INDEPENDENT FIRE STUDY

BERKELEY COUNTY, SOUTH CAROLINA

January 2018

FINAL REPORT

Submitted by:

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Executive Summary

Berkeley County, South Carolina has a population of roughly 210,898 people spread over 1,230 square miles. The County varies from small urban centers, suburban developments, industrial properties, and expansive rural areas consisting of agriculture, forestry, and undeveloped land. Positioned just north of Charleston and Charleston County, Berkeley County is experiencing growth as people and employment are drawn to the area for its favorable weather, affordable cost of living, and positive business climate.

Fire services in much of unincorporated Berkeley County are delivered through a network of 26 fire districts served by 25 fire departments. These departments are organized as non-profit corporations, who execute contracts with the County to provide services on an annual basis. These contracts contain only limited provisions for filing information, and they are difficult to validate. Most importantly, detailed performance information is not included in the current contract requirements.

The administrative burdens of running a fire department are growing as regulations increase and compliance with safety and training standards becomes stricter. Recordkeeping by volunteer boards of directors and chiefs is inadequate in many cases, with manual records storage and difficulties in retrieving information. The existing contract requirements are outdated, and compliance is poor in many cases.

The result is that many gaps exist in terms of basic information about the quality of service being delivered and the viability of fire departments is simply not available. Participation in standardized incident reporting is limited, and the County's existing Computer Aided Dispatch/Records Management System is unable to produce analysis of response times in a format needed to validate performance.

Funding for fire protection is financed through a user fee system based on the number of properties and land in each district. This system of funding has resulted in wide inequities in the level of service provided, with rural areas suffering from inadequate funding, staffing shortages, and limited equipment.

Growth patterns in the County are reinforcing this trend, as rapidly-suburbanizing districts are seeing increased population and development, while rural areas remain stable or even lose population. The County has made attempts to address this problem with the pooled fire fees process, but these adjustments are inadequate to address the underlying concerns.

There is much good work being done day-in and day-out by the dedicated volunteers currently supporting the fire services. However, simply throwing more money at the system as it is currently constituted is not the answer. Experience in other South Carolina counties indicates that a countywide administration of services can produce better insurance ratings and make more effective use of resources.

Several districts have personnel paid to provide staffing in various schedule configurations. These personnel are deployed mainly according to the resources and needs of each district. As demand for

service grows, and additional staff are added, there needs to be greater efficiency in planning for and assigning these and other resources. The current system structure must be changed.

We have proposed a series of reforms designed to increase accountability, improve service delivery, reduce the administrative burden on volunteers, and develop more consistent service levels across the County. These changes are intended to move the system toward more integrated, consistent, and measurable delivery of service.

For those departments that are functioning well and have adequate personnel, the changes will be largely a matter of enhanced reporting and coordination. For those departments struggling with inadequate staff, administrative support, or other burdens, we have done the following:

- Recommended enhanced financial support
- Provided a means for improving performance
- Identified a path for merger with neighboring district(s) or handing over service to the County.

In our estimation, there are departments within the County that are operating in marginal condition, and are already considering these options. We expect that the contract renewal process will stimulate some activity in this regard.

Overall funding to the system needs to be increased, and we propose that an ad valorem tax may be more efficient way to raise revenue for services. However, we recommend that funds be collected and administered by the County, with each Department developing a budget based on need – not on the available resources. As part of this process, existing district boundaries should be redrawn based on response time and capabilities, rather than the traditional boundaries as they exist.

At the same time funding is centralized, we propose that the County take over training and provision of protective equipment, assuring consistency and relieving departments of this burden.

To be clear, we do not recommend a County takeover of fire services. However, the existing structure is inefficient, inequitable, and inadequate to meet the County's future needs. We recommend that a process of greater accountability and County support is implemented.

Specific high-level recommendations include:

- ✓ Mandate compliance with South Carolina Fire Incident Reporting System (SCFIRS)
- ✓ Develop performance goals for fire departments with regard to staffing and response.
- ✓ Develop Countywide credentialing of personnel, including developing minimum training standards and standard position descriptions.
- ✓ Develop a Countywide records system for training, response, and financial data.
- ✓ Begin process to standardize operating procedures and policies.
- ✓ Develop a Countywide volunteer recruitment and retention program.

Other recommendations include:

- ✓ Develop a long-term, orderly solution for service provision in the Charleston/Cainhoy area.

- ✓ Evaluate contracting with municipalities to provide service based on their response capability.
- ✓ Hire a Fire Administrator and Training Officer to support the fire departments.
- ✓ Develop service level standards and measure performance against them.
- ✓ Begin Community Fire Risk Reduction Efforts.
- ✓ Develop Countywide or regional special operations teams.
- ✓ Begin efforts to right-size the apparatus fleet.

The County Chiefs have the opportunity to drive this process. We are optimistic that necessary changes can be made to strengthen the service without wholesale change. We anticipate that this will be a multi-year process, with opportunity for consultation and input from each department.

Volunteers are and will remain the backbone of fire services in Berkeley County's rural districts. These changes will allow their services to be leveraged more effectively, and better utilize the strengths within the system. Effective change will require mutual goodwill, and a focus on service delivery. Loss of autonomy for the fire departments will be limited, and avoidance of administrative work will allow volunteers to focus on service delivery.

We hope this report will motivate the change needed to move forward on these initiatives in a constructive manner that respects the traditions and service of the volunteer fire service, public accountability, and the need for rational, data-driven additional investments in fire and emergency services. We believe that the building blocks are in place to provide improved service with proper direction and a more systematic planning effort.

Additional detailed information on individual departments and supporting documentation are included in Appendices as a separate volume.

Acknowledgments

We would like to thank the Fire Chiefs who dedicated their time to supporting the study. An effort of this sort takes hours of research to identify records and spend time with the consultants. Special thanks go to Donnie Martin, Lake Moultrie Fire Chief and President of the Berkeley County Fire Chiefs Association. Chief Martin assisted by addressing needs and concerns of fire chiefs and their boards. During station tours of individual districts, board members and firefighters alike represented their district in the most professional way.

We would like to specially recognize the fire chiefs of the 26 rural fire departments for their cooperation and assistance in completing this study.

We would also like to specifically recognize those officials and staff who assisted with the project.

Elected Officials
Ken Gunn, County Council, District 3
Tommy Newell, County Council, District 4

County Administration
Timothy Callanan, Deputy County Supervisor
Bill Salisbury, County Coroner
John Williams, County Attorney

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Wilson Baggett, Office of Real Property
Rick Buxton, Fire Marshal
Christy Davis, Purchasing
Sam Gaither, Director, Department of E-911 Communications
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Finally, and most importantly, we dedicate this report to the firefighters – volunteer and career – who faithfully deliver service through the 26 rural fire districts within Berkeley County. We recognize the importance of understanding their concerns and the critical role they will play as the fire services adapt to the future.

Manitou, Inc. would like to acknowledge the staff members who performed this analysis and contributed to the report.

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Although we attempted in good faith to accurately represent the complex and diverse intricacies of the county's fire service delivery system, we retain responsibility for any errors in the report.

1. Study Scope and Limitations

Manitou, Inc. was selected in response to a public Request for Proposals Process in February 2017. After review of proposals by a committee, the County Council awarded the contract to Manitou, Inc. in May 2017. The project was originally scheduled to be completed in 90 days. To account for possible delays in project completion, a 30-day extension mechanism was included in the contract.

Anticipating challenges in collecting data from so many agencies, advance work was done by Manitou staff to introduce the study to Fire Chiefs and to gather as much information as possible prior to beginning field work. We received formal notice to proceed in July 2017 and initiated the study. The schedule for the study was ambitious, especially considering the logistics of arranging visits to each fire station. Scheduling these visits proved to be a challenge, requiring four separate site visits to accommodate availability by chiefs or their representatives from each of the 26 fire departments.

1.1 Scope

This study primarily examines the 26 independent rural fire districts in the unincorporated areas of the county. There are five municipal entities within the county that have their own fire protection services. These municipal fire departments will be considered for mutual aid purposes only. Other entities that impact the provision of services by the rural fire districts, such as county level emergency communications, emergency medical services, and a volunteer heavy and specialized rescue squad, will also be discussed.

The intent of the study was to assess fire protection and related services within the county. The purpose of the study was to determine the effectiveness of the current fire protection system already in place; specifically, the structure, funding, operational effectiveness, and contractual agreements. The departments collectively were to be judged against an all hazard fire and emergency services capability.

Specific areas to be included were:

- Current effectiveness and reliability of existing fire districts based on population, risk, projected growth, and Public Protection Classification (Insurance Grading).
- Evaluate chain of command, organizational structure, governing board, bylaws, budgetary process, and departmental operational policies and directives.
- Determine fire district's debt in relation to funding/revenue, operating costs, outstanding loans, and salaries.
- Assess current delivery of service and critical differences in operating procedures, incident management system, NFPA, OSHA, and NIOSH compliance.
- Evaluation of existing communications infrastructure, 911 dispatch, call taking and computer aided dispatch (CAD) system, radio coverage area, available and designated operating and dispatch channels, and communications policy.
- Assess feasibility of continuing existing service contracts and procedural recommendations for improvement. Recommendations on alternate approaches for service delivery to accomplish

partial or full consolidation, provide staffing for an all hazards service level, and incorporate county-provided service and funding procedures.

- Appraise current funding options, recommended alternatives, or adjustments that would provide a more effective process for each fire protection district if the existing contracts remain. Options for partial or complete consolidation.
- Assess how a merger or consolidation of services would impact volunteer staffing in the county and offer recommendations to overcome adverse findings. Recommendations for recruitment and hiring of career staff.
- Process recommendations and legal obligations for consideration of partial or full consolidation with the current service contractual agreements in place.

For each individual fire department, the following were to be assessed:

Organizational overview

- Command structure, chain of command, and qualifications of company officers
- Departments' directives or policies and scheduled processes for review
- Governing body and rules or bylaws pursuant to contracts
- Reporting system and records management (Field reports, NFIRS), State reporting compliance
- Strategic planning, vision, and mission goals
- Ability to handle challenging or technical level response
- Vehicle rescue
- Industrial fire
- High/low angle or confined space rescue extraction.

Budgetary evaluation

- Accounts and recordkeeping evaluation
- Identify needs assessments and capital improvement or purchase processes that coincide when preparing developing annual budgets
- Acquisition of grants and additional funding strategies.

Training Evaluation

- Evaluation of training program and available resources that apply toward responder and officer development
- OSHA safety training schedule
- Firefighter safety, accountability, and driver training
- Training compliant with OSHA, NFPA, and NIOSH recommendations.

Prevention and Risk Reduction

- ISO Public Protection Classification and process review for maintaining PPC
- Available qualified personnel and program for building inspections, public education, and community risk reduction and education programs.

Staffing

- Volunteer, career, or part-time staffing
- Active responder qualifications and responsibilities
- Recruitment and retention process.

Equipment Evaluation

- Apparatus sufficient and capable to meet fire flows, risk, and response;
- Apparatus replacement program
- Water supply apparatus
    - Comparative to water supply within response district
- Firefighting and rescue equipment inventory
    - Adequate, reliable, age, replacement process, or future plans for upgrading
    - Adequate PPE and other safety and support equipment available and adequate.

Station and facility evaluation

- Facility location and adequacy pursuant to response district and critical areas
- Capital improvement plans
- Adequacy of facility considering emergency shelter, living conditions, training, and providing long-term use.

Operations

- Identify differences in existing procedures, policies, or operating procedures with adjoining and mutual aid departments and other agencies
- Existence and practice of an effective incident management system and responder safety accountability system
- Written mutual aid, automatic aid, or other agreements active with other agencies for meeting community and potential risk
- Response plans for current and identified potential risks
- Determine if service level meets the needs of the response district
- Any plans, agreements, or processes in place for offsetting risks and potential risks for responses given the available staffing, equipment and existing aid agreements.

It is important to note that the study was not intended to be an assessment of each individual fire department, *per se*. Of necessity, we collected significant data from each fire department; however, the findings of the report apply generally to the county and not necessarily to any particular individual fire department. Individual agency summaries are included in an addendum to the main report.

1.2 Limitations

As can be seen above, the scope was exhaustive. In retrospect, it was very ambitious. Given the large number of organizations and the operational nature of some areas of evaluation, the study was not designed to physically observe most organizations actually delivering service. Many policies are unwritten, and we were not in a position to assess the veracity and completeness of statements made

during interviews. In several departments, turnover in Chief positions left new personnel in a period of transition; they were candid that much of the documentation sought in the study was unavailable.

Further, many of the smaller organizations in particular had very little administrative or planning capacity, meaning that long-range plans, budgetary forecasts, and procedures were often non-existent.

Not all information provided to us could be verified, and discrepancies remain between information provided by individual departments and County agencies. These are not material to our findings as they relate to the County as a whole. As stated previously, the focus of the study was not on individual fire departments, but rather on assessing service delivery on a county-wide basis. Centralized record systems are very limited and prevented us from assessing critical measures, such as response time and staffing, without considerable uncertainty.

Lastly, despite numerous attempts to request information, much information was not provided. This includes information required under the County's service contracts, plus additional requests made through the study.

2. Legal Framework and Setting

To understand fire services, it is important to understand the legal and policy settings that underlie the system. These help explain how services have evolved and help define alternatives for the future. In this section, we explain state and county oversight and regulatory environment.

2.1 State Enabling Law

State law defines the powers of counties with regard to establishment and provision of fire protection services. Under the South Carolina Code of Laws, Title 4 "Counties," Chapter 19, counties are authorized to provide fire protection, and to raise revenues through ad valorem taxes on property and issue bonds for funding expenses related to such services.

In section 4-9-15, counties may extend fire protection, on a contractual basis, to areas where no other political subdivision is currently providing service. This service may be provided under contract following the establishment of a fire district.[1]

The county has the ability to alter fire district boundaries, and enter into contracts with the independent rural fire departments to provide service in each of the respective districts. Interestingly, some districts have merged, with fire protection provided by a single fire department operating all of the stations within the newly-combined district. In another case, fire departments merged, and continue to provide service to two distinct adjacent fire districts.

2.2 Training

State Fire Academy Training

Firefighters have robust training opportunities through the South Carolina State Fire Academy at the Columbia campus, as well as through regional training delivered by the Academy. The Office of State Fire Marshal is part of the S.C. Department of Labor, Licensing and Regulation (LLR). The Office of State Fire Marshal and the Academy comprise the Division of Fire and Life Safety, which is located on a 208-acre campus in Columbia.

The South Carolina Fire Academy (SCFA) has been accredited by the International Fire Service Accreditation Congress (IFSAC) since March of 1993. Accreditation by IFSAC means the SCFA certification system has been accredited by an international group of fire service professionals. This accreditation ensures the certification process of the Academy has met national standards, and the accredited programs provided by the SCFA reflect the most current training requirements.

The Academy's mission is to be the state's focal point for service and support to save life and property. This training includes the skills necessary to provide basic to advanced incident command and control

[1] Interestingly, the annotated code notes that Act 146 of 1993 found that "offering fire protection services to residents by contract … has resulted in overlapping and ineffective provision of fire services." Online at www.scstatehouse.gov/sess110_1993-1994/bills/4178.htm.

for emergency operations involving fire, rescue, hazardous materials, and weapons of mass destruction incidents. The Academy provides basic and advanced training for firefighters, fire officers, instructors, and fire department support functions, which include public fire education, fire prevention, inspections, and fire investigations.

Training is based upon the National Fire Protection Association (NFPA) standards and S.C. OSHA regulations. The Academy also focuses its programs on the Fallen Firefighters Foundation's 16 Life Safety initiatives and its "Everyone Goes Home" program. The "Everyone Goes Home" program focuses on firefighter safety and reducing the number of line-of-duty deaths and injuries.

Fire and emergency service training requires a combination of classroom instruction and hands-on skill training, using specialized tools and equipment. The training requires several instructors per course to ensure the safety of students and instructors, and to evaluate and test students for required skill competency.

The Academy opened for business in July 1995 and has been operating on a 208-acre site, located four miles northwest of Columbia off Monticello Road. The site has 15 buildings with more than 120,000 square feet of temperature-controlled floor space. The site houses the State Fire Marshal's office; Fire Academy administration building; five classrooms; a 200-seat auditorium; a dormitory that sleeps 116; a cafeteria; a five-story drill tower with smoke maze; a six-bay fire station with living quarters; an instructor building; a student processing center; a maintenance building and shop; a one and one-half story Class A burn building, an LP gas fired burn building, 10 flammable liquid and LP gas live-fire training props; two 737 aircraft mock ups; confined space rescue, hazardous materials and US&R heavy rescue training area props.

The Academy also has a 50' X 90' large area search building used for many courses, in particular the Rescue-the-Rescuer and the Rescue Intervention Crew courses, a trench rescue prop, collapsed building props, and an urban search and rescue prop. A two-story 1,860- square-foot Class A burn building and 20,855-square-foot US&R/fire station building with eight truck bays and two storage bays is also part of the Academy.

The Academy receives no appropriated funding. However, it does receive one half of a one percent fee and a 0.035 percent fee on fire insurance premiums. The Academy charges fire departments a minimal fee for courses; charges are made to industry to generate revenue to support Academy operations. The Academy also receives some grant funds to deliver certain specialized or targeted courses.

In addition to training at the Academy, regional training is an important component to the overall delivery of academy courses in South Carolina. A majority of Academy courses are conducted within the regions at the local fire departments. The Academy has six regions, each utilizing a regional office. These offices interact daily with the municipal fire service and schedule training courses to be conducted at local fire departments and regional offices. The Academy works in every South Carolina county, striving to meet the fire service needs.

The regions are responsible for maintaining regional facilities, equipment, and book inventory. Regional coordinators are on call to support fire service requests. To ensure customer needs are being met, they also visit fire departments, meet with instructors, and attend association meetings and conferences with fire chiefs and firefighters.

Regional operations allow the Academy to know its customers and meet their needs by providing courses at local departments that are conducted on department schedules. This flexibility is the only way to provide needed training since 70 percent of the state's fire service members are volunteers. Most courses have written tests as well as hands-on skill evaluations each student must pass to complete the course. Many regional courses require a live evaluation burn. It must be conducted at an approved burn facility, such as the Academy. The Academy has approved 33 local burn buildings and facilities used for Academy course evaluation burns throughout South Carolina.

2.3 "One Percent" (1%) Funds

In 1907, the South Carolina General Assembly created the South Carolina Firemen's Insurance and Inspection Fund, or One Percent Fund, to help fire departments improve and maintain their services. The fund equals one percent of homeowner's fire insurance premiums generated in each county. The SC Department of Revenue collects the money and distributes it back to each county. The county treasurer then distributes the funds to each fire department, based on the total assessed value of property within its coverage area. After the money is distributed, the South Carolina Firefighters' Association ensures fire departments use One Percent funds according to state laws and regulations. In the most recent reporting year, Berkeley County received a total of $555,722.00.

Each city or town whose fire department receives One Percent funds must appoint a three or five-member board of trustees, charged with ensuring the money is properly spent. Three member boards include the mayor, the chair of the council fire committee, and the fire chief. A five member board would include the chair of the council fire committee, the fire chief, the city treasurer, and two residents appointed by council.

Though not required by law, the S.C. Firefighters' Association and the Municipal Association strongly recommend One Percent funds be included in the city's annual audit; the city is the responsible party and can be held liable if funds are misspent. Neither the board of trustees nor the city council may dictate to the fire department how One Percent money is spent. By law, those decisions are made by a 51 percent majority of the members of the department.

The members must use One Percent funds within one of three categories: 1) retirement and insurance; 2) training and education; or 3) recruitment and retention. State law and the S.C. Firefighters' Association regulations provide specific requirements for fire department's use of and accounting for One Percent funds. Failure to properly spend and account for the funds may subject a fire department to various sanctions, up to and including exclusion from the program.

2.4 Other State Programs

Volunteer Strategic Assistance and Fire Equipment Program (V-SAFE)

The V-SAFE program is funded by the South Carolina General Assembly and prescriptively administered by the State Fire Marshal. State statute enables the V-SAFE program to provide grant funding to assist chartered fire departments in the purchase of needed equipment in 13 specified areas, including fire suppression equipment, self-contained breathing apparatus, protective clothing, training, and other specialized safety equipment.

To qualify for the grant program, administered by the State Fire Marshal, the fire department must have a minimum of a "Class 9" Insurance Services Office (ISO) rating, be comprised of at least 50 percent volunteer firefighters, and have a signed statewide mutual aid agreement through the S.C. Emergency Management Division, among other requirements. The maximum grant is $30,000, without matching funds. A department can only receive one such grant in a three-year period.

State Forestry Service Programs

The South Carolina Forestry Commission is charged with protecting, promoting, enhancing, and nurturing the woodlands of South Carolina. In addition to their duties in maintaining forests and promoting economic benefits from forestry and forest products, they are also charged with firefighting on over 13 million acres of land within the State. Their staff includes personnel devoted to firefighting and fire management across the State. The Commission also maintains a fleet of firefighting equipment, including aircraft. They are also responsible for fire prevention programs.

The Commission is charged with the administration and oversight of multiple federal grant programs that support small volunteer fire departments. Several of the programs have changed in recent years, and they provide a small but important funding stream for fire protection. These programs are specifically not for structural firefighting but clearly support readiness, and permit limited budgets to go further.

Federal Volunteer Firefighter Assistance grants from the US Department of Agriculture are available to help defray the cost of training and purchase of specialized equipment for wildland firefighting, including conversion of military surplus vehicles to use for firefighting. These matching grants are restricted to fire departments that serve populations of less than 10,000 people, are composed of at least 75 percent volunteers, and have wildland protection responsibilities. The grants pay up to $5,000 as a match against authorized equipment purchased. Equipment includes skid-mounted pumps, specialized wildland PPE, foam, VHF radios, and even installation of dry hydrants. In 2016, 95 fire departments received funding statewide.

National training courses developed by the National Wildfire Coordinating Group (NWCG) are administered via the Commission. Two courses, "Introduction to Wildfire Behavior" and "Wildland Firefighter Training", are taught by a State instructor in a mixed online and in-person format.

The Commission also administers two programs for loan or sale of surplus property, including fire apparatus and related equipment. Several fire departments have equipment obtained through this program in recent years.

The first and older of these programs is the Federal Excess Personal Property Program (FEPP). This program loans equipment to local fire departments, under conditions including maintenance of insurance, painting and upkeep, and utilization. The agreements are for renewable three-year terms. The only direct cost for equipment is a fee to cover the State's cost in acquiring and transporting the equipment from the federal government. The State requires equipment provided under this program be returned to the State warehouse in Columbia when the department is no longer using it.

Figure 2.1 Tanker on loan through FEPP.

This equipment is required to carry a marking indicating that it is on loan from the State Forestry Commission, the administrators of the program (see Figure 2.1).

Some Departments in Berkeley County have not met requirements and are ineligible for the future utilization of the program. Equipment needs to be returned to the State, but several departments were apparently under the impression that the State is responsible for picking this equipment up when it is ready to be returned. The result is that they are no longer eligible for any federal excess equipment and are unable to participate in the VFA program.

The second and newer grant program is the federal Firefighter Property Program (FPP). The program provides equipment similar to the FEPP but, instead of loaning equipment, it transfers ownership of the

equipment to the fire department. Once equipment is obtained, the local fire department is required to make the equipment operational within six months. This typically includes painting the (military surplus) vehicle, installing any firefighting equipment such as a tank, pump, and related equipment, meeting storage requirements, and placing the equipment into service. Once these requirements are met, title to the equipment is transferred to the local agency. The equipment must remain in active service for a minimum of one year before it can be disposed of by the fire department.

This program has been popular, and several departments in the county have obtained brush equipment through the program (see Figure 2.2).

Figure 2.2 Typical Military Surplus Vehicle Acquired under FPP

Income Tax Deduction - Volunteer Incentive Program (VIP)

South Carolina offers an income tax deduction program, known as the Volunteer Incentive Program (VIP), for volunteer firefighters, rescue squad members, and hazardous material response team members. The State Fire Marshal establishes a performance-based point system awarded for participation in a host of approved annual training programs, such as interior firefighting, emergency vehicle training, hazardous materials, and emergency medical training. Currently, if volunteer firefighters, rescue squad workers and hazardous material team members earn the minimum number of points (70), an individual may receive an income tax deduction of $3,000. If a taxpayer and spouse both qualify, the current deduction is $6,000.

2.5 Fire Department Organization

Fire departments in South Carolina are generally organized in one of three forms: municipal departments serving a single governmental entity, special purpose districts, or independent fire departments operating under contract with a governmental entity.

Special Purpose Districts

Many of South Carolina's 46 counties utilize "Special Purpose Districts" (SPD) to fund fire protection service delivery systems. An SPD is created by an act of the South Carolina General Assembly or pursuant to general law and provides certain local governmental power or function. These functions include, but are not limited to, fire protection, sewerage treatment, water or natural gas distribution, and recreation. SPDs may include any rural community water district authorized or created under the provisions of Chapter 13 of Title 6. SPDs do not include any state agency, department, commission, or school district.

Berkeley County does not currently operate as an SPD for the purposes of fire protection, according to the South Carolina Secretary of State. However, there is one SPD for recreation (Goose Creek Recreation Commission) in Berkeley County. More than 500 of these SPDs, as permitted by State Statute, exist in South Carolina with many of these created for the purposes of fire protection.

Special purpose districts are frequently referred to as small governmental units. Beyond county and municipal governments, they are also referred to as the third form of local government. These SPDs provide services tailored to addressing the special needs of citizens as they urbanize the rural communities of the state. The governing body of the SPD may be appointed or elected and has the authority to provide a needed service, which may be funded by user fees or tax assessments.

To form a SPD, a petition must be filed with the clerk of court of the county in which the proposed SPD is to be located. This petition must have the support of a majority of the resident landowners in the proposed district, or by the owners of more than half the land and acreage which will be affected by, or assessed for, the expense of the proposed improvements, as shown by the tax assessment rolls. A plat showing the limits of the proposed district must also be submitted with the petition. When a proposed district is situated in two or more counties, the petition must be filed with the clerk of the court of each county in which the district is to be located.

Each SPD is governed by a board or commission, and funded by ad valorem taxes (a tax based on the value of real estate or personal property), user fees, or a combination of taxes and fees. Prior to 1997, SPD boards or commissions were levying taxes on the district they served. These commissions were comprised of governor appointees, not elected officials. In Weaver v. Recreation Dist., 328 S.C. 83, 492 S.E.2d 79 (1997), the Supreme Court determined unelected commissions levying taxes were in violation of the federal law of "taxation without representation." This means a SPD's budget must go before a group of elected officials. Special purpose districts must now bring their budgets before the appropriate group(s) of county or city council elected officials for approval.

Fire Districts

Under State law, Counties have the power to define fire district boundaries. Berkeley County Codes of Ordinances, Chapter 23, specifies the duties of rural fire control boards. Each board must act in accordance with its bylaws, which must be approved by the County Council. Each Board is responsible for operation of their fire department, including maintenance of equipment, construction of stations, and training of members.

Section 23-3 indicates that services shall be financed by fees charged at rates prescribed by the board of rural fire control in each area. This would appear to conflict with the county's fire service fee schedule, which applies uniformly throughout the county.

The boundaries in Berkeley County predate some legislative reforms at the State level.

State Corporation Oversight

Rural fire departments are recognized as non-profit corporations by the State of South Carolina. As such, they are registered with the South Carolina Secretary of State and must file appropriate forms with the State.

Federal Mandates/State Enforcement

The State of South Carolina has elected to operate a state run occupational safety and health regulatory agency rather than allowing the U.S. Department of Labor to operate such a program within the State. The South Carolina Department of Labor, Licensing and Regulation (LLR) developed a specific fire service standard checklist for fire departments operating in the state. This checklist includes South Carolina's Safety and Health Standards for General Industry and Construction from 29 CFR (Code of Federal Regulations) Part 1910 under the authority 1-15-210 South Carolina Code of Laws (1976) as amended. It is compiled to help employers and employees comply with the Occupational Safety and Health Act of 1970. It is based upon Article VI of the South Carolina Rules and Regulations (Part 1910 of the Federal OSHA Standards), which contains standards for general industry.

Pursuant to this authority, the Director of the South Carolina Department of Labor, Licensing and Regulation has put into force and made public certain Occupational Safety and Health Standards, which are identical to those enforced by the Secretary of Labor, United States Department of Labor. These standards are known as the Occupational Safety and Health Rules and Regulations of the State of South Carolina and have been published as Article VI.

The specialized fire services OSHA checklist includes guidance for fire departments in safety and health, hazardous materials, protective equipment, bloodborne pathogens, hazard communication, confined spaces, and other essential safety standards applicable to the fire and rescue services.

One of the most significant OSHA regulations affecting the fire service is recognized as the "Two In – Two Out Standard," which is intended to ensure that, unless special known conditions are in place, a rescue team must be positioned before firefighters are placed inside of environments that are immediately dangerous to life and health (IDLH environments). The Federal Office of Occupational Safety and Health (OSHA) adopted in 1998 a revised safety standard on respirator protection, *29 CFR 1910.134.* This standard, commonly referred to as the "two-in and two-out" regulation, included provisions concerning procedures for interior structural firefighting. "Two-in and two-out" is also the law in South Carolina.

The S.C. Department of Labor, Licensing and Regulation, Office of Occupational Safety and Health (S.C. OSHA) operates an approved State Plan which must be "as effective as" the Federal OSHA program,

including enforcement of standards. However, Federal OSHA does not cover public sector employees, such as firefighters, although state plans must include private and public employees.

South Carolina OSHA, after recognizing the special needs facing the public sector firefighters in urban and rural settings and the effectiveness of the South Carolina Fire Academy training program for firefighters, made a decision to adopt a limited amendment to section *1910.134(g)(4)(ii)* of the respirator protection standard. The amendment was promulgated in 1998, approved by the General Assembly May 19, 1999, and published in the *State Register* June 25, 1999.

S.C. OSHA standards require firefighters entering a burning structure that is deemed immediately dangerous to life and health (IDLH), to do so in teams of at least two firefighters that operate in direct visual or voice contact. Additionally, there must be at least two fully equipped and trained firefighters who remain outside the structure and are capable of rescuing the firefighters inside should they become disoriented, trapped, or injured. This is known or recognized as the “two-in and two-out” standard.

There is an explicit exemption in the standard, adopted by both federal OSHA and S.C. OSHA, that if human life is in jeopardy, firefighters can perform a rescue without following the "two-in and two-out" requirement.

In recognition that many fire departments have chosen to emphasize rapid response and that firefighters’ safety is improved by preventing the full involvement of a structure by fire, South Carolina also allows a limited short-time deviation when the following five conditions are met:

1. The incident commander has completed the Incident Command System course or its equivalent as certified by the South Carolina Fire Academy.
2. The employees who enter the IDLH atmosphere have completed the Basic Firefighter course or its equivalent as certified by the South Carolina Fire Academy.
3. The incident commander has determined that the standard staffing pattern is not feasible.
4. The incident commander has determined that entry can be made safely with the personnel on-site.
5. Arrival of additional employees to complete the standard staffing pattern is imminent.

South Carolina OSHA has determined the “two-in and two-out” rule is in effect for <u>every</u> fire department at any fire which is beyond the initial or beginning stage and which cannot be controlled or extinguished immediately. Any fire beyond this stage is considered by S.C. OSHA to be “immediately dangerous to life and health” (IDLH). The “two-in and two-out” rule, like all OSHA standards, states a minimum requirement. Employers should continuously strive to exceed minimal OSHA standards.

2.6 County Contracts/Regulation

Berkeley County government uses a service contract between the county and each nonprofit corporation representing the fire departments providing protection within the county. Each fire department protects an area defined as a sub-district of the county’s Special Tax District. The contracts are one-year in term, and are executed by the County Supervisor, Berkeley County Special Fire Tax District Advisory

Commission, and the respective fire department. The departments agree to a number of conditions in consideration for a portion of special fire tax revenues from properties and land within their sub-district. Revenues are distributed four times per year, with late payments and other adjustments also distributed. The complete agreement is included in the Appendices.

The agreement states that the Fire District Advisory Commission, through Berkeley County Council, "agrees to consider increasing the Uniform Schedule of fees as needed, to offset increases in operational costs for fire protection" (p. 3). The agreement is silent on any mechanism or procedure for such changes.

Highlights of Performance Criteria in Current Contracts:

- The Fire Departments respond to 90 percent of calls within their district.
- Governing body must be composed of residents or property owners paying the fire tax within the district.
- Meetings must be held quarterly and properly noticed.
- Although there is a perception that fire department members are prohibited from being board members, the contract implies that if residents meeting these criteria are not available for the seven-member governing body, that up to two seats may be filled by non-voting members "with fire protection service experience" (p. 4).
- The Departments must notify the county before accepting any federal loans.
- The Departments agree to respond to any request for records or information from the county or its representatives.
- Financial reports must be submitted monthly and annually. A number of accounting controls are also required. Records of indebtedness including loan amount and term of loan are also required to be submitted.
- An annual report of employees and members, including any compensation, must be provided.
- The Departments must submit corporate governing documents and names of board members.
- The Departments must provide an inventory of vehicles.

Interestingly, the agreements can be cancelled by the county with 60 days' notice. In addition, any adjustments to sub-district boundaries must be mutually negotiated as a part of contract renewal.

County Financial Oversight Mechanisms

The county currently allots funds from the fire tax collections to fund audits of two districts' accounts each year. There are 26 fire departments so this amounts to an interval of 13 years between audits. Given the recent discovery of financial concerns at one department and an ongoing investigation, it would be prudent to increase funding for audits.

Collection of documents under the contracts is onerous, and compliance among some departments appears to be poor. Considerable effort was invested to bring data up to date as part of this study. Significant gaps remain.

3. The Setting: Berkeley County Overview

3.1 County Description and Trends

This chapter discusses the general geography, setting, and demographic risks of the study area. In addition, specific risks as they relate to the provision of fire and emergency services are also examined.

Berkeley County is located in what is known as the "Low Country" of South Carolina. Lying in the coastal plain, this flat and sometimes swampy terrain is just miles from the Atlantic Ocean. It is north of Interstate 26, which leads into the City of Charleston. To the west lie Interstate 95 and the two largest lakes in the state, formed by dams on the Cooper River. It was designated and formed in 1682 by the Lords Proprietors of Carolina, John &William Berkeley, at the beginning of the colonial era. Moncks Corner became the county seat in 1895. The county is home to the Francis Marion National Forest. There is a total of 1,229 square miles of flat terrain in the county with almost 130 square miles of water (Figures 3.1 and 3.2).

Figure 3.1 Berkeley and surrounding counties.

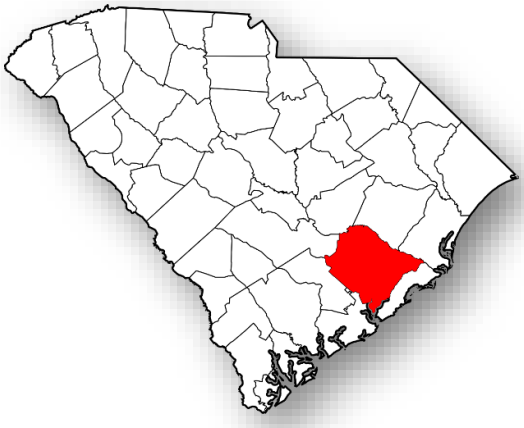
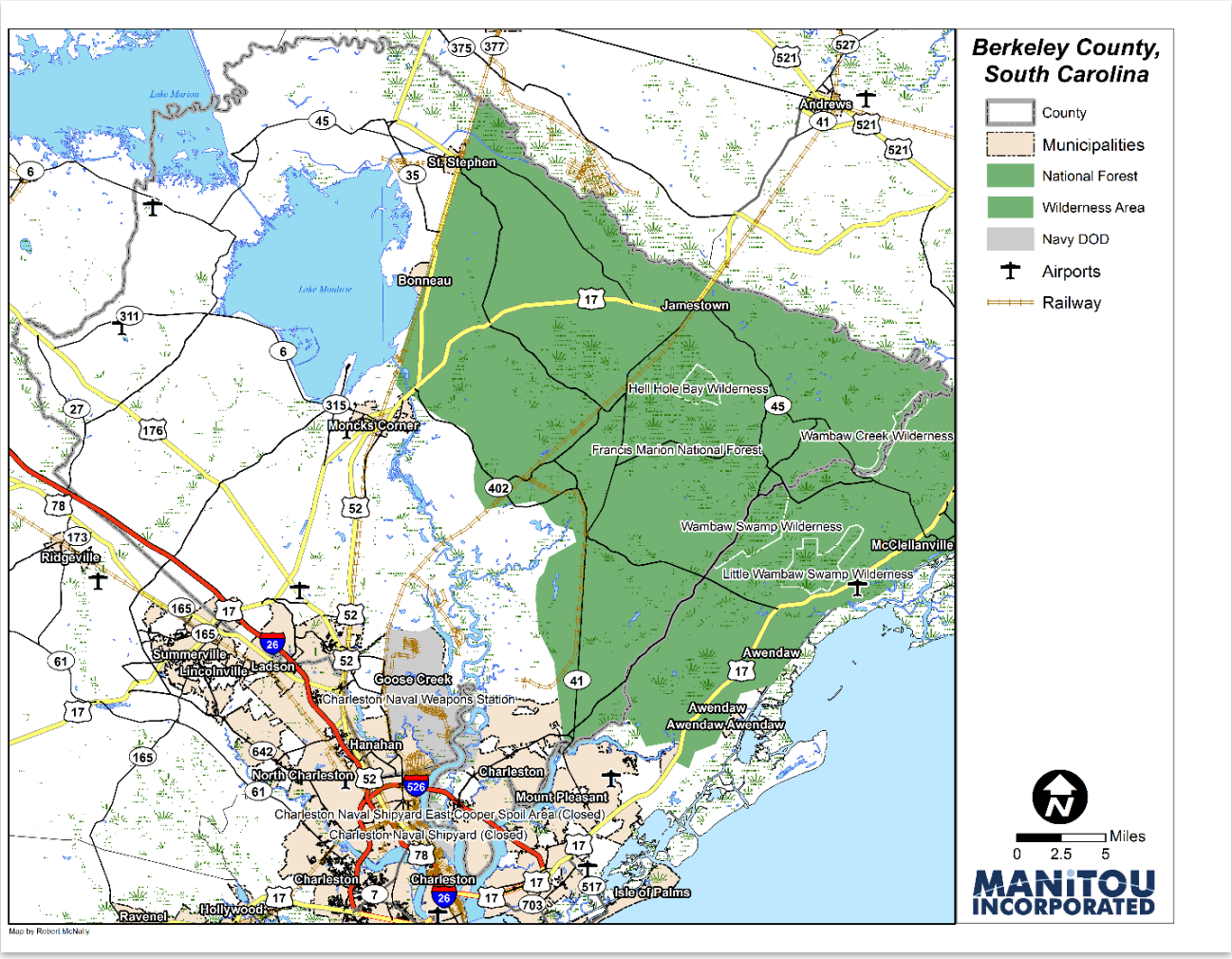


Figure 3.2 Berkeley County Overview



3.2 Population and Housing

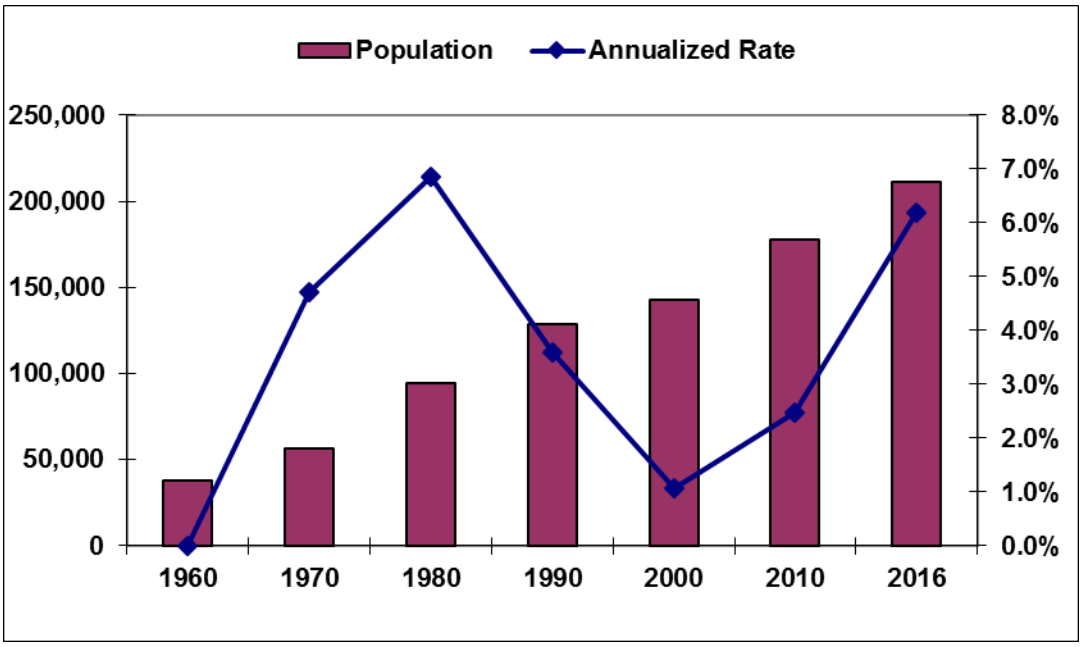
Berkeley County has the fastest growing population by county in the state of South Carolina[2]. The resident population of the county totals 210,898 inhabitants, according to the 2016 U.S. census estimates. The population in the year 2000 was 142,651 persons, which translates to a 48 percent increase in residents. The population has increased almost 19 percent from 2010, when the population was 177,843.

[2] The picture was similar in South Carolina: most metro areas performed on par with their projected share of state population growth, with the exception of Charleston. Charleston's growth was greater than projected; between 2010 and 2014, the Charleston CSA gained 63,000 new residents, nearly as many as it was projected to gain over the entire decade (71,400). Accessed at http://demography.cpc.unc.edu/2015/12/08/population-growth-in-the-carolinas-projected-vs-observed-trends/ on 11/7/17

Population growth is fueled, in part, by new jobs created by a recently operational Boeing Aviation Plant at the Charleston Airport and a Volvo automobile assembly plant in the Pine Ridge region of Berkeley County. The nearby military complexes have been a constant source of employment over the years.

According to Conde Nast Travel publications, Charleston has become even more attractive as a destination. The following figure shows the historic population levels in the county. The chart shows that most of the recent population growth occurred in the 1980's and, although the rate slowed in the early 2000's, the population is back to its significant rate of population increase (Figure 3.3).

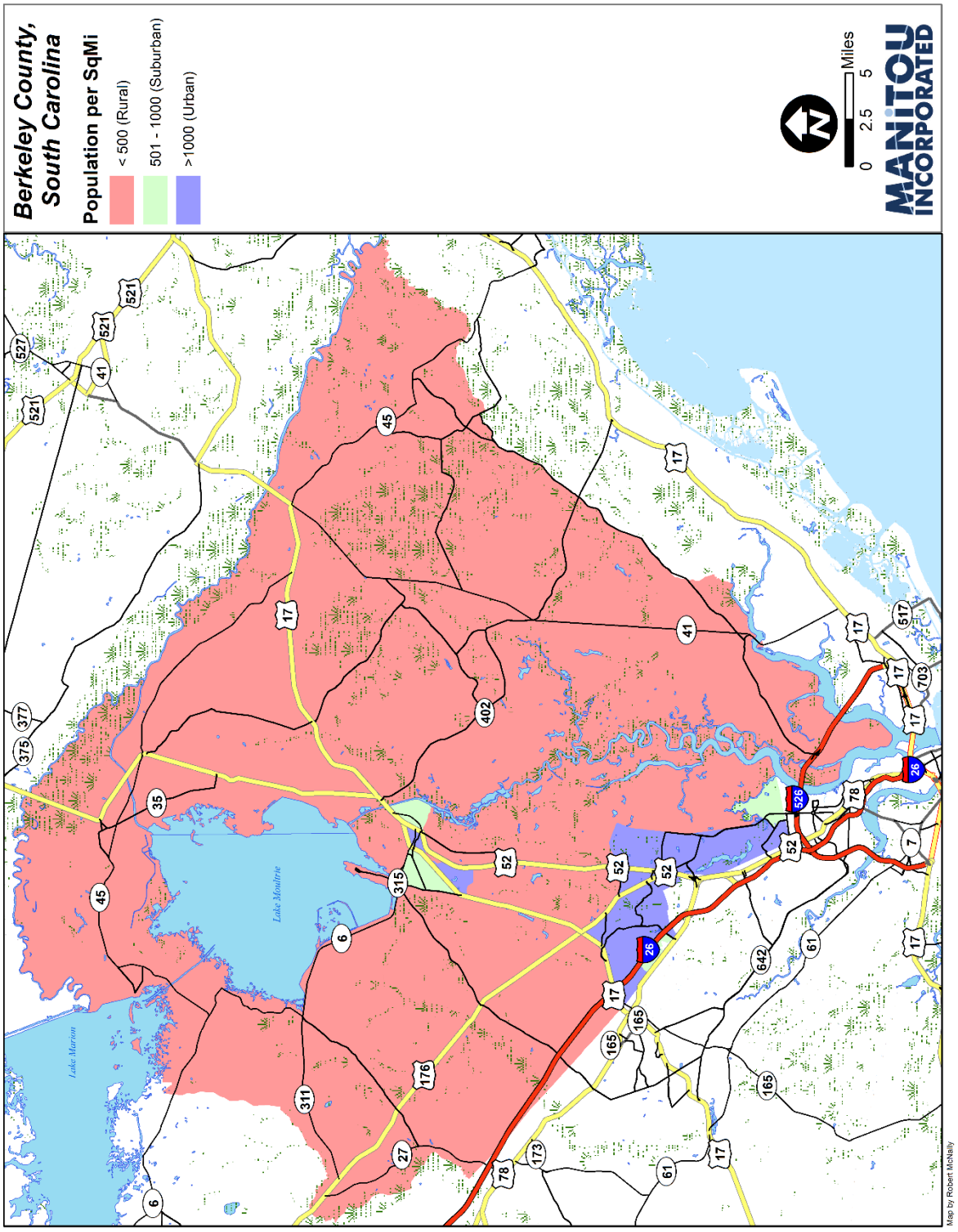
Figure 3.3 Population Trends



These figures represent the residential population and do not account for daytime variations due to the influx of out of region commuters, shoppers, and tourists. It is estimated[3] that the study region decreases in population by 14 percent during the daytime hours. Also, the residential population is not evenly distributed. The next graphic (Figure 3.4) shows the concentration of residential population.

[3] 2010 5yr ACS daytime estimates US Census Bureau

Figure 3.4 RESIDENTIAL POPULATION DENSITY



The Career Departments represent less than 10 percent of the area of the county but have close to 40 percent of the population. Conversely, the majority of the districts have a much lower population density (Table 3.1).

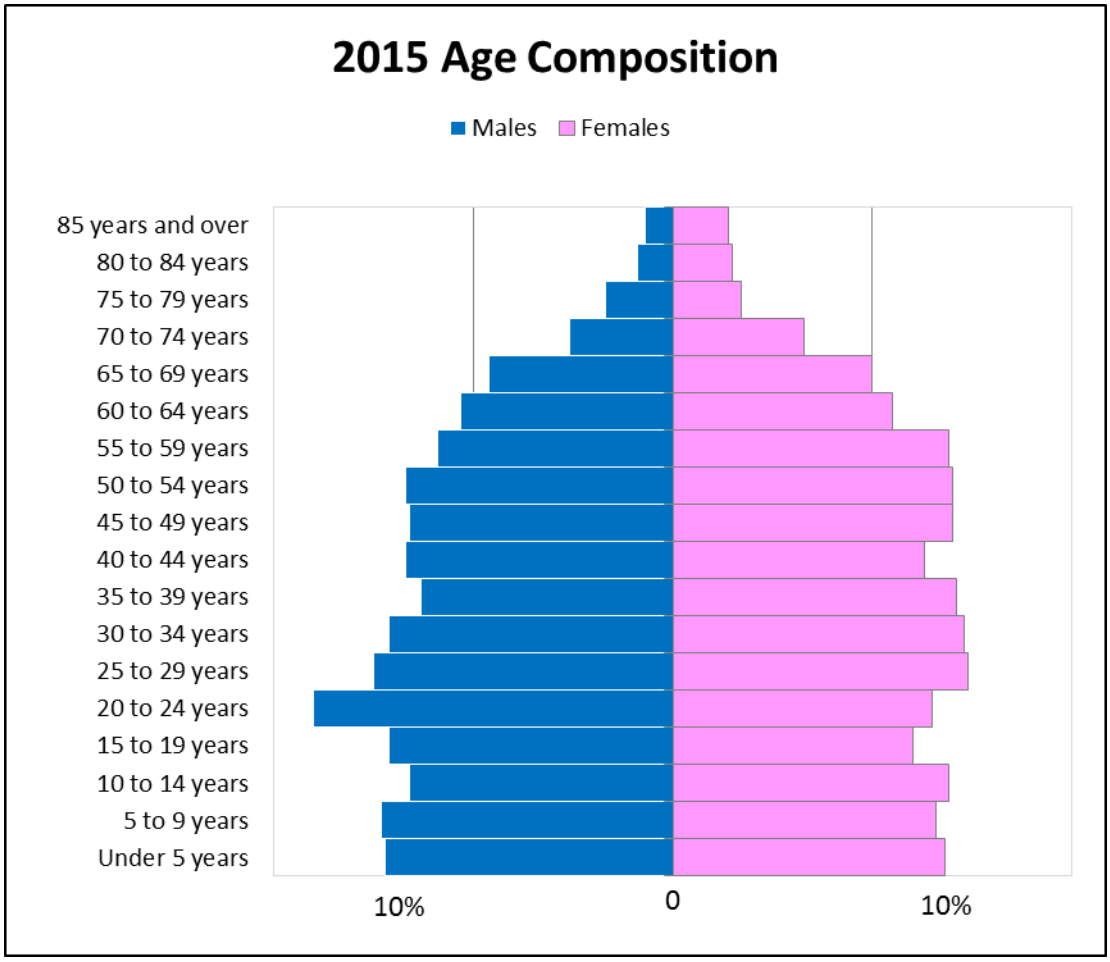
Table 3.1 2016 ACS Population Distribution by Fire Districts				
Area	Sq Miles	Pct Area	Pop	Pop Pct
RURAL TOTAL	1,121.79	91.5%	117,608	60.7%[4]
CAREER TOTAL	103.76	8.5%	76,005	39.3%
TOTAL POPULATION	1,225.55	100.0%	193,613	100.0%

Within Berkeley County, the highest residential population can be found along Interstate 26 due to proximity to Charleston, commuting opportunities to employment, and commercial development in the Charleston Metropolitan Region.

Although general population levels play a role in the geographic distribution of demand for fire and medical services, it is important to examine the composition of the population. The aged and pediatric populations are more prone to serious medical emergencies and more likely to succumb to smoke and fire due to their behavioral tendencies during a fire. Children often hide, making an interior search by firefighters more difficult, while mobility issues limit the ability of the aged to escape. The next graphic illustrates the levels of population by age group and gender in Berkeley County (Figure 3.5).

[4] 2011-15 ACS Estimate of Current Population

Figure 3.5 Age and Gender Distribution of population



The median age in Berkeley County is 35, compared to 39 for the state and 38 for the nation. Seven percent of the county's population is less than five years of age, while 10 percent are over age 65. There hasn't been significant change in the ratio of age distribution over the last five years despite the significant change in total population (Table 3.2).

Table 3.2 Population Change by Age Cohort

Demographic Change- 2010 to 2015							
	Age <5	**5 to 24**	**25 to 44**	**45 to 54**	**55 to 64**	**65 to 74**	**75 and up**
2015 est.	7%	29%	29%	14%	11%	6%	4%
2010	7%	28%	28%	14%	12%	8%	4%
change	0%	1%	1%	0%	-1%	-2%	0%

Population by Race/Ethnicity

The county is similar to the state in racial and ethnic composition. White and non-Hispanics account for the majority (64%) of the population and Black/African-Americans comprise 25 percent of the population. The county has higher percentages of Hispanic/Latino populations (6.3%) and Asian population (2.3%) compared to the state population.

Population Economics

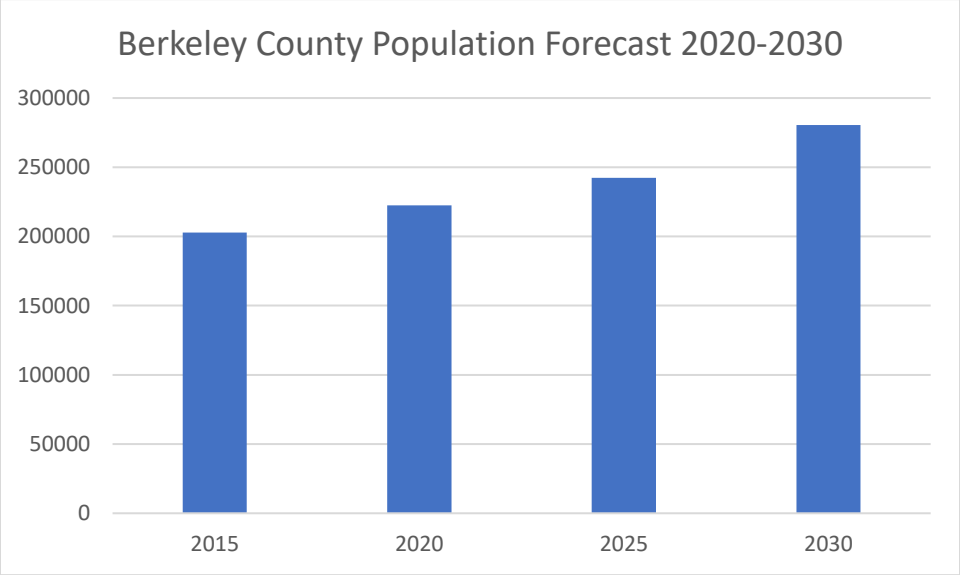
In 2016, the county's poverty rate was 14 percent compared to 17 percent statewide. The median income was $52,506, compared to the statewide income of $45,483. According to the US Bureau of Labor Statistics, the 2016 county unemployment rate of 3.7 percent is lower than the state rate of 4.3 percent for December 2016. Interestingly, the county has a lower percentage of bachelor degree holders (22.3%) than the state (25.8%).

Residential Population Projections

The Study Team expects resident population growth to reflect the pace experienced over the last several decades. The primary objectives of the Berkeley-Charleston-Dorchester Council of Governments (BCDCoG) are to assist local governments in development of local and regional plans within the tri-county region, as well as providing local governments with planning and technical support to improve the quality of life in the region. One of the planning tools that BCDCoG supports is the Charleston Area Transportation Study (CHATS). This group regularly updates their long-range plan[5] and reviews population, household, and employment projections. The Study Team used this information to allocate the population to the fire districts using the current structures in the county. Below is the countywide summary of the population projections (Figure 3.6).

[5] https://bcdcog.com/long-range-transportation-plan/ Accessed 11/11/17

Figure 3.6 Berkeley County Population Projections

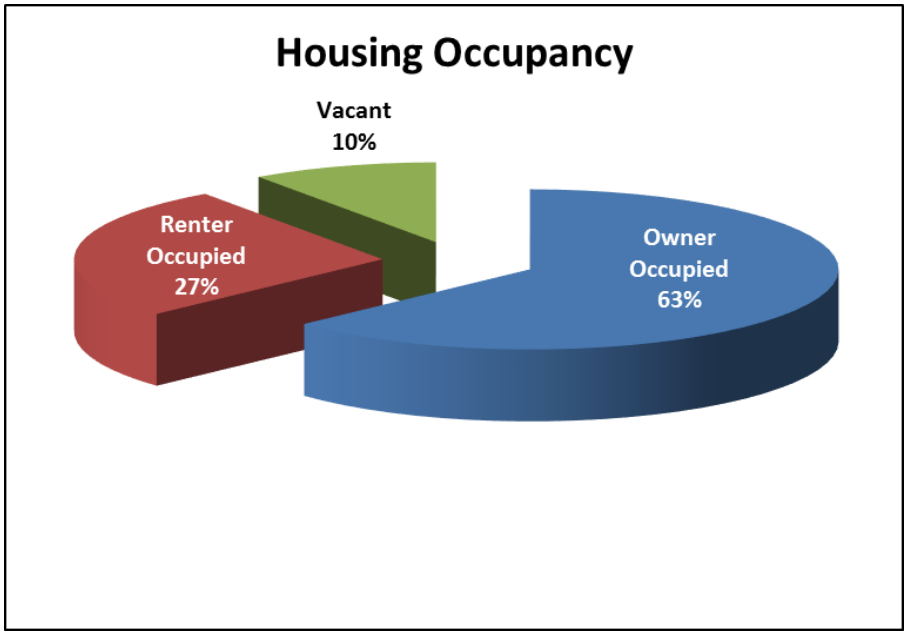


We expect emergency service activity to correlate positively with population increase. Therefore, it is important to have a population-based projection of the future size of the community to be able to forecast future workloads. Because Berkeley County is growing so quickly, we relied upon the Census Bureau's American Community Survey for current population, estimated population for 2020, and relied upon the Berkeley-Charleston-Dorchester Council of Governments (BCDCoG) population projects for future years. We expect that as the BCDCoG forecast is updated, that future years will show even greater increase.

Housing

Next, housing is examined by occupancy types. Berkeley County ratios are similar to the state. There have been recent national trends showing increased rental rates due to the recession and changing cultural attitudes toward home ownership (Figure 3.7).

Figure 3.7 Housing by Tenure and Occupancy



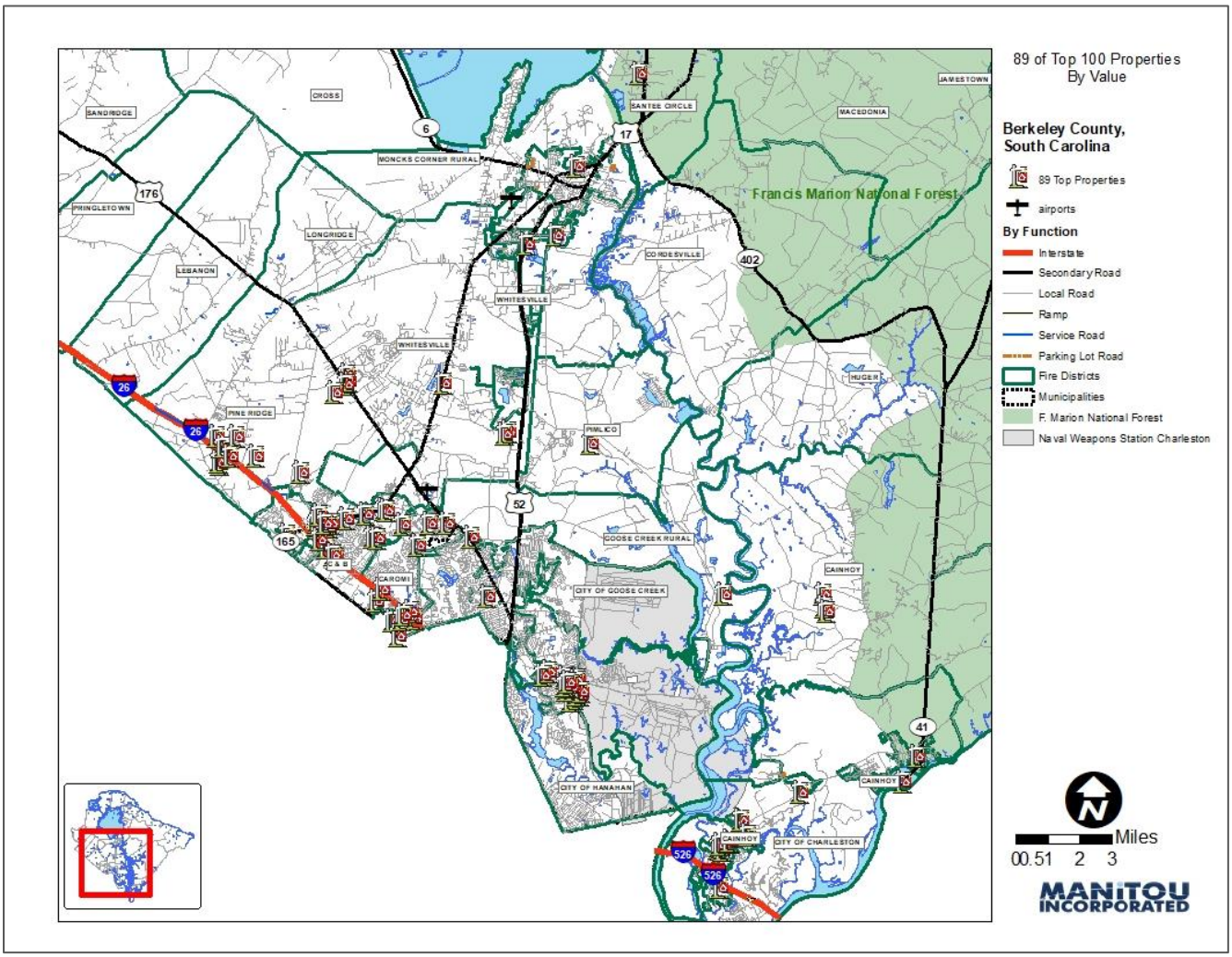
The number of rental properties has increased and vacant properties have decreased since the last census, reflective of improving economic conditions since the recession that occurred just prior to 2010 (Table 3.3).

Table 3.3 Housing Occupancy Change

Housing Information- 2010 to 2015				
	Housing Units	Owner Occupied	Renter Occupied	Vacant
2015 est.	76,503	48,237	20,793	7,473
2010	70,129	42,582	17,890	9,657
change	9%	13%	16%	-23%

Residential and commercial developmental pressure extends northwest into Berkeley County from the City of Charleston, along the Interstate 26 and US Highway 176 corridors. It extends north along the major arterial routes of US Highway 52 and US Highway 17 towards Moncks Corner. In addition, the areas north of the City of Charleston and on Daniel Island are also potential zones for annexation due to development. Any area that does develop is attractive to annexation by the municipalities if a contiguous boundary can be achieved. There is a large Google facility in Whitesville and new hotels in the C&B/Pine Ridge area off of US Highway 176. There are also plans for new hospitals in Moncks Corner and Whitesville. The construction of a full interchange at Nexton Parkway and Interstate 26 is facilitating even more development along the interstate corridor on the southeast side of the county. The map below (Figure 3.8) shows the position of the majority of the top 100 real estate values in the county along this corridor.

Figure 3.8 Highest Tax Value Properties



3.3 Risk Criteria

Property Risks

Certain uses of land, either current or proposed, have either a greater or less risk to the community in the case of fire. In this case, risk is most closely associated with fire flows needed for extinguishment or property value. Such classifications do not account for life risk, which is primarily in residential occupancies, often not of high property value or large size. Categories of property risk can be as follows:

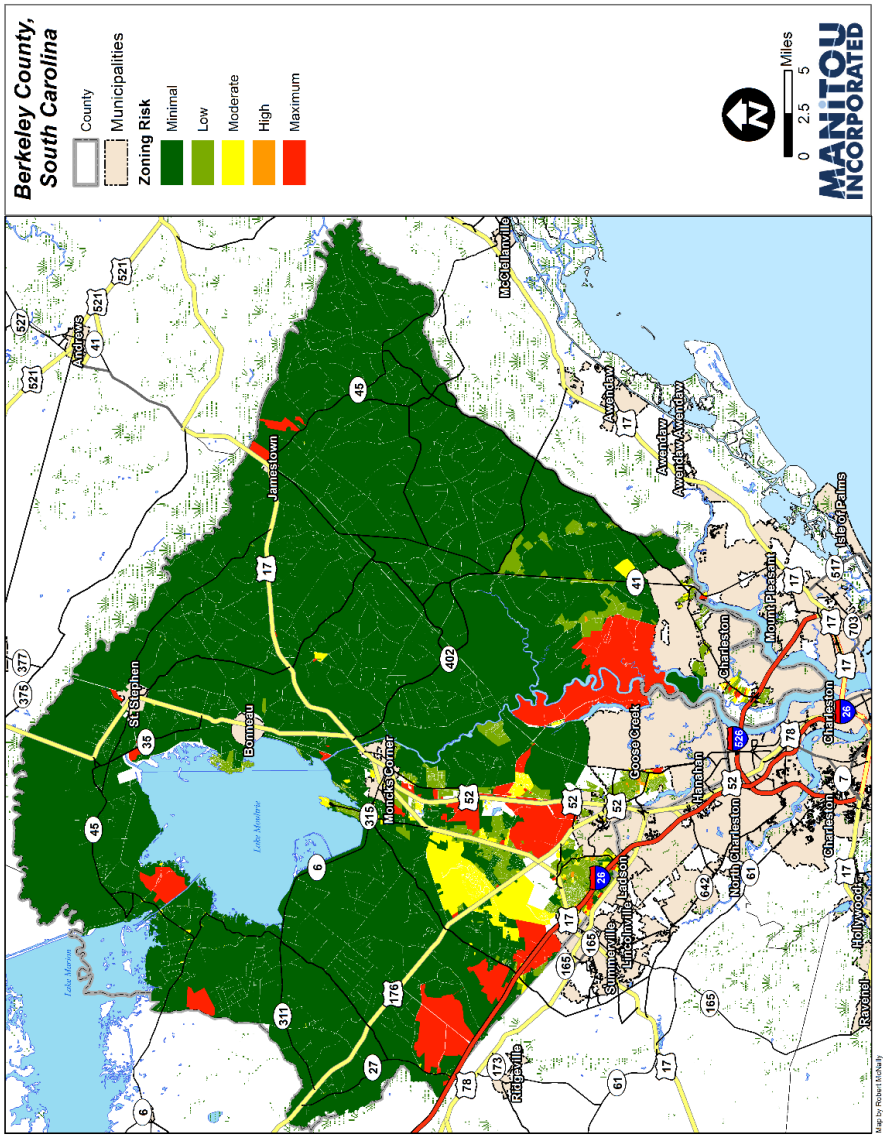
1. Highest: Refineries, large industry, hospitals, school dormitories, lumber yards, and propane storage facilities
2. High: High-rise hotels and residential buildings, large shopping centers, and industrial complexes

3. Medium: Commercial and industrial facilities with sprinkler systems, small shopping centers, and high-density/medium density residential buildings
4. Low: Lower density single-family dwellings
5. Minimum: Wide separation of single family dwellings and farm land.

In the following map (Figure 3.9), the county zoning classifications[6] were re-categorized generally into the five risk levels described above. These categories are not definitive and can be affected by factors such as the presence of fire alarms or extinguishing systems. However, for a large geographic area such as Berkeley County, they can be a useful perspective on examining property risk.

[6] Berkeley County Zoning GIS Data

Figure 3.9 Risk versus Zoning Category



According to the index, the majority of the county is classified as minimal to low risk. This is expected because the majority of land is residential or agricultural in nature. Some higher risk can be noted with careful examination near commercial areas.

Transportation Risks

Several types of transportation hazards exist within the county. The Cooper River and the canal between the lakes effectively split the county. Only three crossings are available: State Highway 45 across the canal between the lakes, US Highway 52 south of Lake Moultrie, and Interstate 526 to the very south, across Daniel Island.

Roadways

As seen by the population density map and the base street map, the majority of traffic is on the south east side of the county near Goose Creek, Hanahan, and Summerville. Traffic congestion in these areas, especially on the main arterials, typically worsen during the morning and evening rush hours and during construction. Interstate 26 on the southeast side of the county and US Highway 52 through the central area of the county are two of many arterial routes.

Marina

The Cooper and Wando Rivers lead into Charleston Harbor and there are several marinas along the rivers and on Lake Moultrie.

Marina Fires are especially hazardous due to the close proximity of boats with fuel storage and limited access by fire apparatus.

Railroad

There are several rail lines that cross the county. Aside from the potential for accidents, rail crossings that are at grade can slow apparatus traversing them, subject to the condition of the crossing. Depending upon the interval and length of trains, rails can significantly impede an emergency response across them. The commodities or cargo being carried by rail can also present a hazard.

Of note, a rail line expansion is planned for the area of the Santee Cooper Cross Generating Station to the Camp Hall Commerce Park. Although the alignment is not yet finalized, the railroad is working with the County and affected fire districts on their plans.

3.4 Summary

Berkeley County is a large, diverse county. It has a dynamic economy, and is experiencing continued population growth. This growth will place additional demands on the fire services and require adaptation in order to maintain or improve services. The positive news is that growth will also bring more revenues to the county to support such needed efforts.

4. County Infrastructure and Partner Agencies

Fire and rescue services are an integral part of the delivery of programs and services to the citizens of Berkeley County. There exist several county agencies that regularly work with fire districts, either holistically as a group or as individual organizations. Regular associations consist of day-to-day activities and programs that directly impact services (e.g. dispatching of units) and indirect governance of individual districts (e.g. annual memorandum of understandings and the distribution of funds). The following highlights the primary county and municipal agencies and offices that work the most often with fire and rescue services.

4.1 County Administration

In conjunction with the Department of Emergency Preparedness, several offices of the county's administration are tasked with working with the county fire chiefs association and each fire district on fire district management and delivery of fire and rescue services.

The County Supervisor serves as the executive administrator of the county's various offices and departments and, in conjunction with the county council, works closely with each department head in administering the many programs and services provided to the county's citizens and visitors. The office assists in the development of policies related to the fire and rescue services, distribution of collected fire fees, and oversight of individual fire districts' annual contracts.

The eight-member council is charged with the overall governance of the county. The council is responsible for the organization and delivery of programs and services, enacting policies, collecting taxes, and establishing and approving budgets. As a body, the council works directly and indirectly with fire district officials to secure county-level support for fire and rescue services.

The County Coroner is an elected position with jurisdiction over all deaths that are investigated, per state and local laws. Generally, the Coroner is responsible for investigating all suspicious and violent deaths, as well as all deaths that occur outside of a hospital or nursing home. A part of these duties often requires the Coroner's Office to work closely with fire and rescue personnel and other local first responders who were present at the scene of fires and emergencies that included a loss of life.

4.2 Emergency Services/Management

The County's Emergency Services Department is undergoing change. In the recent past, new Directors of Emergency Services, Emergency Medical Services, and 9-1-1 Communications have been hired. Long-standing issues are being addressed, and additional investments are being made to improve capabilities and effectiveness.

At present, the Emergency Services Division is staffed by two staff members, the Director and an Administrative Support person.

The Emergency Services Department oversees all non-law enforcement emergency services and administers the emergency management function through the Emergency Preparedness Division. The departments' responsibilities are wide-ranging and include:

- Manage the County's Emergency Operations Center
- Coordinate emergency support functions during disasters
- Manage homeland security and emergency management grants
- Establish training standards and courses for county staff
- Coordinate development and maintenance of the county's emergency plans.

In addition, the Emergency Services Department serves as the county's point of contact for local fire services. The department has been tasked to serve as the county's primary administrative liaison to the rural fire districts. Oversight includes communicating with individual district's boards and fire chiefs and their county-level association. Administrative services include development and dissemination of county-level policies, tracking annual contract and budgetary records, and training opportunities related to incident management and response.

9-1-1 Communications

Berkeley County Communications serves as the Public Safety Answering Point for unincorporated Berkeley County. They dispatch for law enforcement, EMS, and fire. The Center underwent a staffing study in 2003 that found they needed additional positions. Under their new Director, procedures are being updated, training of staff has improved, and facility upgrades are being considered.

One finding that emerged early in our study was the fact that the current Records Management System (RMS), which tracks response information on each unit responding to alarms, is not able to distinguish between fire apparatus and other vehicles dispatched to a fire. The practical implication is that the first unit recorded in the RMS as arriving on the scene may be a fire chief in a personal vehicle, sheriff, or ambulance.

This means that reliable estimates of response times for fire apparatus (engines, tankers, etc.), which are most important to track, are not always available. On fire incidents, the arrival of the first firefighting unit is important because this marks the ability to initiate fire extinguishment; this is the benchmark referenced in national standards and practice.

Fortunately, the county has recognized this shortcoming and has moved to procure a new CAD system. A contract was recently awarded to Tri-Tech software for delivery of a new CAD system and records management system for the Sheriff's Office and jail. This new system will include a linkage to the Charleston County 9-1-1Consolidated Dispatch Center's CAD, which will enable real-time information exchange, more rapid requests for help, and passing of calls between the two jurisdictions.

Emergency Medical Services (EMS)

The Department of Emergency Medical Services provides pre-hospital emergency care for those afflicted with illness or injury. The department provides 24 hour service to meet the varying emergent needs of those experiencing an emergency. The department is staffed by nearly 70 highly trained medical providers and support staff. EMS personnel respond to almost 17,000 calls each year and provide Advanced Cardiac Life Support (ACLS), Pre-Hospital Trauma Life Support (PHTLS), and Pediatric Advanced Life Support (PALS). At a minimum, the department maintains nine units, or trucks, in service at all times. The department works closely with municipal and fire districts through the first-responder program. Crucial time for patient care is gained by simultaneously dispatching the nearest fire department-based trained medical personnel in conjunction with the assigned ambulance unit. The arrangement has been extremely advantageous in many circumstances due to the county's rural setting.

The EMS staff is the county's only 24-hour distributed emergency service workforce. At present their role is restricted solely to emergency medical services.

4.3 Municipalities

There are several incorporated towns and cities within the county. Most of these municipalities provide services to their citizenry, including fire, rescue, and emergency medical services. In some cases, such as in the town of St. Stephen, fire and rescue services are provided through a joint municipal and fire district arrangement. Other communities share services with the county's individual fire districts, whether through monetary, resource sharing, or automatic aid agreements. Incorporated municipalities within the county include the towns of Bonneau, Jamestown, Moncks Corner, St. Stephen, and Summerville. Cities include Charleston, North Charleston, Goose Creek, and Hanahan.

5. Berkeley County Fire Services

This study primarily examines the 26 independent rural fire districts in the unincorporated areas of Berkeley County. There are five municipal entities within the county with their own fire protection services. These municipal fire departments will be considered for mutual aid purposes only. Other entities that impact the provision of services by the rural fire districts will be discussed, such as county level emergency communications, emergency medical services, and a heavily volunteer and specialized rescue squad.

There are two districts that are jointly managed (Sandridge and Pringletown). The following table is a summary of the number of stations, roster, and apparatus resources for each fire district and municipal agency. The data was compiled from paper records provided by the County officials. It shows that there are 45 volunteer fire district stations, with 585 personnel listed on the rosters (active, inactive, honorary, etc.). There are 72 engine apparatus and eight ladder apparatus, along with other resources available in the county (Table 5.1).

Table 5.1 Berkeley County Fire District Resources (Summer 2017).

					Roster:			Apparatus									
Fire Department	**Company #**	**Org Type**	**ISO**	**Stations**	Vols	PTE	FTE	Engine	Ladder	Tender/tank	Brush	Rescue	Chief	ARFF	Marine	Hazmat	Squad/utility
Caromi	**1**	RVFD	3	1	22	2		2	1				1				1
Pine Ridge	**2**	RVFD	3	2	33	8		3	1	1	1		1				1
Goose Creek	**3**	RVFD	3	2	26	24		4	1			1	2				
C&B	**4**	RVFD	3	2	41	20		4	1				4			1	1
Pimlico	**5**	RVFD	5&9	2	24			2			2				1		1
Whitesville	**6**	RVFD	4&4x	2	51	3	1	3	1		2	1	1				1
Moncks Corner Rural	**7**	RVFD	4	3	30		1	6	1	2	2	3			1		1
Longridge	**8**	RVFD	9	1	8			2		1							
Lebanon	**9**	RVFD	9	1	10			2		2							
Sandridge/Pringletown	**10&11**	RVFD	6	2	10			2		3	1	1					
Cross	**12**	RVFD	5	3	11			4		1	1		1				1
Eadytown	**13**	RVFD	5	1	13			2		2							2
Pineville/Russelville	**14**	RVFD	9	1	21	1		1		1			1				1
St Stephens	**15**	RVFD		1	20			4		1.5		1					
Forty-One	**16**	RVFD	6	1	18			1		1							1
Alvin	**17**	RVFD	6	1	12			1		3	1						
Macedonia	**18**	RVFD	7	3	22			4		3		1					2
Bonneau	**19**	RVFD	6	1	16			2	1		1	2					
Lake Moultrie	**20**	RVFD	3	2	38			4			1				2		1
Santee Circle	**21**	RVFD	6	2	11			3		1	1	1					1
Cordesville	**22**	RVFD	7	2	16			2		2							1
Huger	**23**	RVFD		1	7		1	1		1			1				
Jamestown	**24**	RVFD	4	2	14			6		1	1	1					
Cainhoy	**25**	RVFD	4&4x	4	27	3		4	1				2				
Shulerville-HoneyHill	**26**	RVFD	9	2	20			3		1	1		1				1
RVFD Totals				**45**	**521**	**61**	**3**	**72**	**8**	**27.5**	**15**	**12**	**15**	**0**	**4**	**1**	**17**
Moncks Corner City		Municipal	3	1		10	14	2	1								2
City of Hanahan		Municipal		3				3	1				1				
City of Goose Creek		Municipal	3	3				3	1				1				1
Charleston	**Stns 18 & 20**	Municipal	1	2				2	1				1		1	1	
Summerville	**Stn 4**	Municipal		1				1									
Career FD Totals				**9**	**0**	**10**	**14**	**11**	**4**	**0**	**0**	**0**	**3**	**0**	**1**	**1**	**3**
County Resource Total				**54**	**521**	**71**	**17**	**83**	**12**	**27.5**	**15**	**12**	**18**	**0**	**5**	**2**	**20**

Figure 5.1 shows the geographic arrangement of fire districts and fire station locations. Generally, the smaller districts in the southwestern corner of the county are the most populated. Population density generally decreases as you move north. Figure 5.2 shows fire station locations.

Figure 5.1 Berkeley County Fire Districts

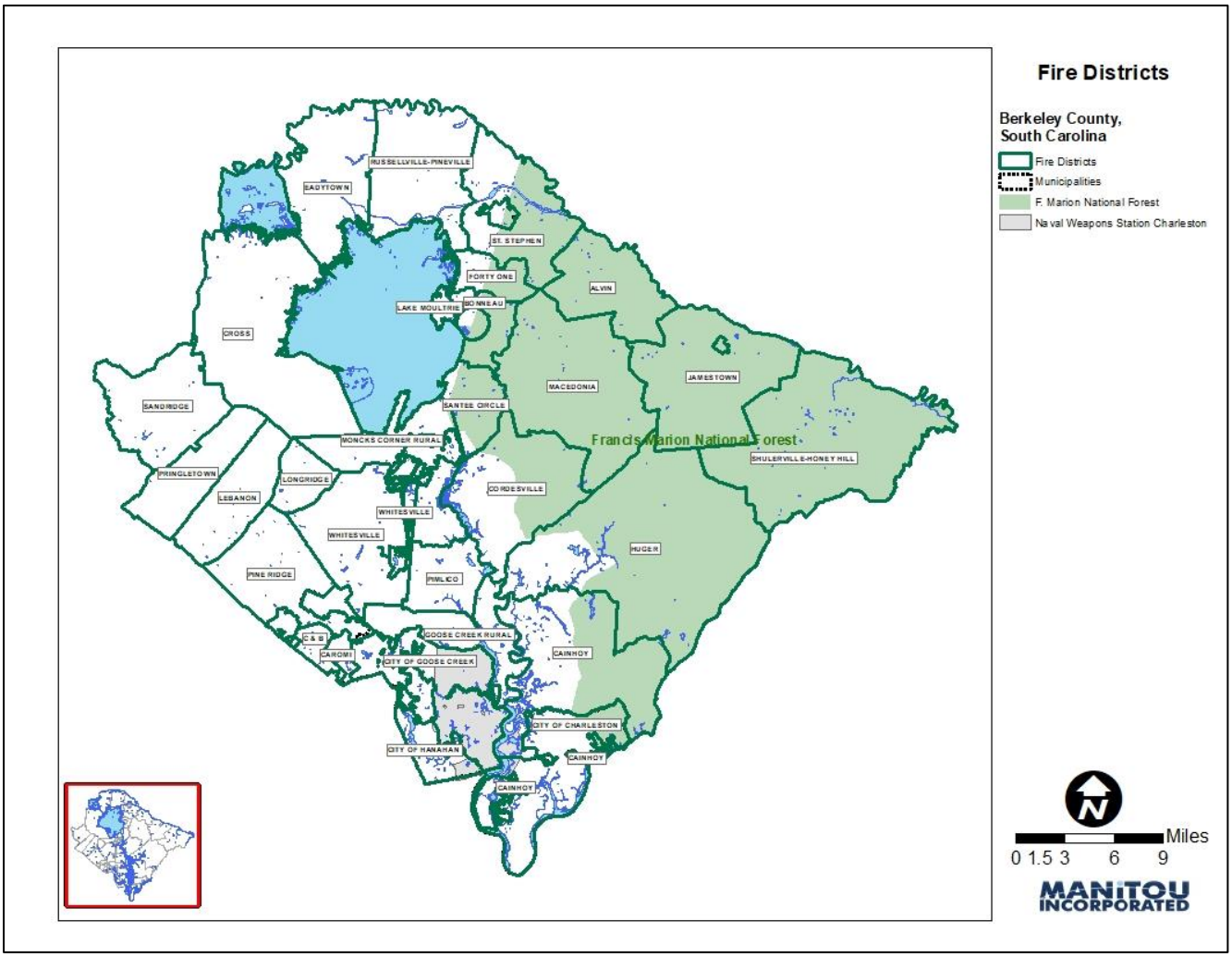
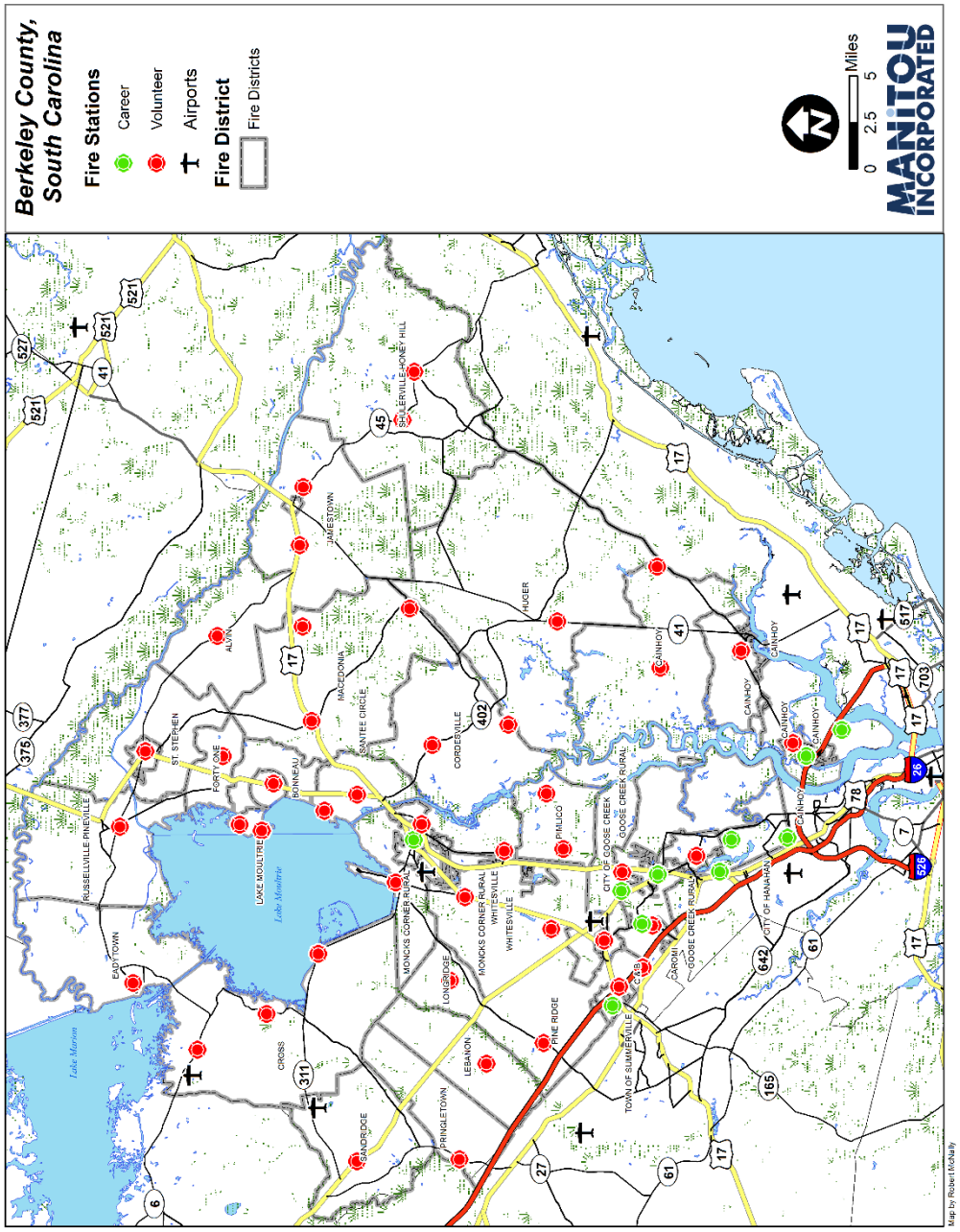


Figure 5.2 Berkeley County Fire Station Locations



5.1 ISO Analysis

The Insurance Services Offices, an entity of Verisk Analytics, provides a diverse set of services to the nation's property and casualty insurance industry. Among its services are the statistical, actuarial, underwriting, and technical services of fire protection and losses related to property risks.

The company's Community Hazard Mitigation Unit actively works with fire departments, building departments, water suppliers, and municipalities through the application of its Public Protection Classification program. Company field representatives distribute the program's Fire Suppression Rating Schedule (FSRS) to towns, cities, and fire districts throughout the country.

The FSRS is a manual detailing the ISO criteria for review of the structural fire prevention and fire suppression capabilities of individual communities or fire protection areas. The schedule measures the major elements of a community's fire protection system and develops a numerical rating called a Public Protection Classification (PPC).

A community's rating is then used by the insurance firms providing coverage for residential and commercial properties. A PPC rating often leads to reduced annual insurance premiums for property owners. This provides an incentive for municipalities and fire districts to retain public fire prevention and mitigation services at a level that generates lower premiums for its residents and commercial properties, while incidentally reducing the risk of life and property loss due to structure fires. Communities in many regions of the country place great emphasis on actual and perceived benefits their rating produces through reduced fire insurance premiums. The PPC number assigned to the community will depend on the community's score on a 100-point scale (Table 5.2).

Table 5.2 ISO PPC Rating Scale

Class	Points
1	90.00 or more
2	80.00 to 89.99
3	70.00 to 79.99
4	60.00 to 69.99
5	50.00 to 59.99
6	40.00 to 49.99
7	30.00 to 39.99
8	20.00 to 29.99
9	10.00 to 19.99
10	0.00 to 9.99

Split classifications

In some cases, such as in Berkeley County, the rated community or district is assigned a split rating such as a 5/9. The first number is the class that applies to properties within 5 road miles of the responding fire station and 1,000 feet of a creditable water supply, such as a fire hydrant, suction point, or dry hydrant. The second number is the class that applies to properties within 5 road miles of a fire station

but beyond 1,000 feet of a creditable water supply. Recently ISO revised the classification to reflect more precisely the risk of loss in a community, replacing Class 9 and 8B in the second part of a split classification with revised designations.

The revisions include an “X” or “Y” at the end of the classification. As an example, a community that originally rated as a split 6/9 classification will now be a split 6/6X classification with the "6X" denoting what was formerly classified as "9". Similarly, a community formally rated as a split 6/8B classification will now be a split 6/6Y classification. The "6Y" denotes what was formerly classified as "8B". Communities graded with single “9” or “8B” classifications will remain intact.

The schedule addresses the three major elements of a community’s structural fire defenses and consists of the following:

- Fire department: A review of the fire department’s capabilities is evaluated with emphasis on the prevention and mitigation of potential structure fires.
- Water system: Emphasis is placed on the system’s ability to provide sufficient pressures and volumes corresponding to local structural fire conditions.
- Emergency communication: The service is reviewed in relation to its ability to adequately dispatch fire department units to reported structure fires.

The FSRS considers the strategic location of stations based on response distance. The schedule applies a theory whereby developed areas of a community should be no further than 1.5 road miles from the closest engine company and 2.5 miles from the closest ladder company. Using the least distance of the two criteria equates to an engine company providing coverage over an area of 4.5 miles on a flat and uniform street grid (Table 5.3).

Table 5.3 ISO Structure Fire Response

Unit/Company	*Maximum Travel Distance **	*Travel Time*
1st due Engine Co.	1.5 road miles	3.2 minutes
1st due Ladder Co.	2.5 road miles	4.9 minutes

* Average travel speed at 35 mph

The response distance criterion has long been used by ISO Field Representatives due to its ease of application. In recent years, the method has undergone much scrutiny due to the perceived over simplification of the subject of fire station location and analysis. However, a review of the background and origins of the method reveals that, at the time of ISO’s adoption, extensive research was conducted into the characteristics of interior structure fire behavior, particularly the time for flashover to occur and the travel times in congested area of several America cities. The research, conducted by the RAND Corporation, revealed an average speed of 35 miles per hour for fire apparatus traversing through city streets where heavy traffic, narrow lanes, topography, tight intersections, and other obstacles created barriers to reaching a theoretical location before the 4-6 minute time for flashover to occur. The criteria

produce an expected response time of 3.2 minutes for an engine company and 4.9 minutes for a ladder-service company.

Taking into account the average speed and the time required for an apparatus to accelerate from a stop to travel speed, RAND developed the following equation for calculating the travel time:

$$T = 0.65+1.7D$$

Where

T	=	time in minutes to the nearest 1/10 of a minute
0.65	=	a constant for vehicle acceleration for the first 0.5 mile traveled
1.7	=	a constant vehicle speed validated for response distances ranging from 0.5 miles to 8.0 miles
D	=	distance

Recently, ISO conducted a review of the formula and found the earlier RAND work still valid as a predictive tool. Their work has not been independently validated.

It is important to note that in its analysis of fire company distribution, ISO does not measure or use actual historical response times of individual communities. This is due to the fact that many fire departments lack an accurate and reliable response-time information system. This is in conjunction with their view that there is no standardized national recordkeeping system that would allow for the determination of fire department response times.

5.2 Individual Fire District PPC

Each district's PPC is subject to be resurveyed every 3-5 years, usually on a rotating basis, with more frequent intervals due to changes in the level and kind of service, changes in population, or other circumstance that may greatly alter a district's fire defenses. The following table presents an overview of each fire districts' most recent PPC rating, incorporating the performance of the fire department and including credit for automatic aid from neighboring districts. The overview does not describe the breakdown of credit for communication and water supply. This is due to the scope of work of the study being directly limited to the capability of the fire departments, which encompass only part of the rating criteria. Table 5.4 shows PPC data for each of the fire departments.

Table 5.4 ISO PPC Information

District	Last Survey	Overall PPC	Credit					
			Communications		Fire Department		Water Supply	
			(10 pts. available)	% Earned	(50 pts. available)	% Earned	(40 pts. available)	% Earned
Alvin †		9						
Bonneau	2014	5/5Y	6.82	68.2 %	22.84	45.68 %	32.00	80.0 %
C & B	2015	3/3Y	7.22	72.2 %	31.86	63.72 %	35.31	88.28 %
Cainhoey	2014	4/4X	6.82	68.2 %	24.49	48.98 %	33.84	84.6 %
Caromi	2014	3	6.82	68.2 %	29.74	59.48 %	36.25	90.63 %
Cordesville †		5						
Cross †		5/9						
Eadytown	2017	5	6.82	68.2 %	20.59	41.18 %	30.73	76.83 %
Forty-One *								
Goose Creek	2016	3/3Y	7.22	72.2 %	32.18	64.36 %	38.57	96.43 %
Huger		6/6X	6.42	64.2 %	12.74	25.48 %	25.48	63.7 %
Jamestown	2014	4/4Y	6.82	68.2 %	24.45	48.09 %	32.93	82.33 %
Lake Moultrie	2014	3/3X	6.42	64.2 %	35.45	70.09 %	37.82	94.55 %
Lebanon †		9						
Longridge	2012	5/9	8.15	81.5 %	24.14	48.28 %	32.01	80.03 %
Macadonia *		5/10						
Moncks Corner	2017	4	6.82	68.2 %	26.15	52.03 %	28.22	70.55 %
Pimlico †		5						
Pine Ridge	2015	3/10	7.22	72.2 %	29.75	59.05 %	35.23	88.08 %
Pineville/Russellville *								
Sandridge/Pringletown †		6						
Santee Circle	2014	4	6.82	68.2 %	24.96	49.92 %	35.31	88.28 %
Shulerville Honey Hill †	2014	5/5X						
St. Steven †	2013	5/10						
Whitesville	2015	4/4X	6.82	68.2 %	27.22	54.44 %	38.58	96.45 %
Average		4.8	6.9	69.44 %	26.1	52.2 %	33.7	84.34%

* No information provided

† Insufficient information provided

To the property owner, an important element is the fire district rating by the Insurance Services Office (ISO). Its rating scale, with 1 being best and 10 being worst, is dependent upon factors of radio communications, water supply, and the fire district itself. ISO rating scores for each fire district were listed in the previous table. A lower score may translate into more affordable insurance premiums for the property owner.[7]

We can see that ISO PPC grades range from a high of three for Caromi and part of C & B, Goose Creek Rural, Lake Moultrie, and Pineridge. The lowest ratings are for Lebanon and Alvin, graded at nine.

[7] It should be noted that many insurers use "banding" in which several ratings are grouped together. A movement of one either up or down may not necessarily translate into a change in premium. The biggest increase is moving from a 10 or 9 upward. Further, fire is only one aspect of pricing for a typical homeowner's policy, so the effects may not be as large as anticipated.

Although we did not have access to complete reports, these ratings are probably attributable primarily to lack of water supplies.

5.3 ISO Fire Station Distance Criteria

To better understand the coverage of stations according to ISO criteria, we calculated coverage for each department given the current configuration of stations. This exercise is strictly for ISO compliance and does not necessarily correspond to "real word' response times. In Table 5.5, we summarize the 1.5 mile and 5-mile distance coverage by estimating the number of address points (corresponding to build area) covered by each department.

We can see from this analysis that 52.4 percent of the county addresses are not covered within 1.5 miles, and that only 8.2 percent of the County's addresses are not covered within five miles of each fire station. Given the rural character and limited road network in many parts of the County, this suggests that the number of fire stations overall is appropriate, or that additional stations are not likely to be necessary.

Table 5.5 ISO Distance Coverage by District/Department

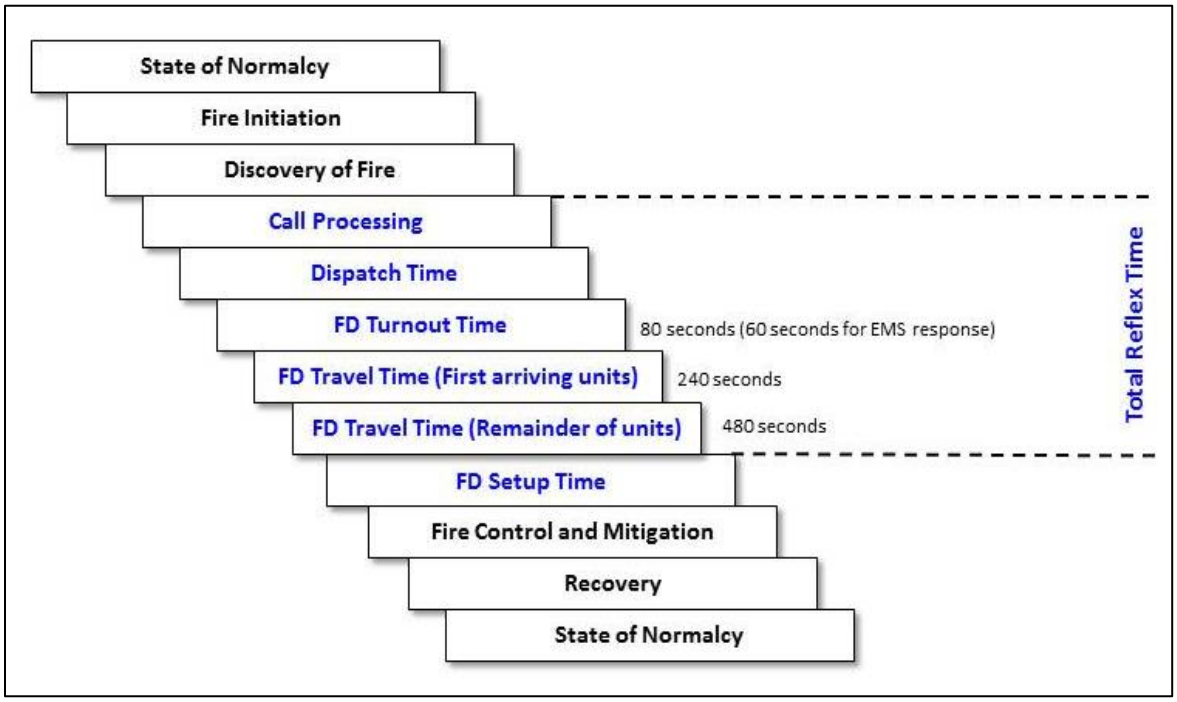
	1.5 Mile ISO Response				5 Mile ISO response		
FD_NAME	Address Points Covered	Address Points Not Covered	Percent Covered		Address Points Covered	Address Points Not Covered	Percent Covered
ALVIN	229	424	35.1%		636	17	97.4%
BONNEAU	29	297	8.9%		304	22	93.3%
C & B	1,731	2,794	38.3%		4,080	445	90.2%
CAINHOY	1,811	1,748	50.9%		3,355	204	94.3%
CAROMI	2,793	1,439	66.0%		4,232	-	100.0%
CORDESVILLE	386	648	37.3%		1,002	32	96.9%
CROSS	559	2,143	20.7%		2,384	318	88.2%
EADYTOWN	367	650	36.1%		793	224	78.0%
FORTY ONE	283	395	41.7%		670	8	98.8%
GOOSE CREEK RURAL	4,857	2,236	68.5%		6,954	139	98.0%
HUGER	174	646	21.2%		752	68	91.7%
JAMESTOWN	175	246	41.6%		409	12	97.1%
LAKE MOULTRIE	1,198	98	92.4%		1,292	4	99.7%
LEBANON	148	390	27.5%		452	86	84.0%
LONGRIDGE	327	211	60.8%		527	11	98.0%
MACEDONIA	617	922	40.1%		1,504	35	97.7%
MONCKS CORNER RURAL	1,427	2,418	37.1%		3,773	72	98.1%
PIMLICO	1,906	635	75.0%		2,337	204	92.0%
PINE RIDGE	3,969	4,147	48.9%		7,540	576	92.9%
PRINGLETOWN	189	145	56.6%		309	25	92.5%
RUSSELLVILLE-PINEVILLE	466	872	34.8%		1,290	48	96.4%
SANDRIDGE	93	839	10.0%		675	257	72.4%
SANTEE CIRCLE	636	340	65.2%		962	14	98.6%
SHULERVILLE-HONEY HILL	185	163	53.2%		336	12	96.6%
ST. STEPHEN	187	1,183	13.6%		1,326	44	96.8%
TOWN OF BONNEAU	303	15	95.3%		315	3	99.1%
TOWN OF JAMESTOWN	76	13	85.4%		89	-	100.0%
TOWN OF ST. STEPHEN	1,032	19	98.2%		1,050	1	99.9%
WHITESVILLE	1,833	8,032	18.6%		6,366	3,499	64.5%
TOTAL (includes municipalities)	**46,510**	**53,232**	**53.4%**		**91,562**	**8,180**	**8.2%**

5.4 Response Time Capability Criteria

The fire apparatus response time to the scene of an emergency incident is an essential determining factor to the magnitude of the fire or medical emergency that the fire department must handle upon arrival. The theory is the shorter the response time, the smaller the fire that must be extinguished. The principal response time standards are developed by the National Fire Protection Association (NFPA).

Before delving into the details of response time standards, it is worthwhile to illustrate the components of fire service response time. While we typically think of the time to drive from the fire station to an incident, the reality is more complex (Figure 5.3).

Figure 5.3. Fire Department Response Reflex Time



5.5 NFPA Guidelines

The National Fire Protection Association (NFPA) is an industry association with a membership of approximately 65,000 that develops and publishes fire protection related standards and codes for usage and adoption by local and other government entities. Their standards and codes are developed through a process approved by the American National Standards Institute. The association was formed in 1896 by a group of New England insurance firms whose intent was to standardize the then-new fire sprinkler systems. The association develops its standards and codes through a consensus-based process utilized by national-level technical committees, whose memberships consist of end users, subject matter experts, manufacturers, and representatives of adopting bodies, such as local government. Standards are published and subject for adoption by government and private industry and subject to revision on an evolving three to five year cycle.

NFPA 1710

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,* is an industry benchmark for paid/career fire departments that describes the requirements for delivery of services, response capabilities, incident management, and strategy. This includes the following benchmarks related to call receipt and processing time, turnout time, and response (travel) time:

- Call receipt and processing time (time from 911 call pick-up to dispatch of an assignment) of thirty seconds on all calls.
- Turnout time (time from dispatch to being enroute to an assignment) of eighty seconds on fire suppression calls; sixty seconds for EMS calls.
- The fire department's fire suppression resources are deployed to provide for the arrival of an engine company within a four-minute travel time, and/or the initial full alarm assignment within an eight-minute travel time, to 90 percent of the incidents.
- The first responder medical or basic life support EMS resources are deployed to provide for the arrival of resources and care providers within a four-minute travel time, and/or advanced level paramedic services within an eight-minute travel time, to 90 percent of the incidents.

NFPA 1710 is a widely-referenced standard, but it is not intended for application to volunteer or mostly volunteer fire departments.

NFPA 1720

The National Fire Protection Association (NFPA) has also issued a response performance standard for all or mostly volunteer-staffed fire departments. Though not a legal mandate, NFPA 1720 *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Services, and Special Operations to the Public by Volunteer Fire Departments* identifies a target response time performance objective for fire departments and a target staffing standard for structure fires.

The first edition of NFPA 1720 was adopted by the association in 2001. Since then, the standard has undergone three revisions with the 2014 edition serving as the current version of the standard available for adoption. The most recent committee membership consists of representatives from the volunteer fire service, firefighter and fire chiefs associations, military and federal agency fire services, insurance industry, town and city associations, and public fire protection consultants.

The standard contains the minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by volunteer and combination fire departments. Sections of the standard address functions and outcomes of a volunteer fire department's emergency service delivery, response capabilities, and resources. The standard also contains minimum requirements for managing resources and systems, such as health and safety, incident management, training, communications, and pre-incident planning.

Addressed within the standard are strategic and system issues involving the organization, operation, and deployment of a volunteer fire department; however, it does not address tactical operations at a specific emergency incident. Also not included are fire department initiatives related to fire prevention, community education, fire investigations, support services, personnel management, and budgeting.

The standard is organized into five chapters, two of which serve as the crux of the standard. Chapter 4 encompasses organization, operations, staffing, and deployment. Chapter 5 covers systems within a volunteer fire department organization, such as firefighter safety and health, incident management, training, communications, and pre-incident planning. It is the focus of the study to apply chapter 4 to each of the county's fire districts. The following are excerpts from the chapter that are relevant to the study:

Staffing and Deployment

Chapter 4 contains specific criteria for the staffing and deployment of volunteer firefighters and their equipment to structure fires within their community or district. The scenario for which resources should be organized is based on a 2,000 square foot, single-family home, without a basement, adjacent homes, or other exposure structures.

The fire department service area, or district, is divided into demand zones based on population density or severity of risk. Based on these criteria, the standard establishes the minimum level of staffing and response times. A zone can be a single building or a group of buildings. It is usually defined in terms of geographical boundaries, known as fire management areas or fire management zones.

Turnout time is considered to be the time required for firefighters to muster and prepare to respond with their equipment. Where firefighters are assigned to a station, the standard allows for up to 90 seconds from the initial dispatch to exiting the station for fires and special operations, and 60 seconds for emergency medical related responses.

The time firefighters spend driving their apparatus to an emergency scene is considered response time. Normally, response time is considered the travel time from the fire station to the initial arrival on the scene of the emergency.

Set up is the time necessary to assemble the necessary resources for firefighting operations upon the fire department's arrival at a structure fire. The standard establishes a time for initial attack of not more than two minutes for 90 percent of structure fires (Table 5.6).

The standard stipulates firefighters responding to fires and other emergencies are to be organized into company units, or response teams, with appropriate apparatus and equipment. Response assignments should be standardized, with procedures including incident management, mutual aid response, and mutual aid agreements predetermined by the location and nature of the reported incident.

Table 5.6 Staffing and Response Time

Demand Zone [a]	Population Density	Minimum Staff to Respond [b]	Response Time (minutes) [c]	Meets Objective (%)
Urban area	Greater than 1000 people per sq. ml.	15	9	90
Suburban area	500–1000 people per sq. ml.	10	10	80
Rural area	Less than 500 people per sq. ml.	6	14	80
Remote area	Travel distance 8 ml. or greater	4	Directly dependent on travel distance	90
Special risks	Determined by AHJ	Determined by AHJ	Determined by AHJ	90

[a] A jurisdiction can have more than one demand zone.

[b] Minimum staffing includes members responding from the AHJs department and automatic aid

[c] Response time begins upon completion of the dispatch notification and ends at the time interval shown in the table.

During firefighting, EMS response, and other emergency operations, the fire department should have commanding officers and company or crew officers in place, along with sufficient resources for initial and sustained operations

In recognition that volunteer departments across the United States cover a variety of communities, the recommended standards are classified according to population densities.

While this guideline pertains to known structural fire incidents, fire districts respond to a myriad of incident types including fire alarms, medical calls, wires down, lock outs, and more. Communities and fire districts ought to establish reasonable response performance goals in terms of time, apparatus, and staffing. Due to their presumed local proximity, other agencies such as County EMS rely upon the fire district to reach a scene first to assess the situation and perform critical tasks before they arrive.

It should be noted that our geographic analysis found that almost the entire county was within eight miles of a fire station, meaning that the "rural area" standard is a minimum for compliance with the standard. [8].

The guideline does not specify any turnout time objective; <u>therefore, depending upon a volunteer departments' time to muster an adequate staff count, the remaining time objective is left to the travel time component.</u>

[8] Only a small area in the Huger Fire District was outside 8 miles. A very small fraction of address points, no large buildings, and only two events were found in this area.

Not all requests for services to the fire department ought to be construed as requiring apparatus to respond emergently or within these short time constraints. These responses should be limited to the most critical emergencies in which they were designed.

The next graphic models the travel time extent of apparatus from each of the current stations. The model utilizes the street network of the county and surrounding areas, calculating the travel time extent via distance and assigned speed capability of streets based upon type. Time penalties were assessed for negotiating turns and intersections. This model assumes departure from the fire stations, which may not always be the case. It also does not take into account weather conditions, traffic congestion, construction, or detours.

Given the NFPA 1720 parameters, the following chart describes the travel model shown in relation to the allowable turnout time. That is, if we estimate turnout time as part of the response time, the component of travel time is reduced, as shown in Table 5.7.

Table 5.7 NFPA 1720 Travel and Turnout Time Relationship

	Urban	Suburban	Rural
Goal Minutes	9	10	14
Travel Minutes	Allowable Turnout Time (includes dispatch processing)		
4	5	6	10
6	3	4	8
8	1	2	6

5.6 Fire Districts Workload Analysis

This section examines the workload of the fire districts, along with a response time and travel model analysis. We can begin by studying the incident response data from the county's dispatch system. The main source is an export of incident data from the county emergency communications center (dispatch) from 2008 through the first half of 2017. The study team requested data only from fire district events.

There are some important limitations in data from the CAD system.

1. Unit Arrival Data cannot be queried. This means that the first unit on scene, regardless of type, "stops the clock" in these calculations. In most cases, a unit other than a piece of fire apparatus arrives first, so this can cause misleading results. While this may not be a serious problem for medical calls (the bulk of responses), for the most serious incidents, fire calls, the data is likely understating the time to get a piece of heavy fire apparatus to the scene. This is important, as these apparatus actually initiate firefighting.
2. Incidents are not prioritized. Some incidents may receive a non-emergency response. As coded, it is not possible to remove "low priority" or "non-emergency" calls, such as service calls.

In addition to summarizing incidents and calculating response times, we also geocoded CAD incidents for analysis and were able to locate 87 percent of incidents. Remaining incidents could not be coded due to issues with alternate or misspellings, use of premise names rather than address, lack of street number of cross street (often for vehicle accidents or brush fires), and use of acronyms.

Figure 5.4 shows the countywide total number of fire service incidents. We see that there has been a fairly steady increase, with incidents approaching 12,000 in 2016. The next figure shows incidents by month by year, showing both a steady increase and what appears to be an emerging seasonal pattern.

Figure 5.4 Total Incidents 2008-2016

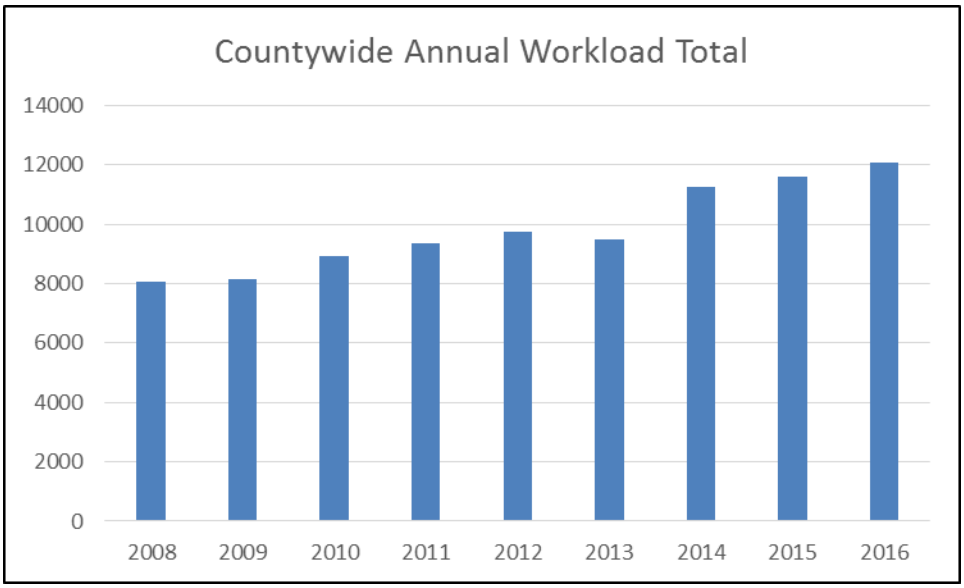
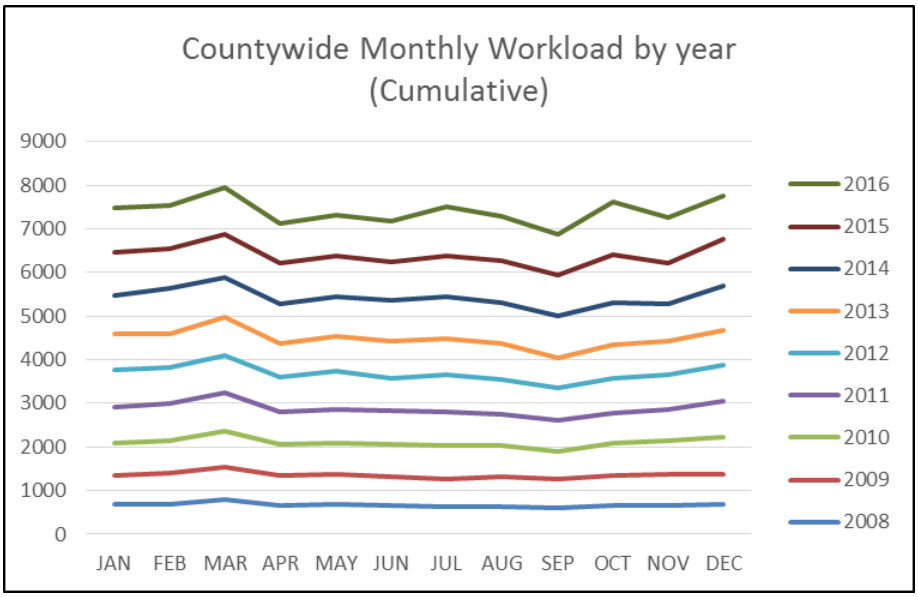


Figure 5.5 Incidents by Month and Year



Workload countywide, reported by hour of day, is typical of most agencies with a much higher daytime workload than overnight (Figure 5.6). The peak for Berkeley County seems to be later in the afternoon/early evening rather than earlier in the day. Volume by day of week varies little and is slightly lower on Sundays, slightly higher on Saturdays.

Figure 5.6 Incidents by Hour of Day by Year

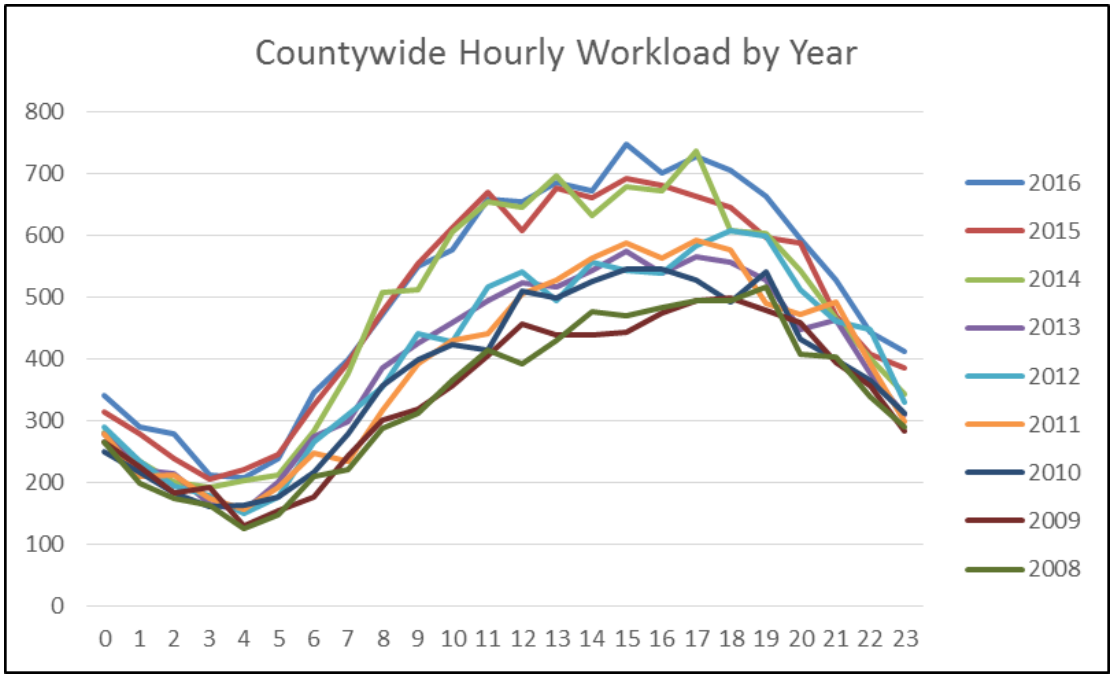
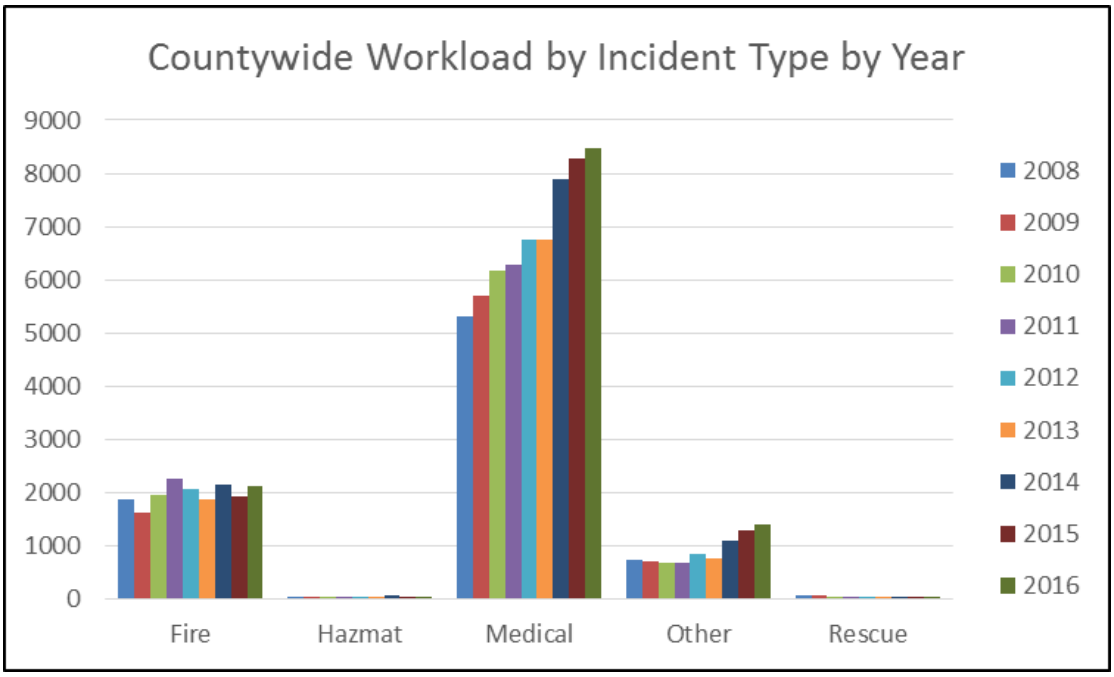


Figure 5.7 shows that medical incidents are the most common type, and have increased the most in absolute terms.

Figure 5.7 Incidents by Type and Year



We next examine incidents at the individual district level. Table 5.8 shows incidents by district from 2010-2016.

Table 5.8 Incidents by Department, 2012-2016

Name of Dept/Area	Fire Dept	ESN	2012	2013	2014	2015	2016
Alvin	Company 17	417	111	105	110	104	93
Bonneau City	Company 19	396	72	74	79	86	94
Bonneau Rural	Company 19	419	61	60	84	83	81
C&B	Company 4	404	1,103	1,156	1,267	1,427	1,535
Cainhoy	Company 25	425	264	253	355	330	364
Caromi	Company 1	401	621	631	683	738	784
Cordesville	Company 22	422	152	136	136	152	136
Cross	Company 12	412	558	458	474	490	532

Eadytown	Company 13	391	114	93	134	132	124
Forty-One Section	Company 16	416	102	100	131	118	130
Goose Creek Rural	Company 3	403	1,073	1,034	1,199	1,163	1,223
Honeyhill/Shulerville	Company 26	426	42	50	37	51	54
Huger	Company 23	423	119	123	133	152	147
Jamestown City	Company 24	394	10	18	6	10	16
Jamestown Rural	Company 24	424	96	47	62	64	81
Lake Moultrie	Company 20	420	170	192	209	223	216
Lebanon	Company 9	409	122	98	94	94	121
Longridge	Company 8	408	89	87	99	75	83
Macedonia	Company 18	418	186	150	207	215	268
Moncks Corner Rural	Company 7	407	486	458	617	579	569
Pimlico	Company 5	405	150	146	202	180	226
Pine Ridge	Company 2	402	1,059	1,062	1,284	1,225	1,370
Pineville/Russellville	Company 14	392	230	233	283	295	275
Pringletown	Company 11	410	51	67	43	50	52
Sandridge	Company 11	411	209	217	263	236	244
Santee Circle	Company 21	421	151	125	176	190	180
St Stephen City	Company 15	393	210	252	242	280	231
St Stephen Rural	Company 15	415	220	223	281	258	246
Summerville City	SFD	155	8	11	6	7	16
Whitesville	Company 6	406	956	935	1,185	1,263	1,419

The Table above shows the total numbers of incidents for each Department according to CAD records. Note that these incidents are reported by ESN, or geographic area. Recall that some districts are composed of multiple ESNs. Activity level in most departments is quite reasonable. The busiest departments have roughly 1500 incidents per year.

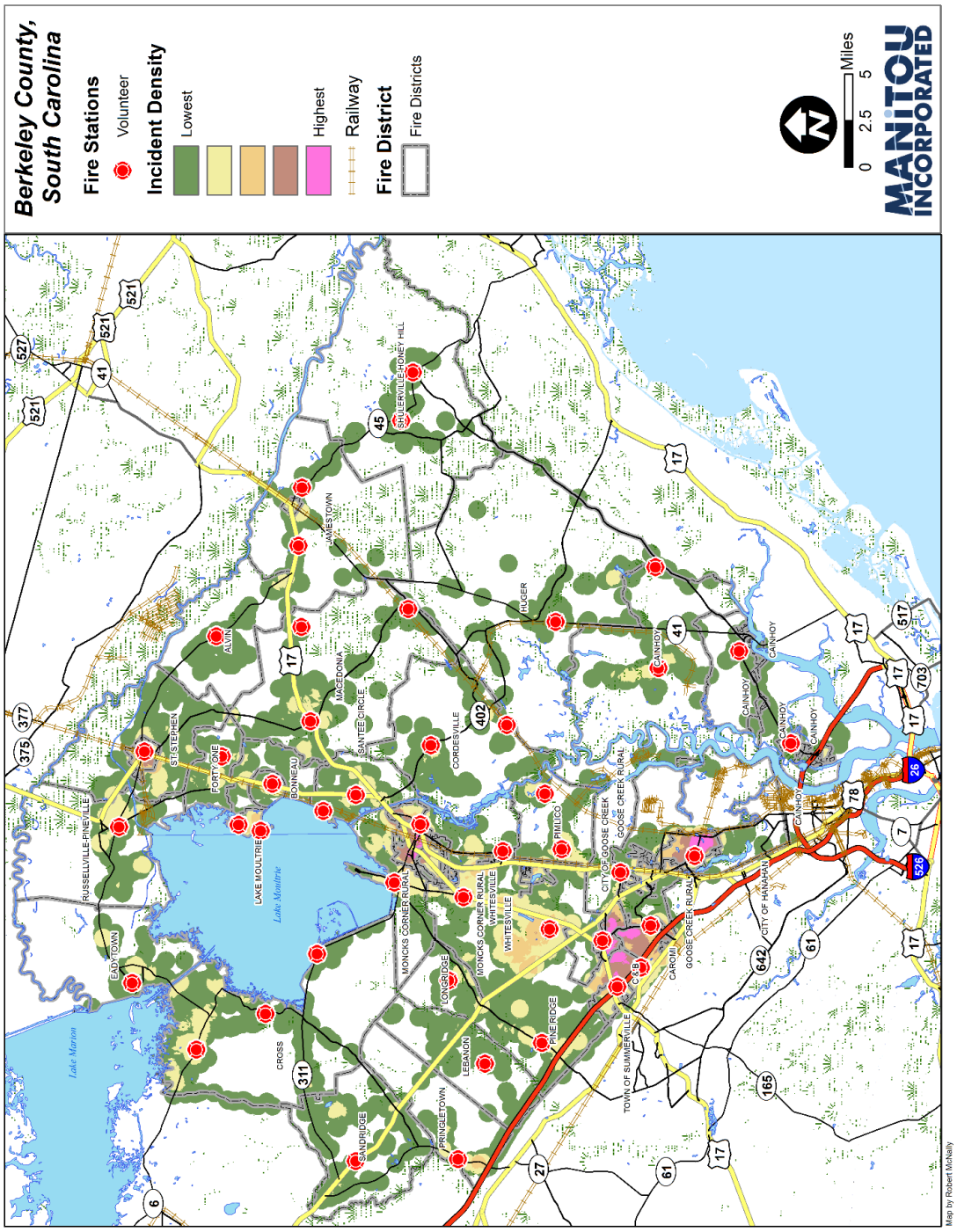
We also examined incidents by type for fire departments. Interpreting CAD incidents codes made this uncertain, but for some incident types this was feasible. Of particular interest, there were just over 400 reported structure fires dispatched by Berkeley County Communications in 2016 (Table 5.9).

Table 5.9 Fire-related Incidents by Type, 2016

Incident type	Count (2016)
Structure Fire	412
Grass, brush, woods fire	422
Car fire	186
Fire Alarm	803
Smoke Investigation	123
Hazardous Materials	3

Figure 5.8 shows incident density for cumulative incidents 2012-2016. While there are areas of relatively higher demand, incidents are widely distributed in rural areas, particularly at low density. This is as expected.

Figure 5.8 Fire Service Incident Density



Workloads for the fire departments range from low to moderate for volunteer organizations. While some of these busier agencies employ on-duty personnel in some capacity, these activity levels may be high enough to justify an on-duty volunteer crew schedule. Population change through 2030 will likely require some adoption of added career staffing in the largest districts. Currently rural areas bordering these areas of highest growth will also see increased development. More remote rural districts will see less pronounced growth, meaning that their needed resource levels will not change appreciably under the present arrangement.

5.7 Future District Population

Using population projection data from the Regional Council of Governments, we applied population growth to each district based on the projected numbers of new households. We also developed our own estimate for 2025 population (Table 5.10). We see that several fast-growing districts (Cainhoy, Longridge, Pineridge, and Whitesville) will experience the highest annualized growth. They will add the majority of absolute new housing units.

Table 5.10 District Population Growth 2015-2030

FD_NAME	Square Mi	15Pop	% Change	20Pop	% Change	25pop	% Change	30Pop	Absolute (	Annualize
ALVIN	32.69	1,154	2.2%	1,180	2.4%	1,208	2.4%	1,237	83	0.5%
BONNEAU	10.87	334	2.9%	344	3.5%	356	3.4%	368	34	0.7%
C & B	5.02	9,938	2.4%	10,179	1.6%	10,347	1.6%	10,514	576	0.4%
CAINHOY	71.23	4,497	22.3%	5,787	50.6%	11,714	33.6%	17,640	13,143	10.3%
CAROMI	3.62	8,367	3.6%	8,683	5.3%	9,174	5.1%	9,665	1,297	1.0%
CITY OF CHARLESTON	39.79	8,515	16.4%	10,187	27.2%	13,993	21.4%	17,800	9,284	5.4%
CITY OF GOOSE CREEK	41.44	33,296	10.0%	37,005	3.8%	38,469	3.7%	39,933	6,637	1.3%
CITY OF HANAHAN	11.53	18,176	8.1%	19,779	11.2%	22,266	10.0%	24,752	6,576	2.2%
CORDESVILLE	49.02	1,495	4.2%	1,560	5.2%	1,644	4.9%	1,729	234	1.0%
CROSS	80.43	1,347	5.2%	1,417	6.5%	1,510	6.1%	1,602	255	1.2%
EADYTOWN	41.01	1,173	3.8%	1,218	4.4%	1,271	4.2%	1,325	152	0.9%
FORTY ONE	10.86	1,258	3.8%	1,306	4.4%	1,363	4.2%	1,421	163	0.9%
GOOSE CREEK RURAL	30.75	16,329	4.8%	17,153	6.2%	18,292	5.9%	19,431	3,101	1.2%
HUGER	119.22	1,403	8.4%	1,531	12.4%	1,748	11.1%	1,966	563	2.4%
JAMESTOWN	59.45	634	2.5%	650	2.2%	665	2.1%	679	45	0.5%
LAKE MOULTRIE	2.57	2,096	3.8%	2,176	4.4%	2,272	4.2%	2,367	271	0.9%
LEBANON	27.19	1,042	13.3%	1,202	13.1%	1,383	11.6%	1,565	523	2.9%
LONGRIDGE	11.31	1,029	28.4%	1,438	28.6%	2,014	22.3%	2,591	1,561	6.8%
MACEDONIA	69.94	2,995	3.1%	3,088	3.8%	3,206	3.7%	3,323	327	0.7%
MONCKS CORNER RURAL	32.84	7,975	12.6%	9,128	5.6%	9,671	5.3%	10,213	2,238	1.8%
PIMLICO	18.84	2,912	29.1%	4,105	10.6%	4,591	9.6%	5,077	2,165	4.1%
PINE RIDGE	34.60	17,122	14.3%	19,982	38.5%	32,472	27.8%	44,962	27,840	7.1%
PRINGLETOWN	25.86	513	10.5%	573	13.8%	665	12.1%	757	244	2.8%
RUSSELLVILLE-PINEVILLE	46.94	1,982	3.8%	2,057	4.4%	2,148	4.2%	2,238	256	0.9%
SANDRIDGE	38.15	1,665	8.6%	1,809	11.4%	2,015	10.2%	2,220	555	2.1%
SANTEE CIRCLE	15.03	1,507	5.3%	1,591	7.6%	1,722	7.0%	1,852	345	1.5%
SHULERVILLE-HONEY HILL	89.53	582	2.5%	597	2.2%	611	2.2%	624	42	0.5%
ST STEPHEN	38.83	2,703	3.8%	2,806	4.4%	2,929	4.2%	3,052	349	0.9%
TOWN OF BONNEAU	3.04	529	3.8%	549	4.4%	573	4.2%	597	68	0.9%
TOWN OF JAMESTOWN	0.61	100	2.5%	103	2.2%	105	2.2%	107	7	0.5%
TOWN OF MONCKS CORNER	7.78	7,727	20.8%	9,752	4.4%	10,196	4.2%	10,639	2,912	2.3%
TOWN OF ST STEPHEN	2.43	1,362	3.8%	1,414	4.4%	1,476	4.2%	1,538	176	0.9%
TOWN OF SUMMERVILLE	2.58	3,812	10.5%	4,260	0.8%	4,295	0.8%	4,329	516	0.9%
WHITESVILLE	43.73	14,203	26.8%	19,398	25.1%	25,903	20.1%	32,407	18,204	6.1%
TOTAL	1,119	179,775	11.9%	204,008	15.8%	242,266	13.6%	280,520	100,746	3.2%

5.8 Departmental Surveys

In order to efficiently gather information from the 26 fire departments being studied, Manitou developed and administered an online survey. It was designed to validate records provided to the county and capture current data. The departmental surveys were to be completed by the Chief or designee and represent the department's official position. These surveys were designed to elicit perceptions and to validate other data sources.

The link to the survey was distributed via the Chief's Association, in conjunction with a letter mailed to each Chief. The survey opened in August 2017, with a 30-day deadline. By September, we had received 11 surveys. Reminders were distributed via the Berkeley County Fire Chiefs Association. To stimulate compliance, a hard copy of the survey was mailed with a stamped return envelope to those departments that had not responded. This yielded an additional six responses. Ultimately, we made our best attempt to complete the remaining nine missing surveys based on interview notes and documents.

We summarized responses to the questions in the section below. A hard copy of the departmental survey is included as Appendix *.

Records Systems

Recordkeeping is a challenge for many small departments nationally. All departments reported that they track the number of members responding on incidents, with 63 percent reporting that they use manual records for this purpose.

Fourteen departments (67 percent) indicate that they used some form of enterprise software system for recordkeeping. Three departments indicated that they had financial software. This response does not seem consistent with our field experience, which indicated that use of such systems was not widespread.

Radio Communications

We asked, "Do you have any interoperability challenges or difficulties with radio communication in your service area?" Two-thirds of the 24 departments responding indicated that they did.[9]

Specialized Services

Departments were asked if they provided specialized services. The results are summarized in Table 5.11. Almost all departments provide EMS first response under County protocols. The next most common was vehicle extrication services, provided by 21 departments, followed by water rescue, provided by six departments. A handful of departments stated that they provide hazardous materials, heavy rescue, and high angle or rope rescue.

[9] Site interviews revealed that some problems may be attributable to radio equipment being purchased by members without regard to County specifications. Differing sensitivity, power, and quality may affect portable radio coverage. The 9-1-1 Center is in the process of relocating a tower site further to the north to address these issues.

Table 5.11 Does your Department provide any specialized services

Answer Choices	Responses	
Medical First Response	96.00%	24
Vehicle Extrication	84.00%	21
Heavy Rescue	8.00%	2
Water Rescue	20.00%	5
High-Angle or Rope rescue	8.00%	2
Hazardous Materials Response	12.00%	3
Other	24.00%	6

Trends in Response

We sought to understand the individual departments' perceptions of trends in member turnouts for alarms and other requirements. These questions were asked on a 3-year and 10-year trend. Response times in the last three years were largely unchanged, with 13 departments stating that response times have improved. Similarly, 12 departments stated that the number of trained members has increased. Similar patterns held for the same questions over the past 10 years.[10] Most departments that answered saw positive trends in terms of response times and member turnout in the next 10 years (Table 5.12).

Table 5.12 Please summarize your Department's trends

	Much worse		Worse		Unchanged		Better		Much better	
Over the last 3 years, your response times	0.00%	0	3.85%	1	46.15%	12	34.62%	9	15.38%	4
Over last 3 years, number trained members attending alarms	0.00%	0	11.54%	3	42.31%	11	23.08%	6	23.08%	6
Over last 10 years, are your response times	0.00%	0	7.69%	2	30.77%	8	30.77%	8	30.77%	8
Over last 10 years, number of trained members attending alarms	3.85%	1	7.69%	2	34.62%	9	42.31%	11	11.54%	3
In the next 10 years, where do you see your response times to emergencies	0.00%	0	3.85%	1	34.62%	9	26.92%	7	34.62%	9
Next 10 years, number of trained members attending alarms	0.00%	0	7.69%	2	30.77%	8	30.77%	8	30.77%	8

Time of Day/Seasonal Staffing Response Issues

The largest number of departments indicating difficulty during time of day stated that daytime hours were the most difficult (Table 5.13). About 70 percent of responses identified weekdays as more difficult

[10] Missing responses were coded as "unchanged," which may affect interpretation.

for providing staffing to incidents. Less than half the number of responses was received for weekends, with Saturday and Sunday receiving equal numbers.

Summer was identified as the most challenging season for providing staffing.

Table 5.13 Are there particular times of the day that are more challenging to provide staffing?

Answer Choices	Responses	
0800-1600	72.22%	13
1600-2400	0.00%	0
0000-0800	16.67%	3
Other	11.11%	2
None	0.00%	0

Training

To determine frequency of training, we asked departments how frequently they held training sessions. The most frequent response was weekly (57 percent), followed by monthly (14 percent). Four departments had some combination of training that was more frequent than monthly, with one department indicating twice weekly training (Table 5.14).

Table 5.14 How often does your department schedule training sessions?

Answer Choices	Responses	
Weekly	57.14%	12
Bi-weekly	9.52%	2
Monthly	14.29%	3
Twice per year	0.00%	0
Quarterly	0.00%	0
Other (please specify)	19.05%	4

Challenges Facing Department

A major question on the survey asked about the degree of challenge associated with various aspects of fire service management (Table 5.15). This question seemed to result in a more candid response than some of the earlier questions. The greatest challenges were identified as staffing (46 percent of departments indicating it as a challenge or major challenge); member recruitment (54 percent indicating a major challenge or challenge); member retention (34 percent indicating challenge); specialized services (30 percent challenge); and budget (58 percent indicating major challenge or challenge).

Table 5.15 Challenges Facing Departments

	Major Challenge		Challenge		Stable		Good		Excellent	
Staffing	23.08%	6	23.08%	6	42.31%	11	7.69%	2	3.85%	1
Member recruitment	34.62%	9	19.23%	5	38.46%	10	7.69%	2	0.00%	0
Member retention	11.54%	3	23.08%	6	46.15%	12	15.38%	4	3.85%	1
Apparatus	7.69%	2	0.00%	0	61.54%	16	19.23%	5	11.54%	3
Equipment	3.85%	1	7.69%	2	57.69%	15	23.08%	6	7.69%	2
Specialized Services	7.69%	2	23.08%	6	50.00%	13	19.23%	5	0.00%	0
Budget	23.08%	6	34.62%	9	38.46%	10	3.85%	1	0.00%	0
Recruit training	3.85%	1	15.38%	4	65.38%	17	15.38%	4	0.00%	0
Specialized Training	0.00%	0	26.92%	7	61.54%	16	11.54%	3	0.00%	0
Drills	0.00%	0	7.69%	2	69.23%	18	19.23%	5	3.85%	1
Fire Facility Maintenance	3.85%	1	11.54%	3	73.08%	19	3.85%	1	7.69%	2

The greatest strengths were apparatus and equipment, reported at about 30 percent "good" or "excellent."

These responses indicate that widely held perceptions are shared by the fire chiefs. Staffing is a challenge and budgets are also difficult, with only one department indicating "good" when asked their budget.

To reinforce the ability to recruit members, we asked the question, "How many new members have joined your department since January 2015?" Fifteen departments answered the question, with answers ranging from 0 to 26 members. The average number among the 15 departments was 10.5 new members since 2015.

Perhaps the most important data gathered in the department survey was the current number of members of each department. The survey explicitly asked to identify "active" members, "members participating in service delivery," and "interior firefighting certified members." Most departments responded to the question in its entirety.

Table 5.16 shows the results. The number of active members ranges from a low of seven members in Huger, to a high of 62 in Goose Creek Rural. In terms of interior certified firefighters, the numbers ranged from a low of three in Alvin to a high of 53 in Goose Creek Rural. Several departments did not respond to this part of the question. It should be noted that six departments indicated fewer than 8 interior-certified members, meaning that it is unlikely that a four-person crew could be assembled to enable an initial structural fire interior attack without reliance on outside resources. This assumes that 50 percent of members attend each alarm.[11]

[11] Ideally, this would be confirmed with SCFIRS reporting, but that was not always available or complete.

Table 5.16 Department staffing numbers

Department	Active Members	Members Participate	Interior Certified	Stations
Alvin	14		3	1
Berkeley County Rescue Squad	23		N/A	1
Bonneau	14		10	1
C & B	50	35	35	3
Cainhoy	21		17	4
Caromi	18	18	15	1
Cordesville	13		4	2
Cross	13		8	3
Eadytown	10		6	1
Forty-One	13			1
Goose Creek Rural	62	58	53	2
Huger	7			1
Jamestown	10		6	2
Lake Moultrie	29		17	2
Lebanon	11		9	1
Longridge	9			
Macedonia	28		25	3
Moncks Corner Rural	31		15	3
Pimlico	14 Career, 28 Volunteer		7	2
Pine Ridge	51	40	36	2
Pineville Russellville	19			1
Sandridge-Pringletown	12		7	3
Santee Circle	12	10	10	2
Shulerville-Honey Hill	8		5	2
St. Stephen	20			1
Whitesville[12]*	52	25	44	2

Methodology issues on coding data were noted in the following text box.

[12] Whitesville indicated that they had 44 interior certified members, but only 25 that participate in service delivery. They also reported a total of 52 members.

Department Survey – Data Entry Reporting Details

The following surveys were completed by our staff off data accumulated through the written onsite assessments and/or interview notes: Eadytown; Macadonia; Forty-One; Pineville – Russellville; St. Stephen; Pimlico; Bonneau; Longridge; and Lebanon.

The following determinations were made:

Question "Does your department provide any specialized services?" All departments were noted as having EMS as a specialization. If not noted explicitly, other determinations were made based on type of trucks in inventory [e.g., rescue or squad trucks = vehicle extrication, brush = other, water rescue = water rescue]

Question "Please summarize your department's trends." If data was not available, "unchanged" was selected.

Question "Please rate the following with regard to their degree of challenge to your department." If data was not available "stable" was selected.

5.9 Individual Member Surveys

Member attitudes were assessed through an online survey. Notification of the survey was accomplished through letters and emails sent via each department's Chief and the Chief's Association. This survey was made available at the web domain firestudy.net. We received 51 responses, representing 15 departments. Eight departments had only one response, possibly indicating that the Chief may have been the only respondent. The largest number of responses came from Whitesville and Moncks Corner Rural, with 12 and 11 responses, respectively. Remaining participating departments had less than five responses.

Ninety-six percent of respondents indicated that they were active members. The respondent pool was 83 percent male, with eight respondents indicating they are female.

The following twelve departments did NOT have any responses to the member survey:

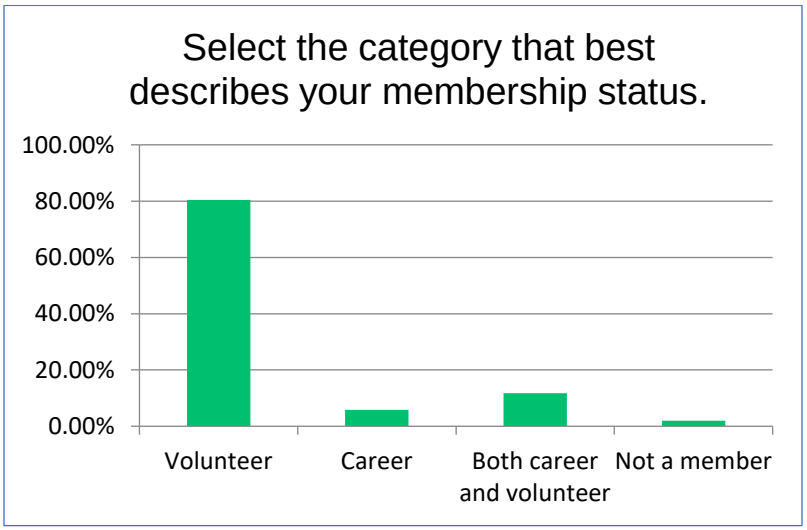
Berkeley County Rescue Squad	Pimlico
Sandridge-Pringletown	Pineville Russellville
St. Stephen	Forty One
Macedonia	Cordesville
Huger	Cainhoy
Shulerville-Honey Hill	

The effect of these missing departments on the overall results weakens the reliability of the survey, and likely reflects weakness in internal department communication, discomfort with completing online surveys, or unwillingness to participate. Due to the lack of data from missing departments, *these results should not be viewed as representative of the entire county's firefighters*.

Member status

Eighty percent of the respondents were volunteers exclusively. Another 12 percent were career and volunteer, and six percent were career firefighters exclusively. One respondent indicated that they were not a member (Figure 5.9).

Figure 5.9 Member Survey "Member Status"



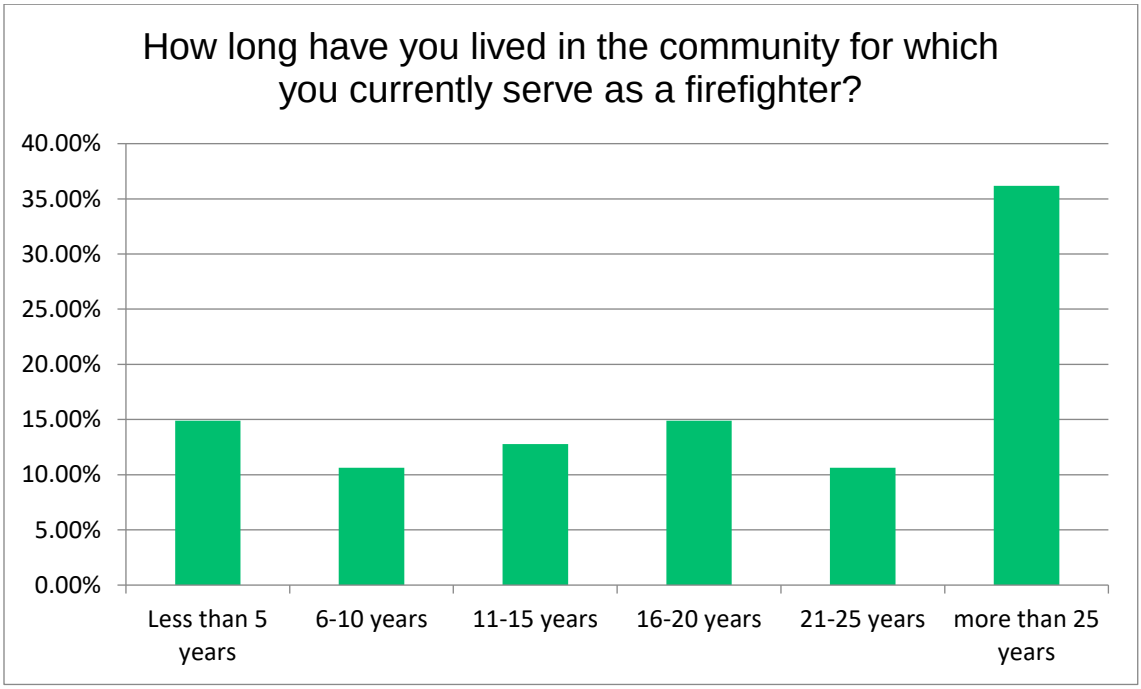
Residence in service area

We asked if members lived in the service area of their primary department. Seventy-six percent indicated that they lived in their department's primary service area. Eleven respondents indicated that they did not. It is not clear if these were career firefighters who interpreted the question as applying to their career job, or if all these responses were from volunteers. It is not unheard of for volunteers to remain active with their departments even after they move outside the district.

How long have you lived in community?

To understand the community ties among the members, we asked how long they had lived in their current fire district. Figure 5.10 shows the distribution of answers, ranging from "less than five years" to "over 25 years." The most common category was "over 25 years", which applied to 36 percent of respondents. All other ranges were in the 10 to 15 percent category, reinforcing the notion that the fire department members are closely connected to their communities.

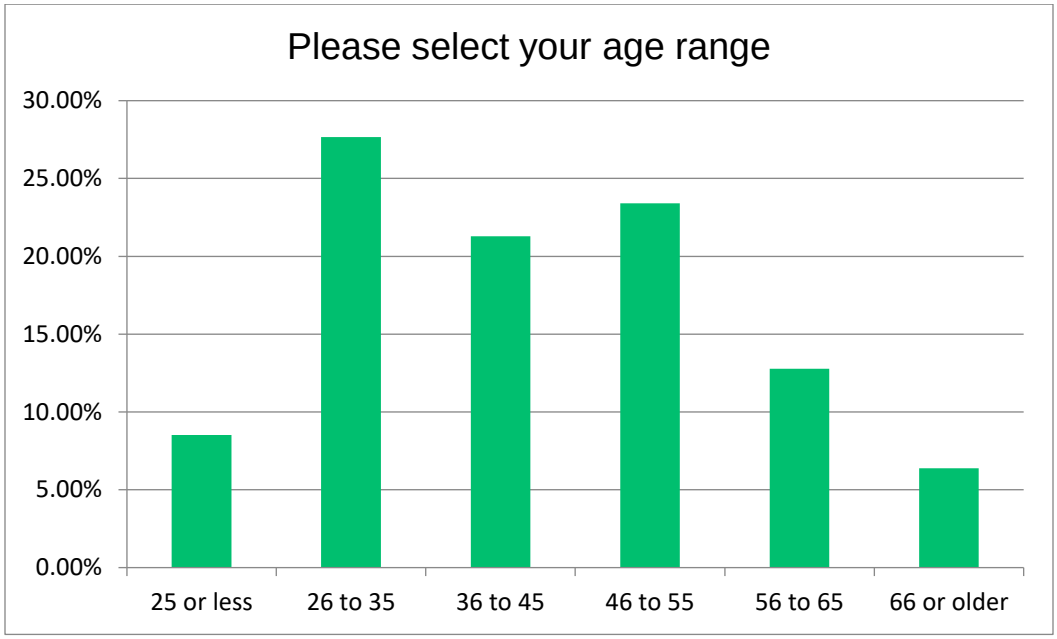
Figure 5.10 How long have you lived in your district?



Age

We asked the age of members to understand long-term trends in membership (Figure 5.11). In particular, a large cohort of senior members may indicate that their numbers will shrink as age advances and physical demands of firefighting may become too taxing. The most common age range was 26 to 35 years old. Other ranges seemed fairly uniformly distributed. Interestingly, only 6.4 percent of respondents indicated that they were age 66 or older. Whether this age range is more a product of younger member's comfort in completing an online survey, or due to limited participation by the older members, is unknown.

Figure 5.11 What is your Age?



Years of experience

We asked about years of firefighting experience (Table 5.17). To capture the possibility that members had served in more than one fire department, we allowed them to answer for their current department, and for total fire service experience. Seventy percent of department members had between six and 20 years of experience in their current departments. For total experience, over 28 percent of members had 26 or more years, with 76 percent having more than 11 years of experience. These results indicate that there is mobility between fire departments.

Table 5.17 Years of Experience

Years of Experience	Current Department	Total Fire Service Experience
Less than 1	8.7%	0
1-5	21.7%	9.5%
6-10	15.2%	11.9%
11-15	15.2%	26.2%
16-20	21.7%	11.9%
21-25	10.9%	11.9%
26 or more	6.5%	28.6%

Employment status

Over 85 percent of members are employed, with only 12 percent indicating they were retired (Table 5.18). This reflects consistently with the age distribution of respondents.

Table 5.18 What is your employment status?		
Answer Choices	Responses	
Employed	85.11%	40
Retired	12.77%	6
Seeking employment	2.13%	1

Ability to attend alarms from work

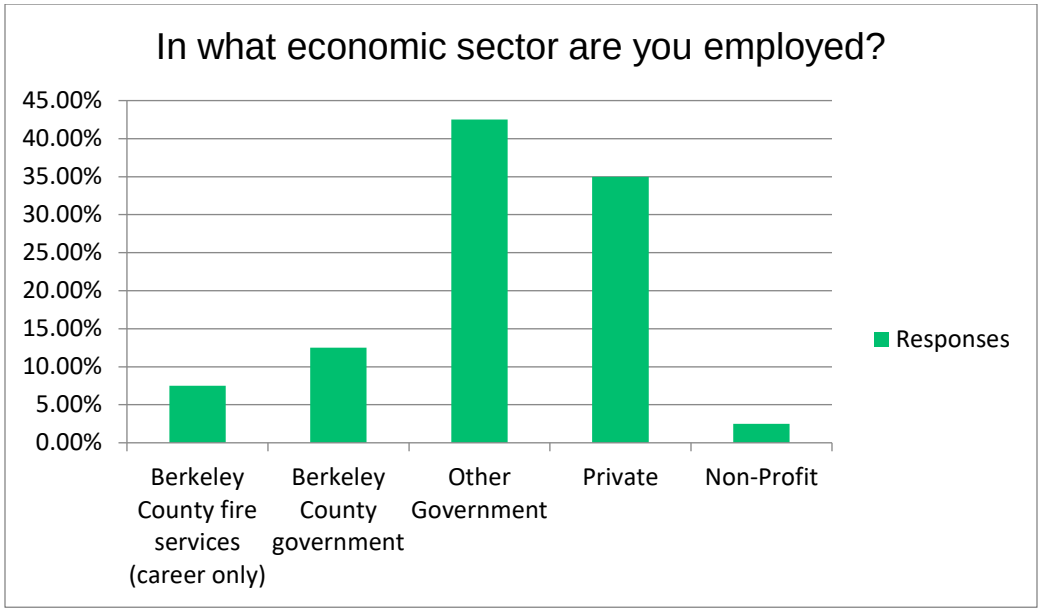
Availability during work hours is an important consideration for volunteer response. We noted that of the 40 members who were employed, 74 percent stated that they were unable to respond to calls while at their job (Figure 5.12). This reflects national trends.

Figure 5.12 Ability to Respond from Work

Where are you employed?

Of the 40 employed members who responded to the survey, 23 are employed in non-firefighting positions in Berkeley County or another government agency. One-third of respondents were employed in the private sector (Figure 5.13).

Figure 5.13 Employment Sector



Training level

We asked members to report their training level. The choices corresponded to national standards, which implied compliance with the standards. The responses showed a high level of training; however, since these training levels build on one another, we would expect that the percentages would drop as we moved to higher levels. Some 52 percent of members indicated that they had specialty training above the operations level (Table 5.19). This corresponds to in-depth training that would be required for participation in a team.

Table 5.19 Describe your current training level (check all that apply)		
Answer Choices	Responses	
Interior firefighter (NFPA Firefighter I)	60.87%	28
Interior firefighter (NFPA Firefighter II)	71.74%	33
Medical First Responder	73.91%	34
Apparatus driver (any fire apparatus)	86.96%	40
Fire officer (NFPA Officer I)	50.00%	23
Fire officer (NFPA Officer II)	15.22%	7
Fire officer (NFPA Officer III or greater)	8.70%	4
Specialty training (Rescue Technician, Haz Mat (above Operations Level))	52.17%	24

Rank

Of the respondents, 30 percent were firefighters, while 28 percent were line officers and four percent were chief officers. This reinforces our assumption that chief officers were overrepresented in the survey.

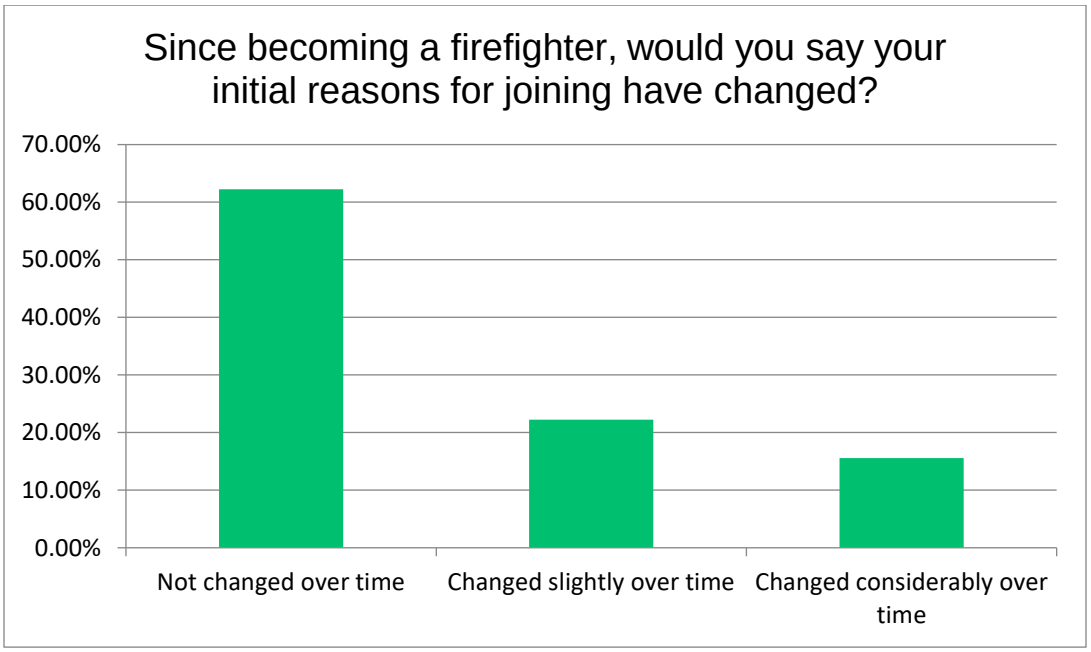
Reasons for joining

We asked for the top three reasons for joining the fire department. The top three reasons for joining were:

- Wanting to help people in times of emergency
- Wanted to be a part of a firefighter community
- Family connections

These reasons are consistent with findings of our studies in other communities. We followed up to ask if those reasons had changed over time. While 60 percent indicated that the reasons had not changed, 22 percent indicated that they had changed slightly, and 16 percent stated that the reasons had changed considerably (Figure 5.14).

Figure 5.14 Have Reasons for Joining Changed?



Top three reasons for continuing to be a firefighter

We found that the most popular reasons were:

- Being part of my community

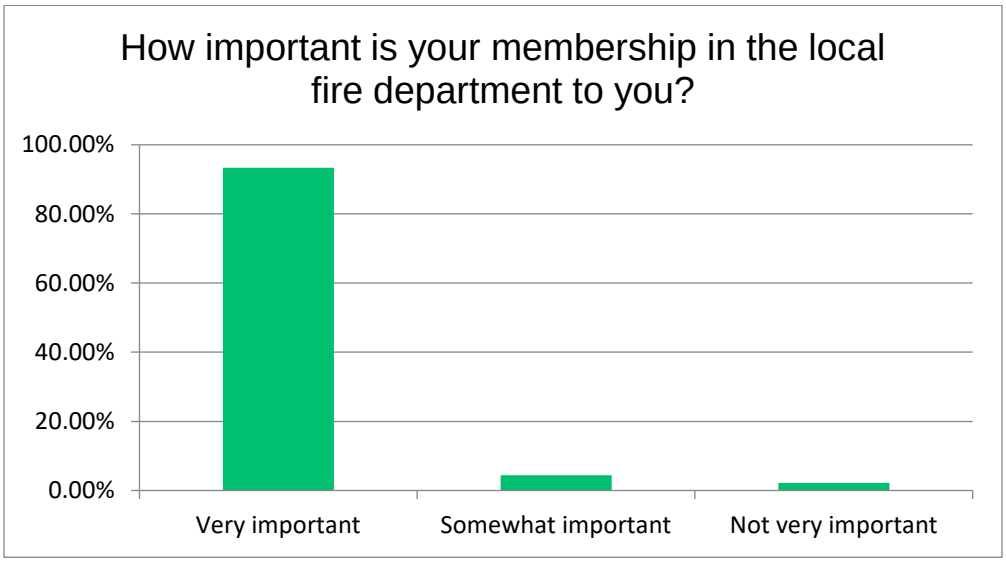
- I enjoy the challenge of applying my skills and experience when volunteering
- The work provides an opportunity to learn new skills and grow as a person

These findings can be important for member retention.

Importance of local Fire Department membership

We asked if membership in their local fire department was important to them. We found that 93 percent stated that it was very important. This suggests that affiliation with and identity of their local department is important.

Figure 5.15 Importance of Local Fire Department Membership



Next, we asked about threats to volunteer participation.

Factors that come between membership and volunteering

We asked about those factors that were most important in limiting volunteer activity. The top three responses were:

- Work related time constraints
- Working too many hours
- Limited time due to family/home related responsibilities

These are as expected. Limited time due to family and work commitments is consistent with national experience. We next asked about factors within the fire department that could limit volunteering.

Top three factors <u>inside</u> your department that come between you and volunteering

The top three responses were related to training demands, company responsibilities, and concerns about the future of the department.

- Training demands
- Company responsibilities/commitments
- Concerns about future of department

Company demands apply to administrative requirement and non-emergency duties, such as meetings and work details. Concerns about the future of the department suggest concerns about internal department management. This question was answered by only 32 respondents, meaning that 19 left it blank. This suggests that those respondents did not feel there were significant internal challenges to volunteering.

Concerns about future of your local department

The large number of choices with no response, and the 18 percent of responses indicating "no concerns" are positive signs (Table 5.20). However, it was clear that funding was a major concern, with 47 percent of respondents indicating that budgetary issues were threatening the future of their departments. The second highest response was "not enough volunteers" at 22 percent. Two respondents expressed concern about inadequate screening of new members.

Table 5.20 Currently, what are your concerns about the future of your local department?		
Answer Choices	Responses	
I have no concerns	18.18%	8
Communication should be more two-way or open	2.27%	1
My input is not valued	0.00%	0
My contribution/accomplishments are not recognized	0.00%	0
Conflicts are not addressed openly	0.00%	0
Conflicts are not addressed in a timely manner	2.27%	1
Awards are distributed unevenly	0.00%	0
New volunteer selection is not scrutinized enough	4.55%	2
Shortage of officers	0.00%	0
Inadequate financial resources	47.73%	21
Not enough volunteers	22.73%	10
Other reasons not listed above	2.27%	1
	Answered	44

The next set of questions sought to gather evaluative information on their experience with their department, other departments, and the county's fire service as a whole.

Long term outlook and openness to change

We presented a series of statements and asked whether members agreed or disagreed. We asked about the 10-year outlook for the volunteer system in Berkeley County Fire Services generally, and also about their individual agency. Opinions were split on the volunteer system, with 55 percent agreeing the system will be strong. For their individual departments, opinions were more positive, at 64 percent agreeing (Table 5.21).

Table 5.21 For both your local department and the Berkeley County Fire Services overall, please answer the following statement as Agree or Disagree.

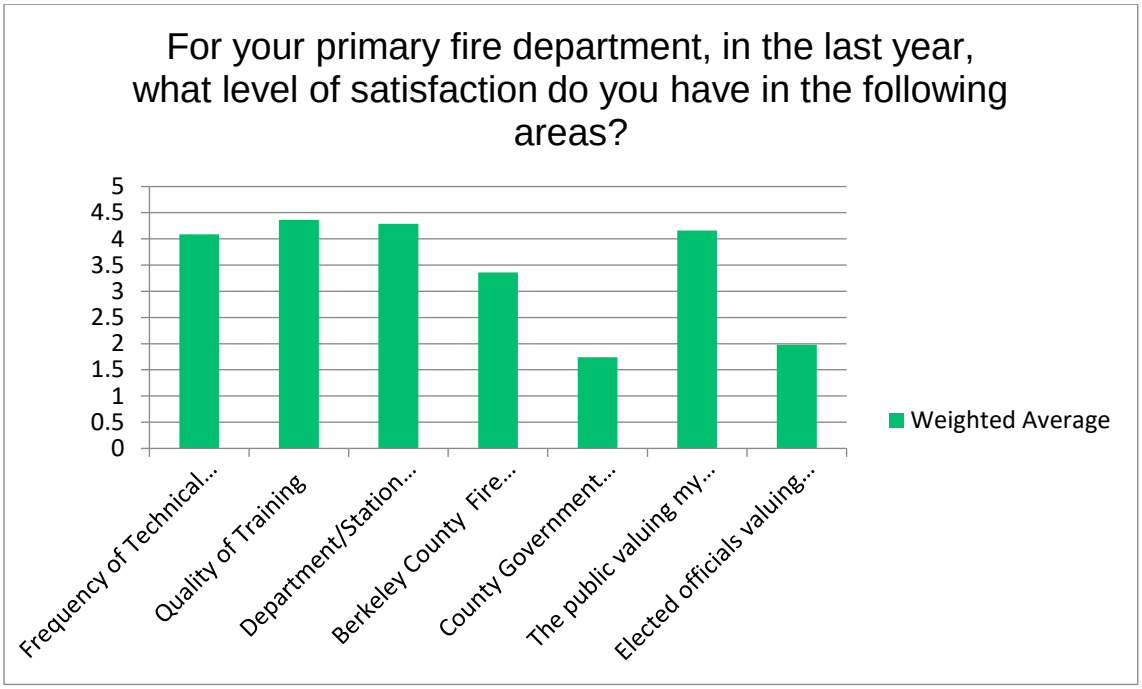
	Agree		Disagree	
In 10 years, the volunteer system in the Berkeley County will be strong.	54.55%	24	45.45%	20
In 10 years, my local community's volunteer participation will be strong.	63.64%	28	36.36%	16
The County's fire departments need to improve cooperation, even if it means reducing the amount of apparatus, moving or consolidating a fire station, and/or merging Departments.	59.09%	26	40.91%	18
The current arrangements in the Berkeley County Fire Services are working well and can continue for another ten years without major change.	31.82%	14	68.18%	30
The current operation of my local fire department is working well and can continue for another ten years without major change.	65.91%	29	34.09%	15

We next asked to assess agreement with the following statement: "The county's fire departments need to improve cooperation, even if it means reducing the amount of apparatus, moving or consolidating a fire station, and/or merging Departments." This statement was intended to assess the openness to change of the memberships. Fifty-nine percent of those responding agreed. This is encouraging, especially given that the responses were so heavily weighted by chiefs, who theoretically have the most to lose in potential consolidations or mergers.

Along the same lines, only 32 percent of respondents agreed that "current arrangements are working well and could continue without major change." However, when the same question was asked about their individual department, the responses reversed, with 66 percent agreeing that their departments were not in need of change.

The next question asked about satisfaction along a five point scale. These statements were applied to their *individual fire department*. A series of statements or areas were listed, and respondents indicated their level of satisfaction. The lowest level of satisfaction was shown for "County government valuing my service," followed by "Elected officials valuing my service." In each of these questions, over 70 percent of respondents indicated being either "somewhat dissatisfied" or "highly dissatisfied." Figure 5.16 shows this data. This illustrates a contentious relationship and a perception that the county's staff and elected officials do not recognize the service delivered by the volunteers and their departments.

Figure 5.16 Primary Fire Department satisfaction



Survey respondents were most pleased with department requirements, and the public valuing their service (Table 5.22).

Table 5.22 Primary fire department satisfaction.

For my primary fire department, in the last year, what level of satisfaction do you have in the following areas?														
	Highly Satisfied		Somewhat Satisfied		Neither Satisfied or Dissatisfied		Somewhat Dissatisfied		Highly Dissatisfied		N/A		Total	Weighted Average
Frequency of Technical Training	38.6%	17	38.6%	17	15.9%	7	6.8%	3	0.0%	0	0.0%	0	44	4.1
Quality of Training	47.7%	21	45.5%	20	2.3%	1	4.6%	2	0.0%	0	0.0%	0	44	4.4
Department/ Station Requirements	43.2%	19	38.6%	17	11.4%	5	2.3%	1	0.0%	0	4.6%	2	44	4.3
Berkeley County Fire Service Requirements	23.3%	10	14.0%	6	25.6%	11	11.6%	5	9.3%	4	16.3%	7	43	3.4
County Government valuing my service(s)	4.6%	2	9.1%	4	6.8%	3	13.6%	6	63.6%	28	2.3%	1	44	1.7
The public valuing my service(s)	45.5%	20	36.4%	16	11.4%	5	2.3%	1	4.6%	2	0.0%	0	44	4.2
Elected officials valuing my service	6.8%	3	11.4%	5	6.8%	3	20.5%	9	52.3 %	23	2.3%	1	44	2.0

The same questions were repeated this time in regard to *Berkeley County fire services generally*. A similar pattern of responses was observed, with nearly identical negative ratings with regard to county government and elected officials valuing service. Highest ratings were received for quality of training, station requirements, and the public valuing service (Table 5.23).

Table 5.23 Berkeley County Fire Service satisfaction

For Berkeley County fire services generally, in the last year, what level of satisfaction do you have in the following areas?														
	Highly Satisfied		Somewhat Satisfied		Neither Satisfied or Dissatisfied		Somewhat Dissatisfied		Highly Dissatisfied		N/A		Total	Weighted Average
Frequency of Technical Training	22.7%	10	34.1%	15	20.5%	9	9.1%	4	6.8%	3	6.8%	3	44	3.61
Quality of Training	27.3%	12	43.2%	19	4.6%	2	11.4%	5	6.8%	3	6.8%	3	44	3.78
Department/Station Requirements	20.5%	9	31.8%	14	27.3%	12	4.6%	2	2.3%	1	13.6%	6	44	3.74
Berkeley County Fire Service Requirements	15.9%	7	18.2%	8	27.3%	12	25.0%	11	4.6%	2	9.1%	4	44	3.18
Berkeley County Government valuing my service(s)	6.8%	3	4.6%	2	9.1%	4	18.2%	8	54.6%	24	6.8%	3	44	1.83
The public valuing my service(s)	34.9%	15	34.9%	15	14.05%	6	4.7%	2	7.0%	3	4.7%	2	43	3.9
Elected officials valuing my service	4.6%	2	9.1%	4	9.1%	4	20.5%	9	50.0%	22	6.8%	3	44	1.9

The final question was devoted to understanding perceptions of inter-departmental relations within the county. Good ratings were received for questions concerning relationships at both emergency scenes and non-emergencies within the fire departments. Most encouraging, 59 percent of respondents strongly agreed and 25 percent agreed that they saw a continuing role for themselves in the county's fire service (Table 5.24). These findings are encouraging and indicate there is a reservoir of goodwill among the respondents with regard to service improvements.

Table 5.24 Interdepartmental relations and continued service

Please indicate your agreement with the following statements.												
	Strongly Agree		Agree		Neither Agree nor Disagree		Disagree		Strongly Disagree		Total	Weighted Average
At emergency scenes, relations between firefighters of different departments are generally good.	56.8%	25	38.6%	17	4.6%	2	0.0%	0	0.0%	0	44	4.5
At non-emergency scenes and in administrative matters, relations between firefighters of different departments are generally good.	43.2%	19	38.6%	17	9.1%	4	9.1%	4	0.0%	0	44	4.2
Relations between departments are positive.	44.2%	19	44.2%	19	9.3%	4	2.3%	1	0.0%	0	43	4.3
Relations between my department's officers and firefighters are positive.	47.7%	21	43.2%	19	4.6%	2	4.6%	2	0.0%	0	44	4.3
I see a continuing role for myself in the future of the County's fire service.	59.1%	26	25.0%	11	9.1%	4	2.3%	1	4.6%	2	44	4.3

Free form comments were included with the survey. An open format question allowed survey participants to provide anonymous responses. Seventeen members responded. Their comments were summarized thematically in the following Table 5.25.

Table 5.25 Major themes from free-form comments

Theme	Percentage	Number
Funding	47.1%	8
Better oversight	17.7%	3
No change	17.7%	3
Takeover only weak departments	17.7%	3
County takeover	5.88%	1

Increased funding: The largest percentage of responses reinforced the need to improve funding for the departments.

Better oversight: Three comments related to improved oversight of performance, finances, and standards.

Approximately 23 percent of the comments advocated that the county take over those small departments that are struggling.

Only three respondents said that the current system was fine as is and needed no major change.

Despite some contradictory answers, the surveys reveal several key findings. Funding is a major concern among both departments and members. Staffing concerns are a problem in many departments, though they are assessed as being more serious across the system than in individual agencies. While there is resistance to the idea of a full county takeover, one-quarter of the members surveyed indicated their agreement that the county should consider making changes in those (generally smaller) fire departments that are struggling to provide service. There is also acknowledgment of the need for greater oversight.

The respondents appear to be willing to use resources to improve service delivery. The need for additional support for staffing needs points to a challenge of where and how to invest to assure the effective use of these resources.

The small number of participants in the member survey limited the certainty with which we can generalize these findings across the entire volunteer fire service.

6. County-wide Assessment

This chapter presents our assessment of the County's fire services with respect to the areas of operations documented previously. We also present the current situation and identify areas for improvement or change. The next chapter will discuss specific recommendations.

6.1 Budgets

The funding for fire services in the 26 rural fire districts is based on a service fee authorized by the County Council and divided among the fire departments serving the districts, based upon the property and land area protected. The County Council passed the current "Special Fire Tax" for rural fire tax district in 2015 (Bill 15-08). The funding formula imposes a fee based on the number of residential units on a property at a rate of $70/year per unit.

Table * Fire Tax Fees

Residential Units -- $70/year/residential unit	
Non-residential units	
< 3,000 square feet	$80
3001 – 5000 square feet	$118
5001—10,000 square feet	$237
10,001-20,000 square feet	$316
20,001 square feet and above	$631, plus $16 per additional 1000 square feet.
Maximum of $8,832 for a structure greater than 532,000 and less than 1,000,000 square feet	
Maximum for structures greater than 1,000,000 square feet shall not exceed $10,514	
Unimproved lots and land	
< 15 acres	$10
15-70 acres	$25

A portion of the fire tax revenues is set aside for a "pooled fund." This pooled fund is designed to be used to provide a minimum funding level for fire departments serving small numbers of taxable properties, with revenues deemed to be inadequate to maintain a viable operation. The pooled fee is

defined as 12.5 percent of the first $70 of residential rate; for non-residential properties ($8.75) and 12.5 percent of the entire uniform service fee.

Prior to FY 2015-2016, some general fund monies were directed to support fire rural services. This was discontinued with an expectation that these costs should be supported solely by the special fire tax.

At present, the minimum funding for a fire department is considered to be roughly $50,000 annually. Only $30,000 is held as reserve in case of emergency needs within a fire department, ending the past practice of permitting fire departments to apply competitively for funding of specific projects. This process was not well-regarded by many departments; concerns were voiced about perceived unfairness or burdens of participating in the process.

As we see in Table 6.1, the special fire tax raised about $4.7 million in FY2016. This growth in revenues of more than $1 million since FY2010 is impressive, but attributable mostly to increased development. We should also remember that this funding applies only to those areas outside the municipalities of Charleston, Goose Creek, Hanahan, and the Town of Moncks Corner. Therefore, this funding does not provide services to some of the most heavily populated areas of the county.

Additional funding from donations and any state grant funds are not included in these totals.

We can see that funding varies widely by district. There are effectively several tiers of departments in terms of their funding. Nine departments (35 percent) receive less than $75,000; another six (23 percent) receive between $76,000 and $125,000; four (15 percent) receive between $125,000 and $250,000 and the remaining six (23 percent) receive more than $250,000. The highest budget goes to the Whitesville District and Goose Creek Rural districts, roughly $590,000.

Table 6.1 Fire District Budgets FY 2010-FY2016

Fire Departments	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Alvin	$58,002.00	$58,895.00	$59,168.00	$57,924.00	$58,070.00	$69,030.00	$76,219.73
Bonneau	$63,213.96	$56,552.00	$59,356.89	$ 62,694.88	$59,174.93	$75,698.50	$70,643.74
C & B	$335,217.02	$339,268.25	$351,331.26	$346,657.72	$346,413.53	$346,296.22	$372,745.12
Cainhoy	$171,798.00	$179,309.78	$183,987.78	$190,692.14	$192,488.29	$200,414.21	$241,963.06
Caromi	$256,708.14	$257,457.05	$269,022.24	$243,928.36	$245,100.32	$255,451.35	$281,180.87
Cordesville	$70,119.16	$ 63,648.80	$63,548.21	$66,693.67	$66,143.26	$64,696.65	$73,532.99
Cross	$162,563.78	$154,788.88	$149,287.00	$163,739.29	$148,721.36	$156,405.57	$157,616.02
Eadytown	$82,546.00	$70,151.00	$73,036.32	$78,659.56	$69,770.82	$72,266.35	$88,761.22
Forty-One	$59,660.00	$57,961.00	$59,550.00	$61,124.00	$58,234.00	$67,678.44	$68,676.73
Goose Creek Rural	$512,151.99	$510,139.25	$474,256.00	$523,778.16	$522,578.63	$520,012.45	$587,905.74
Huger	$64,921.00	$65,373.00	$67,501.00	$69,204.00	$66,041.00	$67,635.00	$73,929.73
Jamestown Rural	$58,113.00	$67,707.00	$53,999.00	$69,999.00	$69,510.00	$56,730.33	$64,555.85
Lake Moultrie	$95,626.53	$82,998.07	$81,262.15	$79,807.00	$79,635.49	$88,015.38	$90,477.78
Lebanon	$75,168.39	$53,878.00	$54,283.00	$54,345.00	$56,024.00	$62,670.00	$63,790.73
Longridge	$48,148.00	$48,507.00	$48,921.00	$49,459.00	$48,358.00	$48,907.00	$55,613.73
Macedonia	$97,112.00	$100,822.02	$115,474.31	$100,168.67	$101,454.68	$132,147.07	$113,089.35
Moncks Corner Rural	$265,108.79	$250,870.27	$250,587.31	$256,876.56	$249,606.61	$252,330.64	$269,163.71
Pimlico	$89,422.75	$108,846.00	$98,749.31	$111,885.44	$111,732.83	$120,748.26	$135,476.53
Pine Ridge	$476,516.23	$487,901.12	$510,454.71	$504,969.70	$503,107.31	$488,124.36	$543,101.42
Pineville/Russellville	$90,393.29	$92,053.96	$98,291.26	$92,126.18	$89,041.68	$94,130.60	$98,532.64
Pringletown	$15,338.00	$16,927.00	$15,573.00	$16,731.00	$15,961.00	$15,759.00	$38,582.01
Sandridge	$101,857.25	$101,391.00	$102,979.98	$110,333.92	$101,184.98	$114,971.41	$109,846.33
Santee Circle	$72,907.83	$63,429.00	$64,502.80	$4,063.08	$65,626.80	$66,484.71	$69,362.73
Shulerville/Honey Hill	$42,783.00	$43,578.00	$42,993.00	$43,351.00	$42,678.00	$65,693.00	$74,378.73
St Stephen	$83,164.00	$96,201.63	$85,861.29	$100,168.31	$91,129.77		$102,831.99
Whitesville	$432,029.24	$425,230.65	$454,963.28	$455,597.94	$484,051.58	$524,763.49	$591,590.46
Fire Board Commission	$7,838.00	$58,900.00	$58,900.00	$77,000.00	$33,493.46	$33,000.00	$33,000.00
Fire Board Travel	$570.00	$570.00	$570.00	$570.00	$310.81	$750.00	$750.00
Fire Board Other	$6,650.00	$6,650.00	$6,650.00	$6,650.00	$6,567.08	$6,000.00	$6,000.00
Unimproved Land Fees	$ -	$ -	$ -	$ -	$143,288.00	$152,806.00	$158,161.00
Total	**$3,895,647.35**	**$3,920,004.73**	**$3,955,060.10**	**$4,059,197.58**	**$4,125,498.22**	**$4,219,615.99**	**$4,711,479.94**

Source: Berkeley County Finance

Table 6.2 - District Funding Compared with Population Served, Calls for Service, and Active Members

Fire Departments	FY 2016	Population	Budget/ Person	Calls	Budget/ Call	Active Members	Budget/ Member
Alvin	$76,220	1292	$59	93	$820	14	$5,444
Bonneau	$70,644	746	$95	175	$404	14	$5,046
C & B	$372,745	10253	$36	1535	$243	50	$7,455
Cainhoy	$241,963	5301	$46	364	$665	21	$11,522
Caromi	$281,181	10527	$27	784	$359	18	$15,621
Cordesville	$73,533	1547	$48	136	$541	13	$5,656
Cross	$157,616	3936	$40	532	$296	13	$12,124
Eadytown	$88,761	1173	$76	124	$716	10	$8,876
Forty-One	$68,677	1258	$55	130	$528	13	$5,283
Goose Creek Rural	$587,906	19490	$30	1223	$481	62	$9,482
Huger	$73,930	1630	$45	147	$503	7	$10,561
Jamestown Rural	$64,556	892	$72	107	$603	10	$6,456
Lake Moultrie	$90,478	2113	$43	216	$419	29	$3,120
Lebanon	$63,791	1128	$57	121	$527	11	$5,799
Longridge	$55,614	837	$66	83	$670	9	$6,179
Macedonia	$113,089	2749	$41	268	$422	28	$4,039
Moncks Corner Rural	$269,164	8460	$32	569	$473	31	$8,683
Pimlico	$135,477	2783	$49	226	$599	42	$3,226
Pine Ridge	$543,101	15368	$35	1370	$396	51	$10,649
Pineville/ Russellville	$98,533	1982	$50	275	$358	19	$5,186
Sandridge	$148,428	2809	$53	244	$608	12	$12,369
Santee Circle	$69,363	1516	$46	180	$385	12	$5,780
Shulerville/ Honey Hill	$74,379	864	$86	54	$1,377	8	$9,297
St Stephen	$102,832	2703	$38	478	$215	20	$5,142
Whitesville	$591,590	14201	$42	1419	$417	52	$11,377

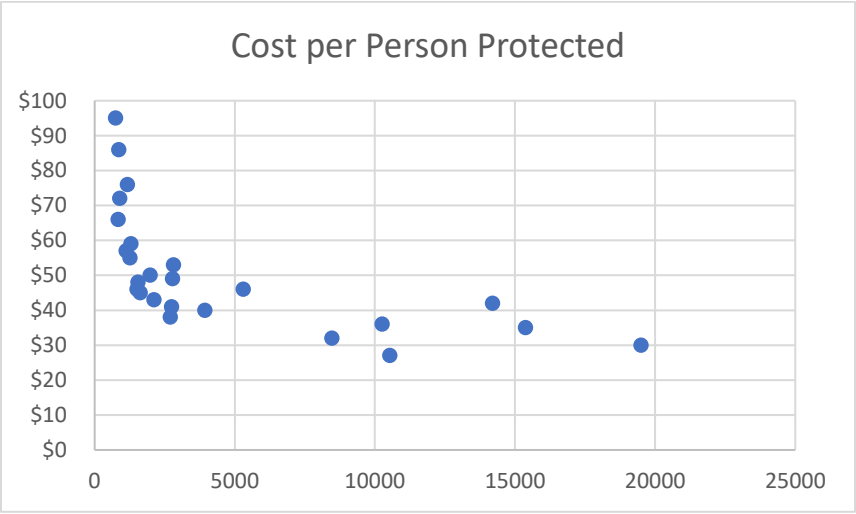
Another way to better understand the funding for fire protection is to examine budgets against population protected, calls for service, and active members (Table 6.2). While this is not definitive, it

provides another point of comparison for budgets across departments. We can see that based on population protected, funding is highest for Bonneau, and lowest for Goose Creek Rural. Since funding is based on largely on housing units, the differences are probably attributable to numbers of commercial properties and differences in persons per dwelling unit.

Next, we examined budgets based on the number of calls for service. This shows the relative investment made on a per-call basis. The high is for Alvin, at $820/call, and the lowest is $215 for St. Stephen. Lastly, we divided budget by the number of active members in each department. We see that values range from a low of $3,120 per member in Lake Moultrie, to a high of $15,621 in Caromi. These differences show that departments have great variation in resources based on the number of active members they sustain.

In Figure 6.1, below, we display the per capita cost for protection based on the population protected. We can see a clear trend of relatively higher costs for small-population districts, and a convergence at $30-$30 per person in the districts with population greater than 7500 people. This suggests that Some of this difference is attributable to providing service over large, sparsely-populated areas. It also suggests economies of scale in providing services.

Figure 6.1 Cost of Service Based on Population Protected



Fire District Debt

A major concern of the County administration is the indebtedness of individual fire departments serving their districts. While there is some reporting requirement on debt, the districts have latitude to encumber debt pursuant to their legal status as non-profit corporations. Disposition of debt is an issue in relation to questions of consolidating districts or dissolving a district are considered.

While the County's annual contract process mandates that Districts provide this information. However, in the documents collected and in our interviews, we were unable to obtain written documentation on terms of indebtedness by each district. We therefore relied in some cases on verbal information provided in interviews,

partial information provided in financial statements, or a combination of both to develop our estimates. Debt information is supposed to be reported to eth County, but this information was absent in many cases.

Table 6.3 presents our best information on debt held by the fire departments. As can be seen, while most departments have modest debt holdings, most of these are related to apparatus purchases. Where large debt exists, facility construction is the most common source. Some departments did not provide debt information, and we were unable to verify this information in our interviews. We address this concern later in the report.

Table 6.3 Berkeley County Fire Districts Debt circa November 2017

Fire District	**Debt (verbal interviews)**	**Debt (records)**
Alvin	Missing	Budget gives no indication of debt
Bonneau	Yes, fire trucks-100k, 3.2 mil. For new fire station	$6-7K shown as debt payment
C&B	$500K, Station 2 and 3 vehicles	$87,821 annual payment
Cainhoy	None	Budget gives no indication of debt
Caromi	$629K	$75,592 annual payment in budget
Cordesville	Less than 25K, 2 payments remaining on an engine	Budget indicates $4,800 monthly payment
Cross	$277,000 for apparatus	$37,355 in annual budget
Eadytown	None	Budget gives no indication of debt
Forty-One	Yes, for new fire station	Budget shows no mortgage
Goose Creek Rural	Missing	$921 interest
Huger	None	Budget shows no mortgage
Jamestown	Missing	$14K annual payment
Lake Moultrie	Less than 50K	
Lebanon	Less than $175K (Building)	Budget shows no mortgage payments
Longridge	26K annual payment, mortgage	Budget
Macedonia	For Brush truck and pumper	$37,775, unknown if total or annual payment
Moncks Corner	$675K	679K mortgage and loans

Pimlico	Missing	34K (possibly 11K remaining)
Pine Ridge	Missing	$184,238
Pineville/Russellville	None	Budget gives no indication of debt
Sandridge/Pringletown	<50K, 2 vehicles	
Santee Circle	$60K apparatus and building	
Shulerville/Honey Hill	None	Budget gives no indication of debt
St Stephen	None	Budget gives no indication of debt
Whitesville	$75K apparatus $3.2 million for new fire station	

6.2 Tax Structure

The County's funding mechanism for fires services in the rural districts is through use of a non-ad valorem tax or assessment, based upon property characteristics other than value. These assessments are based on square footage of property. One advantage of these assessments is that properties that are otherwise tax exempt can help fund service provision.

While this has intuitive appeal, the value of funds raised is not sufficient to support service delivery in less-developed, small population service areas, meaning that the "pooled" funding mechanism must be used to overcome those limitations. This would suggest there are scale problems with the size of fire districts, or that the fees should be raised.

Another concern with regard to the use of fees is that they are imposed without regard to life risk or population. The incidence of fires is related to population, economic, and demographic characteristics, and these are almost inversely related to ability to pay for residential properties.[13] Lastly, the value of property at risk is not reflected in payments.

The alternative to this form of tax would be an ad valorem tax, or tax based on the value of real property. The advantage of an ad valorem tax is that it automatically captures the effects of property value increase and tracks more closely, in theory, with the ability to pay. In the case of fire protection, this form of tax has some intuitive benefit because the value of a property reflects the dollar value at risk. Thus, the value of the service is in direct proportion to the value of property being protected. It has been

[13] U.S Fire Administration. *Socioeconomic Factors and the incidence of Fire*. FA 170, June 1997.

suggested that a combination of the two taxes may be most beneficial in more effectively reaching those who benefit from the service.[14]

Grants

The fire departments in the County have been very successful in applying for and receiving FEMA Fire Act grants. These grants support purchase of equipment, including vehicles, personal protective equipment, fitness, and firefighting equipment. Notably, an analysis of these grants has shown that rural fire departments received five vehicles over the past five years, with total funds coming to these department in excess of $2.2 million (Table 6.4). These grants have enabled departments to acquire high-quality, new apparatus without having to borrow.

The success in securing grants speaks to skill in grant preparation that should be harnessed in Countywide efforts.

[14] Moeller, Bruce J. "Fiscal Management" in Thiel and Jennings, Eds. *Managing Fire and Emergency Services.* Washington, DC: International City/County Management Association, 2012.

Table 6.4 FEMA Assistance to Firefighters Grants FY2011-FY2015

Department	Grant Category	Grant Amount	Total Project	Date
Lake Moultrie Fire Department	Operations and Safety	$63,058.00	Equipment ($62,876)	1/4/2013
C & B Volunteer Fire Department	Operations and Safety	$160,512.00	Personal Protective Equipment ($168,960)	2/3/2012
Eadytown Rural Volunteer Fire Department	Vehicle Acquisition	$246,050.00	Vehicle Acquisition ($248,000)	2/17/2012
Whitesville Rural Volunteer Fire Department	Operations and Safety	$42,750.00	Equipment ($18,000) || Personal Protective Equipment ($27,000)	2/24/2012
Moncks Corner Rural Fire Dept.	Operations and Safety	$86,640.00	Personal Protective Equipment ($91,200)	1/4/2013
Macedonia Rural Volunteer Fire Department	Operations and Safety	$27,916.00	Equipment ($25,885)	1/18/2013
Jamestown Rural Fire Department	Operations and Safety	$97,603.00	Equipment ($28,640) || Personal Protective Equipment ($74,100)	2/8/2013
Eadytown Rural Volunteer Fire Department	Operations and Safety	$66,410.00	Equipment ($69,905)	3/29/2013
Jamestown Rural Fire Department	Vehicle Acquisition	$273,600.00	Vehicle Acquisition ($260,000)	4/5/2013
C & B Volunteer Fire Department	Operations and Safety	$53,979.00	Equipment ($56,820)	4/12/2013
Goose Creek Rural Fire Department	Operations and Safety	$198,196.00	Equipment ($99,667) || Training ($54,560) || Wellness and Fitness Programs ($44,400)	4/12/2013
Lake Moultrie Fire Department	Operations and Safety	$17,666.00	Personal Protective Equipment ($17,175)	4/24/2015
Pine Ridge Fire Department	Operations and Safety	$231,620.00	Personal Protective Equipment ($243,200)	4/24/2015
City of Goose Creek Fire Department	Operations and Safety	$179,728.00	Equipment ($197,700)	7/3/2015
Cordesville Rural Volunteer Fire Department	Vehicle Acquisition	$236,191.00	Vehicle Acquisition ($240,000)	7/10/2015
Cordesville Rural Volunteer Fire Department	Operations and Safety	$24,381.00	Equipment ($23,600)	9/11/2015
Moncks Corner Fire Department	Combination	$155,429.00	Personal Protective Equipment ($163,200)	6/17/2016
Macedonia Rural Volunteer Fire Department	Vehicle Acquisition	$380,953.00	Vehicle Acquisition ($350,000)	7/8/2016
Pine Ridge Fire Department	Combination	$76,191.00	Vehicle Acquisition ($80,000)	8/26/2016
Santee Circle Volunteer Fire Department	All volunteer	$12,960.00	Personal Protective Equipment ($12,600)	9/2/2016

Table 6.5 Population by Fire District Components and Civil Divisions (excludes major water bodies)

Fire Department	Square Miles	Population	Population Density	Share of Total
ALVIN	32.64	1,292	39.59	0.7%
BONNEAU	10.86	746	68.70	0.4%
C & B	5.02	10,253	2,043.65	5.3%
CAINHOY	72.36	5,301	73.26	2.7%
CAROMI	3.62	10,527	2,904.54	5.4%
CITY OF CHARLESTON (Berkeley County)	40.42	8,642	213.78	4.5%
CITY OF GOOSE CREEK	41.45	36,891	890.10	19.1%
CITY OF HANAHAN	11.53	19,494	1,690.90	10.1%
CORDESVILLE	49.02	1,547	31.57	0.8%
CROSS	80.35	3,936	48.99	2.0%
EADYTOWN	40.93	1,173	28.66	0.6%
FORTY ONE	10.86	1,258	115.78	0.6%
GOOSE CREEK RURAL	30.75	19,490	633.79	10.1%
HUGER	119.21	1,630	13.68	0.8%
JAMESTOWN	59.44	892	15.01	0.5%
LAKE MOULTRIE	2.57	2,096	815.11	1.1%
LEBANON	27.19	1,128	41.50	0.6%
LONGRIDGE	11.31	837	73.96	0.4%
MACEDONIA	69.94	2,749	39.30	1.4%
MONCKS CORNER RURAL	32.83	8,460	257.66	4.4%
PIMLICO	18.84	2,783	147.67	1.4%
PINE RIDGE	34.60	15,368	444.23	7.9%
PRINGLETOWN	25.86	950	36.74	0.5%
RUSSELLVILLE-PINEVILLE	46.89	1,982	42.26	1.0%
SANDRIDGE	37.64	1,859	49.39	1.0%
SANTEE CIRCLE	15.03	1,516	100.86	0.8%
SHULERVILLE-HONEY HILL	89.52	864	9.65	0.4%
ST. STEPHEN	38.77	2,703	69.71	1.4%
TOWN OF BONNEAU	3.04	529	174.07	0.3%
TOWN OF JAMESTOWN	0.61	149	246.29	0.1%
TOWN OF MONCKS CORNER	7.79	7,872	1,010.98	4.1%
TOWN OF ST. STEPHEN	2.43	1,362	560.98	0.7%
TOWN OF SUMMERVILLE	2.58	3,107	1,204.66	1.6%
WHITESVILLE	43.73	14,201	324.75	7.3%
	1,225.55	193,613.00	413.20	100.0%

Source: American Community Survey, 2011-2015[15]

The Rural Fire District area accounts for 61 percent of the county population on some 1,122 square miles, or 91.5 percent of the county's land area. In contrast, the town and city fire departments protect 39 percent of the county's population on just 104 square miles. These equate to population densities of 104.8 people per square mile in the rural districts, versus 732.5 per square mile in the incorporated areas (Table 6.5).

Comparative Data

To better understand the adequacy of funding for fire services, we used comparative data from the ICMA annual surveys of local government expenditures for fire protection. In communities in the 100,000 to 249,000 population range, average expenditures for fire protection were $3.1 million in 2011, or nearly $3.5 million in current dollars. On a regional basis, per capita fire service costs for communities in the South Atlantic states was $31.03 (34.78 in current dollars)[16] across all community sizes.[17] These are two indicators of interest as we assess the adequacy of funding.

Of course, Berkeley County is unique for the large land area that must be protected. This means that we would expect costs to be lower to protect a similar population in a smaller geographic footprint. Further, limited road network and natural barriers such as Lake Moultrie create further impediments to response.

We also collected data on fire service expenditures from other similar South Carolina counties. Data were selected from the following counties: Anderson, Colleton, Dorchester, Georgetown, Williamsburg and York.

For each County, we reviewed public-facing documents, including budgets, web pages, and annual reports. This process was imperfect, as subtle variations in tracking costs and services provided may introduce some errors. However, the "big picture" findings are certainly legitimate and worthy of further discussion. Some data are missing, but we can see general trends. We did not include municipal fire services in these summaries, and excluded both their costs, land area, and population where possible.

While costs vary widely, there does appear to be greater reliance on career staff among the other counties. Because Berkeley County uses such a varied schedule for use of their career department employees, it is difficult to make direct comparisons. Also, the employees in other Counties re employed by the County with standard terms of employment, and are assigned by the counties based on need, rather than on a district by district basis (Table 6.6).

In the next table (6.7), we examine average costs for service across the same counties on a square mile, population, and number of stations basis. Berkeley is at the low end of overall funding per person, clearly the lowest in terms of funding per station, and second lowest in terms of cost per square mile protected.

[15] Population estimate based on apportioning population by address in each district.
[16] Adjustments were made using https://www.bls.gov/data/inflation_calculator.htm.
[17] International City Management Association. *Municipal Year Book, 2012.* p. 126-127.

Table 6.6 SC Counties Comparison

County	Operating Budget	Population Protected	Number of Stations	Square Mileage	Career Staff	Volunteer Staff	Cost/1,000 Persons
Anderson	4.96 M 65K hazmat	194,692	27	757	28	870	$25,730
Colleton	8.2 M	37,731	37	1113	82	128	
Dorchester	6M	110,381[18]	16	576	49 (incl. civilians)	150?	$54,357
Georgetown	9.75M	60,158	21	1035	105	112	$162,073
Williamsburg	975K 1.3M EMS	31,255[19]	23	937	12	102	$31,995
York	9.65M	178,752[20]	16	696			$53,984
Berkeley	4.7M	117,607	45	1121	Not comparable		$39,963

Table 6.7 Per Unit Costs from Similar SC Counties

	cost/1000 persons	cost/station	Cost/ square mile
Anderson	$25,730	$185,555.6	$6,618
Colleton			
Dorchester	$54,357	$375,000	$10,417
Georgetown	$162,073	$464,285.7	$9,420
Williamsburg	$31,995	$426,087	$1,046
York	$53,984	$419,565.2	$13,865
Berkeley	$39,963	$104,444.4	$4,193

[18] Excludes Town of Summerville, SC.
[19] Does not include Town of Kingstree
[20] Excludes City of Rock Hill, Tega Cay Fire Department.

As we can see from the similar county comparison, Berkeley County is generally spending less on fire protection than many of their peers. In fact, in the comparisons based on population, square mileage protected, and stations supported, Berkeley is the lowest or nearly lowest of all the comparison counties.

Recommendation 6.1: Berkeley County should pursue a dual funding model, whereby some costs are borne through ad valorem property assessments across the county, and others remain in the special fire tax. The logic of this approach is that as the county provides services that are supportive of the fire services generally, these costs should fairly be shared among all county residents, the potential beneficiaries. Core costs of delivering rural fire protection through the fire districts should continue to receive the bulk of the fire tax. Berkeley County should centrally administer funds to each department based on Countywide needs and local conditions.

6.3 Operational Response Issues (NFPA 1720 Compliance)

To better understand operational response issues, we added another data source, the National Fire Incident Reporting System (NFIRS) reports. NFIRS is a national data system for incidents. The system is voluntary (although South Carolina has a vigorous program to encourage departments to participate) and generates meaningful analysis form the reports. Participation within Berkeley County was spotty for some departments, in that they came in and left participation from year to year. In addition, coverage of incidents is not complete, as some departments do not complete the reports for all incidents but only for actual fire incidents.

Table 6.8 shows the NFIRS incident coverage data we obtained from the US Fire Administration. We can see that these reports represent a small subset of all incidents for fire departments. Nonetheless, these reports are valuable because they tend to cover more serious incidents and they report response times, at a minimum, for fire units arriving on scene. We received mixed opinions from fire chiefs on whether the first unit response time recorded on the NFIRS reports was for a piece of heavy apparatus, or any fire department unit that arrived on scene.

Table 6.8 Berkeley County Fire Departments NFIRS Reports

General	2010	2011	2012	2013	2014
1 - Other Fires	449	677	377	504	468
1 - Structure Fires (11x)	313	387	240	322	310
4 - Hazardous Condition (No Fire)	168	148	88	196	232
5 - Service Call	49	42	30	60	72
6 - Good Intent Call	35	49	36	52	47

Next, we report on the response times for structure fires. Again, this reflects only those agencies reporting incidents from 2010-2014. Table * shows the number of incidents and average response times for reporting departments. We see that response times (time from alarm to arrival on scene) range from roughly five and a half minutes to almost 20 minutes. As expected, volunteer departments have longer response times, due to the time it takes to assemble a crew and the relatively longer travel distances that might be involved.

It is important to remember that these are average times, meaning that there were incidents that took longer. Also, judging from the times, it appears that some of the times reported were for a Chief's vehicle arriving, rather than a piece of heavy apparatus.

Table 6.9 Response Time to Structure Fires (NFIRS Data) 2010-2014

Dept Type	Fire Dept Name	INCIDENT_TYPE_DESCRIPTION	INC_TYPE	Number Of Incidents	Avg RespTime (Sec)	Average RespTime (H:M:S)	Avg OnScene Time(Sec)	Average Time OnScene (H:M:S)
Volunteer	Bonneau Rural Fire Department	Building fire	111	27	540.00	0:09:00	3,531.11	0:58:51
Volunteer	C & B Fire Department	Building fire	111	56	387.86	0:06:27	3,870.00	1:04:30
Volunteer	Caromi Fire Department	Building fire	111	12	465.00	0:07:45	4,500.00	1:15:00
Career	City of Goose Creek Fire Department	Building fire	111	154	324.55	0:05:24	4,793.77	1:19:53
Volunteer	Cordesville Rural Fire Department	Building fire	111	16	847.50	0:14:07	4,173.75	1:09:33
Volunteer	Cross Rural Fire Department	Building fire	111	35	798.86	0:13:18	10,426.29	2:53:46
Volunteer	Eadytown Rural Volunteer Fire Department	Building fire	111	22	1,194.55	0:19:54	7,914.55	2:11:54
Volunteer	Forty-One Community Volunteer Fire Department	Building fire	111	11	676.36	0:11:16	4,510.91	1:15:10
Mostly Career	Goose Creek Rural Volunteer Fire Department	Building fire	111	42	324.29	0:05:24	6,772.86	1:52:52
Volunteer	Jamestown Rural Fire Department	Building fire	111	5	336.00	0:05:36	2,160.00	0:36:00
Volunteer	Lake Moultrie Volunteer Fire Department	Building fire	111	20	456.00	0:07:36	9,921.00	2:45:21
Volunteer	Lebanon Fire Department of Berkeley County	Building fire	111	36	611.67	0:10:11	6,320.00	1:45:20
Volunteer	Macedonia Rural Volunteer Fire Department	Building fire	111	66	569.09	0:09:29	5,976.36	1:39:36
Mostly Volunteer	Moncks Corner Fire Rescue	Building fire	111	54	330.00	0:05:30	5,055.56	1:24:15
Mostly Volunteer	Moncks Corner Rural Fire Department	Building fire	111	75	386.40	0:06:26	6,660.80	1:51:00
Volunteer	Pimlico Rural Volunteer Fire Department	Building fire	111	13	604.62	0:10:04	4,615.38	1:16:55
Mostly Volunteer	Pine Ridge Fire Rescue	Building fire	111	70	467.14	0:07:47	4,455.43	1:14:15
Volunteer	Sandridge Volunteer Fire Department	Building fire	111	16	701.25	0:11:41	5,647.50	1:34:07
Mostly Volunteer	Whitesville Rural Volunteer Fire Department	Building fire	111	285	343.37	0:05:43	4,370.95	1:12:50

More detailed breakdowns of NFIRS response time data for department by incident type are included in the Departmental Supplement Report.

Figure 6.3, below, shows the drive time from each fire station. When we compare this map to the times shown in the table above, we see the important impact of turnout on overall response time.

Figure 6.3 Drive Time Map of Existing Stations

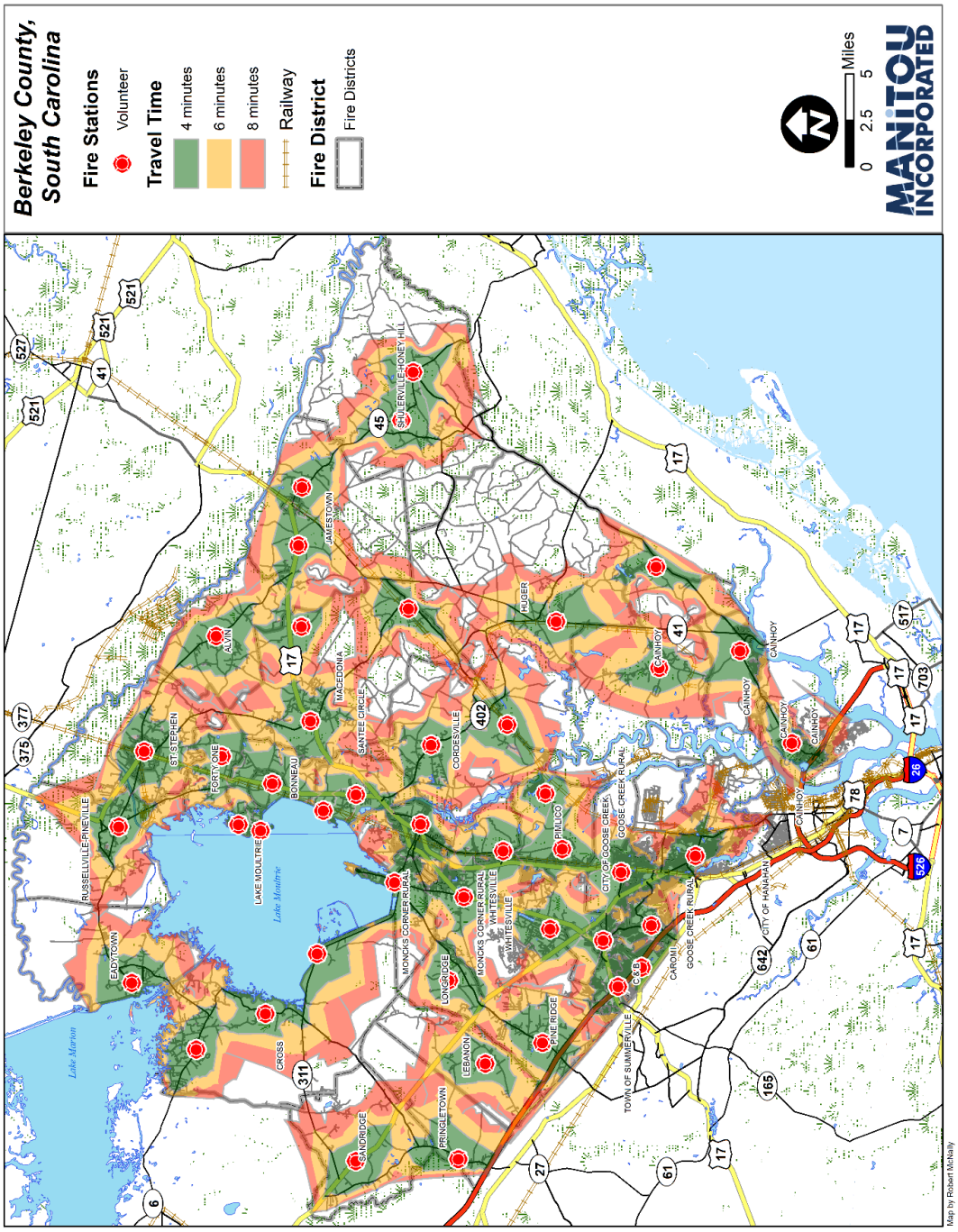
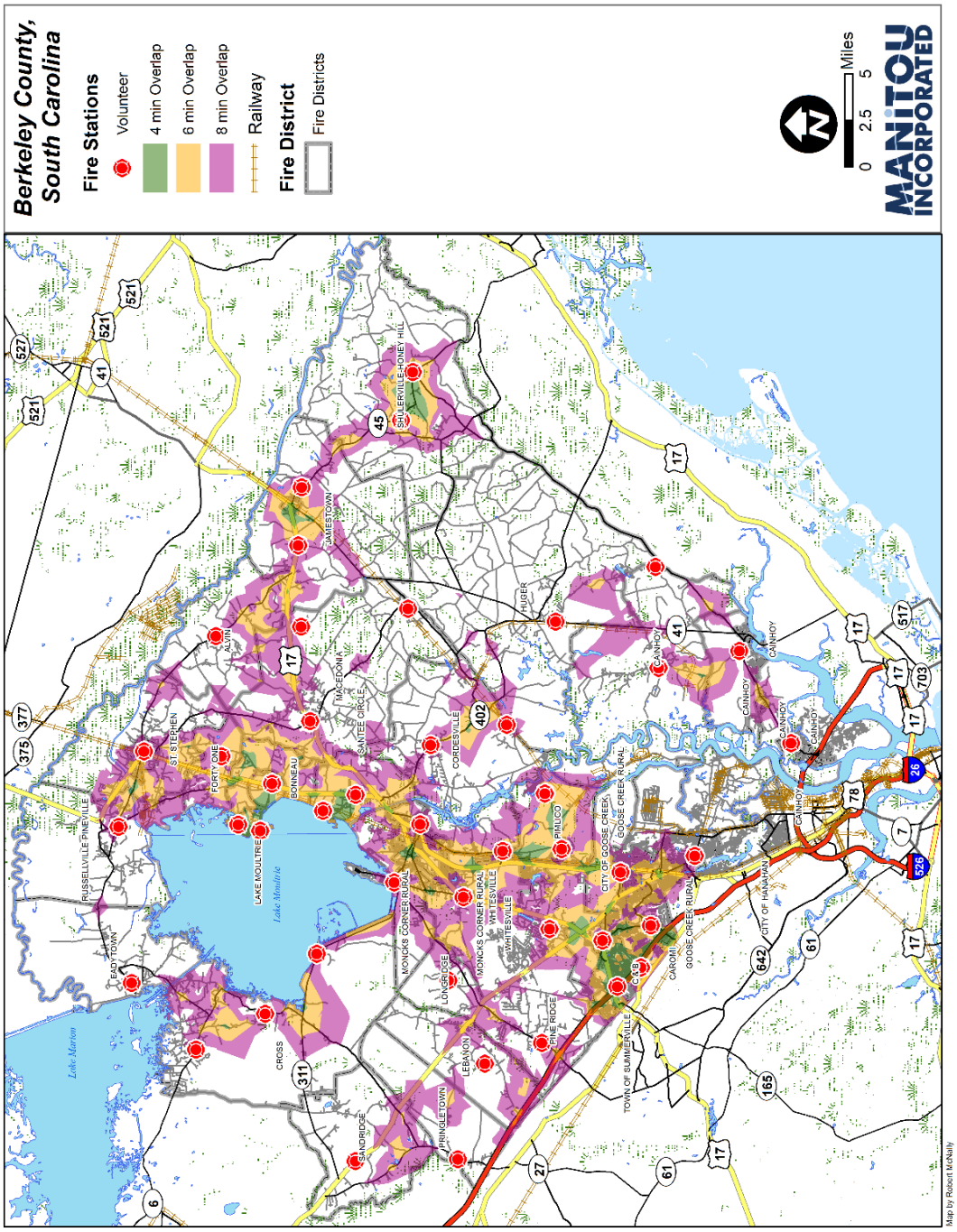


Figure 6.4 shows the overlap in coverage among the existing fire stations. In this map, green areas indicate that more than one station can reach the area within four minutes, yellow indicates six minutes, and purple indicates eight minutes. Again, this is an idealized analysis, because differences in turnout time are not included.

Figure 6.4 Station Drive-Time Overlap



The next important area we can study with NFIRS reports is to examine the numbers of personnel and apparatus responding on alarms (Table 6.10). Because reporting is not 100 percent, these reports may not capture mutual aid apparatus responding. Again, not all incidents are reported. To capture a “best case” in terms of response, the analysis was restricted to structure fires.

Table 6.10: Apparatus and members Responding, NFIRS Data 2010-2014

					Average Apparatus			Average Personnel			Count of Incidents					
Dept Type	FDID	Fire Dept Name	INC_TYPE	Type Description	SUP	EMS	OTHER	SUP	EMS	OTHER	2010	2011	2012	2013	2014	TOTAL
Volunteer	8203	Bonneau Rural Fire Department	111	Building fire	1.4	0.4	0.2	4.6	0.2	0.2		19	8			27
Volunteer	8205	C & B Fire Department	111	Building fire	2.9	-	0.2	6.2	-	0.4				26	30	56
Volunteer	8204	Caromi Fire Department	111	Building fire	1.2	0.2	-	5.2	-	-	16	26	14	13	10	79
Volunteer	8228	Cordesville Rural Fire Department	111	Building fire	1.7	0.4	1.6	3.6	-	1.8		8	4	1	3	16
Volunteer	8206	Cross Rural Fire Department	111	Building fire	3.8	1.6	0.3	5.3	0.2	0.5	12	5	13	6		36
Volunteer	8207	Eadytown Rural Volunteer Fire Department	111	Building fire	1.0	0.0	1.1	1.7	0.0	1.9	14	8				22
Volunteer	8223	Forty-One Community Volunteer Fire Department	111	Building fire	1.3	0.1	0.5	3.5	0.2	0.9		7		3	1	11
Mostly Career	8209	Goose Creek Rural Volunteer Fire Department	111	Building fire	3.4	0.8	0.1	9.4	-	0.3	13	7	8	9	5	42
Volunteer	8234	Jamestown Rural Fire Department	111	Building fire	-	-	-	-	-	-	4	1				5
Volunteer	8213	Lake Moultrie Volunteer Fire Department	111	Building fire	3.5	1.2	0.3	10.4	1.6	1.1		5	7	4	4	20
Volunteer	8224	Lebanon Fire Department of Berkeley County	111	Building fire	1.4	0.4	-	3.7	-	-	9		13	12	2	36
Volunteer	8214	Macedonia Rural Volunteer Fire Department	111	Building fire	2.8	0.3	0.4	6.5	0.3	0.4	26	14	4	12	11	67
Mostly Volunteer	8226	Mondks Corner Rural Fire Department	111	Building fire	3.0	1.2	0.5	5.6	2.2	1.0	15	12	13	13	23	76
Volunteer	8217	Pimlico Rural Volunteer Fire Department	111	Building fire	3.2	0.2	1.1	8.5	0.2	1.8		4	1	6	2	13
Mostly Volunteer	8218	Pine Ridge Fire Rescue	111	Building fire	2.7	-	0.9	5.0	-	1.2		18		29	24	71
Volunteer	8220	Sandridge Volunteer Fire Department	111	Building fire	2.3	0.9	0.6	5.6	1.5	1.1	4	5	4	3		16
Mostly Volunteer	8222	Whitesville Rural Volunteer Fire Department	111	Building fire	3.1	0.6	0.0	6.9	0.0	0.0	58	61	58	58	58	293
				Average/Total Count	2.3	0.5	0.4	5.4	0.4	0.7	171	200	147	195	173	886

We can see in this analysis that suppression personnel averaged 5.4, and an average of 2.3 suppression apparatus responded. We have to interpret these figures with some caution, but they clearly indicate that there may be concern that insufficient staffing is responding to these incidents. However, the data pre-dates the county's policy of sending three departments for reported structure fires.

6.4 Training

6.4.1 Insurance Services Office

The Insurance Services Office has a number of recommendations for training requirements. These are contained within the Fire Suppression Rating Schedule, which is used to determine each department's Pubic Protection Classification (PPC).

Every fire department should have a comprehensive training program in place that is relevant to the community it protects and the scope of services it provides. While referencing ISO's Fire Suppression Rating Schedule, the list below provides an overview of a comprehensive program that incorporates, at a minimum, the following components:

- Recording: Key to a successful program is the system for recording training. All aspects of the program should be diligently recorded, including all classroom, outdoor drill work, individual training, and certifications.
- Position descriptions: The program should have in place documented descriptions of all positions within the department that define the knowledge, skills, and abilities needed to successfully and safely carry out defined duties and responsibilities.
- Program Scope: At a minimum, the program should encompass those subjects to ensure the department will effectively carry out its services. Below are the minimum general subject areas necessary within the scope of fire departments similar to those within the Berkeley County fire/rescue service:
    - Monthly instruction: The department should have regular scheduled training sessions for a minimum of 16 hours per month per member. All training and instruction may be applied to the monthly training hours.
    - Officer training: Every Chief and company officer of the fire department should hold training certifications commensurate with their expected level of supervision and duties. In addition to new appointments, existing officers should undergo annual refresher training.
    - Incident management: All members should be trained in the skills and concepts of incident management that address the command structure, strategy and tactics, tasks, and safety.
    - Company drills: Classroom instruction alone is not sufficient for effective fire ground operations. Coupled with instruction, all members should regularly participate in SCBA, hose, ladder, and other drills. A certain percentage of drills should be conducted in teams or companies, with some being conducted during the evening hours. Ideally, at least some drills should be conducted with adjoining automatic aid departments.

- Driver/operator training: As with officers, all designated drivers should hold training certifications commensurate with the type of fire apparatus used by the department. In addition to new appointments, existing drivers should undergo annual refresher training.
- Recruit training: All new members of the department should receive fire and rescue training per the minimum requirements set forth by state law.
- Hazardous materials: Firefighters are often exposed to the dangers of hazardous materials, either while engaged in firefighting operations involving occupancies that store lethal supplies or during spills of toxic materials. At a minimum, each member should receive at least six hours of instruction in hazardous materials.
- Pre-fire planning: The fire department should conduct and record tours, at a minimum of once per year, of all commercial, industrial, and institutional occupancies within the district. The recorded tours should be easily accessed in the event of an emergency.
- Schedule: The program should have a schedule that identifies various training subjects that must be addressed during the year, or other specified timeframe. The program should be revised annually and made available for review by all members of the department.
- Instructor(s): A cadre of instructors, with either general knowledge of subjects or specific areas of expertise, should be appointed. Ideally, regardless of abilities, all instructors should have minimum instructor certification per state-level requirements.
- Facilities: Indoor and outdoor training facilities and props should be designated. At a minimum, each fire station should have meeting areas or similar spaces that can also serve as classrooms large enough to accommodate all members of the department during indoor training sessions. Included in the classroom accommodations should be audiovisual equipment for instruction. In addition, there should be a training library, consisting of an inventory of firefighting, emergency medical care, and other reference manuals. Outdoor facilities should consist of burn buildings, multi-story drill towers, and drill grounds with the space necessary to maneuver fire apparatus during hose lays and other training evolutions. Where no formal training exists, the department should record, as a part of the training program's documentation, all streets, parking lots, and similar spaces as designated drill locations.

6.4.2 Current Training Program Initiatives

Berkeley County Training Officer's Association

The mission of the training officers' association is to act as the liaison for creating countywide training opportunities for county fire departments through the South Carolina Fire Academy (SCFA). Much of the association's work is in concert with the Berkeley County Emergency Services Training Center.

Berkeley County Emergency Services Training Center

The privately owned center serves both public and private sector emergency service agencies and organizations. The facility is co-funded through public and private annual contributions, with the county providing $32,000 annually for the use of classrooms and training grounds by fire districts.

Figure 6.5 Berkeley County Emergency Services Training Center

The Training Center is a good asset that is frequently utilized by personnel from both the county and around the region. It offers primarily state-level or state versions of federal courses, but also offers training and familiarization for supporting agencies, such as EMS agencies.

6.4.3 Individual Fire District Training Program

Each department performs a certain level of training. Some of the trainings are well recorded whereas, in other cases, evidence of training is little to non-existent. One of the most common shortfalls was inadequate records of training activities. The following Table 6.11 presents an overview of each district's training programs. This information was derived from ISO PPC reports.[21]

[21] Our information request of departments included ISO grading reports. Although many departments provided their grades, they did not produce the detailed reports that contained information needed for our detailed analysis. We provided instructions on obtaining these reports to the Chief's Association.

Table 6.11 Individual Training Program

District	Earned Credit													
	Facilities & Use		Company Training		Officer Certification		Driver-Operator Training		Hazardous Materials		Recruit Training		Pre-Fire Planning	
	35 pts. available	% Earned	25 pts. available	% Earned	12 pts. available	% Earned	10 pts. available	% Earned	1 pt. available	% Earned	5 pts. available	% Earned	12 pts. available	% Earned
Alvin *														
Bonneau †			2.28	9.12 %	6.00	50 %	6.25	62.50%	0.39	.39 %	2.00	40.00%	6.75	56.25%
C & B	17.50	50 %	13.92	55.68%	12.00	100 %	10.00	100 %	1.00	1.00 %	2.00	40.00%	0.00	0.0 %
Cainhoy	35.00	100 %	25.00	100 %	4.80	40 %	6.25	62.50%	1.00	1.00 %	5.00	100 %	4.10	34.17%
Caromi	0.00		16.66	66.64%	6.00	50 %	10.00	100 %	1.00	1.00 %	2.00	40.00%	12.00	100 %
Cordesville *														
Cross*														
Eadytown	23.80	68 %	2.19	8.76 %	2.40	20 %	10.00	100 %	0.58	.58 %	2.00	40.00%	1.44	12 5 %
Forty-One *														
Goose Creek	11.00	31.43%	14.50	58 %	11.45	95.42%	10.00	100 %	0.71	.71 %	5.00	100 %	2.52	21.00
Huger *														
Jamestown	27.65	79 %	15.17	60.68%	6.00	50 %	6.67	66.70%	1.00	1.00 %	2.00	40.00%	11.40	95.0 %
Lake Moultrie	24.50	70 %	16.14	64.56%	6.00	50 %	8.33	83.30%	1.00	1.00 %	2.00	40.00%	12.00	100 %
Lebanon *														
Longridge *														
Macadonia *														
Moncks Corner	20.30	58 %	8.44	33.76%	12.00	100 %	7.29	72.90%	1.00	1.00 %	1.50	30.00%	9.00	75.00%
Pimlico *														
Pine Ridge	12.60	36 %	13.42	53.68%	10.50	87.50%	9.51	95.10%	0.94	.94%	5.00	100 %	12.00	100 %
Pineville/ Russellville *														
Sandridge/ Pringletown *														
Santee Circle	24.15	69 %	7.66	30.64	10.80	90 %	4.79	47.90%	0.75	.75 %	1.50	30.00%	9.00	75.00%
Shulerville Honey Hill †														
St. Steven †														
Whitesville	35.00	100 %	1.64	6.56 %	10.67	88.92%	6.00	60.00%	1.00	1.00 %	1.67	33.40%	5.40	45.00%
Average	21.04	66 %	11.41	45.67%	8.21	68 %	79.2	79.24%	.86	.86 %	2.6	52.78%	7.13	59.49%

* No information provided

† Insufficient information provided

Although all departments recognize the NFPA standards for firefighter, there is little uniformity between departments beyond this basic level. Driver requirements, officer standards, and specialized training requirements vary between departments. It is also unclear if some senior members may be operating without completing these basic training levels.

6.4.4 State Training Resources

State associations have taken positions with regard to training standards. The South Carolina Firemen's Association (SCSFA) has advocated that "training be based on nationally accepted standards to meet the OSHA Fire Brigade Standard."[22] [23] This standard can be interpreted to require compliance with recognized state fire training programs, which now are based on national consensus standards from the National Fire Protection Association.

The SCSFA also recognizes NFPA 1001 *Standard for Fire Fighter Professional Qualifications* and NFPA 1500 *Standard on Fire Department Occupational Safety and Health*, which explicitly requires NFPA 1001 as the standard for basic firefighter training.

The State Firefighters Association has a portal for daily, weekly, and monthly training resources designed for use by local fire departments (http://scfiretraining.com/).

State Fire Academy Training

Firefighters have robust training opportunities through the South Carolina State Fire Academy at the Columbia Campus as well as through regional training delivered by the Academy. The Office of State Fire Marshal is part of the S.C. Department of Labor, Licensing and Regulation (LLR). The Office of State Fire Marshal and the South Carolina Fire Academy make up the Division of Fire and Life Safety, which is located on a 208-acre campus in Columbia.

The South Carolina Fire Academy (SCFA) has been accredited by the International Fire Service Accreditation Congress (IFSAC) since March 1993. Accreditation by IFSAC means that the SCFA certification system has been recognized by an international group of fire service professionals. This accreditation ensures that the certification process of the South Carolina Fire Academy meets national standards, and the accredited programs that the SCFA provides reflect the most current training requirements.

The Fire Academy's mission is to provide statewide training for South Carolina fire service personnel: paid, volunteer, airport crash rescue firefighters, industrial fire brigade, and other emergency response personnel. This training includes the skills necessary to provide basic to advanced incident command and control for emergency operations involving fire, rescue, hazardous materials, and weapons of mass destruction incidents. The academy provides basic and advanced training for firefighters, fire officers,

[22] This standard is in 29 CFR 1910.156, found at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9810

[23] South Carolina State Firefighters' Association. *Position Statement on Minimum Firefighter Training*. December 20, 2011.

instructors, and fire department support functions, which include public fire education, fire prevention, inspections and fire investigations.

Training is based upon the National Fire Protection Association (NFPA) standards and S.C. OSHA regulations. The Fire Academy also focuses its programs on the Fallen Firefighters Foundation's 16 Life Safety initiatives and its "Everyone Goes Home" program. The "Everyone Goes Home" program focuses on firefighter safety and reducing the number of line-of-duty deaths and injuries.

Fire and emergency service training requires a combination of classroom instruction and hands-on skill training and using special tools and equipment. The training requires several instructors per course to ensure the safety of students and instructors and to evaluate and test students for required skill competency.

The academy opened for business in July 1995 and has been operating on a 208-acre site four miles northwest of Columbia, off of Monticello Road. The site has 15 buildings with more than 120,000 square feet of temperature-controlled floor space. The site houses the Fire Marshal's office, Fire Academy administration building, five classrooms, a 200-seat auditorium, a dormitory that sleeps 116, a cafeteria, a five-story drill tower with smoke maze, a six-bay fire station with living quarters, an instructor building, a student processing center, a maintenance building and shop, a one and one-half story Class A burn building, a LP gas fired burn building, ten flammable liquid and LP gas live-fire training props, two 737 aircraft mock ups, confined space rescue, hazardous materials props, and US&R heavy rescue training area props. The academy also has a 50' X 90' large area search building used for many courses, in particular the Rescue-the-Rescuer and the Rescue Intervention Crew courses, a trench rescue prop, collapsed building props, and an urban search and rescue prop. A two-story, 1,860- square-foot Class A burn building and a 20,855-square-foot US&R/fire station building with eight truck bays and two storage bays are also part of the Academy.

The Fire Academy receives no appropriated funding. However, it does receive one half of a 1% fee and a 0.035% fee on fire insurance premiums. The Fire Academy charges fire departments a minimal fee for courses. Fees are charged to industry to generate revenue to support academy operations. The Academy also receives some grant funds to deliver certain specialized or targeted courses.

In addition to training at the Academy, regional training is an important component of the overall delivery of fire academy courses in South Carolina. A majority of the academy courses are conducted within the regions, at the local fire departments. The academy has seven regions, served by six regional offices. Regional offices interact daily with the municipal fire services; they schedule training courses to be conducted at local fire departments and at the regional offices. The Fire Academy works in every South Carolina county, striving to meet the fire service needs.

The regions are responsible for maintaining regional facilities, equipment, and book inventory. Regional coordinators are on call to support fire service requests. Regional coordinators visit fire departments, meet with instructors, and attend chief, firefighter and instructor association meetings and conferences to ensure customer needs are being met.

Regional operations allow the Fire Academy to know its customers and meet their needs by providing courses at local departments that are conducted to meet department schedules. With 70 percent of the state's fire service being volunteers, this flexibility is the only way to provide needed training. Most courses have written tests, as well as hands-on skill evaluations, that the student must pass to complete the course. Many regional courses require a live evaluation burn. It must be conducted at an approved burn facility, such as the S.C. Fire Academy. The Academy has approved 33 local burn buildings and facilities that can be used for academy course evaluation burns throughout the State of South Carolina.

6.5 Prevention and Risk Reduction

Fire prevention is an important and under-supported means to reduce the fire problem. Indeed, preventing fires can be very effective – more so than relying on manual fire suppression efforts. The challenge is that most fire injuries and deaths occur in residential properties, which are not subject to fire inspections. Ironically, the needs for such programs are often greatest where resources for local fire protection are minimal.

Fire prevention is being transformed through various methods, from public relations-oriented open houses and distribution of generic literature, to community risk reduction. Community Risk Reduction implies that a focused program or intervention, targeted at a known vulnerability, is designed and executed. Data is collected to inform the program, and efforts are tracked to enable analysis of results. The Vision 20/20 project (strategicfire.org) contains numerous resources to assist in these efforts.

Each of the professional fire service organizations throughout South Carolina has united to form an alliance known as Fire Safe South Carolina. Its mission is to unite fire service organizations in encouraging influential community stakeholders to support local fire departments, allowing the departments to serve their citizens through strategic community risk reduction programs.

Goals and objectives of this state-wide initiative include the following:

- Fire Safe South Carolina will result in a reduction of annual home fires in the state, decreasing risks for residents and firefighters. Objective: To increase fire service community risk reduction participation through increased training, partnerships, and opportunities.
- Fire Safe South Carolina will provide consistent fire prevention messages across South Carolina. Objective: To recruit community stakeholders and utilize various forms of mass communication, such as social media, to promote fire prevention messages.
- Fire Safe South Carolina will provide data-driven resources to enhance programming. Objective: To identify residents at the highest fire risk in participating communities, target home visits to those areas, and provide for the procurement and distribution of smoke alarms.
- Fire Safe South Carolina will improve fire data quality and use in the state. Objective: To provide targeted National Fire Incident Reporting System (NFIRS) training, integrating the use of geographic information systems (GIS) for targeted program delivery.

Although there are some prevention programs in place within the county, in most communities the programs mostly consist of school visits and information distribution at community events. While these are important, there is little in the way of targeted public fire education.

Recommendation 6.2: Establish an interdepartmental task force to begin a community risk reduction project aimed at rural fire fatalities. The project should incorporate planning, public health, emergency services, sheriff, and local fire department representatives. This effort could be facilitated or assisted through a partnership with a local college that offers a public health or education graduate program.

Most fire departments within the County perform inspections. These inspections are intended as a supplement to the efforts of the State Fire Marshal's office and County Fire Marshals. The inspections take place in businesses, hotels, offices, and commercial properties. Fire chiefs generally perform these inspections under their authority, by state law. There are no minimum standards for training of personnel performing these inspections, and many appear to be performing the inspections with minimal formal training. If questions arise during a local inspection, chiefs can reach out to the State or County Fire Marshal's office for support or enforcement action.

Recommendation 6.3: Report fire inspections, code compliance inspections, and investigations through a Countywide database.

Recommendation 6.4: Expand County Fire Marshal services to include fire scene investigation with appropriate staffing and certification, possibly in partnership with the County Sheriff's Office.

6.6 Special Operations and Hazards

Response to special hazards is an important component of comprehensive fire and emergency services. Special hazards typically require additional training and equipment beyond normal firefighter requirements. These specialized services are usually low frequency, high consequence events during which potential for injury or death of a victim is very real. Rescuers need to operate with trained, adequately staffed, and equipped teams to be effective and safe. These operations may also be time consuming and require safety officers and a well-defined command structure.

Due to these requirements, it is difficult, if not impossible, for small fire departments to provide these services according to standards. Even moderate-sized career fire departments may find the costs of providing such service to be prohibitive. In this section we discuss major special services, and their status within the County.

Technical Rescue/Extrication

Technical Rescue encompasses numerous capabilities. There are multiple NFPA standards that pertain to these services, but principally NFPA 1670 *Operations and Training for Technical Search and Rescue Incidents (2014).* NFPA 1670 defines technical rescue as the following specialties shown below.

For each of the specialties, training and functional capabilities are defined at the levels of awareness, operations, and technician. While some fire departments are capable of providing some of these services, none provide them all, nor do they necessarily meet the requirements of the NFPA standard. On a *de facto* basis, based on the departmental surveys, the following departments stated that they provide these services (Table 6.12).

Table 6.12: Technical Rescue Services Provided

Specialty	Departments Stating they provide service	Commentary and Recommendation
Rope rescue	Two departments (Jamestown, BCRS) report that they provide this service.	Form County Support Team, Develop formal Aid Agreement (Operations Level). Currently provided by Charles County Rescue.
Structural collapse search and rescue	None	Develop Aid Agreement
Confined space search and rescue	None	Form County Support Team (Technician Level)
Vehicle search and rescue	Twenty-one fire departments indicate they provide this service, including Berkeley County Rescue Squad.	Equipment and training varies, some department do not have capability.
Water search and rescue	Berkeley County Rescue Squad Four other departments report providing this service (Pimlico, Macedonia, Lake Moultrie, and Moncks Corner Rural)	Maintain Capability
Wilderness search and rescue	Berkeley County Rescue Squad	Maintain Capability
Trench and excavation search and rescue	None	Form County Support Team, Contract for Service (Technician Level)
Machinery search and rescue	None	Form County Support Team, Contract for Service (Operations Level)
Cave search and rescue	None	Not applicable
Mine and tunnel search and rescue	None	Not applicable
Helicopter search and rescue	None	Not Applicable
Tower Rescue	None	Contract for Service
Animal technical rescue	None	Contract for Service

Recommendation 6.5: Conduct a risk analysis for technical rescue incidents, particularly for unique hazards such as machinery or tower, and work jointly with the City of Charleston to share information, develop preplans, and conduct regular exercises.

Recommendation 6.6: The county should form a team to provide initial response to technical rescue incidents. This team would work closely with the Charleston technical rescue team and meet training standards and equipment consistent with theirs. The goal would be to provide some capability for handling low acuity incidents while improving initial response times and supplementing the staffing of the City of Charleston.

Hazardous Materials

Hazardous materials are a concern because they require specialized training and equipment to safely respond to and mitigate an incident. Given Berkeley County's industrial base, transportation network, and sheer size, it is highly conceivable that hazardous materials incidents could occur. From an administrative perspective, two entities within the County have roles in managing potential hazardous materials incidents.

The Berkeley County Local Emergency Planning Committee (LEPC) is composed of local stakeholders from the industrial, government, and emergency response communities. Their mission is "ensure the safety of Berkeley County communities and to protect the environment from chemical mishaps or contamination."[24] The LEPC is tasked with developing and maintaining local emergency response plans, administering community Right to Know information in accordance with federal regulation, and maintaining data in support of these tasks. Information gathered by the LEPC is used by the county's Emergency Management Division.

Certain facilities meeting the requirements of the federal law,[25] with regard to quantities or types of hazardous materials used or stored at their facilities, must file reports annually with the State Department of Health and Environmental Control and County. These reports are used for emergency planning and response.

In terms of emergency response, while some fire departments have training in hazardous materials, there is no public hazardous material response team within Berkeley County. Although the number of incidents requiring such a response is small, there is a significant potential. The requirements for maintaining a team are significant in terms of both initial and ongoing training and equipment. Training requirements for hazardous materials response are defined in NFPA 472, *Standard for Competence of Responders to Hazardous Material/Weapons of Mass Destruction Incidents (2018).*

At present, the County would request a hazardous materials response from the nearest teams, either directly to the City of Charleston or the City of Summerville, or request assistance through the State Firefighter Mobilization via the State's HazMat Working Group. The County does not have an automatic aid agreement in place for Charleston or Summerville.

Recommendation 6.7: Berkeley County should enter into a formal agreement with the City of Charleston for provision of hazardous materials response services. Consideration should be given to creating a hazmat operations-level task force among career departments to support these services.

Aircraft Rescue and Firefighting (ARFF)

Berkeley County owns and operates an airport (MKS), located at 616 Whitesville Road in the Moncks Corner Rural Fire District. The Berkeley County Airport is a public general aviation facility with no

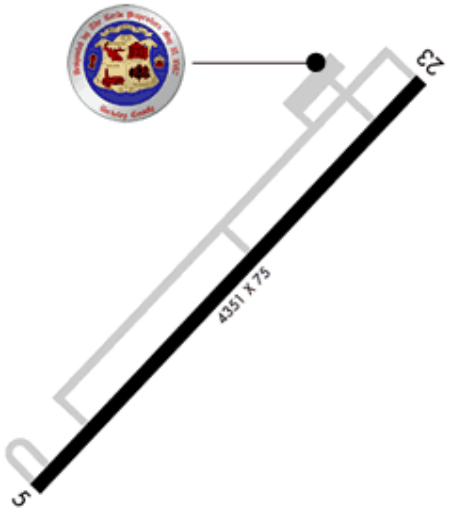
[24] Berkeley County Local Emergency Planning Committee http://www.berkeleylepc.org/about.html
[25] Superfund Amendments and Reauthorization Act, Title III and Emergency Planning and Community Right to Know Act (EPCRA).

scheduled commercial service. Under Federal Aviation Administration (FAA) requirements, there are no fire protection requirements beyond those under the local building and fire codes for structures and storage tanks on airport property.

Any fire protection requirements would be based on the FAA's regulations in 14 CFR Part 139. These requirements do not apply until the airport serves scheduled air carrier operations of greater than nine seats, or any landings of aircraft with more than 30 seats.

The airport has a single 5,001 foot runway and an accompanying taxiway (Figure 6.6). This runway was extended recently, and plans are in place to obtain easements to avoid any limitations on use of the full length of runway. There is no tower for the airport. Although it is staffed seven days per week, from 8 a.m. to 6 p.m., staff is not trained in aircraft fire protection. Fuel is available 24 hours a day, and takeoffs or landings are not time limited.

Figure 6.6: Berkeley County Airport (MKS) Runway and Taxiway Layout



There are no fleet aircraft housed at the airport, and the largest aircraft regularly using the airport is a Dassault Falcon 10, with a wingspan of nearly 43 feet and a length of 45 feet, six inches. Depending on configuration, the aircraft could carry up to seven passengers and two crew members.

Although the airport is in the process of updating its Master Plan, there are no expectations or aspirations for attracting commercial carriers or scheduled service to the facility in the foreseeable future. The County's continued attraction of multi-national corporations and facilities will likely continue to increase utilization of the airport.

Airport Risk Analysis

Although the airport itself has a limited number of departures and landings by smaller aircraft, the county itself is overflown by commercial, military, and general aviation flights from nearby Charleston

International Airport and surrounding airports. This creates a small risk of aircraft accident within the county.

While the FAA does not regulate fire protection for general aviation airports, the NFPA has a standard for airport fire protection. NFPA 403 *Standard for Aircraft Rescue and Fire-Fighting Services at Airports (2018)* incorporates requirements that go above FAA requirements. The standard is not mandatory and, like other NFPA standards, must be adopted by an Authority Having Jurisdiction. In the standard, fire protection requirements are based on the aircraft length. According to NFPA 403, MKS would be classified as a Class 3 airport. For this class of airport, an ARFF vehicle with a turret capable of applying firefighting agent would be required, with a response within 180 seconds. Staffing levels required for this vehicle would be determined based on a task resource analysis, with a minimum of two personnel.[26] Additional NFPA standards apply to ARFF vehicles and to airport firefighter qualifications.

The subject of aligning federal ARFF standards more closely with consensus standards such as NFPA 403 remains highly controversial. A 2009 report, by the Airport Cooperative Research Program of the Transportation Research Board of the National Academy of Sciences, found significant costs associated with enhancing fire protection requirements.[27]

Emergency Procedures

The Airport maintains a Continuity and Disaster Preparedness Plan. In the event of an aircraft, fire, or medical emergency, Berkeley County 9-1-1 Communications would be notified. They in turn, would alert Moncks Corner Rural Fire Department and supporting resources from EMS and the Sheriff's Office. Emergencies are reported using regular telephones at the airport.

Aircraft Emergency Response Capabilities

Neither the county nor its fire departments own any specialized aircraft rescue or firefighting apparatus. While foam and supplies for extinguishment of flammable liquid fires are maintained by some fire departments, there is no organized plan for marshalling supplies and equipment for an off-airport response. The fire departments we spoke with did not indicate that they prepared for aircraft-related emergencies.

Training courses are available. The State Fire Academy teaches an Aircraft Rescue Firefighting Training course that meet FAA standards. In addition, the FAA has an online training course designed to familiarize and prepare structural firefighters and first responders for off-airport aircraft accidents.[28]

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[26] We do not discuss the quantities of extinguishing agents required, but they are also specified in the standard.
[27] Golaszewski, Richard et al. *ACRP Document 7: How Proposed ARFF Standards Would Impact Airports.* June, 2009. Washington, DC: Transportation Research Board.
[28] The FAA course *First Responder Safety at a Small Aircraft or Helicopter Accident.* https://www.faa.gov/aircraft/gen_av/first_responders/

Recommendation 6.8: Berkeley County should encourage enhanced awareness-level training for aircraft incidents for first-arriving fire departments to the airport. This should include annual airport response exercises for close-by fire departments.

Recommendation 6.9: Berkeley County should encourage the Fire Chiefs Association to develop a foam response capability to deal with flammable liquid issues, including on and off-airport aircraft incidents.

Recommendation 6.10: If traffic at the airport is expected to expand, consideration of the purchase of an appropriate ARFF vehicle and training of airport employees to undertake firefighting as an ancillary duty should be evaluated.

Berkeley County Rescue Squad (BCRS)

The Berkeley County Rescue Squad was formed in 1966. It is currently composed of roughly 30 volunteers delivering water rescue, vehicle extrication, wilderness search, and related services. Their headquarters is located at 202 Factory Street in Moncks Corner. Their five-bay station houses multiple boats, trailers, and utility vehicles to transport equipment. Members are drawn from the community, with some also being active in EMS or fire departments.

The BCRS operate from one location to serve the entire county. For time-sensitive incidents such as water rescues, members must respond to headquarters, take a boat out, drive it to an appropriate site for launching, and then put the boat into the water. Because of the County's size, this can take considerable time.

BCRS, along with the local fire department and EMS, is dispatched automatically for water rescue calls and land searches within the county (Figure 6.7). BCRS is dispatched to vehicle extrication calls if a local fire department does not have extrication capability and they are closer to the scene.

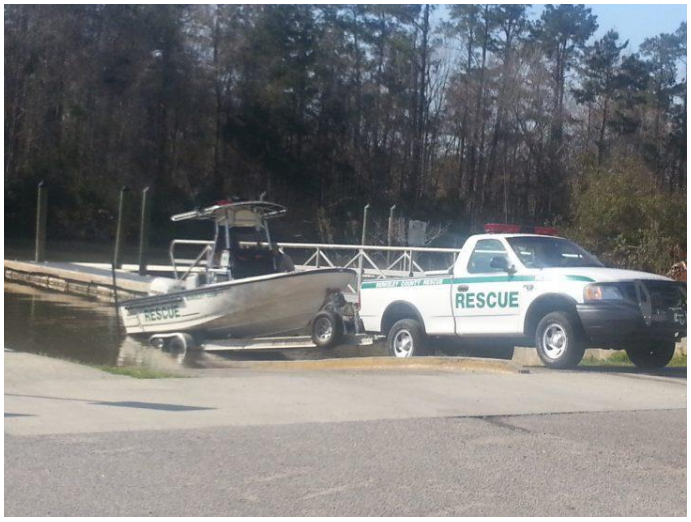


Figure 6.7 BCRS Boat Being Launched

In addition to private donations, the Rescue Squad received an annual appropriation of $28,500, with a supplement of $7,500, in FY 2016.

As this report was being finalized, we were informed that the leadership of the BCRS has announced that the organization was seeking to cease operations. Media reports indicate that the Sheriff's Office will take control of the BCRS assets, including boats, vehicles, and their headquarters.[29] It is unknown what long-term plans may be for the disposition of any remaining funds in their budget when they cease operations.

Recommendation 6.11: Berkeley County Sherriff should continue responsibility for water rescue and open land search within the County. Berkeley County EMS should assume the extrication responsibilities from County rescue to supplement the areas of limited or non-existing coverage for medium and heavy rescue for vehicle accidents. Some fire departments already provide this service however, Berkeley County EMS should provide vehicle rescue/extrication with the responding fire departments in those areas where the service is not available. They have a workforce that is geographically distributed and could house equipment at strategic locations throughout the county. It is important that as this service transitions, clear standards are developed and maintained, and personnel are credentialed.

Special Operations Conclusions

Berkeley County needs to enhance its oversight and engagement in special operations. At present, capabilities vary from none to very limited across the county and across services. Many of these incidents, as stated, have high risk to life of the public and responders, and responses are regulated by federal safety standards. The fire services are not currently configured to provide these services, and action is needed to improve capability. Regional solutions are desirable, given the staffing, training, and equipment demands.

[29] Rindge, Brenda. "Berkeley County Rescue Squad Dissolving, Sheriff's Office to Absorb Trucks, Boats, and more." Charleston *Post and Courier*, October 24, 2017 online at http://www.postandcourier.com/news/berkeley-county-rescue-squad-dissolving-sheriff-s-office-to-absorb/article_a85d32e6-b8bc-11e7-977b-735ea4413ae2.html

7. Service Delivery Options and Improvements

This chapter details specific recommendations and options for service improvement. A range of alternatives is provided, along with a selection of recommendations to be pursued independent of whether consolidation is suggested. Selection from among these alternatives will be a challenge, and some alternatives will require additional analysis and data.

7.1 Feasibility of continuing existing service contracts

The service contracts are the clear mechanism to assure improvements in service; performance and reporting need to be enhanced. The following areas should be included in the contracts going forward. It may be necessary to phase these changes in over more than one contract cycle.

The following revisions to the annual contract between the county and each fire district are for consideration. Many of the revisions reflect recommendations found in chapters of this report. The revisions include:

Recommendation 7.1: Baseline Contract Revisions

1. Revised nomenclature that reflects the evolved scope of services most of the fire departments now provide, to include rescue services such as vehicle extrication and other forms of physical rescue. Departments should acknowledge the services they provide according to agreed-upon standards.
2. Vehicle rosters should be managed and apparatus should be typed by recognized standards. A minimum equipment complement should be required for all apparatus. This process should begin with Rescue apparatus, the move to engines and tankers (tenders).
3. Section 3 should include language to permit a deduction, from annual payments, of administrative costs necessary for county oversight of services. Contributions would be based on a fair share of costs and on a percentage deducted from the County's total collection of fees, prior to disbursements to individual fire districts. Administrative costs <u>could</u> include:
    a. County administrative support positions
    b. Records management systems and license fees
    c. Training costs for district personnel.
4. In Section 6:
    a. FIRE Act Grants should be subject to prior approval. Loans and grants from the federal government, as well as from state government and private entities, should be reported before acceptance.
    b. Mandatory use of a county-based fire/rescue records management system, participation in the National Fire Incident Reporting System, and lines of authority and contract management.
    c. Fire District must adopt minimum training requirements for firefighters, company officer, and chief.
    d. Fire District must seek approval before acquiring apparatus.
5. General Provisions

a. Begin Countywide credentialing and registration of personnel into a common database for tracking activity and training.
b. Begin standardization of Self Contained Breathing Apparatus (SCBA), with the County assuming responsibility for maintenance, inspection, and tracking.
c. Develop common fireground and emergency scene Standard Operating Procedures.
d. Reduce frequency of financial reports to quarterly, and increase frequency of independent audits.
e. Record training through a Countywide database.
f. Require fire departments to cooperate in coordinating service delivery with other County agencies.

7.2 Options for Limited or partial consolidation

There are a number of options for consolidation of services. We will start with the least intrusive and move toward the most comprehensive options. In considering any of these options, there are two key concerns. The first is to not hamper those parts of the system that are running well and delivering good service. The second is to assure an orderly transition, regardless of what options are selected. The limited data available on system performance, company rosters, training levels, and regulatory compliance leaves considerable uncertainty and risk for the county in moving too quickly to assume responsibility for service.

Several members spoke of "poison pills" of indebtedness by fire companies as a deterrent to county takeover. The legal process for transitioning service from an independent fire company to another entity must be resolved. Similarly, where compliance issues exist, a process must be identified to bring departments into compliance wherever possible. This may require individual department remediation plans with goals built into service agreements.

7.3 Enable closest/fastest station response for incidents

One of the fundamental tenets of fire services is sending the closest or fastest-arriving station to any reported emergency. We have seen that district boundaries have not been drawn to promote efficiency, and that there are areas of the county where the closest station does not necessarily respond. The other dimension of this issue is that stations with an on-duty crew can obviously respond more quickly than a station where members must respond from home. This means that distance alone is not necessarily the determining factor for which station can service an area.

Consideration should be given to redrawing district boundaries to reflect the ability to provide coverage. This effort will not be possible until at least a year of good response data and incident reports are available for analysis.

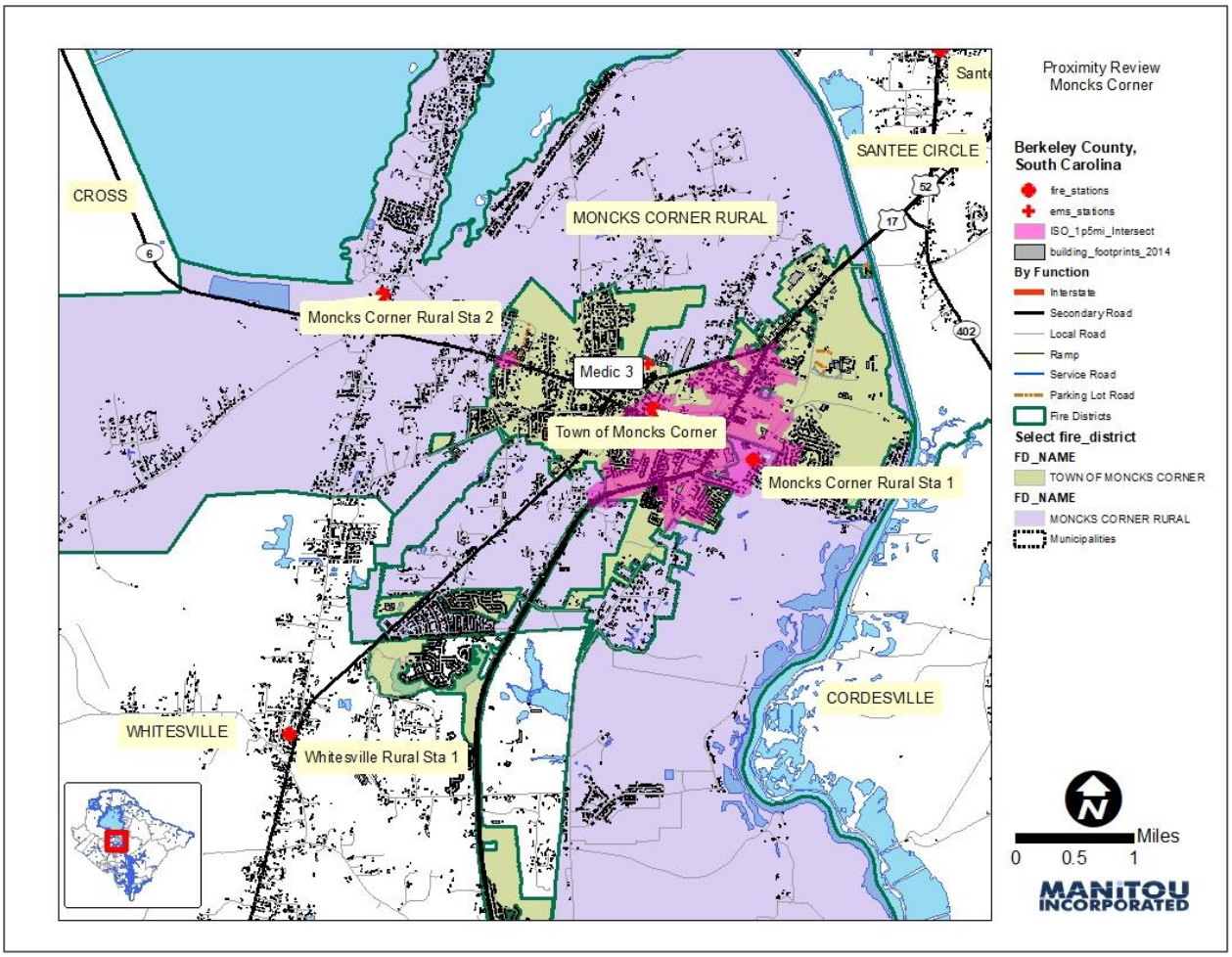
In the course of our study, we identified several cases where two or more stations were located in proximity to one another. These cases are worthy of deeper analysis to reveal if efficiencies can be gained through redrawing district boundaries, initiating automatic response, station consolidation, or

some combination of these. Possibly consolidating facilities also offers the potential to share facilities with other agencies, such as Berkeley EMS or the Sheriff's Office.

Moncks Corner – Town Station and Moncks Corner Rural 1

Figure 7.1 below shows the overlap (identified by the purple section) in the ISO 1.5 Mile structural response coverage for these two stations. The geography of the town and the rural district, along with the projections of growth in the area, do not lend themselves to efficient coverage with these two stations in proximity to each other. If the purpose of the rural station is to support the town's incidents, it may be better served in the southern portion of the rural area near the Whiteville district. Station 2 in the rural district covers the northern area, and there is little development south of the present location of Rural Station 1.

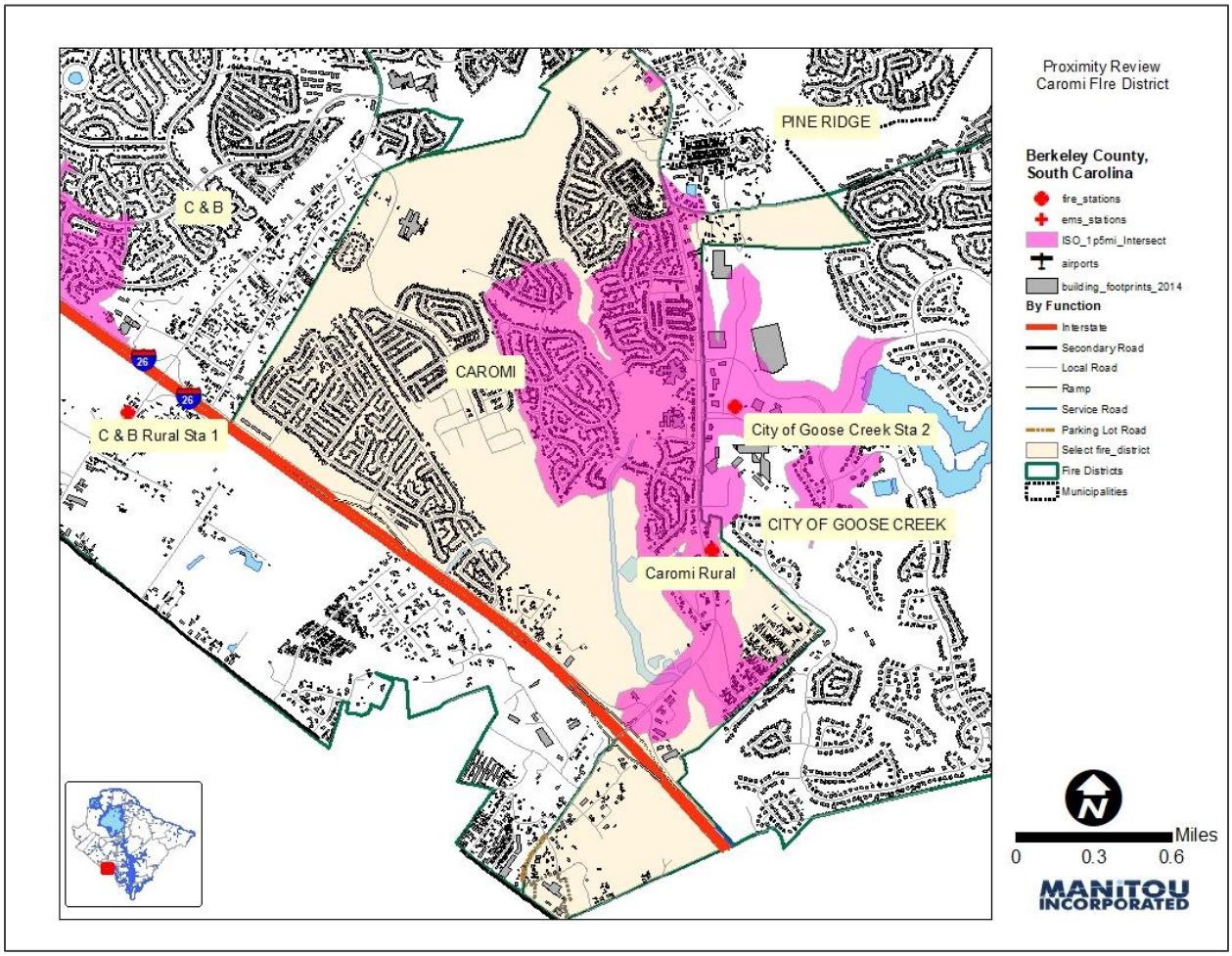
Figure 7.1 Moncks Corner Rural Station 1 and Town of Moncks Corner Station



Caromi Fire District – Rural District Station and City of Goose Creek #2

Figure 7.2 below shows the overlap of the 1.5 ISO structural response coverage for the Caromi Fire district with the City of Goose Creek Station 2. The Caromi District crosses over Interstate 26 at Exit 203, and the station is positioned to cover that lower section and still reach the western side of the District. In addition, the street network in western Goose Creek and the location of the Caromi station do not lend themselves to broad coverage.

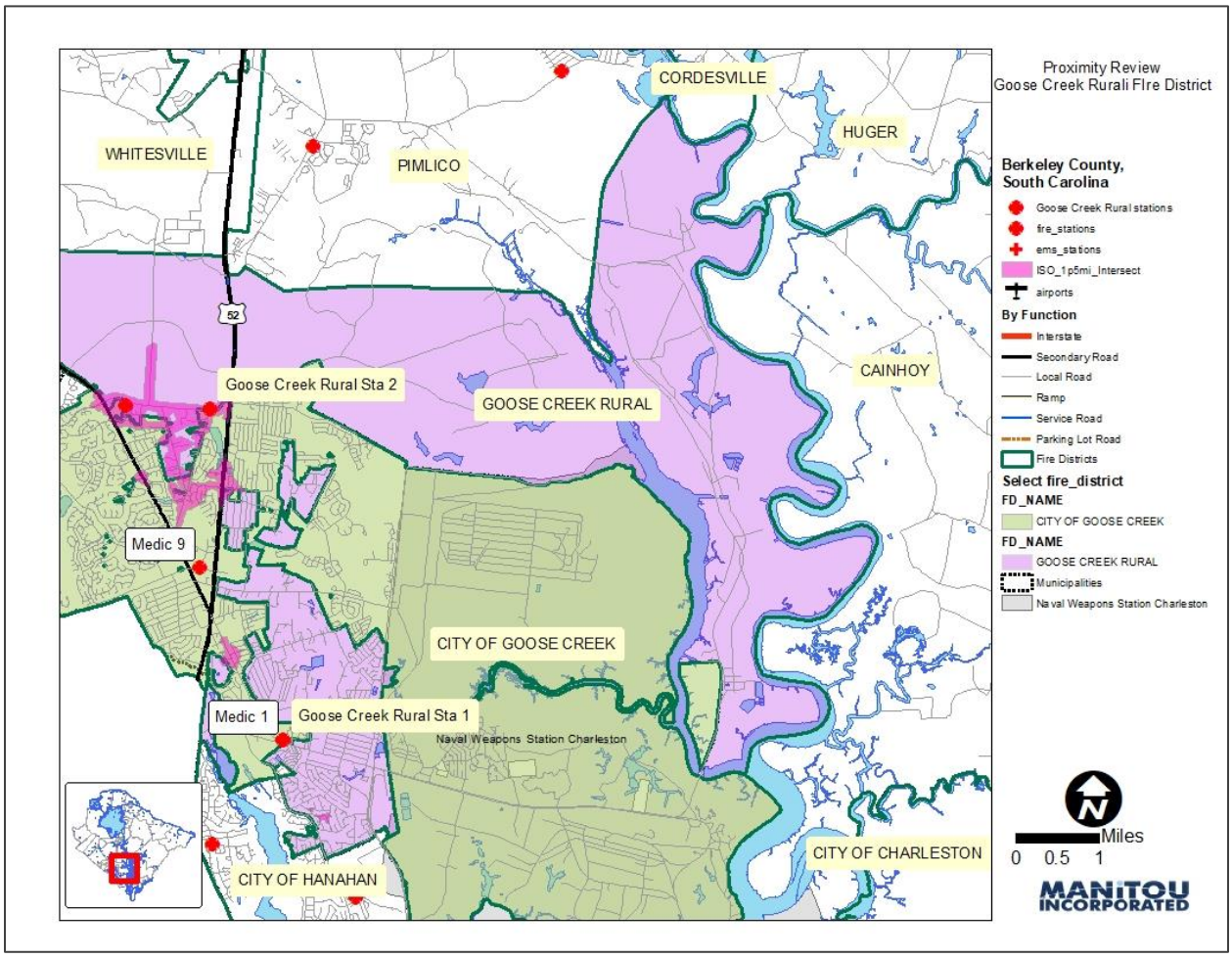
Figure 7.2 Caromi and Goose Creek Station 2



Goose Creek Rural – Station #2 and Goose Creek #1

Figure 7.3 below shows the overlap (identified by the purple section) in the ISO 1.5 Mile structural response coverage for these two stations. These two stations are relatively close, leaving much of the more rural, eastern portion of their district closer to other stations.

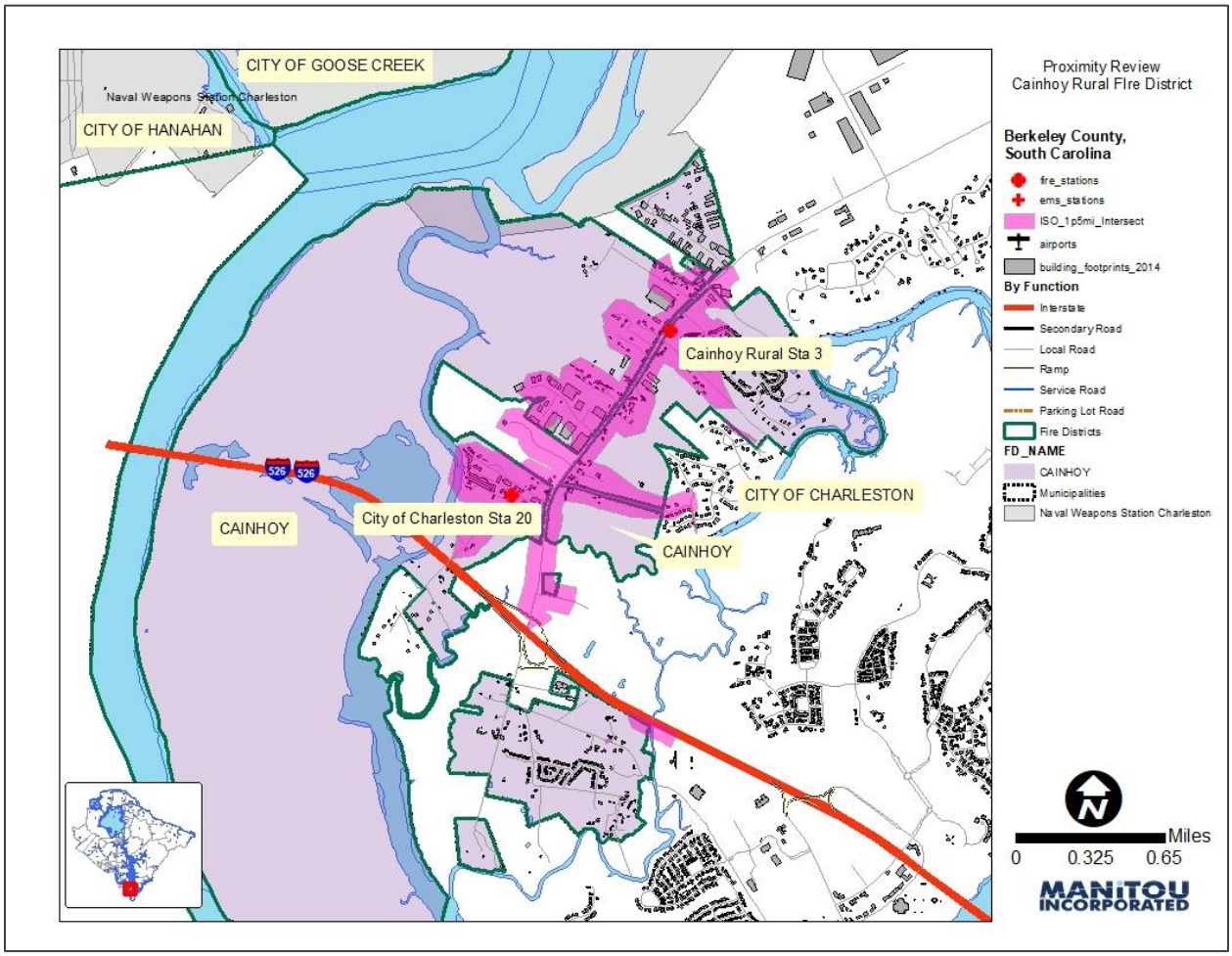
Figure 7.3 Goose Creek and Caromi



Cainhoy Fire District – Stations #3 and City of Charleston Station #20

Figure 7.4 below shows the overlap (identified by the purple section) in the ISO 1.5 Mile structural response coverage for these two stations. We will discuss this in further detail later in this chapter.

Figure 7.4 Cainhoy Station 3 and City of Charleston.



7.4 Feasibility of Countywide Services

There are several scenarios for moving to a countywide service model. We define three distinct options, although it is not necessary that they be implemented in their totality, or across the entire county, or with all fire departments. Several recommendations would be required regardless of which option is pursued.

Three main options are presented here. They can be thought of as a continuum. We recommend that action be started along the set of baseline recommendations. See Table 7.1 at the end of the section for a synopsis of the options.

Option A: Increase Coordination, Consistency, and Standards

In this option, existing district structures would remain largely in place. A series of changes would occur, implemented in part through the contracts. The emphasis would be on working through the Chiefs Association to develop minimum performance standards in the areas of:

1. Training
2. Equipment
3. Standard operating guidelines
4. Apparatus
5. Response time and staffing goals.

Merger of weaker departments with their stronger neighbors would be encouraged. The burdens of maintaining a department do not increase linearly with membership. That is, it is just as much work to maintain an organization of 20 members as it is to maintain one with 50 members. By merging departments, a larger pool of members could permit sharing of workload.

A key aspect of this option is working with the existing structure to improve service. We would expect that some fire departments would improve, but some marginal organizations may be unable to meet the new requirements. In these cases, a merger with a neighboring department would be recommended, or district boundaries could be redrawn to apportion the area served by the department ceasing operations to its neighbor.

Advantages: This is the least disruptive approach to improving service. It is also the least costly.

Disadvantages: The time required to achieve change under this system may take longer than acceptable. Some departments may resist merger, and a shortage of volunteers may pose a challenge to keeping all existing stations operational.

Option B: County begins service provision to supplement existing system.

This next option would provide direct support to fire services in areas of the county not served adequately by existing arrangements. If departments opt to stop delivering service, or are unable to meet minimum requirements, neighboring agencies should have their districts expanded. It is possible that neighboring agencies may be unwilling to take on responsibility for additional area for reasons of response time or staffing. In this case, the county would begin to provide staff and possibly equipment to respond to incidents in these areas.

One option would be to deploy two-person crews on a lightweight CAFS vehicle equipped with extrication equipment. They could fulfill the special response role and provide first response for fire events. They would also be able to provide secondary support to fire calls in neighboring areas. These units should be deployed in a dynamic fashion, and could be based out of existing fire stations or EMS facilities.

Recommendation 7.2 : Begin County personnel deployment on lightweight units capable of supporting multiple missions.

These personnel would be overseen by a shift supervisor who would assume command and serve as an additional resource for other departments. Personnel would be engaged with community risk reduction as part of their regular duties; engaging in outreach, pre-fire planning, and smoke detector installation, for example.

Advantages: Provides direct support to fire service delivery.

Disadvantages: Requires creation of a county bureaucracy and workforce for fire services. The large geographic area to be covered limits the impact of expenditures. A chain of command agreement would be necessary to integrate these personnel into the existing county system. Scheduling need not be 24-7, but an advantage of flexible deployment is that personnel could move to areas of greatest need over the course of the day.

Option C: Full County Consolidated Service Delivery

In this option, the county would become the primary provider of fire services throughout the county, or at least the current rural fire district service area. Under this scenario, a Fire Chief would be hired to assume control of fire services, with all firefighting services delivered under his/her authority and ultimate control.

Existing volunteer officers would need to be integrated into a single chain of command. This should be driven by expertise, certification, and experience. Existing chiefs would retain authority in their own districts but, going forward, would need to meet the agreed-upon credentials from the county, enacted in consultation with the Chefs Association. Assuming that the ranks of Chief Officers will be more difficult to fill, some systems have designated a District or Battalion Chief rank that would respond in a designated area across multiple stations or districts. This is an effective way to assure that there is qualified command officer coverage on incidents, and also to recognize the skills and qualifications of volunteer members.

Any personnel currently paid as firefighters by the districts would be brought under county supervision and deployed according to need. An entry process would be required, and perhaps existing employees could be given preference in hiring as part of any transition.

A County Consolidated system would be a volunteer system supplemented and overseen by career staff. After credentialing and chain of command are established, in consultation with the Chiefs Association, an integrated chain of command would be established.

From a budgetary standpoint, all funds would be administered by the county and a formula could be used to allot funds for departmental expenditures. These funds would be based, in part, on the number of active members. However, operational needs such as equipment, apparatus, and facility maintenance would need to be resolved. To the degree that assets such as fire stations and apparatus are owned by

private non-profit corporations, the county would need to negotiate contractual agreements for their use. Agreement must also be reached on retirement of debt, ownership of assets and, ultimately, whether the current corporate entities would continue as social organizations or if they would dissolve.

Table 7.1 Consolidation Option Summaries

Option	**Option A** Coordinate, Consistency, Standards	**Option B** County Begins Service Provision to Augment Existing Districts	**Option C** Full County Consolidation
Comments		Recommended Option	Best to transition from Option B
Time Frame	Begin immediately for next contract review cycle	One Year	More than One year to 3 years
New Positions	Fire Coordinator Program Assistant (PPE/SCBA) Administrative Assistant	Fire Chief Company Officers Firefighters Administrative Assistant Training Coordinator Program Assistant (PPE/SCBA)	Fire Chief Company Officers Firefighters Administrative Assistant Training Coordinator Program Assistant (PPE/SCBA)
Advantages	Slow change	Maintain service levels; provide direct support that could enable volunteer departments to maintain services.	Ability to provide consistent service level(s) across county.
Disadvantages	Requires leadership and consensus with Fire Chief's Association Need mechanism for facilitating decisions. Not likely to help existing marginal departments. May exacerbate some departments failing or ceasing operations.	Loss of some volunteers. Other departments may cease service. Difficult to predict costs, uncertainty over how many departments may require takeover.	Probable significant loss of volunteers. Highest cost for transition and delivery of service. Likely unfunded costs from compliance not currently being met by the fire districts.

Staffing scenarios

Predicting staffing needed for Options B and C is difficult due to of uncertainties in the desired service level. In addition, there is inadequate data on volunteer participation to enable assessment of additional resource needs. In particular, we do not have definitive data on response times, and only very limited data on number of personnel responding, short of a manual audit of records.

Option A calls for three new positions, one of which is sworn, and the other two are civilian.

Option B would require two civilian positions and a Fire Chief, company officers, firefighters, and a uniformed training coordinator. It is anticipated that four firefighters and one officer would be needed.

Option C would require additional field firefighting staff, depending on needs.

Shift personnel could be deployed in incremental fashion. As a starting point, daytime weekday shifts would be envisioned, as they cover times when volunteer availability is lowest.

The next step would be to move to 24-hour coverage. A three platoon system would be desirable. It is difficult to speculate on how many employees would be needed. A workweek based on a three-platoon would be desirable.

Recommendation 7.3: Evaluate the feasibility of implementing an on-duty platoon in rural areas of Berkeley County. When personnel are unable to commit, the next closest agency should be dispatched on the initial alarm. This could be pursued after regional or countywide operating procedures are produced and adopted by the affected organizations.

It is also important that Berkeley County Communications develop a better awareness of the availability and status of volunteer resources within the County. Such a program could be facilitated by software such as iamresponding©, which uses smart phones to track and alert personnel. Monitoring such information at the 9-1-1 Center would allow real-time awareness of staffing availability. This would help to better manage resources by knowing when additional units need to be alerted, or to notify career staff to respond (under Option B).

Recommendation 7.4: Evaluate the feasibility of using software to track personnel availability and response.

Desired service levels

We recommend that two service levels be established. NFPA 1720 provides a good framework that recognizes the population density issue. These service levels would ideally be set after an analysis of response times and staffing are made. The existing boundaries used by Berkeley EMS could be utilized.

Recommendation 7.5: Create suburban and rural service level standards within the current County service area boundaries.

Excess apparatus and fire stations

The comparative data and our own analysis suggest that some fire stations exist primarily to satisfy ISO grading requirements. Some of these stations are located in remote areas with little staffing available, and some appear to be very minimally maintained and utilized. It is likely that an analysis of these facilities and their utilization may reveal that some are unnecessary or unsupported by existing staffing or call volume.

While we believe there are likely several fire stations that will not be supported due to limited volunteer staff, they cannot be specified at this time. Determinations on facilities to retain would be made based on available staffing and utilization, location, and condition. Many of the stations at risk are essentially storage buildings with little or no amenities for on-duty personnel, and little or no effective programmatic space. Some are on small plots of land that would not be large enough for a modern fire station.

Any decisions on fire station closure should be informed by:

- A detailed study of member locations (apparatus operators and interior qualified firefighters)
- As assessment of the physical condition of the fire halls
- Response time analysis, including volunteer turnout
- Facility capability – number of bays, classrooms or meeting spaces, room for installation or hosting of training props, and major structural, mechanical, or electrical needs, including future maintenance. Closure of excess facilities will allow avoidance of upkeep costs (which are currently largely deferred). This would permit existing funds to be spread over a smaller number of facilities with a greater impact. Many of the rural firehouses are essentially storage buildings, with no amenities.

Similarly, there are too many apparatus given the number of active volunteer members across the County. Further study with sound and reliable data will enable a closer look at this issue.

Recommendation 7.6: Utilize the new CAD system to do a study of apparatus utilization to identify apparatus needs and excess apparatus.

Recommendation 7.7: Standardization of apparatus should be pursued, to streamline training requirements, ease maintenance, and permit seamless movement of apparatus between districts as needs dictate in the future.

7.5 Recruitment and Retention

Recruitment and retention of volunteers is a critical component of stabilizing fire services in the county. Although national trends suggest volunteer participation is declining, there are two areas of optimism. First, there are new residents moving into the county who may already have experience, or be interested in, contributing to their community. Some of the most stressed fire departments do not have the resources to run robust recruitment programs. Both these suggest that there may be a potential for additional volunteer recruitment.

A countywide recruitment program can identify department's needs and connect potential volunteers with training opportunities. Reaching out to non-traditional populations, and encouraging volunteers who might serve in administrative roles or doing community risk reduction, are also ways to increase engagement and provide enhanced services.

Attracting young people can also be a viable strategy for finding volunteers. One important program is the SC *Learning for Life Explorer Program,* offered through the State Fire Academy. This program enables 16 or 17 year old Explorer Scouts, as volunteer members of a fire department, to complete Firefighter I and Firefighter II training at the State Fire Academy. They are granted a provisional certificate once training is complete. Their provisional certificate will grant them full certification when they turn 18. The SCSFA also has a junior firefighter standard.[30]

Recommendation 7.8: Explore development of a county-assisted program for developing Junior Firefighters. This would include establishment of a school-based program, utilizing partnerships with State Career and Technology Centers.[31]

Recommendation 7.9: A centralized recruitment sector should be launched to assist departments in making contact with potentially interested future members. The National Volunteer Fire Council (NVFC) has numerous publications in this regard. Establishment of a local intake number and social media presence could be used.

Recommendation 7.10: Additional data should be collected from current volunteers to better understand their concerns and interests. These efforts should include focus groups and candid discussions of challenges, threats to participation, and motivating factors for volunteers.

Impact on volunteer staffing

We recommend additional consultation with volunteers to better understand their concerns and to be able to estimate the probable loss of membership under different scenarios. We expect that under any of these scenarios, there will be a reduction, at least in the short term, of volunteers. This would likely be attributable to the perception that services would be provided by the county; unwillingness to meet minimum standards; and loss of control over aspects of district operations. Several chiefs were open in stating that if the county attempted to take over service delivery, they would quit. This effect is not unique to Berkley County. With proper consultation, we believe the losses will be small.

7.6 Legal Obligations with current service agreements in place

We are not attorneys, nor do we offer legal advice. However, the current contracts would appear to be very permissive in terms of the county's ability to require many of the changes we recommend in this study.

Technical Rescue Agreements

With the cessation of the Berkeley Rescue Squad, the county does not have any specialized teams. While some departments provide specialized services, it is not likely that they have the staffing and equipment

[30] SC State Firefighters' Association. *Junior Firefighter Program Recommended Guidelines.* September 2010. http://scfirefighters.org/wp-content/uploads/2011/07/Junior-member-guidelines.pdf

[31] Law, Public Safety, Corrections and Security: Emergency and Fire Management Services Career Pathway Plan of Study. https://cte.careertech.org/sites/default/files/PlanPathways-CareerCluster-LW-EmegandFiremgmtsvcs.pdf

to meet applicable standards at the technician level, nor is any mechanism in place to compensate them for the cost of providing such service across the county.

As recommended previously, countywide support teams should be formed for the most frequent special hazards. Automatic response agreements should be formed with nearby teams that can provide this capability to the county.

Cainhoy/Charleston issues

The City of Charleston is actively seeking to annex properties adjacent to the city limits. Current annexation patterns have created islands of unincorporated areas within the Cainhoy Fire District. In particular, development is occurring rapidly in the area of Cainhoy station 3. In spite of individual residents' preference to remain outside the City of Charleston, commercial property owners and large residential developments may seek to be annexed in order to access the services of a city and have the cachet of a Charleston address.

We understand that the City of Charleston provides a full response to incidents that traverse the Cainhoy district boundaries. Their willingness to respond in force, even when the emergency may not be in their primary service area, is admirable. However, arrangements for response should be formalized. Cainhoy does not have the capacity to provide a response comparable to the City of Charleston in terms of staffing, apparatus, or response times.

We understand that this rapidly-growing corridor, as it develops higher density, taller buildings, and increased population, is a source of revenue for the county and the Cainhoy district and a point of pride for Cainhoy. However, it is reasonable to expect that Charleston will continue to seek to annex territory. This places Cainhoy in a difficult position both in regards to finances and service provision.

Consideration should be given to an orderly retraction of the Cainhoy fire sub-district and entry into a long-term arrangement providing for stable service provision in the interim.

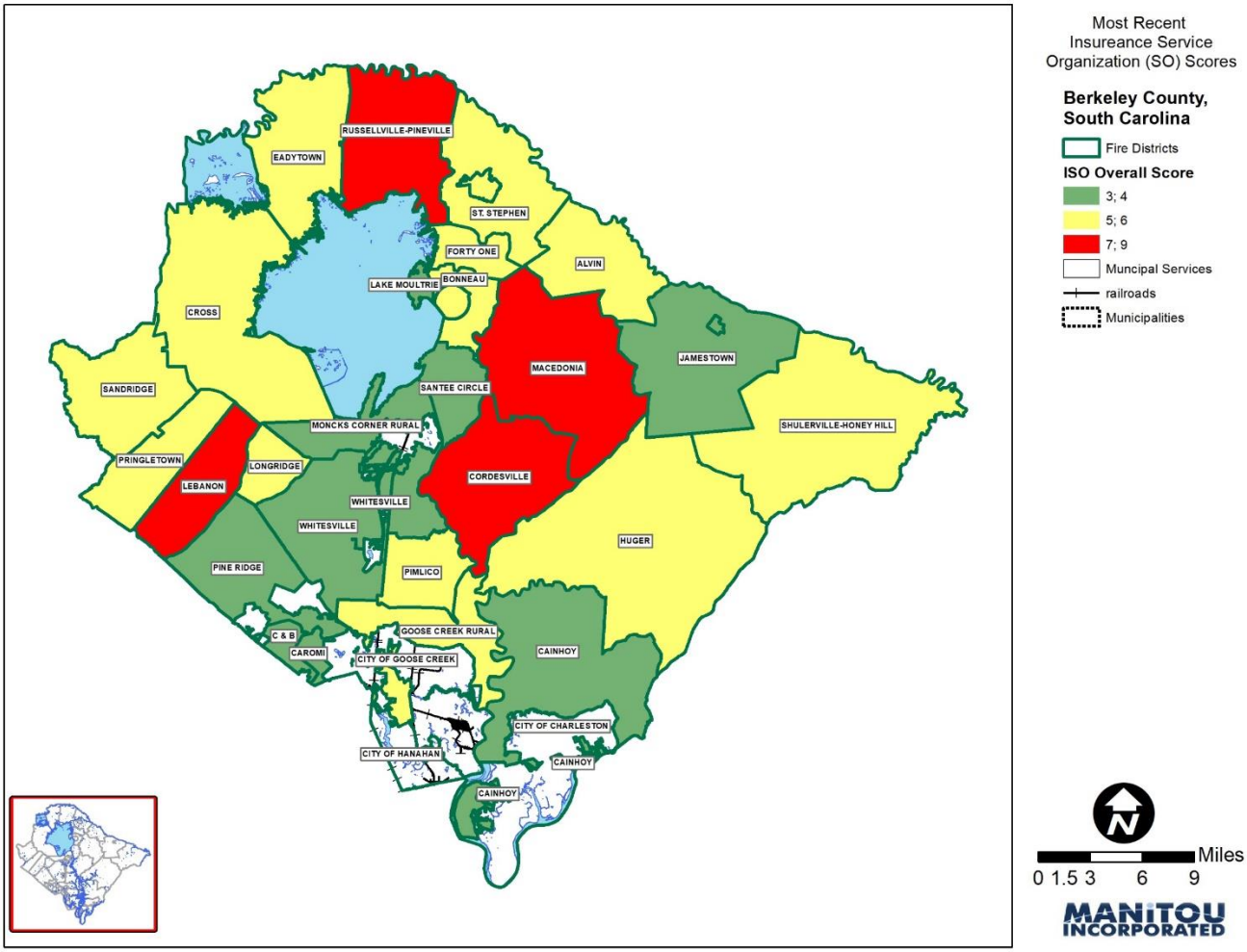
7.7 ISO Issues Commentary

The importance placed on the ISO FSRS is evident in the rural districts. In our opinion, this adherence to the schedule has resulted in more stations and more equipment than the departments can realistically support.

Figure 7.5 shows the best information on ISO Public Protection Classification (PPC) ratings for the County's rural fire districts. We can see that ratings go from 3 down to 9. Based on the limited data provided, it is apparent that improved coordination, planning, and analysis can result in improved ratings generally. This is particularly the case for smaller districts with limited resources.

Home and commercial property owners may receive benefits, by way of reduced comprehensive or fire insurance, through lowered rating of their fire district's Public Protection Classification. This feature is often the catalyst for improved public fire protection in the county's smaller communities and rural

Figure 7.5 ISO Ratings by District.



settings. Of the 16 districts whose records were made available, the highest rating was a class six, with the average being class four. These ratings are exceptional, given limited availability of personnel and fire protection rated water systems.

Significant improvements of individual fire district ratings can be made through county-level planning, organizing, and recording of fire protection services. Many of these improvements do not automatically correlate to a need for funding of additional resources, but rather to improvements in planning, organizing, and deployment of existing resources. Referencing ISO's Fire Suppression Rating Schedule, some improvements may be made through an objective and comprehensive county-wide deployment plan initiative that considers the following:

- The number and size of districts; consider consolidation in areas where there exist a level of redundancy or improvements in service through pooling of personnel and resources
- Organization

- Recordkeeping, including incident reporting, training and certification, testing and maintenance of pumps, hoses, and ladders
- Number, location, and staffing of fire stations
- Utilization of the limited pool of current and future volunteers
- Initial dispatching of units
- Apparatus typing and strategic placement
- Training program, including officer, driver-operator, and recruitment certifications
- Fire prevention activities, including code enforcement, plans review, public education, and fire scene investigation
- Water supply systems, including alternatives such as haul water and dry hydrants.

Reduced fire insurance ratings do not necessarily correlate to reduced fire losses nor reflect the many other services the fire department provides to its citizens. The rating will only impact a homeowner's annual insurance premiums. It does not evaluate the fire department's quality of emergency medical care, outdoor fire suppression, extrication of victims from motor vehicle, and the host of other services provided, nor does a lower rating correlate to a reduction in the number of fires, lost property, or occupants exposed to potential bodily harm.

Every year fires completely destroy homes and commercial properties in communities that have low PPC ratings. The challenge is to strike a balance between what property owners and occupants feel is a reasonable cost to pay for fire insurance, and what they pay for public fire protection. Coupled with this equation is the moral dilemma of determining the most effective means of reducing the likelihood of someone suffering loss or injury due to fire. The rating system and its criteria for 9-1-1 and dispatch systems, fire department capabilities (including community risk reduction programs), and a good water supply can serve as a starting point for the improved effectiveness and efficiency of the county's fire and rescue services.

Recommendation 7.11: Evaluate water supply and dispatch improvements for their potential impact on improving or maintaining ISO rating.

7.8 Strengthen Volunteer Representation and Governance

The Berkeley County Fire Chief's Association plays a critical role in articulating the needs of the volunteer fire service. This organization has a challenging mission, with disparate groups vying for attention. The Association is run on a shoestring budget but will take on added importance as the system begins to transition. It needs to be supported.

Recommendation 7.12: The County should provide funding for a recording secretary and the creation and maintenance of a web page for the Chief's Association. The web page should contain copies of minutes and other documents of interest. Social media should be used to facilitate information sharing between fire department members, Fire Administration, and the public.

8. Conclusions and Next Steps

Berkeley County's fire services are at a crossroads. Faced with population growth, rapid development, and steadily rising standards and expectations, the rural fire service model is inadequate to meet current and future needs. The current funding model does not raise adequate revenue to fund operations in small population departments. However, simply increasing funds given to the fire departments is not the answer. More money alone is not going to attract and retain volunteers, contrary to national trends and recent experience.

The administrative burden of managing and operating 26 independent fire departments is unacceptable. Some departments have as many board members as they have active members. The poor state of records in many departments is a demonstration of the need to streamline the management process. The lack of data on basic system performance frustrated this analysis. Acquisition of a countywide fire service records system is a priority.

Although some departments are functioning well, most are facing shortages of personnel and are unable to maintain operations in accordance with national standards. By even the most modest measure – being able to mount an interior structure fire attack in compliance with 2-in 2-out requirements - is beyond the capacity of several departments without reliance on outside support. The county's wise implementation of a multi-department dispatch policy is recognition of this fact.

The inability to mount an initial fire attack within a single department is a sign that an organization is not sustainable. The district-based funding model does not permit efficient sharing of resources. The model diffuses planning responsibilities among 26 entities, many of whom are operating in "survival mode" with little time or energy for long-range planning.

Berkeley County needs to prepare itself to take a more active role in terms of oversight, planning, and service provision. We believe that several departments are teetering on the edge of ceasing operations. Out of fairness to those volunteers still struggling to deliver service, additional support is needed.

While a complete countywide takeover is not recommended at this point, the county must develop the infrastructure to ensure greater support for fire service delivery. To ensure some consistency of service, performance standards should be developed and departments should be held to them. Career staff should be deployed without regard to district boundaries, and placed where they will have the greatest impact. This requires that the funding model add additional revenue streams that reflect the countywide, or at least multi-district benefit, of shared expenditures.

The county should take a more active role in providing direct budgetary support for personal protective equipment; firefighters should have the assurance that breathing apparatus are properly maintained. The county also needs to develop a command capability to formally participate in the chain of command at incident scenes.

Underinvestment in fire services is apparent. Antiquated apparatus and deteriorating and austere fire stations are evidence of the difficult choices being made on a daily basis by the fire chiefs. While some

chiefs could be accused of building and defending fiefdoms, they are committed to doing what is best for their communities with the resources they have. Their service deserves to be recognized.

Any choices will be difficult to make, but the county must begin the transition. If this process is handled with consultation and mutual respect, the dedicated service of the volunteers should continue. As minimum standards are applied, there will be those who choose to leave the system, but this toll can be minimized.

The county service contracts are the mechanism to move forward with change.

Another issue is the engagement of the municipal departments in the delivery of services within the county. Several of their stations are located in proximity to rural fire district areas.

Funding issues will dominate any consideration of better integrated service, but constructive solutions should be identified that will enable the most cost effective and best levels of protection for all the county's residents.

Implementation Strategy

The report presents numerous recommendations. Our suggestion for implementing these recommendations follow a similar path regardless of which option the County selects. These strategies identify concrete steps to be taken to implement improvements in service under the options.

Figure 8.1 Initial Implementation of Administrative reporting and Service Level Standards

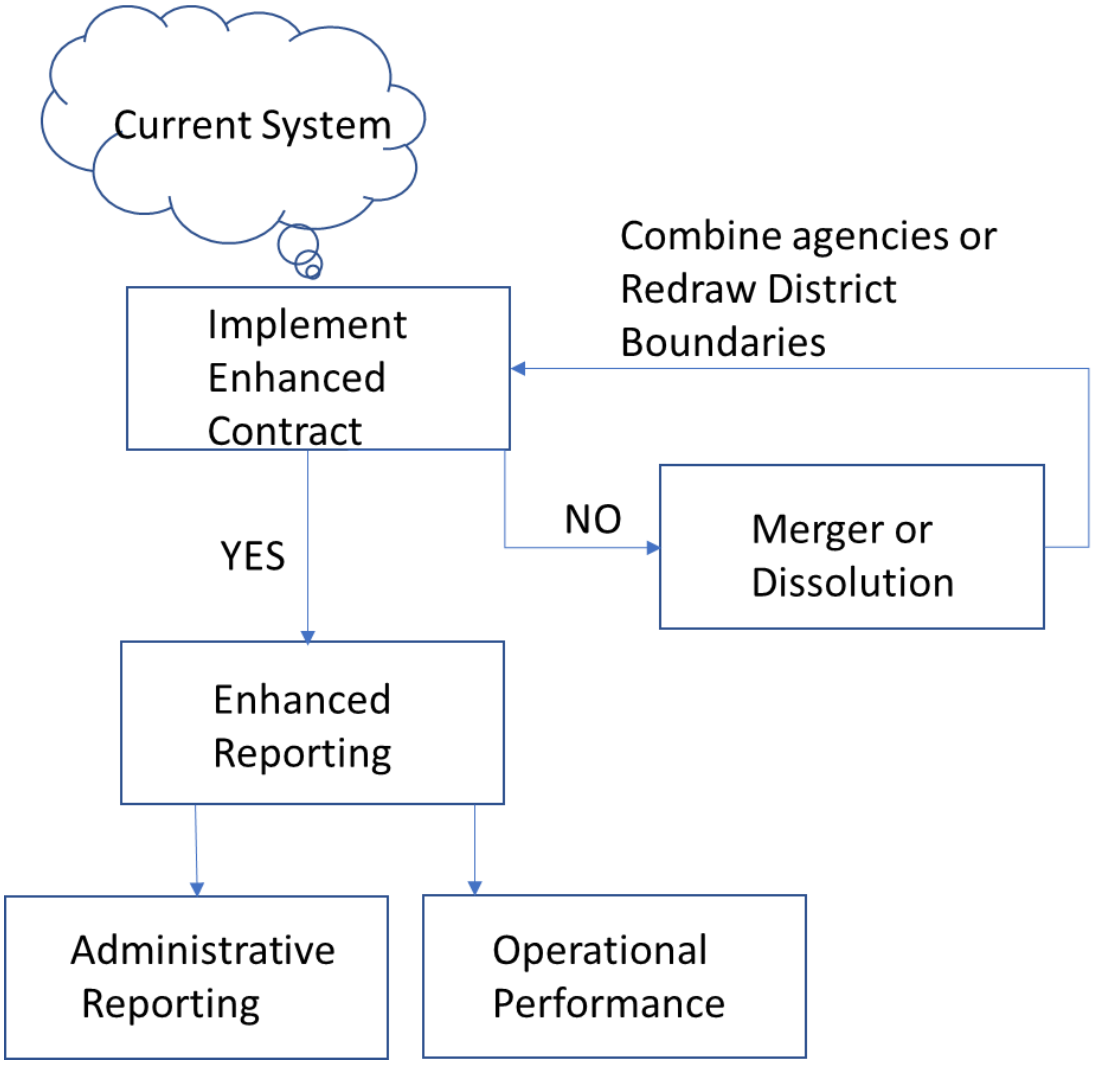


Figure 8.1 shows the process. The first step is to announce the enhanced reporting requirements of the district contracts.

It is anticipated that this process alone may prompt some organizations to opt for consolidating via merger, or possibly dissolution. For a merger, a neighboring department would merge with the District in question, assuming administrative and operational responsibility for service provision. This could have the benefit of better leveraging the capabilities and officer corps and/or administrative capabilities of a stronger department.

If a neighboring department does not want to merge, the service area could be divided among surrounding departments. If staffing or response time considerations dictate, then consideration would have to be given to County-provided service, at least during hours of highest demand.

Implement Enhanced Reporting

Once the departments accept the enhanced reporting requirements, the implementation of these requirements would need to be phased in over an agreed-upon time period within the first year. The reporting requirements are in two primary areas: Administrative and Operational.

Administrative requirements would include financial information, but also filing of information on ISO reporting, grants, and coordination of apparatus plans. As software systems are implemented by the County, there would need to be a phase-in for meeting filing requirements. Some requirements, such as participation in the SCFIRS system, could be implemented more quickly (or included in County software).

Operational Performance would include primarily response time, staffing, training records, and operational information. The implementation of the County's new Computer Aided Dispatch/Records Management System (CAD/RMS) should permit centralized collection of response time information, but staffing information would need to be provided incident-by incident and keyed to a master roster of accredited fire department members.

The goal in the first year would be to measure performance. Once quality data are collected and validated, response-time objectives and staffing and apparatus targets would be developed collaboratively under County leadership. We have suggested NFPA 1720 as a starting point. It is anticipated that in following years, these requirements would be built into the service contracts with the County. The operational performance requirements would be assessed against newly-develop performance criteria that would specify strength of response (apparatus and personnel), and response times.[32]

Once the system is in place, and the initial adjustments are made, the subsequent year would see addition of performance criteria to the contact process (See Figure 8.2). For organizations that meet the administrative reporting and operational requirements, they would continue. For those that could not meet the administrative requirements, merger would be suggested. For those that cannot meet performance goals, then an assessment of the prospects of improving performance must be made.

A remediation process is designed to permit a department to come into compliance or develop a credible plan for coming into compliance. Depending on the gap between the objectives and actual performance, a 3-month 6 month, or one-year compliance goal could be set, depending on the nature of the deficiency.

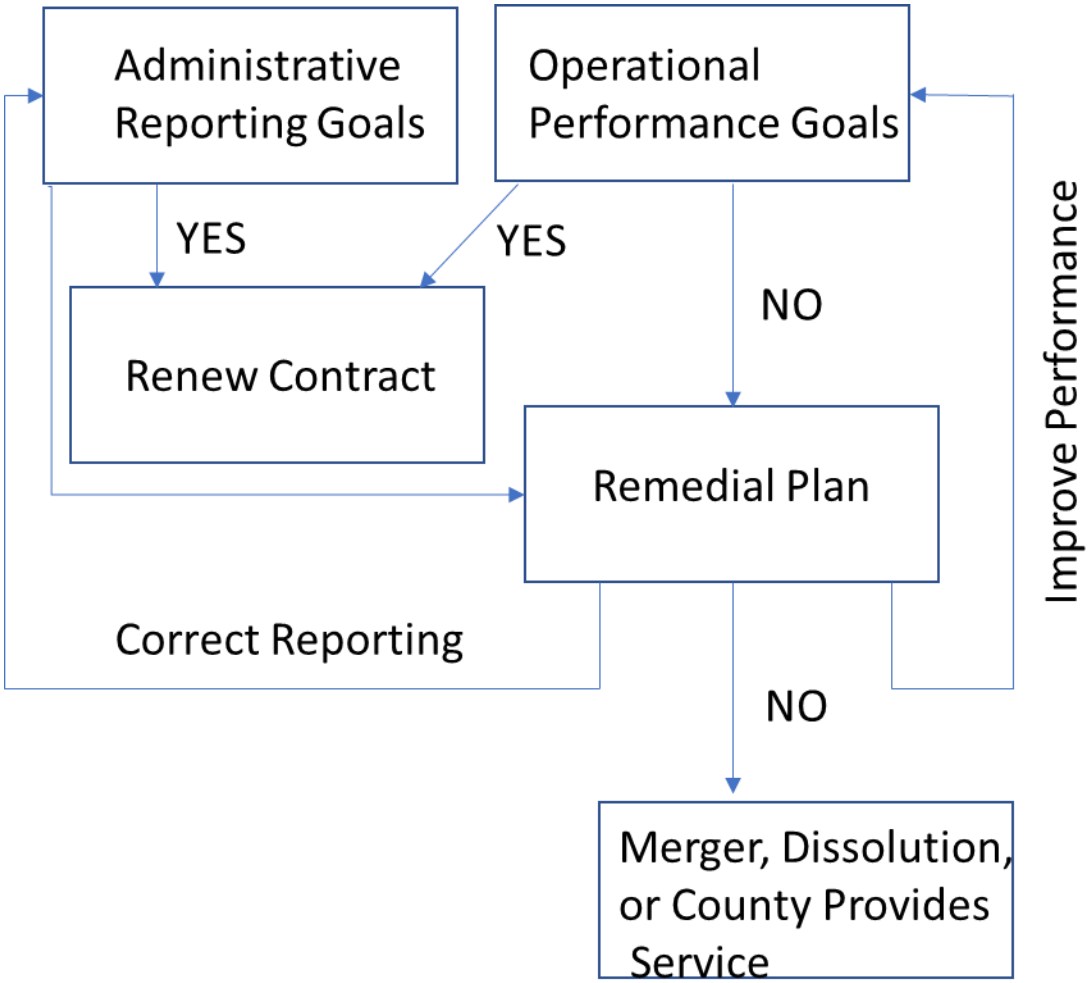
Remember that any County personnel assigned to augment service would respond without regard to current boundaries, and that investments made in this area would provide benefits in multiple districts, improving compliance and possibly avoiding the need to make changes. Provision of career staffing can avoid the need to maintain the current complement of rural stations.

[32] This data could begin with SCFIRS reports, and be followed by more complete data on individual unit responses from the new CAD/RMS system once it as operational.

The idea is that with regular and ongoing monitoring of operational performance, that the process of making adjustments requiring administrative consolidation or provision of County service can be identified in advance, and managed in an orderly manner.

If, after a remedial plan were developed and the department were still unable to meet desired standards, then the process or merger, dissolution, or County service provision would be triggered. These triggers would need to be identified based on the service standards selected (for example, failure to meet a standard by "*x* percent over a certain number of months."

Figure 8.2 Ongoing Implementation (After Initial Year)



This framework provides a guide to improving service under Option B. This framework can be applied independent of decisions about budgeting, tax strategy, or even district boundaries as tax entities versus operational response areas.

9. RECOMMENDATIONS

This section lists every recommendation from the report (Table 9.1).

Table 9.1 List of Recommendations

Recommendation Number	Recommendation Summary	Report Section
6.1	Pursue a dual funding model, whereby some costs are borne through ad valorem property assessments across the County, and others remain in the special fire tax. Berkeley County should centrally administer funds to each department based on Countywide needs and local conditions.	6.2
6.2	Establish an interdepartmental task force including planning, public health, emergency services, sheriff, and local fire department representatives, to begin a community risk reduction project aimed at rural fire fatalities.	6.5
6.3	Expand the services of the County Fire Marshal to include formal fire scene investigation duties with proper staffing, training, and certification.	6.5
6.4	Record all fire inspections, code compliance, public education, and fire scene investigations through the proposed county managed records management system.	6.5
6.5	Conduct a risk analysis for technical rescue incidents, particularly for unique hazards such as machinery and tower, and work jointly with the City of Charleston to share information, develop preplans, and conduct regular exercises.	6.6
6.6	Form a team to provide initial response to technical rescue incidents.	6.6
6.7	Enter into a formal agreement with the City of Charleston for provision of hazardous materials response services.	6.6
6.8	Encourage enhanced awareness-level training for aircraft incidents for first-arriving fire departments to the airport. This should include annual airport response exercises for close-by fire departments.	6.6
6.9	Encourage the Fire Chiefs Association to develop a foam response capability to deal with flammable liquid issues, including on and off-airport aircraft incidents.	6.6
6.10	If traffic at the airport is planned to expand, evaluate and consider purchase of an appropriate ARFF vehicle.	6.6

	Evaluate possibility of training airport employees to undertake firefighting as an ancillary duty.	
6.11	Berkeley County Sherriff should continue responsibility for water rescue and open land search within the County. Berkeley County EMS should assume the extrication responsibilities from County rescue to supplement the areas of limited or non-existing coverage for medium and heavy rescue for vehicle accidents. Some fire departments already provide this service however, Berkeley County EMS should provide vehicle rescue/extrication with the responding fire departments in those areas where the service is not available.	6.6
7.1.1	Include a positive affirmation statement on services provided by each department, consistent with standards developed by the county and the Chiefs Association.	7.1
7.1.2	Develop resource typing for apparatus. Include minimum complement of equipment and training requirements for vehicle extrication.	7.1
7.1.4.b	Require all fire departments to record all emergency incidents utilizing the South Carolina Fire Incident Reporting System (SCFIRS).	7.1
7.1.4.c	Develop county-wide minimum training requirements for senior and line officer, driver-operator, and firefighter. In consultation with Fire Chiefs, the county should begin process of developing minimum standards for training and experience for firefighters, line officers, and chief officers. Existing chief officers could be “grandfathered.”	7.1
7.1.4.d	Require approval of the county to purchase new apparatus. Begin a process to “right-size” the fleet, retire aged obsolete apparatus, and develop a realistic understanding of fleet needs.	7.1
7.1.5.a	Develop Berkeley County Fire/EMS credentialing system. This should be combined with an incident scene accountability system to be used for all incidents across the County.	7.1
7.1.5.b	In consultation with Fire Chiefs, the County should begin process of standardizing SCBA, and providing annual maintenance and inspection services for the existing stock of SCBA. Develop a plan to move toward standardizing manufacturer and model based on current inventory and maintenance cost.	7.1
7.1.5.c	Develop uniform standard operating procedures that are enforced county-wide. These would begin with fire ground	7.1

	life safety policies (safety, accountability, evacuation, rapid intervention procedures), and move into operational concerns. This process should be led by the County Fire Chiefs Association, with facilitation provided by the county.	
7.1.5.d	Have auditing firm review periodic financial reports from fire departments on an ongoing basis. The frequency of submission could be reduced to quarterly, corresponding to disbursement of fire fee revenues.	7.1
7.1.5.e	Record all training and certification through the proposed county managed records management system. Equipment for departments to interface with the system should be provided by the county. Require all fire departments to use the county managed records management system for all records and reporting.	7.1
7.2	Develop a lightweight, Compressed Air Foam apparatus for use by non-interior firefighters in departments with fewer than 8 interior-certified firefighters.	7.4
7.3	Evaluate the feasibility of implementing an on-duty platoon in rural areas of Berkeley County.	7.4
7.4	Evaluate the feasibility of using software to track personnel availability and response.	7.4
7.5	Create suburban and rural service standards.	7.4
7.6	Using the CAD systems data, commission a study of apparatus utilization to identify under- utilized apparatus that may be candidates for elimination.	7.4
7.7	Standardization of apparatus should be pursued, to streamline training requirements, ease maintenance, and permit seamless movement of apparatus between districts as needs dictate in the future.	7.4
7.8	Explore development of a County-assisted program for developing Junior Firefighters.	7.5
7.9	A centralized recruitment capability should be launched to assist departments in making contact with potentially interested future members.	7.5
7.10	Additional data should be collected from current volunteers to better understand their concerns and interests.	7.5
7.11	Evaluate water supply and dispatch improvements for their potential impact on improving or maintaining ISO rating.	7.7

7.12	The County should provide funding for a recording secretary and establishment of a web page for the Chief's Association. A web page should be established that would contain copies of minutes and other documents of interest. Social media should be used to facilitate information sharing between fire department members, Fire Administration, and the public.	7.8