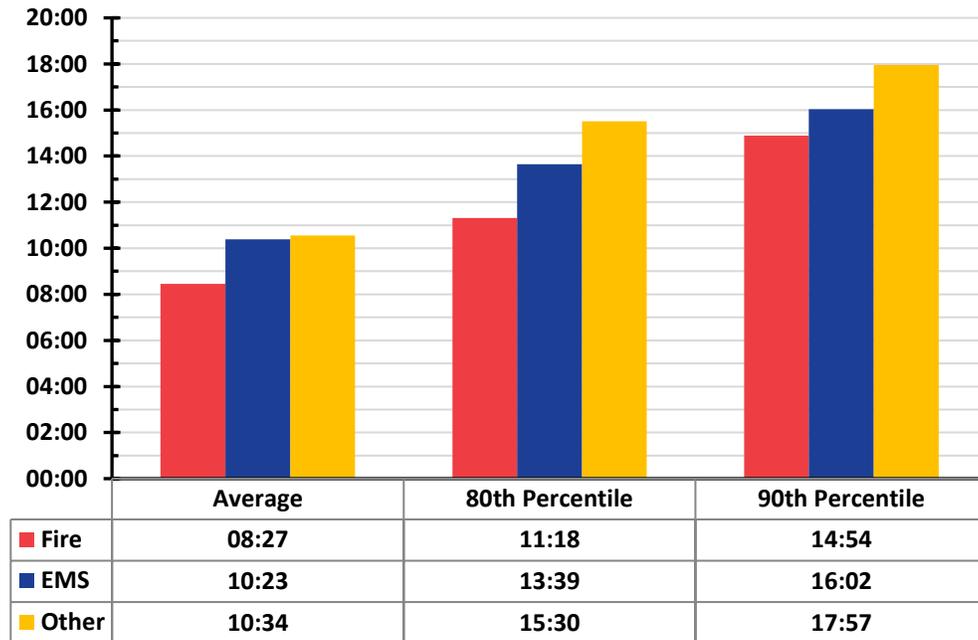
Figure 50: BSFD Study Area Overall Emergency Response-Time Performance

Time Period	Average	80th Percentile
2017–2018	10:23	14:14
2013–2014	10:05	15:00

On average, BSFD emergency response performance, from the time BSFD was dispatched to the arrival of the first apparatus arrived on-scene, increased by 18 seconds between the 2013 through 2014 data used in the 2015 Master Plan and the 2017 through 2018 data used in this update. However, measured at the 80th percentile, response times improved by 46 seconds during the same time period.

Using National Fire Incident Reporting System (NFIRS) incident type codes, incidents are categorized as *Fires* (structures, vehicle, brush, any 100-series NFIRS code), *EMS* (all calls for medical service, including MVAs and rescues, any 300-series NFIRS code), and *Other* (false alarms, hazmat incidents, service calls, all other NFIRS codes). The following figure summarizes BSFD emergency response performance in 2017 and 2018 based on the type of incident.

**Figure 51: BSFD Study Area Emergency Response Performance by Incident Category, 2017–2018**



On average, the first apparatus arrived at Fire incidents in 8 minutes, 27 seconds. Emergency incidents categorized as EMS or Other incidents required approximately an additional 2 minutes for the first BSFD apparatus to arrive. Measured at either the 80th or 90th percentile, BSFD response performance demonstrates a similar pattern, with Fire incidents displaying the best response performance and incidents categorized as Other demonstrating the longest response time for the first BSFD apparatus to arrive.

As previously 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. In the 2015 Master Plan, ESCI identified data collection errors and omissions as issues that affected the Department's ability to accurately record and report emergency response performance. Since 2015, BSFD has purchased and implemented the ERS records management system. Department leaders and policy makers are commended for implementing a robust, modern RMS. ESCI finds that, in general, the quality and accuracy of the data collected in the RMS is good and has improved since the 2015 report. However, missing data points and other errors in the data imported from the dispatch center into the BSFD data still prevent an accurate and complete measurement of the components of emergency response-time performance just listed. It is essential that the dispatch center provides BSFD and other Gallatin County emergency service providers with accurate and complete time stamps for all response activity.

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

- Duplicate time stamps for "Alarm Time," "Dispatch," and "Enroute."
- Inconsistent recording of "Response Mode" (emergency vs. nonemergency responses).

Establishing performance goals and monitoring performance for the various components of response performance just listed is a vital part of developing emergency response-time performance goals. Additionally, without accurate knowledge of the individual components that comprise emergency response time, it is difficult to identify where to direct efforts to improve response performance. Note that complete and accurate response performance data will be an important component of tracking the effects of staffing Station 2 on overall BSFD service delivery. Additionally, if BSFD wishes to comply with fire service best practices such as the NFPA 1710 Standard or the CPSE Community Risk Assessment: Standards of Cover, it is vital that accurate measurements for the various components of response time are available.

*Recommendations:*

Develop a methodology to capture accurate and complete response performance data. This process should include, at a minimum, the following components:

- Review of incident reports for completeness and accuracy.
- Training for department personnel.
- Interaction with the dispatch center and ERS to ensure accurate data transfer from CAD to RMS.

Ensure that accurate data are available to report the components of response-time performance including the following:

- Turnout Time—Units dispatched to roll time (unit enroute).
- Travel Time—Unit enroute to unit on-scene.
- Response Time—Unit dispatched to first unit on-scene.

### *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's 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 club 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.

As discussed in the 2015 Master Plan, opportunities to utilize mutual or automatic aid resources from neighboring structural fire jurisdictions are limited in the BSFD service area. 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. However, BSFD continues to interact with other emergency service providers including wildland firefighting agencies, ski patrol and rescue organizations, and air medical resources. In 2017 and 2018, BSFD received mutual/automatic aid 15 times and provided aid 26 times. This represents approximately 2.5 percent of 2017 through 2018 total service demand.

### *Incident Control and Management*

BSFD uses the Incident Command System (ICS) for tactical incident management and the National Incident Management System (NIMS) as its 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 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.

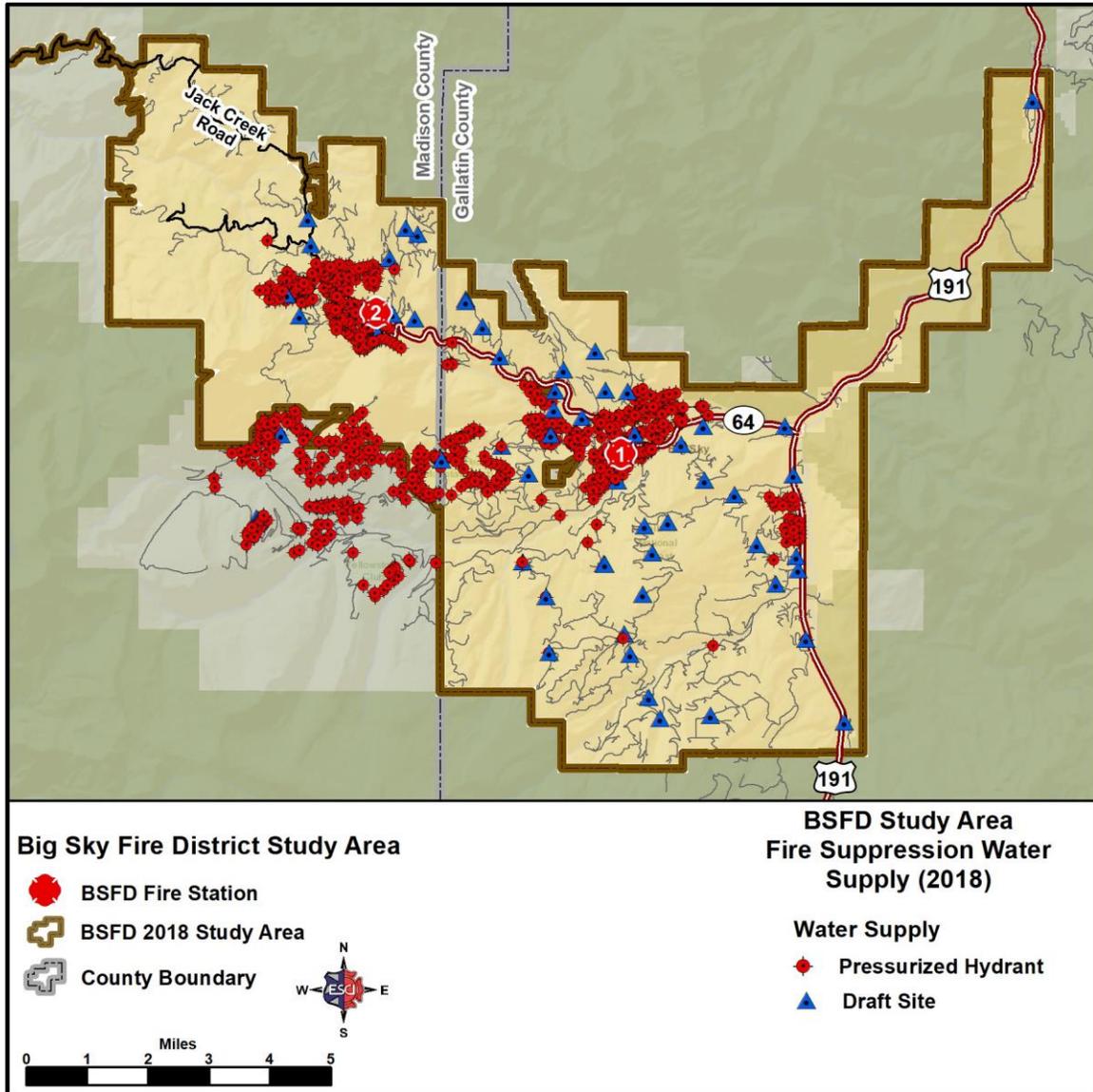
BSFD employs ICS for emergency scene management when operating singly or with other fire or emergency jurisdictions during joint operations. ICS training for career and paid-on-call personnel is included in the annual training calendar. ICS and scene safety are addressed in the BSFD Standard Operating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

Note that the addition of the shift Battalion Chief position enhances BSFD's ability to have a command officer available for complex or multijurisdictional incidents.

### 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 52: BSFD Study Area Fire Suppression Water Supply, 2018



As seen in Figure 52, 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 Stations 1 and 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 areas without hydrants.

BSFD works proactively with planners, developers, and the water districts to ensure that adequate fire flow is available for fire suppression in new development and existing properties. As discussed in 2015, these efforts are critical now and will continue to be critical, especially since new development that was proposed in 2015 has moved out of the proposed phase to being actively developed currently.

## SUPPORT PROGRAMS—TRAINING

Training is the core of an effectively managed fire department. Adequate training is essential if a fire agency is to, first, ensure firefighter safety and survival and, second, ensure that its personnel are capable of delivering effective emergency response and mitigation to the community. In the absence of quality, comprehensive training programs emergency outcomes are compromised, and response personnel may be at risk. Responders 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 are maintained. To accomplish this task, the District must either have a sufficient number of instructors within its own organization or work with its 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 2015, ESCI found that the training program was staffed with two operational, shift-based fire Captain positions, both of whom were managing training as an additional assigned duty. Training management and administration was divided into EMS and fire subject areas, one assigned to each Captain. At the time, the Captain's workload associated with training was stated to be nearly at maximum levels, and concern was expressed about staffing of the training function.

Since that time, BSFD has addressed the need to enhance staffing of training by adding three new Battalion Chief positions, two of which are assigned to training. Further, the addition of a Captain's position, dedicated to training, is planned to be filled in 2019.

The District has committed itself to addressing the needs identified in the 2015 report and is commended for doing so. In the following discussion, ESCI reviews the recommendations made in 2015 relative to training practices and identifies actions taken since that time.

### *General Training Competencies*

When the initial report was compiled, it was found that the District was operating an effective training program. Even though the staffing of the training function was limited to two on-duty Captains at the time, ESCI found that the fundamental training competencies that are found in an effective program were in place.

It was recommended at the time that the delivery of incident command training be expanded to include chief officers. That recommendation was addressed, and the Battalion Chiefs are training with their shift regularly on the subject.

#### *2015 Recommendation:*

- Establish minimum monthly incident command training with Fire Chief and crews.
  - ✓ Action: Battalion Chiefs are training regularly on incident command practices.

### *Training Program Administration and Management*

To function effectively, a training program needs to be managed. 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.

As stated, in 2015 the District had assigned two Captains to manage fire and EMS training, but as an additionally assigned duty, not a dedicated role. Although concern was expressed about the capacity of the captains to operate an effective program, the training functions at the time were found to be well developed and effective. The steps that were just described in the form of the assignment of the two Battalion Chiefs to training and the planned addition of a Training Captain will address the need for continued administration of the function.

The need to complete an annual training plan was recommended in 2015, to be developed, provided to the Fire Chief for review and published within the organization. The program planning that was in place at the time fell short of meeting needs.

Today, BSFD's staff has developed a training plan and identified specific training goals, based on NFPA 1001 standards and state-required JPRs. Based on the training plan, data provided to ESCI by the District indicates that over 800 hours of training was delivered to responders in FY 2017/18.

The earlier Master Plan also identified a shortcoming in the area of training record keeping. At the time, records were kept internally on a single computer, and ESCI recommended the use of an off-site backup and/or cloud-based storage. It was also recommended that the duty Captains input training records directly into the system rather than forwarding them to the training officers at the time. The District has since transitioned to the "Target Solutions" training program and the Emergency Reporting System (ERS) software, and record keeping is secure. Data input has also been assigned to the shift Captains.

Also recommended in 2015 was the composition of an annual report of training activities to be included with the District-wide annual report. That process has been initiated.

Finally, shortcomings were found in terms of training facilities and props. Classroom work was generally completed in the Station 1 training room, which was found to be adequate in terms of space but lacking educational simulation equipment. Outdoor training was limited to the stations or area commercial and residential occupancies absent a dedicated training facility. It was recommended that the District plan and budget for more robust simulation tools as well as explore the joint development of a training ground in conjunction with the Yellowstone Club Fire Department.

It is reported that, at this time, a tentative agreement has been reached with the local water district to develop a training facility on its available land. However, a funding strategy for the project has not been established. ESCI renews the recommendation and underscores the importance of safe and effective firefighter training.

*Key 2015 Recommendations:*

- Develop and institutionalize an annual training plan; update as needed. Plan should outline training program goals and activities for the year.
  - ✓ Action: A well-developed training plan is now in place.
- Create a detailed report for a specific training section as part of the annual fire department report.
  - ✓ Action: Report is currently being provided to the Fire Chief for inclusion in the annual report.
- Assign each shift Captain the responsibility to input training hours daily to reduce workload on training officers.
  - ✓ Action: Completed.
- Plan, budget, and equip more robust SIM tools. Explore joint purchase/training of SIM tools with Yellowstone Club Fire Department.
  - ✓ Action: Potential site identified. Funding source not yet determined.

*Other Recommendations:*

- Continue efforts to locate and fund a dedicated training facility.

### *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.

As discussed previously, the District is in need of improved training props and tower and fire training tools. In this section of the 2015 report, the recommendation was repeated encouraging the long-term planning of a dedicated training facility. Efforts remain underway to do so.

The District has historically created training manuals for various ranks in the organization. At the time of the 2015 informational interviews, the training manuals were in place for new hires and all position levels with the exception of the Captain rank. At that time, a Captain's Manual was planned, and ESCI recommended completion of that process. The Manual has since been developed.

Fire suppression and EMS drills should periodically be conducted at night to approximate real-life conditions. This was not done on a regular basis in the past, and a minimum of two night drills were recommended annually. That recommendation has been implemented.

Finally, ESCI learned that there was room for improvement in the area of disaster and Mass Casualty Incident (MCI) training. Drills were periodically conducted at the Bozeman Airport, and some annual training was conducted jointly with the Big Sky Ski Patrol and Big Sky Resort staff. A recommendation was made to formalize and enhance the training work with the resort staff to include three trainings per year. It is now reported that drills have been scheduled jointly with Big Sky Resort staff including a dam breach scenario, an MCI, and an airport emergency simulation.

#### *Key 2015 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.
  - ✓ Action: Planning is underway, but funding has not been located.
- Finish implementation of Captain's Manual.
  - ✓ Action: Manual is complete.
- Schedule night drills two times per year each shift.
  - ✓ Action: Recommendation implemented.
- Explore more formal training opportunities with Big Sky Resort staff; target a minimum of three times per year, per shift.
  - ✓ Action: Three drills have been scheduled with Big Sky Resort staff.

### SUPPORT PROGRAMS—LIFE SAFETY SERVICES (FIRE PREVENTION)

The importance of an effective and aggressive risk management program was discussed at length in 2015, explaining that 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.

In 2015, ESCI reviewed the fire and life safety efforts that were in place in the District and made recommendations regarding areas of improvement. At the time, prevention work was largely an additionally assigned duty of the Fire Chief with support from staff. One of the primary concerns expressed in the report was the lack of a dedicated fire prevention and public education position, and the addition of a Fire Marshal’s position was recommended.

Today, the identified need for a prevention position has been addressed by the addition of a Deputy Chief of Community Risk. Further, in 2022, a new Captain’s position is planned to assist the Deputy Chief. These steps are viewed as positive and important to enable the department to meet the identified prevention, public education, and risk management needs.

In the following figure, ESCI revisits the fundamental components of an effective fire prevention program accompanied by the elements needed to address each component.

**Figure 53: Fire Prevention Program Components**

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

### *Fire and Life Safety Code Enforcement and New Construction Plan Reviews*

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. ESCI reviewed BSFD fire prevention efforts in the earlier document and offered the observations and recommendations listed next.

#### **New Construction Plan Reviews**

Big Sky Fire Department has historically acted in an advisory capacity only with regard to the review and approval of residential new construction plans. The Department is consulted and able to comment on access, water-supply-related considerations; however, it is not authorized to place requirements, sign off, or deny approval for a building permit. All commercial new construction plan applications are processed by the building department, and, at the time of the report, the fire department was not provided with the opportunity to review or comment on the permit issuance. Finally, in Madison County there is no building permit process, and, lacking the ability to approve or deny an application, BSFD is only able to make comments and recommendations.

Based on concerns with the limited involvement that is provided for new construction plan reviews, ESCI recommended that BSFD “Seek to increase the District’s involvement and influence on new construction plans review and approval where possible.” It is difficult, if not impossible, in some regards for the Department to inject itself into the process, and BSFD has made substantial efforts to improve the situation. As of today, there is an increased level of involvement, but still no authority over the issuance of permits. ESCI renews the prior recommendation encouraging the District to make all efforts possible to address the need.

#### **Existing Occupancy Inspection Program**

In addition to new construction plans and oversight, a fire department needs to conduct inspections of existing commercial properties to find and eliminate potential fire hazards and other dangers. These efforts can only be effective when completed by individuals having the proper combination of training and experience, and when completed with appropriate frequency.

In 2015, the District indicated a stated goal of inspecting all commercial occupancies on an annual basis, which is appropriate considering the occupancy types found in Big Sky.

BSFD completed 90 existing occupancy inspections in the 2014 reporting period (the most recent data available at the time of the prior report). At that time, the Fire Chief completed the majority of the higher risk category inspections whereas line personnel conducted the balance of the lower risk inspections, a practice that is appropriate and effective. In 2015, ESCI underscored the importance of assuring that the inspection program is effective and also discussed the Fire Chief’s workload relative to other duties. As discussed in the next section, the program has been effectively updated, and dedicated staffing is now in place.

## Prevention Function Staffing

One of the additional observations in 2015 was the absence of a dedicated fire prevention position. At the time, almost all prevention and public education efforts were achieved by the Fire Chief as an additional assigned duty. As stated at the time, the Chief's workload was excessive, and it was challenging for him to give this function the needed attention.

ESCI recommended the addition of a Fire Marshal position at the time. As of this writing, that recommendation has been achieved by the appointment of a Deputy Chief of community risk as well as the planned hiring of a Captain to assist the Deputy Chief.

### *Key 2015 Recommendations:*

- Increase involvement in the new construction plan review process to the extent feasible.
  - ✓ Action: Increased involvement has been achieved, but still only as recommendations.
- Encourage and support the adoption of a building permit process in Madison County.
  - ✓ Action: A preconstruction Safety Review has been implemented, at the Fire Chief's request so that all construction is reviewed. The review still results in only a recommendation, but it is documented at BSFD and at the County so that the liability is on the owner if they do not follow the recommendations. The same process is in place in Gallatin County. Address the need for a dedicated fire marshal position in the future.
  - ✓ Action: A Deputy Chief of Community Risk has been hired with plans to add a Captain position to assist the Deputy Chief.

### *Other Recommendations:*

- Continue efforts to increase involvement in the new construction plan review process to the extent possible.

### *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.

A significant element of an effective prevention and public education program is the implementation of Integrated Community Risk Reduction (CRR), a trend that has emerged since the 2015 analysis. CRR is an integrated approach to risk management that marries emergency operations and prevention strategies into a more cohesive approach to reducing risks in any community. It includes the fire department partnering with the community, nonprofit organizations, and any private sector agencies with a nexus to an identified community risk.

The concept starts with the fire department mining data to quantify community risk. Once the community risks have been identified, they are prioritized based on frequency of emergency service demand or consequence (to the victim, to the community, to the local economy). Upon prioritizing the risks, strategies are developed to mitigate the risks. These strategies are incorporated into a CRR plan, which integrates resources across the fire department, partner agencies, and the community to implement the various strategies in a cohesive manner. After plan implementation, the results are reviewed to determine the impact on the risks. Adjustments are made, as necessary, based on the results, and the process is refined and continuously re-implemented.

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*If the community is better prepared, they will need to rely less on local government.*

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The risks are not limited to structure fires. They can include falls, drowning, interface exposure, disasters, or any risk requiring fire department response. Risk can also be localized by station area. Operations personnel, in collaboration with fire prevention staff and community groups, can develop and manage a station-area-specific CRR plan as a subset of the fire department's plan. CRR lends itself well to a volunteer-supported effort, led by competent professional leadership. CRR also includes public education for risk reduction. A prepared and informed community is a safer community.

In 2015, ESCI found that there was no dedicated community risk or public education position at BSFD and recommended that one be established when funding was available to enhance community outreach efforts. Since that time, commendably, the department has added a Deputy Chief level officer, titled Deputy Chief of Community Risk, and has embraced the CRR concept, including enhanced public education outreach.

The CRR efforts underway include wildland risk assessments, the implementation of a fuels' reduction program and juvenile fire setter outreach, along with multiple other CRR initiatives. In addition, the Department plans to add a Captain-level position in the next two years to further assist the Deputy Chief in CRR efforts.

ESCI commends BSFD for its work in this area and dedication to CRR and recommends continuation of these efforts.

*Key 2015 Recommendations:*

- Establish a dedicated public education position to enhance current outreach efforts.
  - ✓ Action: A Deputy Chief of Community Risk position has been added, effectively addressing public education needs.

*Other Recommendations:*

- Continue to develop CRR efforts.

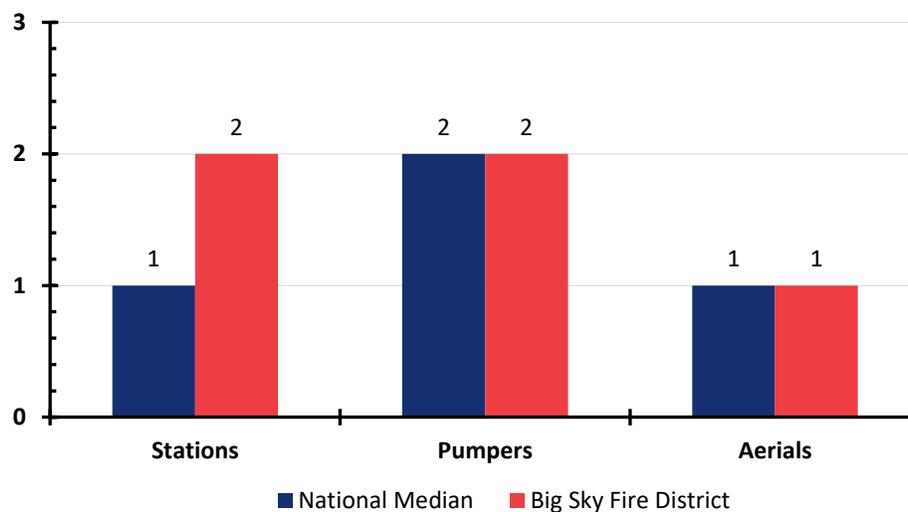
## CAPITAL ASSETS AND CAPITAL IMPROVEMENT PROGRAMS

Two primary capital assets that are essential to the provision of emergency response are facilities and apparatus (response vehicles). If appropriate capital equipment is not available for the use by responders, it is impossible for a fire department to deliver services effectively.

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 a small fleet of fire engines, ambulances, and an aerial ladder truck. 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 54: Capital Assets per 1,000 Population**



As stated previously, the number of capital assets has not changed since the 2015 report, and, relative to national comparators, BSFD compares more similarly to number of fire stations and pumpers than similar-sized organizations based on population.

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

### *Facilities*

The following figures summarize ESCI's nonengineering/nonarchitectural review of each of BSFD's fire stations. It is noted that the two stations are the same ones, and generally the same in configuration, as found and documented in 2015. Updates have been included in the figures.

**Figure 55: 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. The building is currently being remodeled to add needed sleeping space. There are six single-depth apparatus 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 is maximized.

Structure	
Construction Type	Two-story conventional framed structure. Cedar siding with a metal roof.
Date Built	1986; remodeled in 2007, undergoing additional remodeling.
Square Feet	Approximately 12,500
Seismic Protection/Energy Audits	None
Auxiliary Power	Automatic starting propane fired generator in place.
Condition	Good
Special Considerations (ADA compliant, 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.
Facilities Available	
Exercise/Workout	Well-equipped exercise area is available.
Kitchen/Dormitory	A good-sized kitchen and day room are present. Five separate sleeping areas with storage. Space for a total of 8 sleeping areas is under construction.
Lockers/Showers	Separate shower room and locker area.
Training/Meetings	There is a large training room upstairs. Six offices and three working areas for shift use are available. There is a reception area and a small conference room in the office area.
Washer/Dryer	Washer/dryer is available for on-duty personnel. Extractor for PPE cleaning and decontamination.
Protection Systems	
Sprinkler System	The facility is protected with a sprinkler system with a flow alarm.
Smoke Detection	The station is fully protected by a central smoke detection system.
Security	Building is secured with keypad security locks.
Apparatus Exhaust System	Automatic and point of use exhaust system in place. Turnout gear storage has been added to protect equipment from contaminants.

**Figure 56: 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 were no living quarters. However, at the time of this writing, remodeling has just been completed, adding 1,373 square feet of space including quarters, meeting space, kitchen, and bathrooms.

**Structure**

Construction Type	Single-story masonry block and conventional frame structure.
Date Built	1997; currently being remodeled.
Square Feet	Approximately 4,800 square feet
Seismic Protection/Energy Audits	None
Auxiliary Power	Automatic starting, propane fired, generator in place.
Condition	Good
Special Considerations (ADA compliant, 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.

**Facilities Available**

Exercise/Workout	Currently being added.
Kitchen/Dormitory	A kitchen area and day room are present. Living quarters are being added currently.
Lockers/Showers	Currently being added/updated.
Training/Meetings	Currently being added/updated.
Washer/Dryer	Currently being added.

**Protection Systems**

Sprinkler System	The facility is protected by a sprinkler system with a flow alarm.
Smoke Detection	Residential smoke detectors are installed.
Security	Building is secured with keypad security locks.
Apparatus Exhaust System	Automatic and point-of-use exhaust system in place.

**Facilities Discussion**

The Big Sky Fire District facilities are in good physical condition, and they are well maintained. Both were found to be in need of upgrades in the 2015 report; both are in the process of being remodeled at the time of this writing. In 2015, ESCI noted that Station 1 was not originally designed for 24-hour personnel. Living and sleeping areas had been added to the second-floor area, but areas were not compliant with current life safety code.

The primary focus of the remodeling in both stations is that of providing for adequate crew quarters. Station 1 is in need of more room for the full-time personnel that have been added. Station 2 had no residential quarters in the past and was not staffed with 24-hour personnel. With plans to staff the station with career personnel, the addition of living space is needed.

BSFD is actively and appropriately addressing the noted facility deficiencies.

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. As stated, the station is in the process of receiving residential quarters. It is also the location where the District's only ladder truck is located due to lack of space in Station 1. This presents a challenge for BSFD emergency operations when there is a need for the aerial apparatus. ESCI provides further discussion concerning stations and apparatus in the Future Options section of this report.

## Apparatus

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

**Figure 57: Big Sky Fire Department Major Apparatus**

Station 1: Meadow Village							
Apparatus Designation	Type	Year	Make/Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 1243	Structure Engine	2005	Pierce/Arrow XT	Good	2	1500 GPM	1800 GAL
Engine 1232	Structure Engine	2018	Pierce Velocity	New	2	1500 GPM	1000 GAL
Tender 1268	Water Tender	2002	General/ Freightliner	Good	1	1250 GPM	2500 GAL
Brush 1268	Wildland Engine		Hypro/Dodge	Good	2	150 GPM	250 GAL
Ambulance 12	ALS Ambulance	2008	Medtec/Ford	Good	2	N/A	N/A
Ambulance 1215	ALS Ambulance	2012	Medtec/Ford	Good	2	N/A	N/A
Utility 1289	Utility SUV	2008	Chevrolet Suburban	Good	1	N/A	N/A
Command 1203	Battalion Chief vehicle	2018	Dodge Pickup	Excellent	1	N/A	N/A
Command 1201	Staff	2018	Durango	Excellent	1	N/A	N/A
Command 1202	Staff	2017	Ford	Excellent	1	N/A	N/A
Command 1204	Staff	2017	Ford	Excellent	1	N/A	N/A

Note: Engine 1242, a 1997 Pierce/Dash structural engine, has been placed in reserve at Station 2.

Station 2: Mountain Village							
Apparatus Designation	Type	Year	Make/Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Ladder 1257	85' Tower Ladder	2001	Pierce	Good	2	2000 GPM	400 GAL
Tender 1269	Water Tender	1997	Pierce	Good	1	500 GPM	1800 GAL
Brush 1269	Wildland Engine	2014	Dodge	Good	2	150 GPM	250 GAL
Ambulance 1211	ALS Ambulance	1995	Lifeline/Ford	Good	2	N/A	N/A

## Apparatus 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.

Since the 2015 study, the following changes have been made to the apparatus fleet:

- Engine 1242, a 2005 Pierce Arrow XT 4x4 with an 1,800-gallon water tank, was refurbished, and a 1,500 GPM pump was added.
- The District purchased Engine 1243, a 2018 Pierce Velocity 4x4 rescue engine with a 1,500 GPM pump and 1,000-gallon water tank.
  - With this purchase, Engine 1241 (the 1997 Pierce Dash) has been placed in reserve.
- The District is in the process of adding a fourth ambulance, which was delivered and placed in service in mid-2019. The oldest ambulance will be placed in reserve once the new unit arrives. This partially addresses a need to increase the number of ambulances in response to the District's rising call volume.

## *Apparatus Replacement Planning*

In 2015, BSFD fire apparatus were found to be in good condition, and, with the replacements just noted, that remains the case. Due to the cost of fire apparatus, as well as associated equipment, long-range 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 are important.

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 was in place in 2015 and found to be complete and accurate. ESCI reviewed an updated version provided by the District shown in the following figure.

Figure 58: Big Sky Fire Department Capital Equipment Replacement Schedule, 2019

Projected Repl. Year	Equipment to Be Replaced	Anticipated Lifespan (Years)	No. of Units	Est. Cost per Unit (2019)	Total Cost (2019)
2019–2020	Firefighter Turnout Clothing & Helmets	5	25	\$4,000	\$100,000
2020–2021	Ambulance 1214 Remount	10	1	\$160,000	\$160,000
2021–2022	Engine 1241/1997 Pierce Replacement	20	1	\$850,000	\$850,000
2022–2023	Tender 1235/1997 Pierce Replacement	25	1	\$425,000	\$425,000
	Self-Contained Breathing Apparatus	10	30	\$8,000	\$240,000
2023–2024	Brush 12/2003 Dodge/Hypro Repl.	20	1	\$130,000	\$130,000
	Cardiac Monitor/Defibrillator Repl.	8	4	\$37,000	\$148,000
2024–2025	Command 1202 & 1204/2017 Vehicles	7	2	\$42,600	\$85,200
	Firefighter Turnout Clothing & Helmets	5	32	\$3,500	\$112,000
2025–2026	2016 Ambulance Replacement	10	1	\$210,000	\$210,000
	Command 1203/2018 Dodge Repl.	7	1	\$60,000	\$60,000
2026–2027	Engine 1244 Purchase/2007 Pierce Engine 1242 into reserve	20	1	\$725,000	\$725,000
2027–2028	Ladder 1253 Replacement/2001 Pierce Dash	25	1	\$1,200,000	\$1,200,000
	Command 1203/2021 Vehicle	7	1	\$65,000	\$65,000
2028–2029	2018 Ambulance Replacement	10	1	\$210,000	\$210,000
	Replace 1201/2018 Vehicle	10	1	\$55,000	\$55,000
2029–2030	Tender 1232/2002 Freightliner Repl.	25	1	\$450,000	\$450,000
	Firefighter Turnout Clothing & Helmets	5	32	\$3,100	\$99,200
2030–2031	2020 Ambulance Replacement	10	1	\$210,000	\$210,000
2031–2032	Cardiac Monitor/Defibrillator	8	3	\$37,000	\$111,000
	Reserve 2007 Engine 1242 Replacement (Engine 1243 into reserve)	20	1	\$650,000	\$650,000
2032–2033	Ambulance 12-2/2022 Ford-Medtec	10	1	\$210,000	\$210,000
	Command 1202 & 1204/2024 Vehicle Repl.	7	2	\$42,600	\$85,200
2033–2034	Self-Contained Breathing Apparatus	10	30	\$8,000	\$240,000
2034–2035	Command 1203/2027 Vehicle	7	1	\$65,000	\$65,000
	Firefighter Turnout Clothing & Helmets	5	32	\$3,100	\$99,200
2035–2036					
2036–2037	2026 Ambulance Replacement	10	1	\$210,000	\$210,000
2037–2038	Engine 1243 Replacement	20	1	\$715,000	\$715,000
2038–2039	2028 Ambulance Replacement	10	1	\$210,000	\$210,000
				<b>Total</b>	<b>\$7,919,800</b>
				<b>Per Year</b>	<b>\$395,990</b>

ESCI reviewed the updated schedule and found it to be very well developed with accurate and adequate estimated replacement values. The District is commended for this planning effort.

## Future System Demand Projections

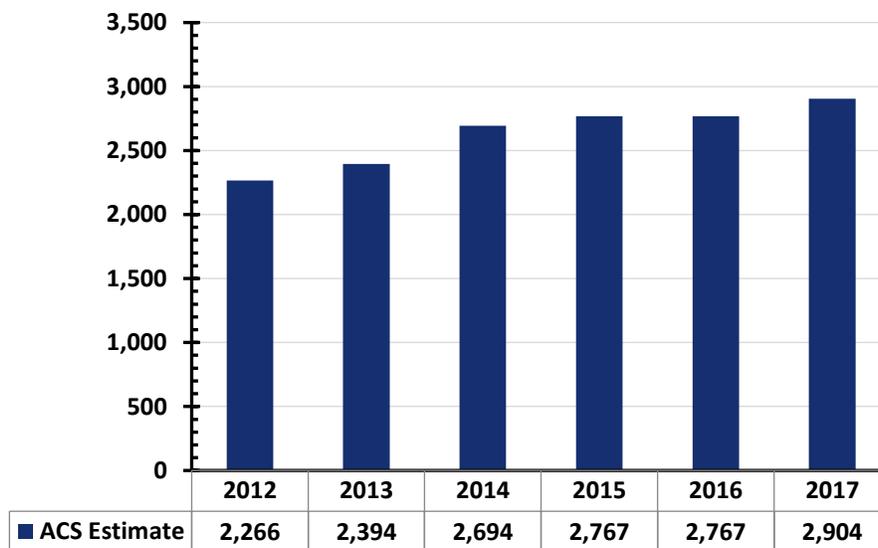
The process of forecasting growth and future service demand within the Big Sky Fire District begins with an overview of historical population growth in the BSFD area: U.S. Census Bureau data, Montana economic data, information from the Big Sky Chamber of Commerce web page, and the 2018 Community Housing Assessment and Needs document (*WSW Consulting Inc.; Navigate, LLC; Williford, LLC*, February 2018).

Like other resort communities, Big Sky is comprised of a relatively low number of permanent residents and a high number of vacation rental properties, vacation homes, transient workers, and visitors during the tourism season. It is still useful to examine population growth in the area.

### Historical Population Growth

The following figure displays U.S. Census Bureau American Community Survey (ACS) annual population estimates for the Big Sky census designated place (CDP) from July 1, 2012, to July 1, 2017.

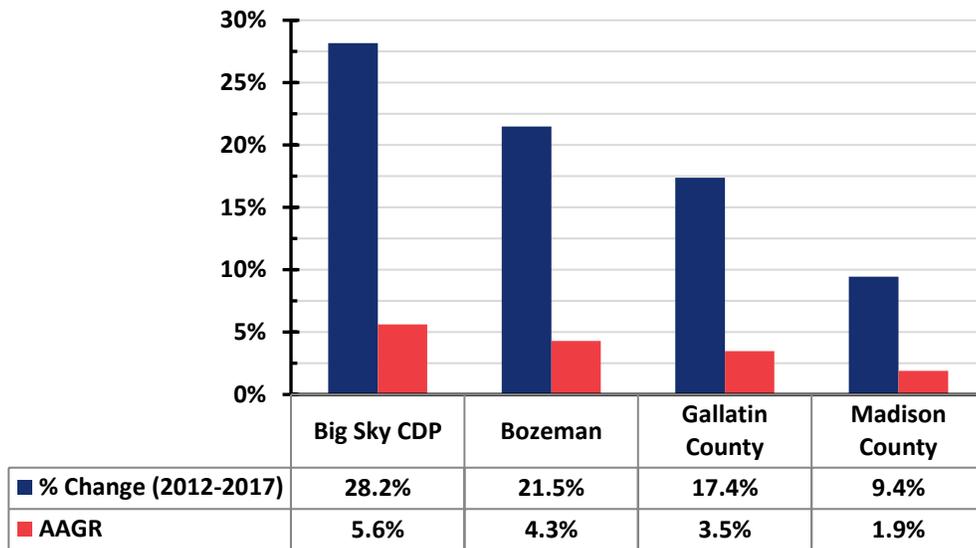
**Figure 59: Big Sky CDP Annual Population Estimate, 2012–2017**



According to the most recent Census Bureau estimate (2017), the population in the Big Sky CDP, which roughly corresponds to the BSFD district boundaries, grew by over 28 percent (28.2%) between July 2012 and July 2017.

The BSFD service area includes portions of Madison and Gallatin County. Bozeman is the closest urban center to Big Sky, and a majority of workers that commute to Big Sky reside in Bozeman. The following figure displays historical population growth in the area around Big Sky.

Figure 60: Big Sky Area Historical Population Growth, 2012–2017 (U.S. Census Bureau)

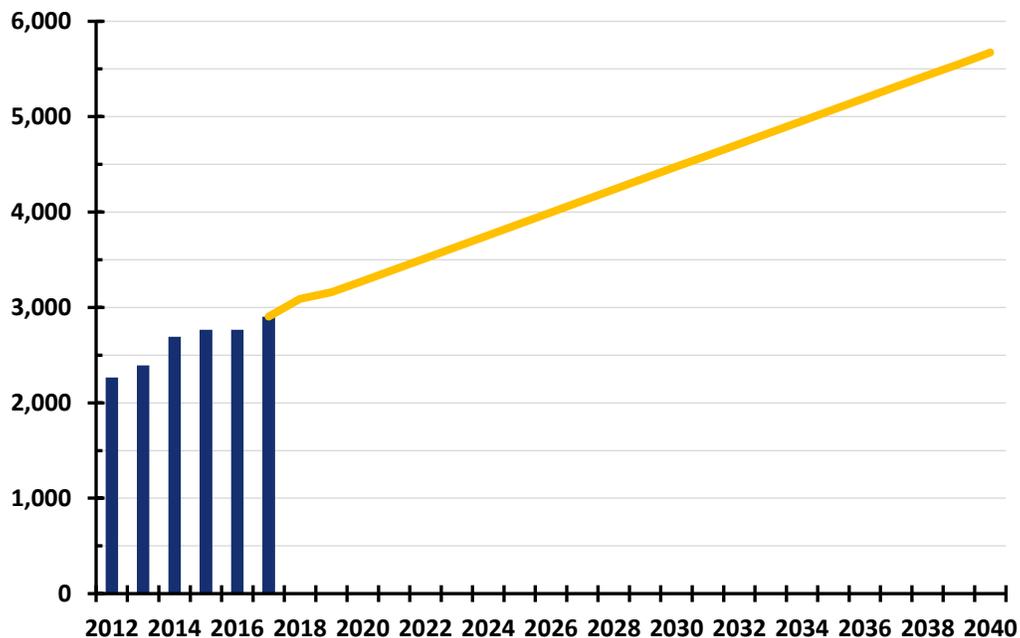


The preceding figure displays the overall total change in population and the average annual growth rate (AAGR) for each of the entities displayed. The Big Sky CDP demonstrates the highest overall rate of population growth (28.2%) and the highest AAGR (5.6%) in the area.

*Population Projection*

Using a linear forecast model, based on the 2012–2017 ACS population estimates for the Big Sky census designated place, the following figure displays a projection of the future population in the BSFD service area.

Figure 61: Big Sky CDP Population Projection, 2017–2040



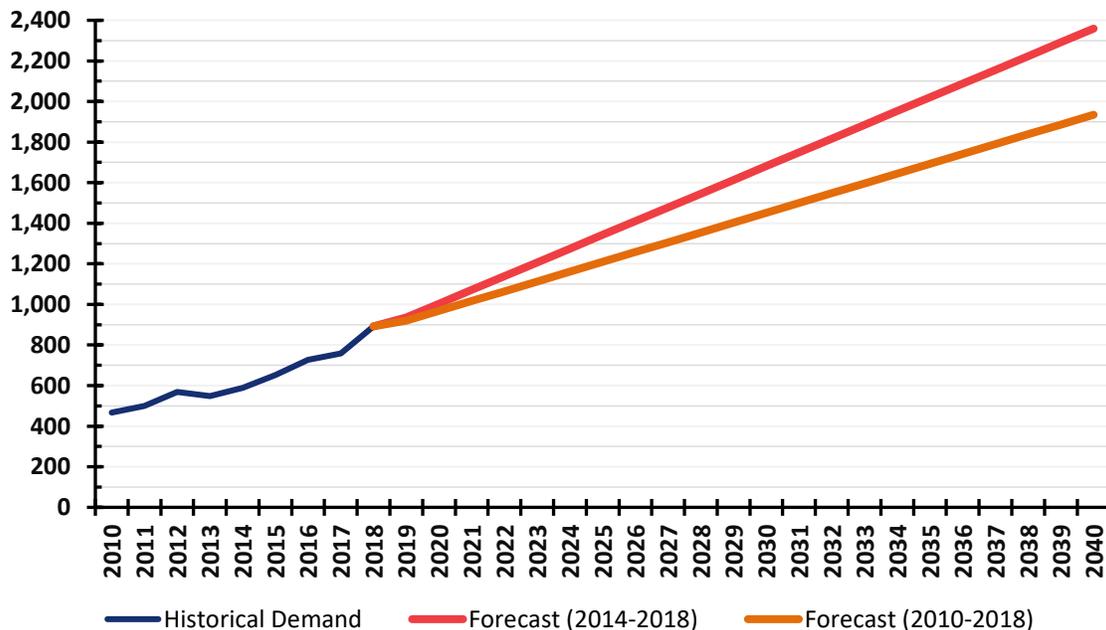
This forecast model shows the population of the Big Sky CDP increasing to nearly 5,700 residents by 2040. This is an overall increase of 95.4 percent at an average annual growth rate of approximately four percent. The 2014 Big Sky Housing Development Plan identified a lack of affordable housing for workers in the Big Sky area as an impediment to full-time residential population growth in the area. The 2018 Housing Assessment and Needs document updates the 2014 plan and affirms the need for additional housing. The 2018 assessment identifies a need for 560 to 655 additional housing units targeted for both rental and ownership by workers in Big Sky by 2023. Any increase in the availability of affordable year-round housing in Big Sky may affect full-time residential population growth in the BSFD service area.

### SERVICE DEMAND PROJECTIONS

As discussed in the 2015 Master Plan and previously 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. Although service demand grew by 26.1 percent between 2010 and 2014, demand for BSFD services grew by over 51 percent (51.4%) between 2014 and the end of 2018. Overall, BSFD service demand increased from 467 incidents in 2010 to 892 incidents in 2018, an increase of 91 percent, which represents an average annual rate of 11.4 percent.

The following figure displays two forecasts of possible future BSFD service demand: one based on historical service demand between 2010 and 2018 and a second forecast based on service demand between 2014 and 2018.

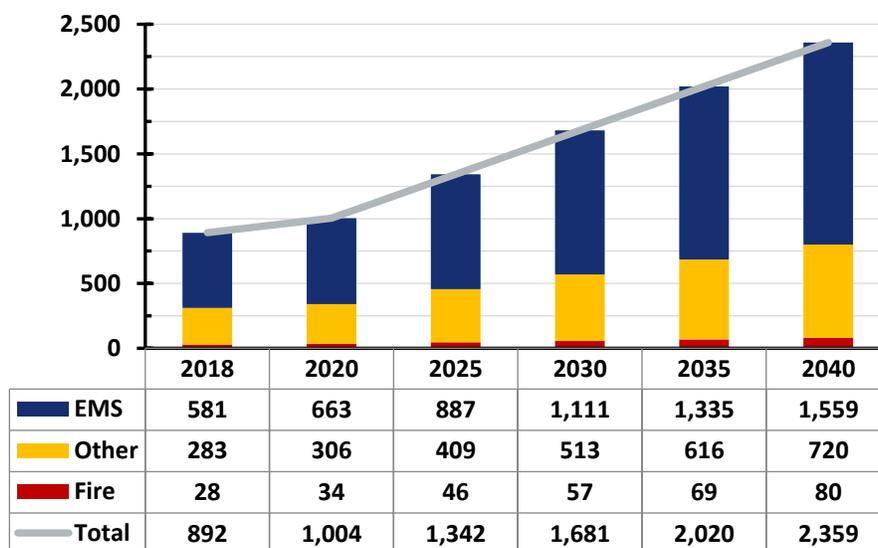
Figure 62: BSFD Service Demand Projection, 2018–2040



The forecast based on 2010 through 2018 service demand shows BSFD service demand increases by 117 percent to approximately 1,934 incidents by 2040 at an average annual rate of 5.3 percent. Based on 2014 through 2018 service demand, service demand increases to over 2,350 annual incidents. This represents an increase of approximately 165 percent at an average annual rate of approximately 7.5 percent.

The following figure uses the 2014 through 2018 forecast data and NFIRS incident types to display the possible nature of future BSFD service demand.

**Figure 63: BSFD Future Service Demand by Incident Type, 2018–2040**



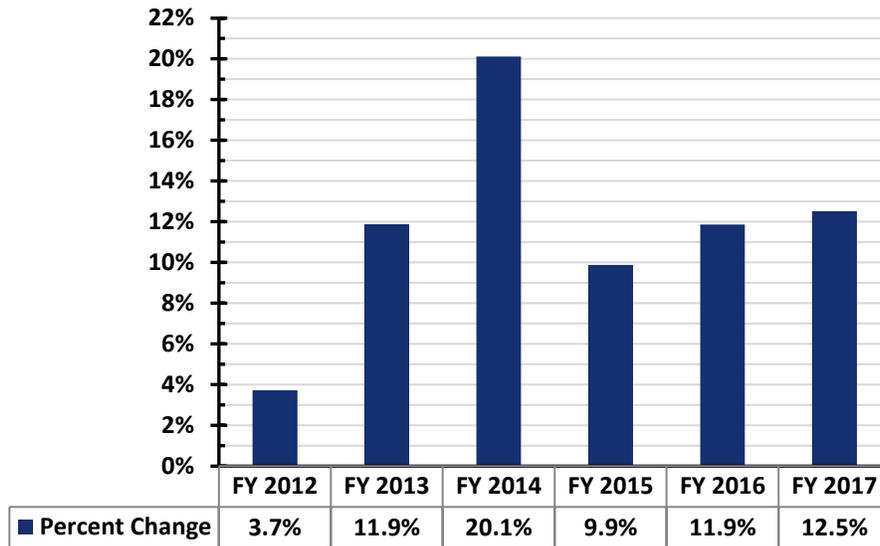
Incidents are categorized as EMS, Other, and Fire based on historical NFIRS data. In the historical data (2014–2018), EMS incidents represent approximately 66.1 percent of service demand, 3.4 percent of incidents are categorized as a Fire, and the remainder of incidents (30.5 percent) are categorized as Other—primarily cancelled calls and false alarms.

The two forecasts presented in Figure 62 demonstrate BSFD service demand increasing at a much higher rate than the service demand forecasts in the 2015 Master Plan based on 2010 through 2014 data. BSFD service demand in 2018 (892 incidents) exceeds or nearly exceeds projected 2025 service demand from the previous study. The difference in the 2015 service demand projections and the 2019 updated projections underscores the importance of consistently monitoring service demand and activity that may affect future service demand.

As discussed in the 2015 report, BSFD service demand will fluctuate over time, and the forecasts just presented should be regarded as baseline values. Depending on future economic activity and demographic changes in the BSFD service area, future service demand may well exceed the projections presented in this update. It is essential that the department monitor annual service demand, economic factors (job growth, development activity, etc.), and demographic changes in order to anticipate periods of increased demand for BSFD services. Documents such as the 2018 Community Housing Assessment are an excellent source of information concerning recent and future demographic changes in the area.

Perhaps one of the best indicators of overall activity in the Big Sky area is data available from the Big Sky Resort Area District (BSRAD). BSRAD administers collection and distribution of the 3 percent Big Sky Resort Tax, which is a sales tax collected by businesses within the resort area. The following figure displays the rate of growth in Resort Tax collections between 2012 and 2017.

**Figure 64: BSRAD Tax Collections, 2012–2017**



Resort tax collections grew by approximately 86 percent between FY 2012 and FY 2017 at an average annual rate of approximately 12 percent. With some exceptions, the Resort Tax is collected for all goods and services sold in the Big Sky Resort Area District, which includes all of the BSFD service area. Resort tax collections cannot be directly correlated to service demand. However, they capture development and business activity, transient workforce activity, and tourism-related activity in the area. Combined, these factors appear to be the primary drivers of BSFD service demand.

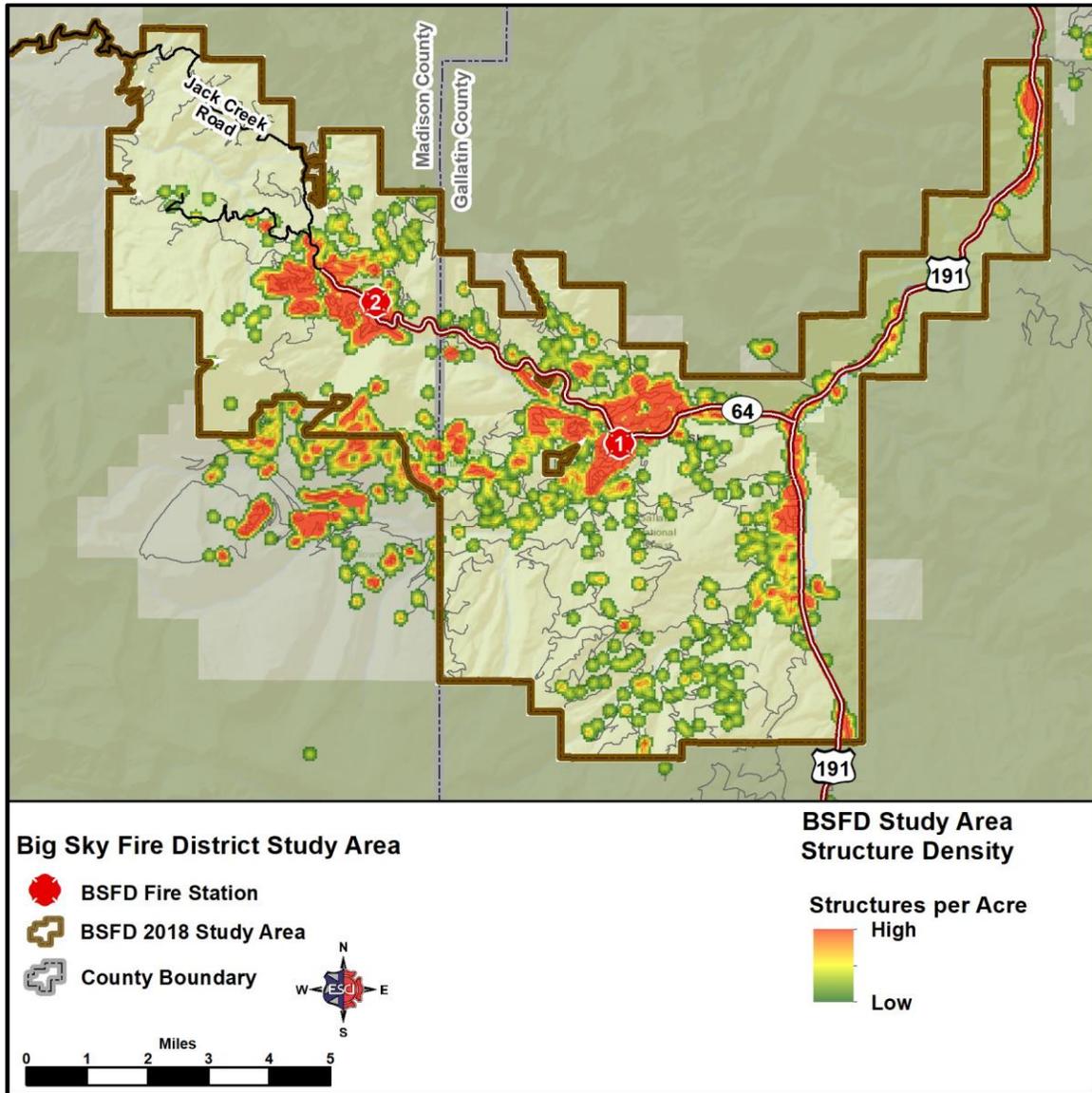
ESCI believes that BSFD will continue to experience increased demand for their services, especially through 2025, based on current development in progress and future development slated to begin soon. Further discussion of future development and risk is provided in the Community Risk Assessment and Future Options section of this report.

## COMMUNITY RISK OVERVIEW

The distribution of the population, demographics, and the activity of that population affects the nature of risk within a fire department’s service area. Current zoning, along with future land use and development, also impact the nature of community risk. Properties with high fire and life safety risk require greater numbers of personnel and apparatus to effectively mitigate a fire emergency. Additionally, the geography of the area and natural risks can affect the level of risk in the service area. Staffing and deployment decisions should be made with consideration of the level of risk within geographic subareas of a community.

The following figure uses GIS data provided by Gallatin County to display the distribution of structures throughout the Big Sky Fire District.

**Figure 65: BSFD Structure Density (Structures per Acre), 2018**



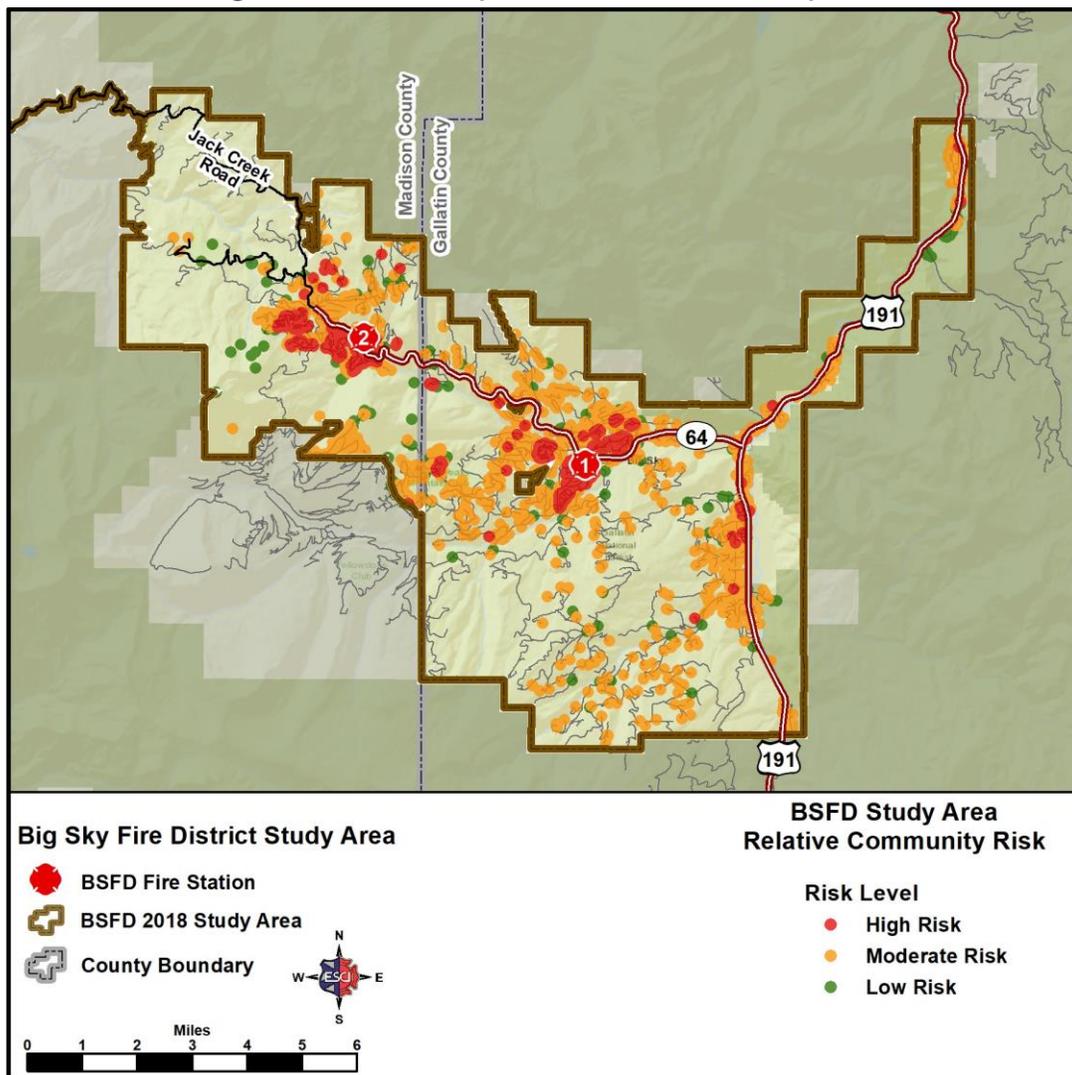
Just as in 2015, structures are clustered in the Meadow Village area, the Big Sky Mountain Village area extending into Moonlight Basin, the Highway 191 Corridor, and the Spanish Peaks Resort area. Approximately 86 percent of buildings are residential, and approximately 8 percent are commercial properties. There has been a slight increase (2%) since 2015 in the percentage of properties that are classified as residential. The remaining structures include government buildings, schools and churches, recreational buildings, and other types of structures. Note that approximately 45 percent of buildings in the BSFD service area are classified as “condominiums” or “multi-family” residential structures. These structures are typically two- or three-story multi-unit buildings, which represent a high level of life safety risk for both occupants and firefighters.

ESCI uses the building type descriptions included in the structure data used in the previous figure to examine current land use in the study area. Risk is assigned to the structure points to present a view of relative community risk.

- **Low Risk:** Structures used for agricultural purposes, recreational use, low-density residential, and other low-intensity uses.
- **Moderate Risk:** Most residential properties, commercial and office use, retail sales, and equivalently sized business activities.
- **High Risk:** Condominiums, other multi-family residential, structures in mixed-use areas, any other high-density residential, hospitals, schools, churches, large assembly properties, and industrial or warehousing facilities.

The following figure displays relative community risk within the BSFD service area based on the criteria just listed.

Figure 66: BSFD Study Area Relative Community Risk



Most of the high-risk structures in Figure 66 are multi-unit condominiums or multi-family residential structures. Residential and commercial structures represent the majority of moderate-risk properties. Government buildings, schools, and churches are also categorized as moderate risk. Structures categorized as low risk in this figure are generally agricultural, seasonal cabins, or recreational buildings that do not experience a high frequency of incident activity.

ESCI notes that, compared to other similarly configured fire jurisdictions, BSFD contains a high percentage of moderate- and high-risk properties. Although many rural fire districts may usually contain a high percentage of low- to moderate-risk single family dwellings (2,000 square feet, one or two stories), most of the residential development in the Big Sky service area is comprised of larger multi-level structures, condominiums, and other high-occupancy properties.

It is also helpful when discussing community risk to examine incident data to determine the types of properties that generate demand for fire department services. The next figure uses National Fire Incident Reporting System (NFIRS) data to display the actual property use associated with 2017 through 2018 incidents.

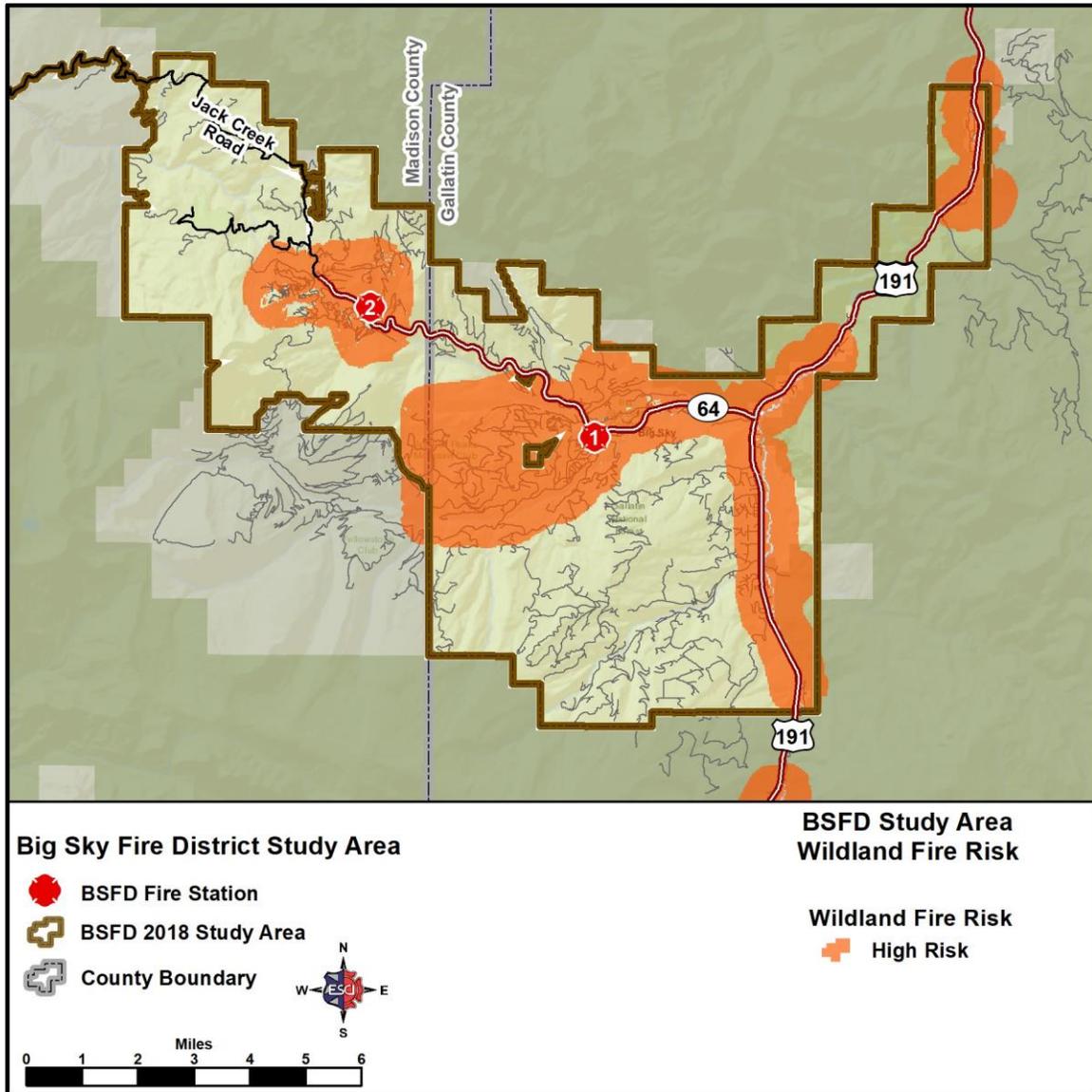
**Figure 67: BSFD Study Area Property Use and Incidents, 2017–2018**

NFIRS Property Use Category	Percent of 2017–2018 Incidents
1—Assembly (restaurant, bar, club house, fixed-use recreational, church)	6.6%
2—Educational (school, daycare)	0.6%
3—Health Care (medical clinic, doctor’s office, hospital)	23.5%
4—Residential (single family, multi-family, condominium, hotel/motel, vacation rental)	34.0%
5—Mercantile/Business (grocery store, recreational sales, service station, bank)	4.6%
6—Industrial, Utility, Agriculture, Mining (forest land, mine/quarry)	0.2%
7—Manufacturing, Processing	0%
8—Storage (outside storage, vehicle storage, fire station)	0.5%
9—Outside or Special Property (open land, campsite, highway, residential street road, outside parking area)	29.6%

Approximately 34 percent of 2017 through 2018 service demand occurred at a residential property. Outside areas and the highways and roads within the service area are the second most common property use (29.6%) for BSFD incidents. Also, 23.5 percent of service demand occurred at properties designated as health care facilities. This category primarily includes responses to the clinic in the Mountain Village, ski patrol facilities, and the Big Sky Medical Center. Overall, residential properties, outside properties, and health care properties account for over 87 percent (87.1%) of BSFD service demand. The remainder of service demand occurred at the other property categories displayed.

The final draft of the 2019 Gallatin County Hazard Mitigation Plan published in April 2019 categorizes wildfire as the most likely natural or manmade hazard to impact the Big Sky area. The following figure uses federal and Montana Department of Natural Resources and Conservation (DNRC) GIS data to examine wildfire risk in the Big Sky area.

Figure 68: BSFD Wildland Fire Risk



The data displayed in this figure model the probability of a fire occurring, the expected fire behavior, and the relative risk to the community for catastrophic loss from wildfire. The data identify areas in and around communities where federal, state, and local fire managers should focus efforts to mitigate fire risk. The BSFD service area is recognized as within the wildland urban interface (WUI) in both the Gallatin and Madison County Community Wildfire Protection Plans (CWPP). Key components of the CWPP are wildland fire risk assessments, fire prevention, and education projects. BSFD actively participates in these ventures in the BSFD service area; increased participation has been identified as a goal for the new Deputy Chief of Community Risk Management.

*Geographic and Other Risk Factors*

As discussed in the 2015 Master Plan, the geography and location of the Big Sky area affect 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 gain between Stations 1 and 2, which can affect travel-time performance for fire apparatus responding from Station 1 into the Station 2 service area. This situation may be mitigated to some degree once Station 2 is staffed.

The following figure displays BSFD average emergency response performance in 2017 and 2018 summarized by month of the year.

**Figure 6g: BSFD Response-Time Performance by Month of the Year, 2017–2018**

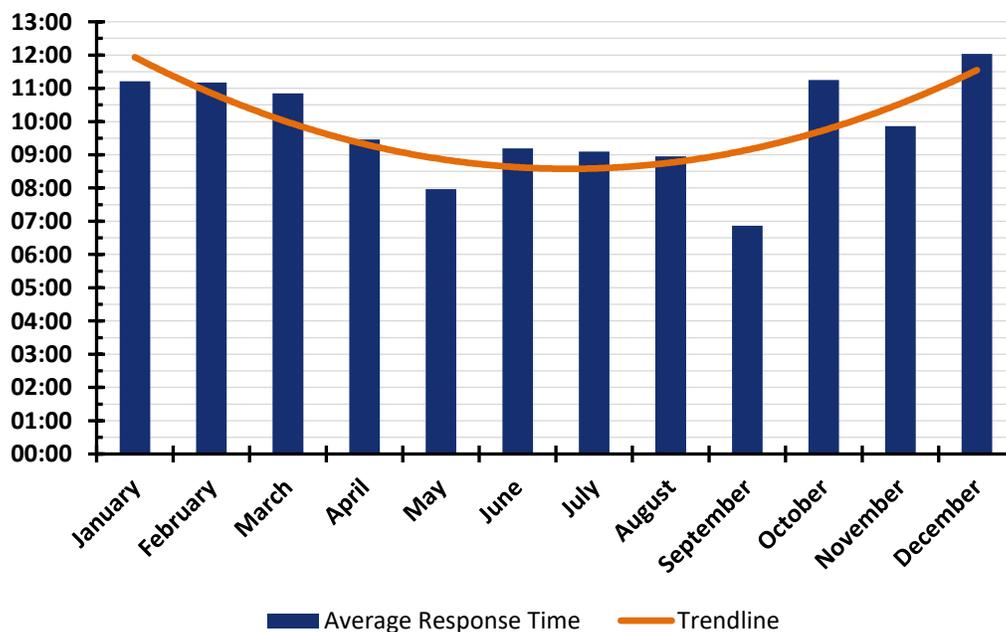


Figure 6g demonstrates that the mountainous terrain and severe weather conditions in the winter months appear to negatively affect BSFD emergency response performance. In 2017 and 2018, emergency response times increased from an average of approximately 8 minutes, 30 seconds from April through September to an average of approximately 11 minutes from October through March.

The Gallatin County Hazard Mitigation Plan (Gallatin County HMP) is intended to identify and provide a risk severity ranking of natural or human-caused hazards in Gallatin County and provide an action plan for County officials and emergency service providers to reduce the effects of the identified hazards. The Gallatin County HMP identifies 19 major hazards countywide and in specific areas within the County (Belgrade, Big Sky, Bozeman, Three Forks, and West Yellowstone). BSFD participated in prioritizing and ranking hazards in the Big Sky area in 2018. The following figure is extracted from April 2019 update to the Gallatin County HMP and displays the six hazards in Big Sky ranked with a High Relative Overall Risk score.

**Figure 70: BSFD Hazard Summary, Gallatin County Hazard Mitigation Plan, April 2019**

Hazard	Probability of Occurrence	Property Impact	Population Impact	Economic Impact	Relative Overall Risk (Score)
Wildfire	High	High	High	High	High (50)
Limited Access	High	Moderate	High	High	High (35)
Critical Infrastructure Disruption	Moderate	Moderate	High	Moderate	High (35)
Ground Transportation Accident	High	Low	Moderate	Moderate	High (32)
Mass Casualty Incident	High	Low	Moderate	Moderate	High (30)
Hazardous Materials Release	High	Low	Moderate	Moderate	High (30)

The hazard rankings displayed in this figure are prioritized based on the probability and the extent of potential impact in the Big Sky area using a Federal Emergency Management Agency (FEMA) risk assessment tool. Most of the hazards displayed in this figure are shared, at differing levels of risk, by all the areas throughout Gallatin County. ESCI notes that Big Sky is the only one of the five areas identified in the Gallatin County HMP where Limited Access is identified as a High Overall Risk. Highway 64 and Highway 191 are the only ground transportation routes into or out of the area. A significant event such as a wildfire, ground transportation accident, hazardous material release, flooding, or landslide could magnify the impact of the incident by impeding evacuations or by slowing the arrival of additional resources into the area.

### *Future Community Risk Assessment*

As discussed in the 2015 Master Plan and previously in this update, the Big Sky area appears to be entering a period of considerable growth and development; that will increase the number and nature of risks present in the BSFD service area. All the factors identified as possible indicators of future growth in 2015 appear to still point to even more activity in the BSFD service area.

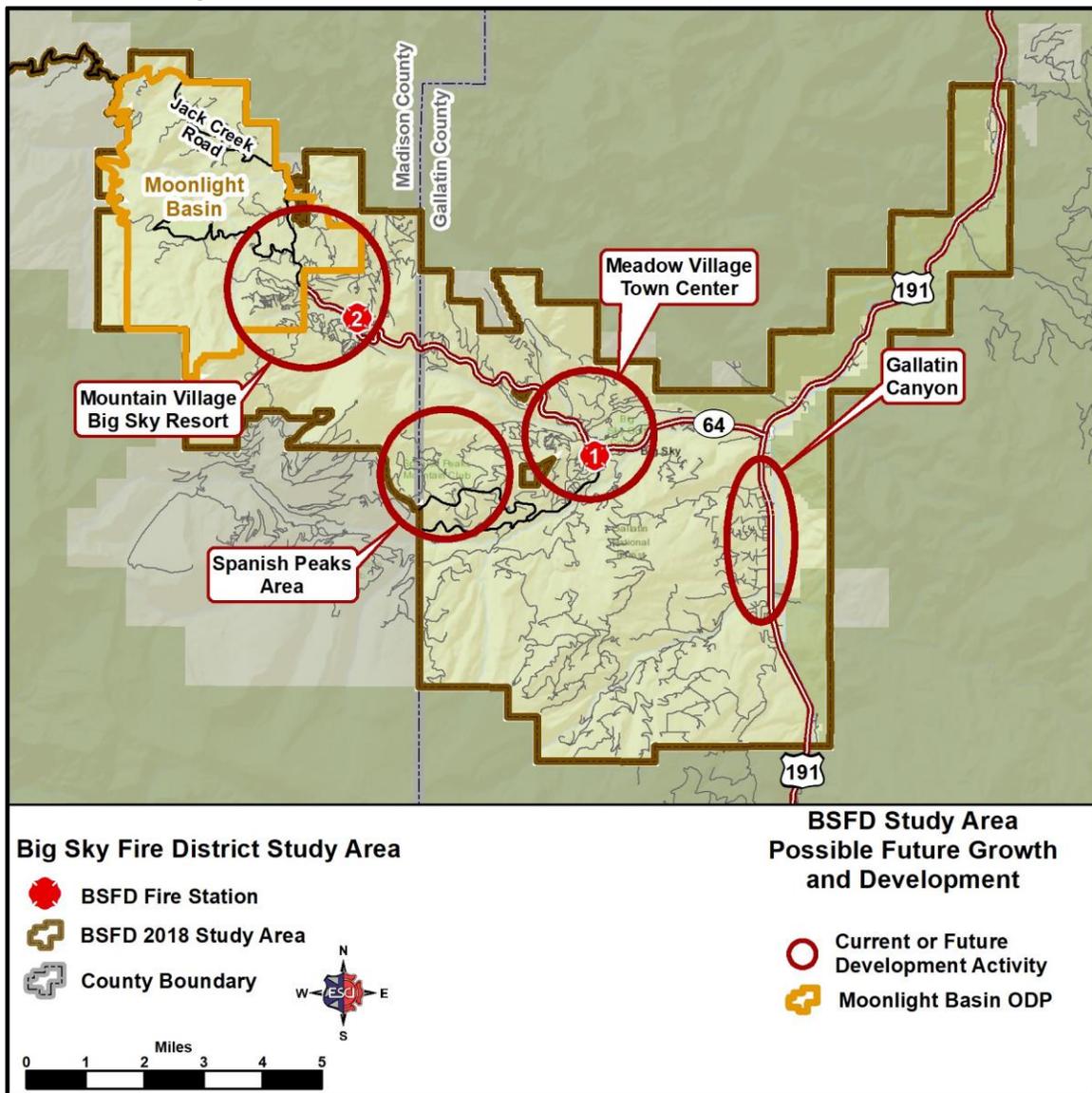
Just some of the factors that may indicate increased development and growth in the BSFD service area include the following:

- Annexation of the Moonlight Basin area into the fire district occurred. This area adds approximately 1,250 planned residential units to the fire district, including hotels, condominiums, and residential properties.
- Planned increased investment in infrastructure (water, sewer, and electrical) indicates developer's confidence in future growth.
- Steady and consistent growth in economic indicators such as Resort Tax collections is happening. Resort tax collections grew by approximately 23 percent between 2017 and 2018 (fiscal year); collections for 2019 through March 2019 already exceed 2018 total collections.
- Consistent residential population growth in the Big Sky CDP (5.6%, 2012–2017) is occurring with a projected increase of 600–900 jobs by 2023.
- Formation of Big Sky Community Housing Trust (BSCHT) to address affordable housing in Big Sky is desirable, which may promote job growth and residential population growth.
- Current commercial improvements and future planned resort residential development adds visitor capacity to the area. BSFD reports that approximately 67 percent of 2018 service demand were visitors to Big Sky.

The information just listed was gathered from data provided by BSFD, local planning documents, documents available on the Big Sky Chamber of Commerce webpage, the Big Sky Resort Area District webpage, and the Big Sky Community Housing Trust webpage.

The following figure identifies areas within BSFD that are likely to experience a change in the nature of risk present and increased service demand based on increased development and activity.

Figure 71: BSFD Future Risk Based on Development and Growth



The areas identified in Figure 71 currently have development projects in progress or planned that will promote increased activity and change the nature of community risk to some degree in these areas.

- **Meadow Village/Town Center:** A new 129-room Marriot Residence Inn is scheduled to open in June 2019. Additional commercial improvements and new construction are scheduled to be completed by 2023. Funding to construct a multi-use community center is being pursued. A 52-unit affordable housing development (Meadow View) is scheduled for completion and sales in Summer 2019.
- **Spanish Peaks:** The 500,000-square-foot Montage Hotel and Convention Center in the Spanish Peaks area is under construction and scheduled for completion in 2021. Additional vacation residential development is planned in this area (capacity for an additional 600 residential units).
- **Mountain Village/Big Sky Resort:** A \$150 million-dollar renovation of the Mountain Mall is scheduled to break ground in the summer of 2019. Other renovations of ski lifts and hotels are planned as part of Big Sky 2025 Plan; also, additional employee housing is planned.
- **Moonlight Basin:** Moonlight Basin encompasses approximately 8,000 acres in Madison County. The Moonlight Basin Overall Development Plan (ODP) approved in 2007 and amended in 2017 includes approximately 1,650 residential units. Currently, approximately 400 lots have been sold, leaving approximately 1,250 available for development. A water and sewer infrastructure project are in progress currently.
- **Gallatin Canyon (Highway 191 corridor):** This area is included due to the availability of land in this area. Currently, new development is hindered by current zoning and a lack of infrastructure. However, Gallatin County is in process of updating and revising the building/zoning code in this area. This may promote future development as the rest of Big Sky approaches build out in the distant future.

The discussion in the Community Risk Overview and the Future Community Risk Assessment is intended to provide an overview of current and future risk factors in the BSFD service area. It is not intended to take the place of a thorough, complete Community Risk Assessment Plan. ESCI commends BSFD policy makers for creating the Deputy Chief of Community Risk Reduction position. Doing so indicates that policy makers are aware of the unique challenges presented to a fire department serving a resort community such as Big Sky.

#### *Recommendations:*

- Develop a Community Risk Assessment Plan that includes the following:
  - ✓ 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

A Long-Range Master Plan is designed to provide future service demand projections, current response performance, and identification of needed future delivery system models as was included in the 2015 report. That report stated, "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 its risk exposure and its community's expectations." It was also noted that BSFD's geography, demographics, and lack of substantial mutual aid assistance result in a very unique service delivery challenge differing substantially from what is found in most fire and EMS systems of similar size.

Since the 2015 project, BSFD has made substantial and commendable progress in implementing the recommendations and future strategies discussed with appropriate modifications. In fact, the department has moved forward more quickly than expected, resulting in the need for the Master Plan update earlier than generally expected. The leadership and staff of BSFD have done an exceptional job in this area.

That said, as found in this analysis, the service area is experiencing a great deal of growth resulting in steadily increasing service demand that can be expected to continue to increase. It is imperative that the Department continue to develop to prevent the projected demand from exceeding future capacity.

### REVIEW OF RESPONSE STANDARDS AND TARGETS

To make good future decisions, a fire department must first identify the performance targets that it is seeking 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.

In 2015, ESCI discussed the importance of the establishment of response performance metrics by 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.

It was also explained that response standards and targets must be developed by the department and the 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, offers guidance and examples of appropriate metrics.

In updating the Master Plan, ESCI learned that the Department has not yet taken the step of identifying response targets and standards and establishing measurable metrics. However, it has delayed doing so with good reason. Multiple changes have occurred and are continuing with regard to resource deployment and, specifically, emergency response staffing. The Fire Chief explains that his intention is to first implement and stabilize the addition and deployment of additional personnel, as well as capital improvements, prior to setting response targets that will be subject to change in the near term.

ESCI supports the decision to hold off; however, ESCI re-emphasizes the importance of establishing the targets and standards, which is becoming more and more important with continued demand increases.

The 2015 report included considerable detail regarding development of response goals as well as multiple examples of how to quantify critical staffing needs by incident type. We will not repeat that detail here, instead referring the reader to the previous document. We will, however, revisit the following elements from 2015 as a review, but including 2019 updates to address the most recent NFPA and CPSE references.

Once BSFD has established response objectives and identified the critical tasks and number of personnel necessary to achieve those critical tasks as outlined in 2015, 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 both the citizens, and elected officials representing them, 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 is considered to be acceptable, reasonable, and effective in containing fire, stopping the loss, and saving lives when considering the 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 detailed in that report.

It was explained that national consensus standards, specifically NFPA 1710 and NFPA 1720, contain response-time goals for career fire jurisdictions (NFPA 1710) and combination/volunteer fire jurisdictions (NFPA 1720).<sup>5</sup> The NFPA 1710 standard is primarily suited for heavily developed and densely populated urban areas such as the areas identified and discussed in the Future Community Risk discussion. The NFPA 1720 standard recognizes that many fire jurisdictions serve diverse large areas and recommends response time standards based on population density. The CPSE Community Risk Assessment: 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.<sup>6</sup> 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. Big Sky Fire Department does not fit neatly into either the 1710 or 1720 category because of its unique service area and staffing strategy.

Due to the large geographic area, consisting of varied risk types and extended travel times, ESCI recommended that BSFD develop *tiered* response performance objectives based on risks present and travel time from an existing 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 8 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 12 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.*

In summary, ESCI continues to recommend the establishment of clearly defined response standards and targets as the Department achieves its new staffing and personnel deployment approach. Doing so must include careful consideration of community needs and expectations, as identified in 2015, and should be revisited as this initiative moves forward.

#### *Recommendations:*

- Establish risk zones within the BSFD service area, with tiered emergency response-time goals, that consider the differing level of risk within the BSFD service area.
- Establish and measure response standards and targets, with due consideration to community input, as the organization continues to grow to ensure service delivery is keeping pace with increasing demands.

<sup>5</sup> 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 2016) 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).

<sup>6</sup> *Center for Public Safety Excellence (CPSE) Community Risk Assessment: Standards of Cover, 6<sup>th</sup> Edition.*

## SHORT- AND MID-TERM STRATEGIES

The 2015 report contained multiple observations and recommendations relating to BSFD management and operations. ESCI explained the importance of understanding, prioritizing, and implementing the recommended in an organized manner using the prioritization approach outlined next.

All of the listed recommendations have been completed, modified or otherwise addressed since 2015. Those recommendations are condensed and summarized below, with updates on steps taken.

### *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 term or midterm 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 and then modify them 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.

#### *2019 Status Update:*

- ✓ This is an ongoing project that is being addressed, and considerable progress has been made.

- 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 outdated 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.

*2019 Status Update:*

- ✓ Sales tax funding was secured from the Big Sky Resort Area District for the project. It is delayed at this time but expected to move forward.

## 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.

*2019 Status Update:*

- ✓ The Fire Chief is monitoring and updating the Board throughout the year regarding financial concerns.

- Implement a second computer records server in an off-site, secure, location or cloud-based backup.

*2019 Status Update:*

- ✓ An off-site, cloud-based backup system has been established.

- Establish formal, annual administrative performance objectives.

*2019 Status Update:*

- ✓ The Fire Chief has been evaluated but only verbally. Performance objectives and a structured evaluation process for administrative staff have not been established.

### Priority 3—Matters That Address a Service Delivery Issue

The recommendation addresses a service delivery situation that, although it does not create an immediate safety risk to personnel or the public, does affect the department's ability to deliver service in accordance with its standards of performance. For example, add a response unit to compensate for a growing response workload, or deliver 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.

*2019 Status Update:*

- ✓ Staffing needs are in the process of being addressed as detailed in this report.

- Establish a Board-approved staffing document detailing both full and minimum staffing requirements, and place in Policy Manual.

*2019 Status Update:*

- ✓ The Board has adopted the 2015 Master Plan as well as a subsequent Strategic Plan, which facilitated the success of the mill levy accommodating improvements in capital facilities and staffing.

- 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.

*2019 Status Update:*

- ✓ New records management system is being used to more closely monitor response times and assembly of an ERF.

- Stabilize fluctuating full-time and paid-on-call staffing. The BSFD should fill any vacant authorized positions to ensure a full staffing.

*2019 Status Update:*

- ✓ Paid-on-call firefighter staffing has been discontinued; on-call EMTs are still used to assist with ambulance transports.
- ✓ Vacant positions have been filled and additional positions established.
- ✓ Additional staff positions are planned in 2019 and 2021.

#### Priority 4—Considerations to Enhance the Delivery of Services

These are recommendations that improve the delivery of a particular service. For example, relocate a fire station to improve response times to a particular part of town, or add a piece of equipment that will improve the delivery of a service.

- Develop and memorialize an annual training plan, and update annually or as needed. Plan should outline training priorities for the year.

*2019 Status Update:*

- ✓ A plan is in place but needs further development. It is a work in progress.

- Explore formalized drill scheduling with Big Sky Resort, a minimum of three times per year per shift.

*2019 Status Update:*

- ✓ New lines of communications have opened, and details are being formalized.

- Explore formalized training with Yellowstone Club Fire Department staff.

*2019 Status Update:*

- ✓ This remains a challenge despite outreach efforts by the BSFD Chief and Training Officer. This is an ongoing effort.

#### Priority 5—An Important Thing to Do

The recommendation does not fit within any of the preceding 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.

*2019 Status Update:*

- ✓ The Board has formally adopted the Master Plan and accommodated funding where needed.

- 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.

*2019 Status Update:*

- ✓ The Board has formally adopted the Strategic Plan and accommodated funding where needed.

- Establish formalized weekly, monthly, and quarterly administrative staff and first line supervision staff meeting dates to improve internal communications.

*2019 Status Update:*

- ✓ Meetings are scheduled on a regular basis.

- Establish incident command training to regularly include the Fire Chief and crews.

*2019 Status Update:*

- ✓ Need has changed with the addition of Battalion Chiefs to each shift. The Fire Chief is less directly involved in field operations as a result.

- Develop and implement a Captain's Manual for professional development for the first line supervisor level.

*2019 Status Update:*

- ✓ Manuals for the positions of Captain and Acting Captain have been completed and adopted.

- 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.

*2019 Status Update:*

- ✓ With the new Deputy Chief of Community Risk Management position, outreach has increased significantly.

## RECOMMENDED LONG-TERM STRATEGIES

The preceding short- and mid-term strategies have moved 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. Long-term strategies were identified in 2015 and are reviewed in the following discussion.

### *Review of 2015 Recommended Long-Term Strategies*

The 2015 report included numerous recommended long-term strategies, many of which have been addressed and implemented by the Department. Following is a summary of the previous long-term strategies.

#### **Big Sky Resort Tax Dispersal Policies**

The Big Sky Resort Area District (BSRAD) has consistently provided financial support to the Big Sky Fire Department. However, in 2015, it was necessary that the fire department make its requests for assistance annually, absent the opportunity to request multiyear funding for ongoing programs. The practice limited the ability for BSFD managers to develop and implement mid- or long-term plans, and ESCI recommended at the time that the department seek the ability to obtain funding that could be applied for more than one year.

ESCI acknowledged at the time that, although it would be preferable for BSFD to have ongoing and dedicated funding from the Resort Tax Board, due to the configuration of the taxing system the expectation is unreasonable. The current board could not be expected to commit subsequent boards to funding that is based on unknown future resort tax revenues.

The concept was suggested wherein a three- to five-year funding plan and commitment from the Resort Tax Board would provide the fire department with a 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 multiyear financial strategy as an option that we recommend be discussed.

Today, the situation has improved. In 2018, BSFD signed a Memorandum of Understanding (MOU) with the Big Sky Resort Area District wherein the BSRAD Board agreed to increase the amount of the Resort Tax it would remit to BSFD by three over the preceding year's amount in FY 2020 and again in FY 2021. This provides an improved opportunity for the fire department management to plan ahead. It is important to note that the MOU applies only to funding of operational costs. It does not address capital expenses. Each year, BSFD seeks funding for capital projects separately from the MOU.

#### **Administrative and Support Staffing**

Significant concerns were expressed in the 2015 report in regard to administrative and support staffing levels and existing unbalanced span of control that was negatively impacting the ability of the Fire Chief and his limited support staff to adequately meet the District's needs.

At the time, BSFD was in the process of filling a newly created Deputy Chief's position, which was completed. In addition, a second Deputy Chief's position was later added with responsibility for community risk assessment and management including fire prevention and public education.

Battalion Chiefs have been added to the organizational chart to take on many administrative functions previously addressed by the Fire Chief and Administrative Officer. Further, the Administrative Officer now has a needed assistant. Finally, two new positions have been planned and funded: Training Captain and another Captain assigned to the Community Risk Deputy Chief.

The District's administrative and support staffing needs have been effectively addressed at this writing.

### Truck Company Relocation/Deployment

The department's sole aerial ladder truck is located at Station 2 because of space limitations at Station 1. At the time of the 2015 writing, ESCI expressed concern about the situation for two reasons. First, the location is removed from the core population and service area, and, second, the station was not staffed with career personnel, and, at times, it was necessary to send personnel from Stations 1 to 2 to retrieve the truck when needed.

The situation is changing, however. In the near future, the Department plans to add enough personnel to enable it to staff Station 2 with two personnel on a full-time basis. When completed, there will be a crew to respond the truck when in quarters. Effective engagement of a ladder truck at a fire may require more than two personnel, so additional staffing support on the scene may be needed.

### Protection in Areas Outside of Big Sky Fire District

ESCI reported that the Big Sky Fire District had defined boundaries, within which it collects tax revenue and has an obligation to provide fire protection services. However, in 2015, the District also provided 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 that were outside of the District, but receiving services, were subdivisions or housing developments, such as the "Big EZ" development. In other cases, properties that are outside of any organized development are being served.

ESCI offered a listing of potential strategies by which to address the concern of portions of the District that were receiving services, but for which BSFD was not receiving revenue. One of the options offered was that of annexation of properties adjacent to the District boundaries. BSFD has since implemented the annexation process, and all areas receiving fire protection service from the District are now included within its boundaries and taxed accordingly.

### Apparatus Replacement Planning

It was acknowledged in 2015 that BSFD had implemented a well-developed plan for replacement of capital assets including fire apparatus. The report offered additional information and a sample replacement schedule based on ESCI's projected service lives and replacement costs at the time.

Subsequently, BSFD has updated an apparatus replacement plan including related equipment. As stated previously, ESCI reviewed the current plan and finds it to be comprehensive and appropriate in content.

## Future Training Site Development

An area of weakness previously identified was the lack of a dedicated training facility. The 2015 report included a recommendation that a training site be developed, preferably as a joint effort with the Yellowstone Club Fire Department.

Inquiring about the status of this recommendation, ESCI learned that a potential site has been identified, but that a funding source for the project has yet to be identified. ESCI renews its recommendation that a training facility be planned and developed.

## *Future Fire Station Options*

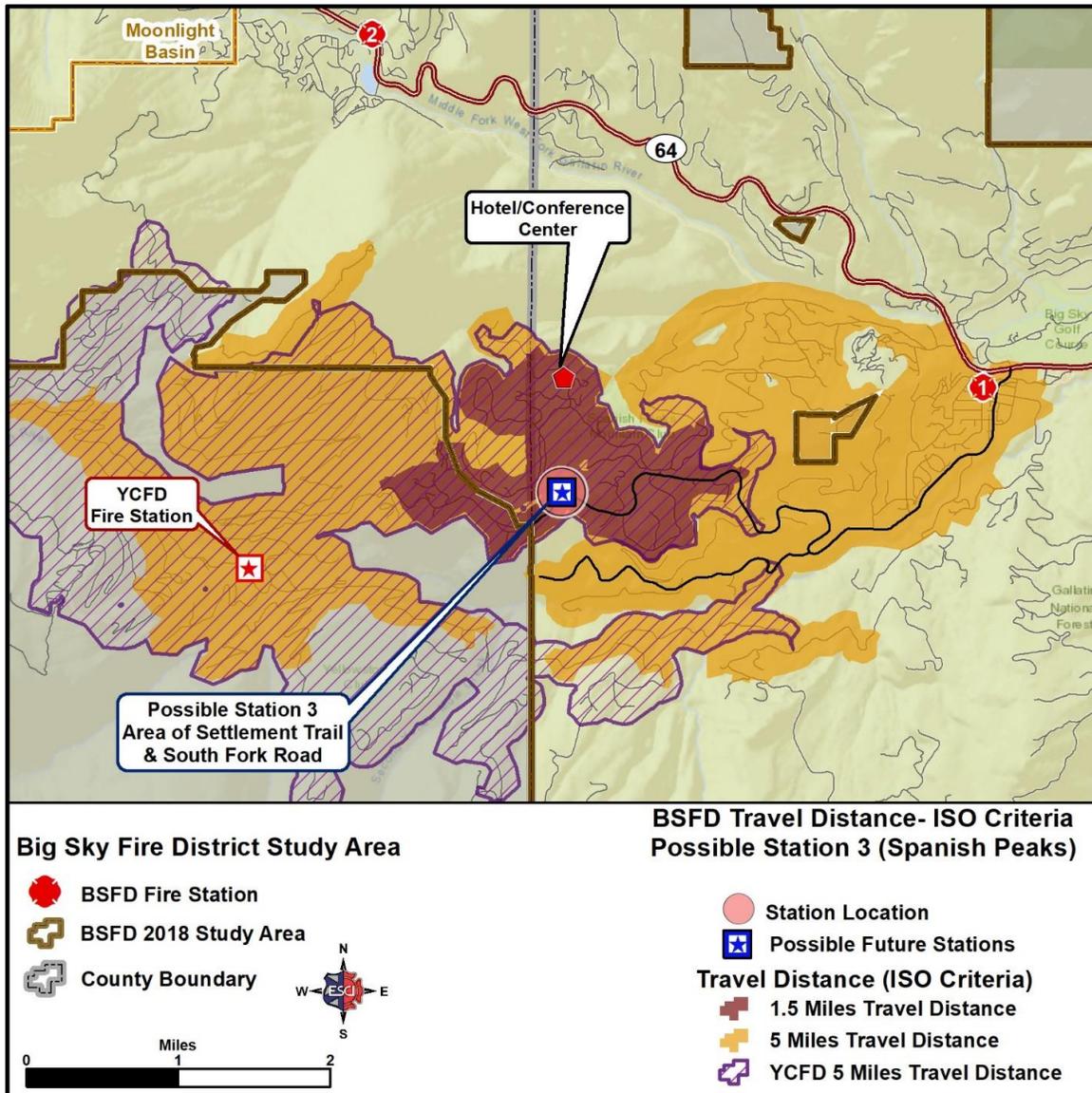
### Possible Future Fire Station in the Spanish Peaks Development

Since 2015, construction of the Montage Hotel and Convention Center and associated residential development in the Spanish Peaks area has moved from the planning stage to development. The approximately 500,000-square-foot hotel is scheduled for completion in 2021, and a new residential development is also in progress.

Using GIS analysis, ESCI identifies a location in the general vicinity of Settlement Trail and South Fork Road that is well located to provide coverage to new development in the Spanish Peaks area and other portions of the BSFD service area, such as the Andesite Ridge Road area, that are currently beyond 5 miles' travel of a BSFD fire station. Additionally, the location in the area of Settlement Trail and South Fork has good access east to Ousel Falls Road, which is a main route back into the center of BSFD service area.

The following figure displays a possible future station location and the service area of that site, based on the ISO criteria for geographic coverage (travel distance).

Figure 72: Travel Distance—Possible Station 3 (Area of Settlement Trail and South Fork Road)

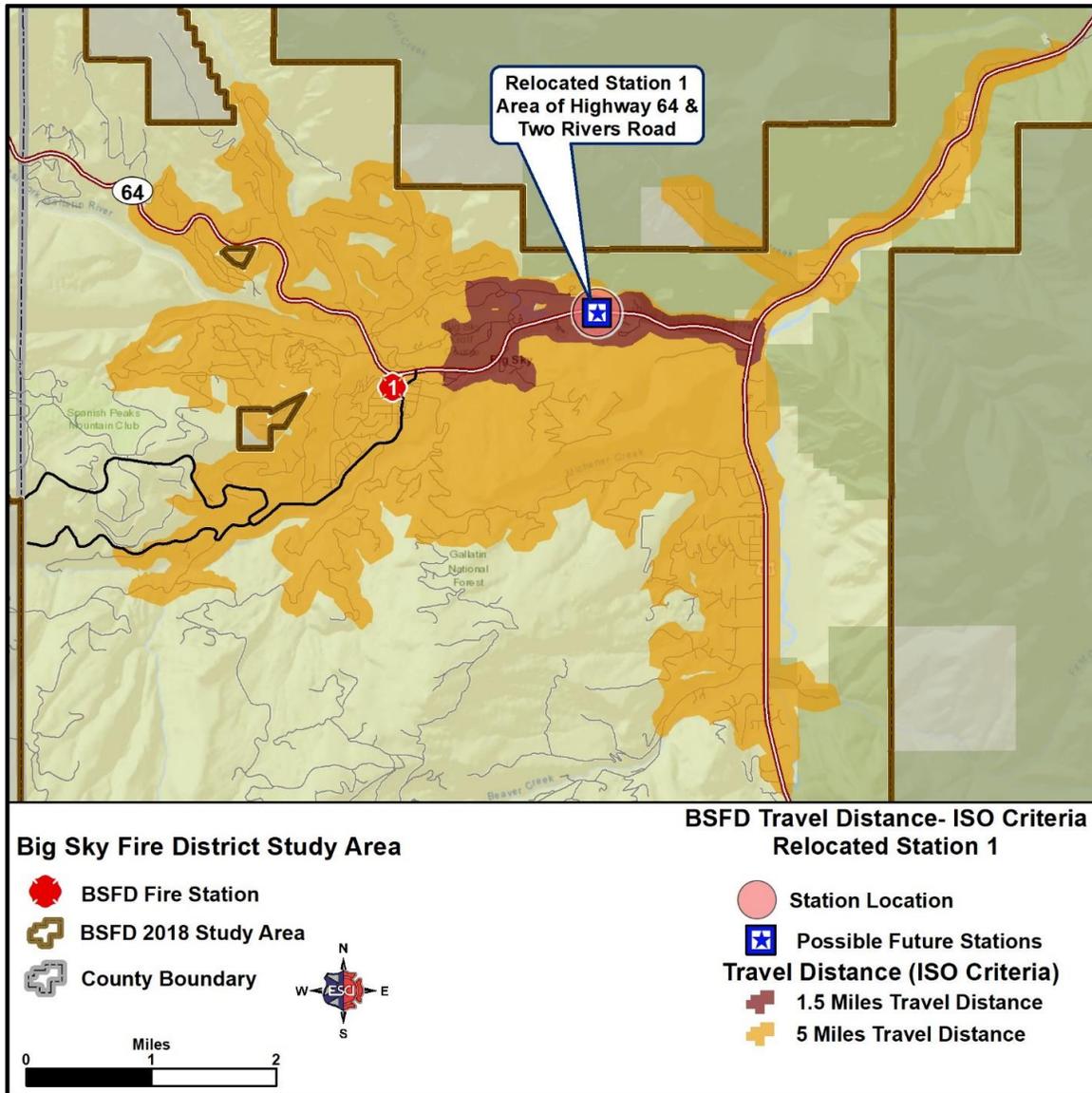


At 1.5 miles’ travel distance the location identified provides good coverage into the portions of Spanish Peaks currently experiencing the greatest development including the hotel/convention center. Most of the western corner of the BSFD service area that is currently beyond 5 miles of a BSFD fire station can be reached from this location. There is also good coverage to the east along South Fork Road and Ousel Falls Road, which will be essential once the current Station 1 is relocated. ESCI also displays the 5-mile service area from the Yellowstone Club Fire Department (YCFD) station, which is approximately 3 miles west of the proposed BSFD station location. BSFD currently has signed an automatic aid agreement with YCFD, which will increase the resources available in the Spanish Peaks area. However, given the nature of the current and future risk in this area, the YCFD station is not a substitute for a BSFD station in the Spanish Peaks area. A staffed station located in the Spanish Peaks area improves response capabilities and the effectiveness of BSFD emergency operations. Additionally, this station would serve an area that is expected to experience new development and growth beyond 5 miles’ travel from a BSFD station.

### Relocation of Station 1

As previously discussed, BSFD has planned to relocate the current Station 1 to a location just off Highway 64, approximately 2 miles east of the current location. ESCI agrees with BSFD’s decision to pursue relocating Station 1. The next figure demonstrates the service area of this new station location based on travel distance.

Figure 73: Travel Distance—Relocated BSFD Station 1

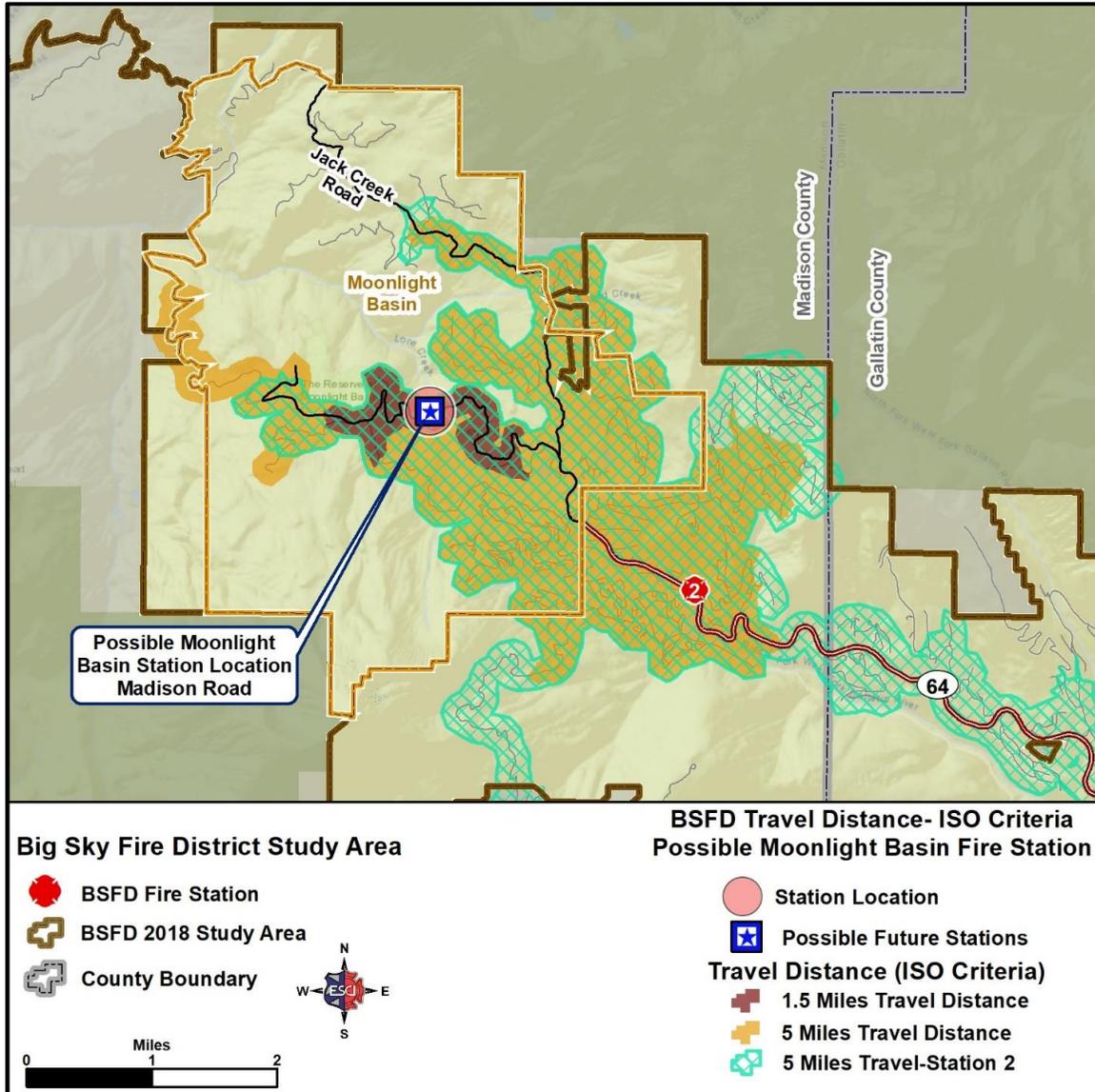


Overall, at 5 miles’ travel distance, the location displayed is within approximately 56 percent of structures inside the BSFD service area. This represents an increase over the coverage provided by the current Station 1 (54 percent of structure points). Although the new station location is beyond 1.5 miles’ travel of the Meadow Village/Town Center area, the travel-time model shows that travel time into the area is still within 4 minutes or less (NFPA 1710 criteria). Relocating Station 1 to the proposed location provides an opportunity to meet the current and future needs of BSFD.

### Future Fire Station in Moonlight Basin

The following figure demonstrates travel distance capabilities from a possible future fire station in the Moonlight Basin area.

**Figure 74: Travel Distance—Possible Future Moonlight Basin Fire Station**

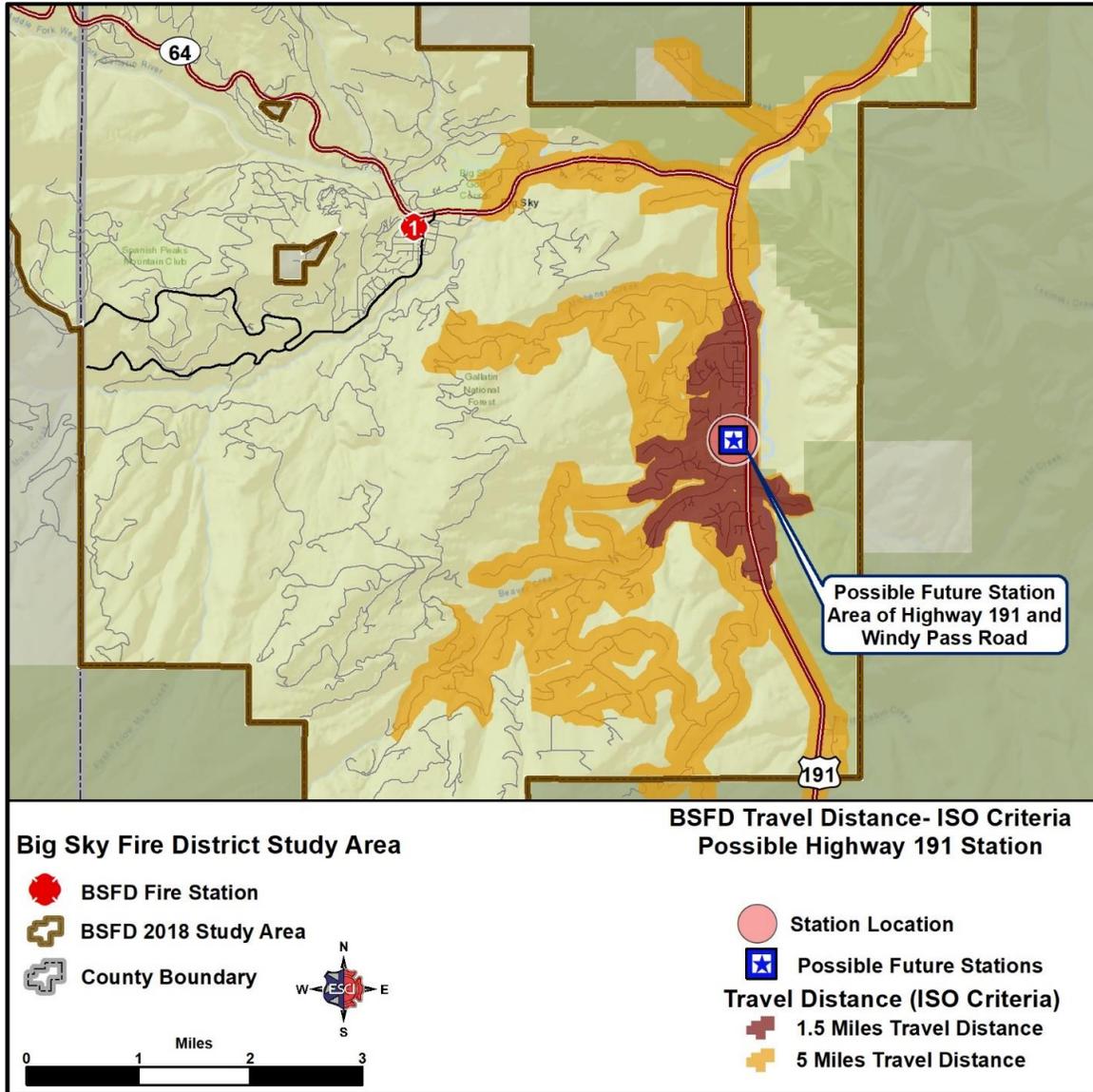


The Moonlight Basin area has been annexed into the Big Sky Fire District. A preliminary station location has been identified, and travel distance capability is modeled in this figure. The 5-mile service area from the current Station 2 is also displayed in this figure. Note that most of the area within 5 miles’ travel or less of the proposed location is currently within 5 miles’ travel or less of the current Station 2. ESCI notes that the GIS data reveal that currently there are virtually no structures beyond 5 miles’ travel of Station 2. Distant future development may necessitate an additional fire station in Moonlight Basin; however, staffing Station 2 with 24-hour personnel will meet the current and pending needs for fire protection in the Mountain Village and Moonlight Basin area well into the future.

### Future Fire Station—Area of Highway 191 and Windy Pass Road

The next figure displays travel distance capability from a possible station location on Highway 191 near Windy Pass Road.

**Figure 75: Travel Distance—Possible Highway 191 Fire Station**



In 2015, ESCI recommended that BSFD consider locating a fire station on Highway 191 in the area identified in this figure. This station location would improve geographic coverage of properties along Highway 191, especially in the area of the Ophir and Lone Peak school area, based on the ISO travel distance criteria. Although this station location is still a viable option for a BSFD station in the future, the proposed relocation of Station 1 mitigates to some degree the need for this station and provides additional future opportunities to improve BSFD operations. BSFD should continue to monitor service demand and response performance along Highway 191. However, constructing and staffing a fire station in the Spanish Peaks area and relocating Station 1 should be regarded as higher priorities.

### *Future Deployment Models*

In the Future Community Risk Assessment, ESCI identified four areas that are expected to experience future growth and increased service demand. The four areas identified also account for approximately 84 percent of current structural risk and nearly 81 percent of current service demand (2017–2018 incidents) in the BSFD service area. Based on structural density and the availability of fire hydrants, these areas should be regarded as “Urban Risk” zones. These are the portions of the service area where BSFD should strive to meet the more stringent travel time (4 minutes) recommendations of the NFPA 1710 Standard for Career Fire Departments.

The following figures examine future station deployment options for BSFD stations and the coverage provided by the identified stations in the portions of the service area that currently experience the highest service demand and are expected to experience increased risk and service demand in the future.

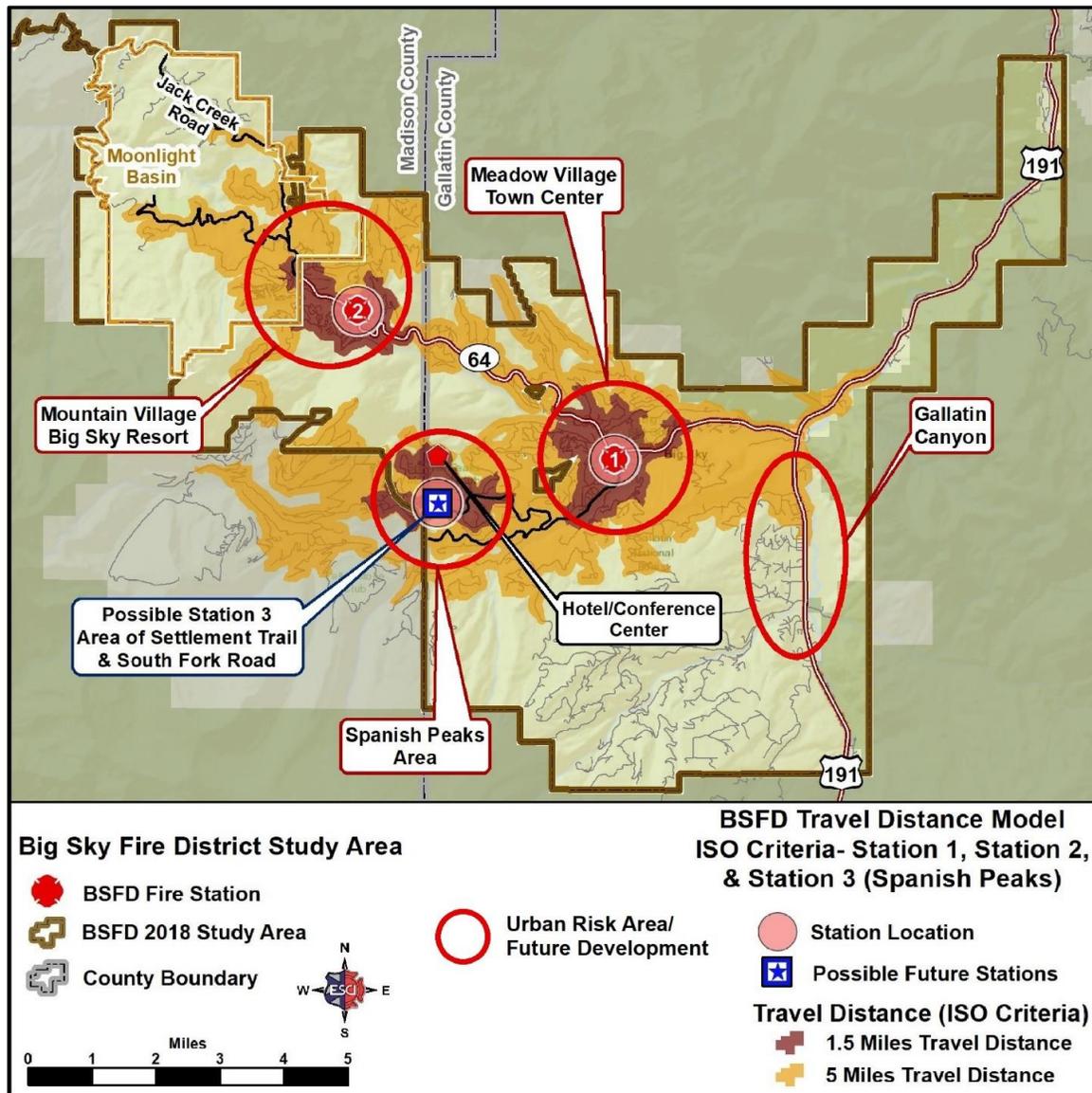
#### Three Staffed Stations—Stations 1, 2, and 3 (Spanish Peaks)

The next two figures display the coverage provided from the current BSFD stations and a new station located in the Spanish Peaks area. It is anticipated that BSFD Station 2 will be staffed with 24-hour personnel in the current fiscal year (2020). After staffing Station 2, the next priority for BSFD should be the construction and staffing of an additional fire station in Spanish Peaks in the area identified in the following figures. A new development such as the Montage Hotel/Conference Center is scheduled for completion in 2021, and another new development is currently in progress.

BSFD should work with developers to identify a suitable site for the Spanish Peaks station. ESCI has observed jurisdictions open new fire stations in newly developed areas or proposed development by partnering with developers. These partnerships have utilized development agreements to secure land, construction costs, equipment, and incremental operational costs.

ESCI recommends that BSFD consider a goal of five to seven years for placing the third staffed BSFD fire station in the Spanish Peaks area. This goal may need to be achieved incrementally with the station being constructed as soon as possible and staffing occurring as soon as the District is fiscally able. Big Sky should monitor service demand and response performance in the area. Increased response activity or the need for a staffed fire station in the area to meet ISO requirements, which may lead to reduced insurance costs, could require this station be constructed and staffed sooner.

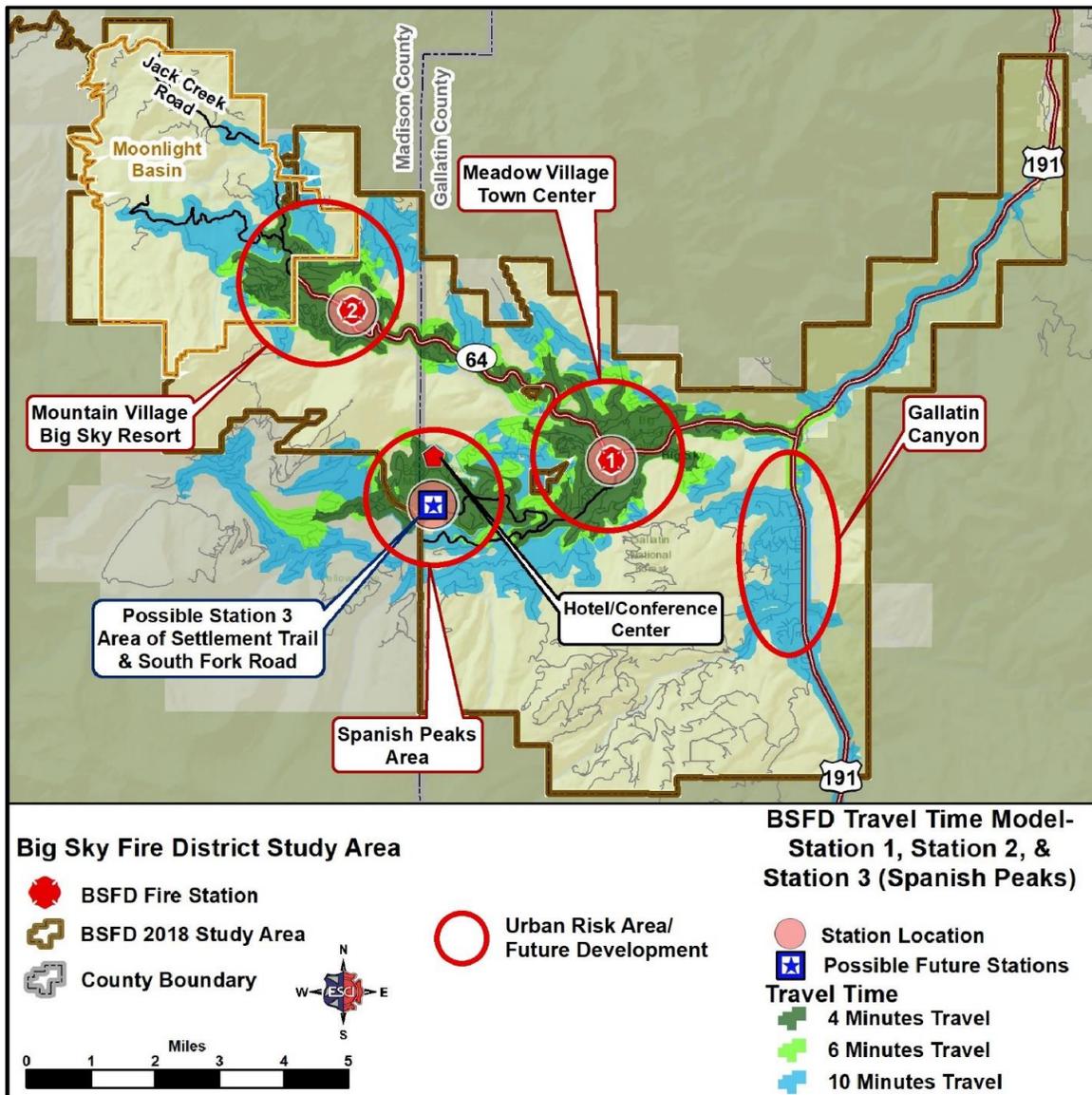
Figure 76: Travel Distance—Three Station Deployment Model, Current Stations and Station 3 (Spanish Peaks)



The analysis of travel distance from these three station locations demonstrate the following geographic coverage of structural risk in the Urban Risk areas identified for future growth and increased service demand (Meadow Village/Town Center, Mountain Village/Big Sky Resort, Spanish Peaks, and Gallatin Canyon):

- 1.5 miles’ travel distance—71 percent
- 5 miles’ travel distance—93 percent

Figure 77: Travel-Time Model—Three Station Deployment Model, Current Stations and Station 3 (Spanish Peaks)



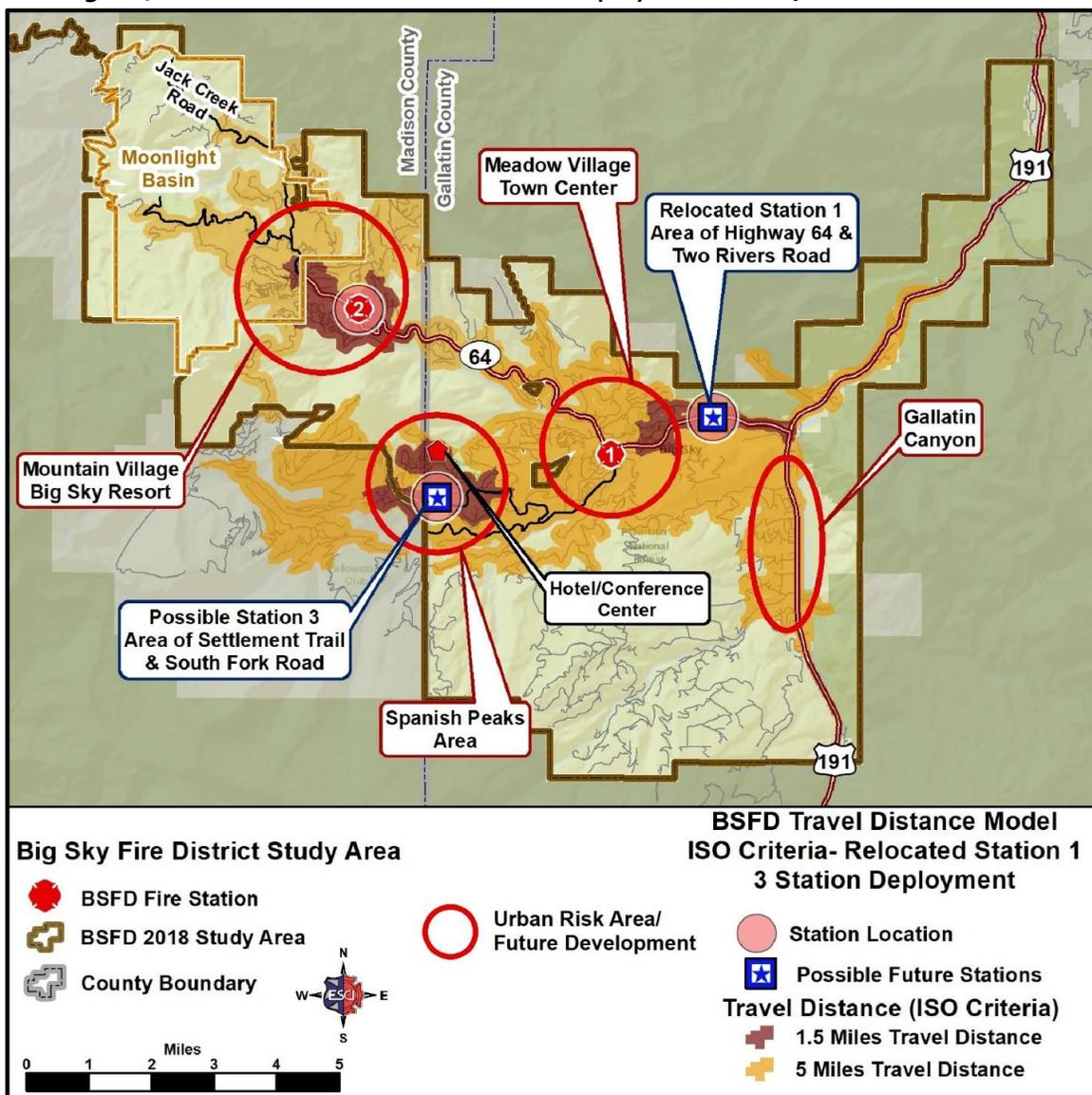
The analysis of travel time from these three station locations demonstrates the following coverage of 2017 through 2018 BSFD service demand in the Urban Risk areas identified for future growth and increased service demand (Meadow Village/Town Center, Mountain Village/Big Sky Resort, Spanish Peaks, and Gallatin Canyon):

- 4 minutes’ travel time—90 percent
- 6 minutes’ travel time—92 percent
- 10 minutes’ travel time—100 percent

### Three Staffed Stations—Relocated Stations 1, 2, and 3 (Spanish Peaks)

The following figures examine the coverage provided in the BSFD service area, once the department relocates the current Station 1 to the proposed site in the area of Highway 64 (Lone Mountain Trail) and Two Rivers Road. Moving Station 1 provides BSFD with an opportunity build a modern, well-designed facility on suitably sized lot that will meet the future needs of the fire district and the Big Sky community. The Department’s anticipated timeline for the relocation of Station 1 is 10 to 15 years from now. While the argument can be made that a new facility to replace Station 1 is a more immediate need, remodeling work in progress now should accommodate the Department’s current needs in the near term. Prior to construction of the relocated Station 1, ESCI recommends that BSFD conduct a facility study that provides recommendations and costs to address current essential facility, ADA, dual gender, and industry safety and functionality best practice standards.

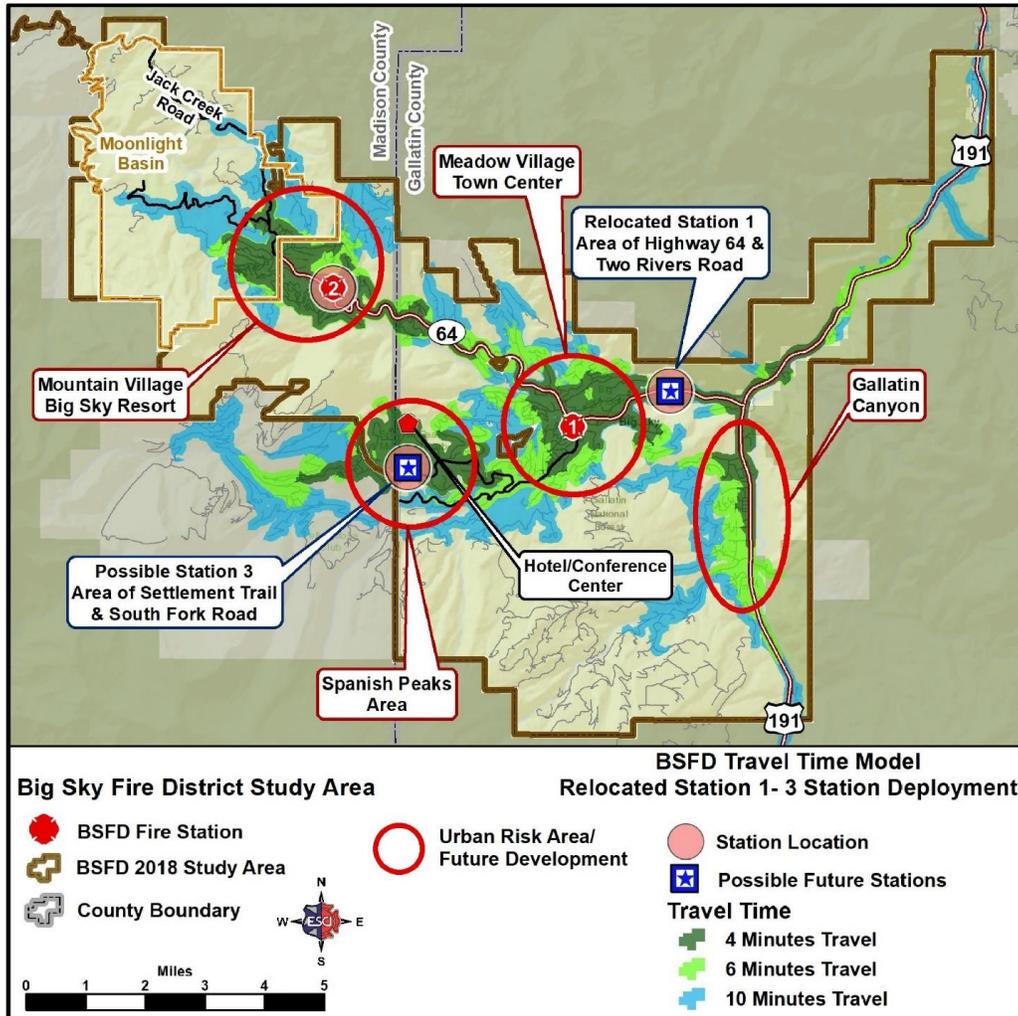
**Figure 78: Travel Distance—Three Station Deployment Model, Station 1 Relocated**



The analysis of travel distance from these three station locations demonstrates the following geographic coverage of structural risk in the Urban Risk areas identified for future growth and increased service demand (Meadow Village/Town Center, Mountain Village/Big Sky Resort, Spanish Peaks, and Gallatin Canyon):

- 1.5 miles’ travel distance—37 percent
- 5 miles’ travel distance—98 percent

**Figure 79: Travel-Time Model—Three Station Deployment Model, Station 1 Relocated**



The analysis of travel time from these three station locations demonstrates the following coverage of 2017 through 2018 BSFD service demand in the Urban Risk areas identified for future growth and increased service demand (Meadow Village/Town Center, Mountain Village/Big Sky Resort, Spanish Peaks, and Gallatin Canyon):

- 4 minutes’ travel time—91 percent
- 6 minutes’ travel time—98 percent
- 10 minutes’ travel time—100 percent

## Summary Discussion

The Big Sky Fire Department currently serves an area of approximately 80 square miles from a centrally located single station. The service area is diverse and contains an extraordinary amount of risk. Continuing to serve the District from a single staffed station is currently difficult and will soon be unsustainable.

The two three-station deployment models just presented represent an incremental plan to better serve the constituents of the fire district in an effective and efficient manner.

The key findings are as follows:

- BSFD has already started implementing this plan by committing to 24-hour staffing at Station 2.
- Station 2 is well located to serve current and future service demand in the Mountain Village and Moonlight Basin area.
- Constructing and staffing a third BSFD station in the Spanish Peaks area will meet the future needs in this area. Additionally, a third staffed station improves the overall response capability of BSFD and the ability to assemble an ERF.
- The eventual relocation of Station 1 will provide the opportunity to meet current and future needs of the organization from a modern, well-designed facility and will improve response performance in the portions of the service area along Highway 191.

## *Future Staffing Deployment*

As BSFD adds stations in the future and increases current station staffing, the Department will need to consider the number of personnel needed to maintain minimum staffing levels. Determining the minimum levels is an exercise that Big Sky will have to undertake based on the response standards and targets already discussed, the degree to which the Department seeks to achieve NFPA staffing levels, and the financial capacity available to pay for additional personnel.

Because these are decisions that will need to be made by the department, ESCI cannot advise on the numbers with which future stations should be staffed. However, the following discussion is offered to enable the Fire Chief to calculate how many personnel are necessary to achieve minimum levels, accounting for times when responders are unavailable due to various leaves, Kelly Days, and other predictable time off.

ESCI calculated the theoretical total number of full-time employees required to meet the various average leave hours used by employees in 2018 and compared the results to the current number of operations employees assigned to 24-hour staffed units. This calculation compared the average available scheduled weekly work hours per employee, subtracted the average use of various leave types—based on 2018 historical leave use data—and calculated sick and vacation relief factors. ESCI then multiplied the number of personnel needed to cover a single position at 24 hours per day with the relief factor to determine the theoretical total number of employees required to meet daily minimum staffing without taking into account the use of paid-on-call or part-time employees to backfill vacancies. The following figure summarizes the results of these calculations:

**Figure 80: Theoretical Relief Factor Calculation, 2018**

Relief Factor	BSFD
Sick Leave	1.15
Vacation Leave	1.17
<b>Total Relief Factor<sup>1</sup></b>	<b>1.21</b>

<sup>1</sup>Includes vacation leave, sick leave, Kelly Day leave, comp time leave, FMLA, bereavement, short-term disability, military leaves, etc.

The total leave factors were multiplied by the number of personnel needed to cover one 24-hour position. The following figure compares the theoretical number of positions needed with the current number of employees assigned to the work schedules and the anticipated 2020 staffing levels. Note, these calculations do not include seasonal increases in daily minimum staffing levels. In addition, future minimum numbers of positions are included to plan for minimums of seven and eight that may occur with the addition of a station.

**Figure 81: Calculated Operational Staff Shortage/Overage**

Number of Positions Required 24/7	Total Number of Operations FTEs	Theoretical Number of FTEs Needed	Shortage/Overage
5	21	18	<b>3</b>
6	21	22	<b>-1</b>
7	21	26	<b>-5</b>
8	21	33	<b>-12</b>

The preceding calculations were made assuming the current average work week, average annual work hours, and 2018 leave usage. Downward adjustments to work hours will result in a higher relief factor. Likewise, reductions or increases to historical leave usage will increase or decrease the factor.

If desired, ESCI is happy to provide calculations for additional staffing levels.

## Conclusion

The Big Sky Fire Department is faced with multiple and complex challenges that are a result of demographics, very diverse community risk, and limited external response resources. Multiple recommendations from the Master Plan complete in 2015 have been implemented by the Department in a very short period of time. The staff of BSFD is commended for their considerable efforts as is the Board of Directors for their continued support and guidance.

This document has provided a review of the 2015 recommendations, as well as a renewed look into the future of the Big Sky Fire Department, and the challenges that it will need to overcome if it is to maintain an acceptable level of service delivery and continue to do so in the light of future demands. It will be critical that the Department remain vigilant regarding how it will need to deploy physical resources and response personnel as explained throughout the report. The plans for future facilities and staffing strategies that BSFD has already developed, with adjustments recommended by ESCI, are appropriate and needed and will ensure that the citizens of Big Sky will continue to be served effectively.

ESCI thanks the Big Sky Fire Department's Board members, responders, and administrative staff for their assistance in bringing this project to fruition.

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