

## 1. COMMUNITY PROFILE

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### **1.1 GENERAL**

Jefferson County is one of 55 counties in West Virginia and is located in the eastern-most portion of the state's eastern panhandle. It is bordered by Berkeley County, WV to the west; Washington County, MD to the north and east; and Loudoun and Clark Counties, VA to the south. Jefferson County is composed of five (5) incorporated municipalities, including Bolivar, Charles Town, Harpers Ferry, Ranson, and Shepherdstown.

According to the U.S. Census Bureau, the population of Jefferson County is 42,190 (Census 2000), which is a significant increase from 1990's population of 35,926. The county's population continues to grow because of the community's close proximity to Washington, D.C. See Section 2, "Growth Trends", for a more detailed discussion of population growth.

Jefferson County's climate is predominantly influenced by air from the west. There is considerable variation in seasonal temperatures, with none of the temperatures being considered severe. The average temperatures in January are a high of 38° and a low of 19° Fahrenheit; the July average temperatures are a high of 85° and a low of 61° Fahrenheit; the annual average temperature is 52° Fahrenheit (WVBEP 2004). Precipitation is evenly distributed throughout the year with an annual average of 37 inches (Jefferson County HMP 2003).

There are an estimated 24,458 structures in the county, approximately 82% of which are considered residential. According to the 2000 Census, Jefferson County has a total of 17,623 housing units, 16,165 of which are occupied. (Several housing units can be contained in a single structure, e.g. apartment complexes and townhouses.) The median value of these units is \$116,700 (Census 2000). However, Jefferson County's residential population is growing rapidly. As a result, new structures are being built at a very high rate.

Jefferson County offers several other amenities, including a hospital, 25 schools, a university campus, five (5) fire departments, seven (7) police stations, and an emergency communications facility (Jefferson County HMP 2003). Seven (7) industrial sites are available in the county, totaling 1,406 acres (WVBEP 2004). Two (2) industrial parks are located near the community of Bardane: the Bardane Industrial Park and the Burr Business Park.

**1.2 TRANSPORTATION INFRASTRUCTURE**

Jefferson County’s transportation infrastructure is comprised of highway and rail elements. WV 9 and US 340 are the principle arterial routes through the county. Many sections of these roadways are four-lane, divided highway. Currently, significant construction is upgrading WV 9 to four-lane, divided highway throughout Jefferson County. Other components of the highway infrastructure are shown in Figure 1.2.1.

*Figure 1.2.1*

HIGHWAY	APPROXIMATE ROUTE/LOCATION
WV 45	Shepherdstown west to Berkeley County Line
WV 51	Charles Town west to Berkeley County Line
WV 230	Shepherdstown south to Halltown (intersects/ends at US 340)
WV 480	Shepherdstown south to Kearneysville
CR 1	Kearneysville south through Middleway and Summit Point to Virginia State Line
CR 13	Charles Town southwest through Summit Point to Virginia State Line
CR 25	Mechanicstown south to Virginia State Line
CR 28	North south along Potomac River in the northeast portion of the county

Rail lines are also a part of the county’s transportation infrastructure. The Norfolk Southern Railroad runs north south through the center of the county, passing near the communities of Charles Town, Ranson and Shepherdstown. Two (2) CSX lines are located in the county. The first line runs southeast in the northern portion of the county near Kearneysville, Shenandoah Junction and Reedson into Harpers Ferry. The second line runs northeast in the southern portion of the county near Summit Point and through Charles Town and Ranson on its way to Harpers Ferry. CSX does offer commuter boarding at Duffields and Harpers Ferry. In addition to these two (2) lines, Amtrak service is offered in Harpers Ferry.

Jefferson County’s transportation infrastructure is sufficient to meet the needs of most of the county’s current population. As the county continues to grow and develop, so too should the transportation system. The upgrading of WV 9 is a prime example of the development of the roadway network. However, major construction causes many inconveniences, not the least of which is to emergency services responding to an incident. Even with the extensive transportation network in Jefferson County, there are areas with limited access. These areas are primarily residential in nature and are indicative of

the fast-growing subdivision sectors of the county. Areas in this situation include Shannondale, Blue Ridge Acres, and Keyes Ferry Acres.

### 1.3 PUBLIC WATER CAPABILITIES

In terms of a fire risk assessment, the utility of most concern is the public water system. A total of 26 community water systems operate throughout Jefferson County. (There are several other small systems that serve schools, federal installations, industrial parks, campgrounds, parks, etc. These systems do not provide water to a population on a 24 hours per day, seven [7] days per week basis and are thus not considered here.) In total, community water systems serve approximately 19,200 persons (Jefferson County Comprehensive Plan 2004). The following community water systems operate in Jefferson County.

- |   |                                |
|---|--------------------------------|
| 1. Jefferson County Public Service District | 15. Tuscowilla Utilities       |
| 2. Cave Quarter Estates                     | 16. Valley View MHP            |
| 3. Charles Town City                        | 17. Walnut Grove Utilities     |
| 4. Fox Glen Utilities                       | 18. Westridge Water Department |
| 5. Glen Haven Utilities                     | 19. Potomac Farms              |
| 6. Green Acres MHP                          | 20. Oak Hill MHP               |
| 7. Harpers Ferry City                       | 21. Harpers Ferry Campsites    |
| 8. Harpers Ferry Job Corps                  | 22. Parkview Woodland          |
| 9. Keyes Ferry Acres                        | 23. Shenandoah Plantation      |
| 10. Kratz MHP                               | 24. Cavaland                   |
| 11. Leights MHP                             | 25. Shenandoah Mini Homes      |
| 12. Russell's MHP                           | 26. Potomac Terrace            |
| 13. Shenandoah Junction                     | 27. Meadowbrook                |
| 14. Shepherdstown                           |                                |

“Three major public systems supply approximately 65% of the population that is on public or community water systems. These public-operated central water systems serve the municipalities of Charles Town/Ranson, Shepherdstown and Harpers Ferry. All three of these systems primarily draw their source from surface waters (the Potomac and Shenandoah Rivers)” (Jefferson County Comprehensive Plan 2004). Together, these systems serve a population of approximately 12,300. All three (3) of these systems provide fire protection.

Of the remaining 23 community systems, five (5) provide fire protection. These five (5) systems – Harpers Ferry Job Corps, Shenandoah Junction, Tuscarilla Utilities, Walnut Gove Utilities, and Meadowbrook – serve a population of approximately 4,110. Currently, approximately 2,790 customers served by community water systems are not provided fire protection and approximately 25,780 total residents (including the above customers) are not afforded fire protection.

The Harpers Ferry Job Corp water system provides a water supply that is used to fill a large tank at the Harpers Ferry Job Corp facility as the facility has its own fire protection system. The Shenandoah Junction water system supplies fire protection for the entire Shenandoah Junction area; it is also connected to the Burr Bardane Industrial Park, as well as the Duff Field area. The Shenandoah Junction water system also provides fire protection for the Jefferson County High School and Middle School. The Walnut Grove Utilities water system provides fire protection for the entire Walnut Grove subdivision, the Potomac Market Place, Lakeland Place subdivision, Breckenridge subdivision, Cambridge Mobile Home Park, the Charlestown Race Track and the development surrounding the race track, as well as the area along Flowing Springs Road. The Meadowbrook water system provides fire protection for the Amber Knoll subdivision, Gap View subdivision, Sheridan subdivision, Breckenridge North subdivision, and the US Customs Training Facility located just off of route 340.

#### **1.4 COMMUNICATION**

In communities such as Jefferson County, the local media fulfills a necessary role in providing information to the general public. The media can also enhance mitigation initiatives. Press releases and advertisements can generate public interest and participation in mitigation projects while giving the sense that emergency managers are “doing something” and actively protecting the community. The local media, if used effectively, can assist in dispelling negative preconceptions about emergency service providers. The media also provides the vital, obvious service of disseminating emergency public information during disasters or emergencies. As such, solid working relationships with media providers are of cardinal importance. Figure 1.4.1 lists the media outlets serving Jefferson County.

**Figure 1.4.1**

<b>NEWSPAPER</b>	<b>TELEVISION</b>	<b>RADIO</b>
<i>Charles Town Citizen</i> – Charles Town	<i>WHAG (NBC 25)</i> – Martinsburg/Hagerstown	<i>WMRE 1550 AM</i> – Charles Town <i>WXVA 98.3 FM</i> – Charles Town
<i>Hagerstown Herald Mail</i> – Hagerstown	<i>WWPX</i> – Martinsburg <i>WWPB</i> – Hagerstown	<i>WRNR 740 AM</i> – Martinsburg <i>WEPM 1340 AM</i> – Martinsburg
<i>Shepherdstown Chronicle</i> – Shepherdstown	Jefferson County Schools Ch. 19 Adelphia Cable	<i>WKMZ 95.9 FM</i> – Martinsburg <i>WLTF 97.5 FM</i> – Martinsburg
<i>Shepherdstown Observer</i> – Shepherdstown		<i>WYII 95.9 FM</i> – Martinsburg <i>WINC 92.5 FM</i> – Winchester
<i>Spirit of Jefferson</i> – Charles Town		<i>WUSQ 102.5 FM</i> – Winchester <i>WZFM 98.3 FM</i> – Winchester
<i>The Journal</i> – Martinsburg		<i>WXVA 1550 AM</i> – Winchester <i>WARX 106.9 FM</i> – Hagerstown
<i>The Picket</i> – Shepherd University		<i>WVEP 88.9 FM Public Radio</i> – Shepherdstown <i>WSHC FM 88.1</i> – Shepherd University

However, local media outlets are not the only form of communication or the only means of disseminating warning. For warning, several existing civil defense sirens are still operable and could be used on a limited basis in areas threatened by a fire event. Additionally, technology could be used to the benefit of notification and warning. Cellular telephones with text messaging capability and Internet sites for local jurisdictions could be utilized to warn citizens.

## 2. GROWTH TRENDS

### 2.1 POPULATION GROWTH

Demographic information is an integral part of community and emergency planning. According to FEMA's *Risk, Hazard and Value Evaluation*, "an awareness of changes in population projections help decision makers anticipate needs before they arise." As discussed in the *Jefferson County, West Virginia Comprehensive Plan 2004*, fluctuations in population are the result of two (2) factors: natural rate of growth (number of births versus deaths) and migration (number of persons moving into the county versus moving away). The natural rate of growth is much easier to portray accurately than is growth as a result of migration.

#### KEY POINTS

- Jefferson County's population is growing rapidly.
- Population totals could reach as high as 57,142 by 2020.
- Much of the growth is a result of an increase in employment opportunities near Washington, D.C., Frederick, Hagerstown, the Dulles Corridor and Berkeley County.
- More people require more fire services.

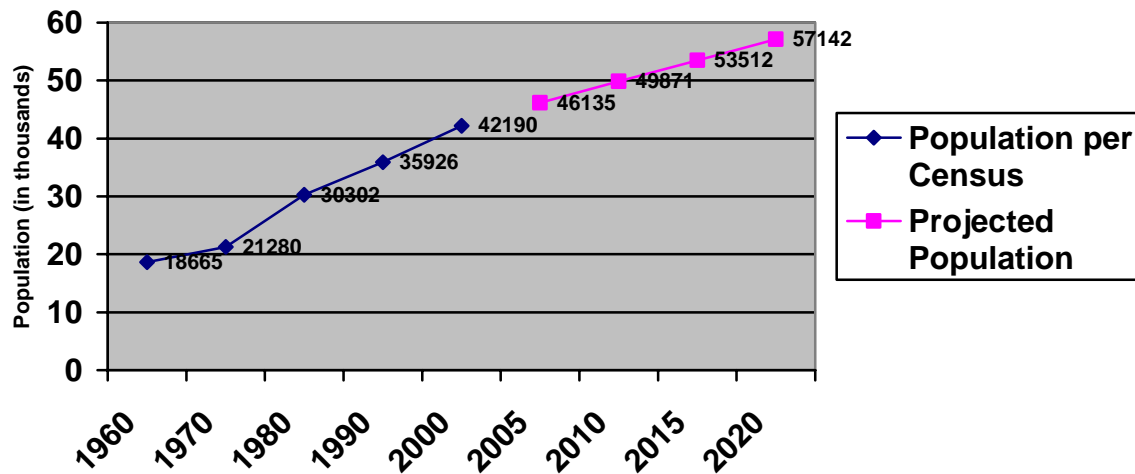
#### *Jefferson County Growth*

Jefferson County's population is represented in Figure 2.1.1 below. The population grew slowly in the early part of the 20<sup>th</sup> century increasing from approximately 16,000 people to 21,280 over the fifty-year period ending in 1970. The county's population increased dramatically throughout the 1970s, growing by 42.4% from 21,280 to 30,300 in 1980. While no other decade has since equaled that amount of growth, the county's population continued to increase rapidly throughout the 1980s and 1990s. The population growth rate was 18.56% from 1980 to 1990 and 17.4% from 1990 to 2000. The population totals at the end of those periods were 35,926 and 42,190, respectively.

Population projections for Jefferson County are based on three (3) sources: the Regional Research Institute of West Virginia University (RRI/WVU) Series M and Series A computations and the Jefferson County Planning Commission. The RRI/WVU Series M data is based on current rates of birth, survival and migration; RRI/WVU Series A data is based on long term averages; Jefferson County Planning Commission data are locally derived based on long term trends in dwelling unit construction, persons per dwelling unit, and fluctuations due to economic cycles. When averaged, these sources predict the following populations: 46,135 in 2005; 49,871 in 2010; 53,512 in 2015; and 57,142 in 2020 (Jefferson County Comprehensive Plan 2004).

Figure 2.1.1

## Jefferson County Population



Jefferson County is located in the “Washington Metropolitan Fringe” as defined by the Greater Washington Research Center. Growth in Jefferson County is influenced by what is happening in the Washington Metropolitan Region as a whole. Much of the growth experienced by Jefferson County is residential-style growth consisting of people working in regional markets between and including Washington, D.C. Such nearby areas as Frederick, the Dulles Corridor, Hagerstown, and Berkeley County are all seeing an increase in employment opportunities; thus, Jefferson County is no longer a significant drive from employment centers (Jefferson County Comprehensive Plan 2004).

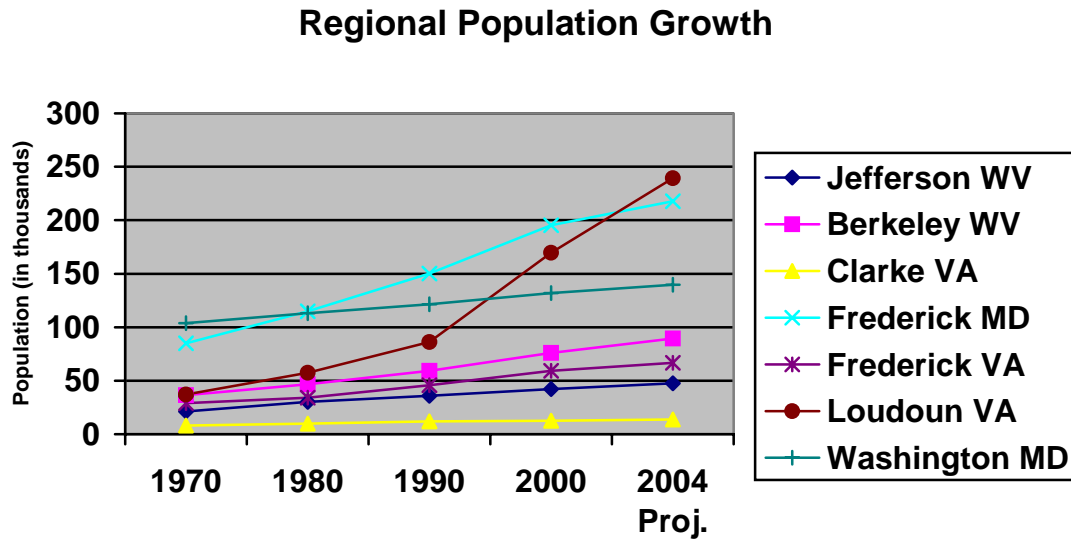
As Jefferson County’s comprehensive plan states: “The conclusion can be drawn that the impact of external employment opportunities will continue to grow, which will continue to impact the County as it is an attractive ‘bedroom community’ for those areas.”

### *Regional Growth*

Figure 2.1.2 shows the population growth of Jefferson County and other nearby counties. As can be seen, Jefferson County has grown steadily, but not at a higher rate than other nearby counties. Loudoun County, Virginia and Frederick County, Maryland have grown at the most significant rates. These counties are located east of Jefferson County. Jefferson County and its westerly neighbors have grown steadily at approximately the same rates (signaled by the nearly parallel lines below). It is anticipated that migrant populations will continue to move west. Jefferson County, then, could expect more significant population growth in the coming years as eastern neighbors “fill up”. Local growth rates

could be similar to the rates currently experienced by Loudoun and Frederick (MD) counties, which would further strain local fire services.

*Figure 2.1.2*



#### *Population Density*

Population density is measured in persons per square mile. Because Jefferson County's boundaries are set and the population is increasing, population density is also increasing.

The population density within the incorporated areas of Jefferson County is much higher than in the rural areas. Figure 2.1.3 demonstrates this fact. Such a situation can be expected in future years, as municipalities offer the greatest access to such services as health care, recreation, emergency services, etc.

**Figure 2.1.3**

<b>MUNICIPAL POPULATION DENSITIES</b>			
<b>Name</b>	<b>Population (Census 2000)</b>	<b>Land Area (in sq.mi.)</b>	<b>Persons per Sq. Mile</b>
Bolivar	1,045	0.5	2,090
Charles Town	2,907	1	2,907
Harpers Ferry	307	0.6	511*
Ranson	2,951	0.9	3,279*
Shepherdstown	803	0.4	2,008*
Charles Town – Ranson	5,858	1.9	3,083
Bolivar – Harpers Ferry	1,352	1.1	1,229
Unincorporated Areas	34,177	209.01	163
Jefferson County (Total)	42,190	212.41	199

\* Persons per square mile totals are higher than populations because municipalities are less than 1 sq.mi.

The population density within what are termed “rural areas” can vary significantly as well. For instance, subdivisions or unincorporated communities may include clusters of persons and homes that result in very small, dense areas located sporadically throughout rural Jefferson County.

According to the Jefferson County Office of Planning, Zoning and Engineering, several subdivisions have made certain areas of the county very dense in terms of population and residential housing structures. For example, the Thornhill subdivision located on Route 9 east of Charles Town contains 700 to 800 homes. (Using Census figures for persons per household, this equals an approximate population range of 1,778 to 2,032.) Other subdivisions, such as Sheridan Estates and Breckenridge contain large populations in small areas.

The City of Ranson also has significant commercial and residential development planned. Several projects, adding as many as 3,325 residential units and five (5) commercial areas, can significantly add to the population density of the area.

*Impacts on the Fire Service*

Significant population growth is important to the fire service for several reasons. One simple adage states: “More people require more services.” People themselves can add to the fire risk. Examples include: carelessness; residents increase the probability of electrical fires in their homes by improperly using appliances and overloading outlets; many people enjoy fireplaces in their homes; and a larger population will require more vehicles (especially in Jefferson County where many people commute to work), which could result in more frequent Motor Vehicle Accidents (MVAs) and even vehicle fires.

Adequate fire protection may be more difficult to provide in the heavily populated “clusters” throughout the rural areas of the county. Many fire companies within Jefferson County (with the exception of the Blue Ridge Mountain Company) are located in municipalities. These companies may have difficulty responding to other congested areas within their first-due area because of the rural areas between their station and each “population cluster”. For instance, road construction or other road conditions may cause delays in response times. Further, physical distance may play a role in the level of immediate fire protection available.

The “urban”/wildland interface that Jefferson County is currently experiencing also contributes to the fire risk. As the county’s population grows and more housing opportunities are needed, populated areas will encroach upon wild areas or, in some instances, wild areas will be cleared to make way for population growth. In any event, a population residing near a “wildland area” will have to shoulder more responsibility for fire protection (e.g. brush will likely need to be cleared from around homes, etc.). During the spring and fall seasons when wildfires are most likely to occur (because of dry [dead] foliage covering the ground [acting as fuel]), populations in and near heavily wooded areas are at a greater risk. A quickly-spreading wildfire could consume many houses before firefighters could respond. This risk is compounded when the population most at risk is located a significant distance from its first-due fire company’s station.

With a growing population, new residents in Jefferson County will require new housing opportunities. In other words, the existing housing stock cannot house the projected numbers; new homes must be built. In fact, local leaders and residents have seen a recent upswing in the number of subdivisions and new homes being constructed.

In very simple terms, a larger building inventory equals a larger fire risk. This is certainly not to say that each new building or facility constructed will present a high fire risk. In fact, according to FEMA

and the NFPA, residential structures actually present a “low probability” when considering fire risk. However, the overall county fire risk will rise as new homes and other buildings are constructed. (Growth in the building inventory is discussed in more detail below.)

**2.2 INCREASE IN BUILDING INVENTORY**

As mentioned above, a significant increase in population likely signals an increase in the building stock. Data from the county department of Planning, Zoning and Engineering support this statement. According to the *Jefferson County, West Virginia Comprehensive Plan 2004*, the number of Improvement Location Permits (ILPs) and Building Permits Issued has steadily increased since 1984. The number of ILP and building permits issued from residential lots has increased from 130 in 1984 to 611 in 2002, for an increase of 470%. (NOTE: These figures do not include parent to child conveyances.)

Further, the number of ILP and building permits for dwellings has significantly increased during the same time period. (“Dwelling” is defined as the total of single family detached dwellings, duplex units and townhomes.) The number of permits for dwellings has increased 407% from 85 in 1984 to 246 in 2001. It is also significant to note that the number of permits for dwellings skyrocketed in 2002 to 503. The total of 503 is for the partial year 2002.

As more and more building permits are issued and more and more buildings are constructed, one must remember that buildings are not being demolished at the same rate. Further, as officials with Planning, Zoning and Engineering have indicated, many of these permits are being issued for subdivision development, which means a clustering of residential structures in a relatively small area. According to county commission representatives, the rural building density is standardized at one (1) house per 15 acres. Clustered areas can approach one (1) house per ten (10) acres. Many of the subdivisions in the county push the density toward the 1:10 ratio. As discussed above, clustering areas does have ramifications on the local fire service. The following table figure 2.2.1 illustrates the number of buildings, and population in each fire district as of 2000.

**Figure 2.2.1**

<b>FIRE DISTRICTS</b>	<b>NUMBER OF BUILDINGS</b>	<b>POPULATION</b>
Blue Ridge Fire District	3267	5257
Citizens Fire District	4189	6870
Friendship Fire District	2983	4666
Independent Fire District	9761	16465
Shepherdstown Fire District	5561	8932

### 2.3 ECONOMIC TRENDS

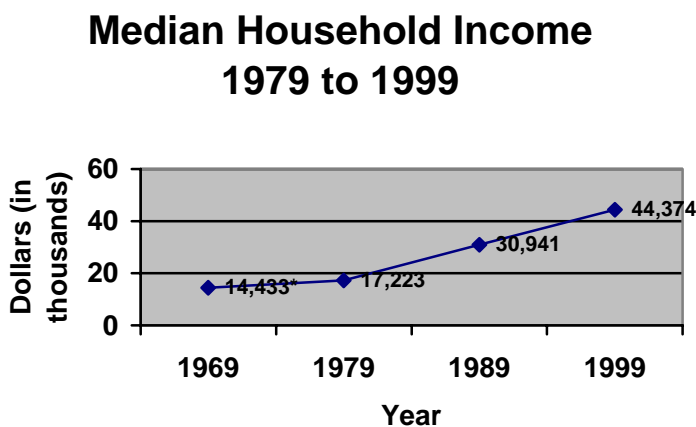
In many ways, the economic climate of Jefferson County has steadily improved. The median household income has risen, as has the per capita income and the median value of owner-occupied housing units.

Median household income is perhaps the strongest indicator of economic gain at the level of the individual citizen. Figure 2.3.1 shows recent median household income trends.

#### KEY POINTS

- Median household income has steadily risen.
- Rising incomes have ramifications if local departments consider paid personnel.
- The total number of structures throughout the county is increasing rapidly, especially in the residential sector.
- The value of owner-occupied housing units is steadily increasing, leading to greater potential losses due to fire.

Figure 2.3.1



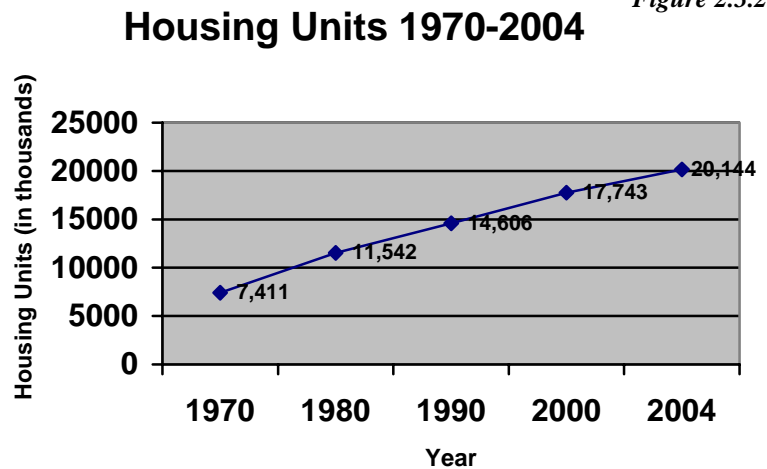
\*1969 MHI is estimated.

Per capita income has also risen significantly from \$7,553 in 1969 to \$20,441 in 1999. These figures indicate that Jefferson County residents are making more money. Such a rise in income can be generated in several ways. General prices, often referred to as “cost of

living”, are more expensive in today’s economy. Today’s dollars are inflated compared to 1970 dollars (the value of the dollar has changed over time). Finally, many county residents commute to work in areas with a higher cost of living, where positions inherently come with a slightly higher pay scale.

As discussed above in 2.2, the building stock is also increasing, especially in the area of residential housing. The number of structures has grown to include 130 industrial structures, and 4,184 commercial structures as of 2003. Within that figure, the number of housing units has grown from 14,606 in 1990 to 17,743 in 2000 to an estimated 20,144 in 2004. Figure 2.3.2 depicts this trend graphically.

As can be seen, the increase in housing units has steadily increased along with increases in populations. The largest 10-year increase was between 1970 and 1980, which follows the sharp increase in population that occurred during that decade. According to local officials, the number of housing units is expected to spike between 2000 and 2010. The Department of Planning, Zoning and Engineering reports that a very high number of building permits are issued monthly for construction of or within a subdivision. The county addressing office reports that new roads are constructed at an alarming rate, reinforcing the fact that subdivision construction is at an all-time high throughout the county.



One may expect only slight changes in the value of properties when such a sharp increase in the number of properties considered is occurring. Simple mathematics states that averages change in smaller increments as more units are included in the average calculation. However, even with this increase in residential housing, particularly owner-occupied units, Jefferson County has also seen a sharp increase in the median value of owner-occupied units. The county has experienced a 28% increase in the value of owner-occupied units, which is a significant increase. Several factors affect these median values, just as income levels were affected. Inflation means that today's dollars have a different value than yesterdays.

Economic trends also show areas in which commercial/industrial development is targeted. As these areas develop, additional facilities may add to potential losses. Commercial and industrial facilities present a much greater fire risk than residential facilities due, in part, to the machinery that is often utilized within them. Also, access to additional facilities, as well as crowding at and expansion of targeted growth areas may create congested areas causing delays for responding fire service providers. Currently, there is a 200-acre industrial park in Jefferson County near the community of Bardane. (Bardane is also home to a county government complex and the Burr Business Park.) Several other

commercial and industrial developments are occurring along State Route 9 and US Route 340. These roadways are four-lane, divided highways and are the most heavily traveled within and through Jefferson County, making them attractive to developers and entrepreneurs.

*Impacts on the Fire Service*

Rising median household and per capita incomes are significant for the fire service, particularly if fire companies consider adding paid personnel. According to local officials, many volunteer firefighters in Jefferson County are paid personnel with departments in neighboring states. Paid firefighting salaries in Jefferson County must be competitive with those positions. Additionally, firefighter salaries must compete with other salary levels throughout the county. Rising median household and per capita incomes suggest that paid firefighter salaries must also rise accordingly. Without competitive salaries, a paid staff will be hard to recruit.

As commercial and industrial development continues, local fire companies must take appropriate planning steps to ensure that they can adequately serve newly commercialized areas. In the long term, as areas along State Route 9 and US Route 340 as well as the Burr Business Park and Bardane industrial park develop, fire companies in Charles Town and Ranson (the Citizens and Independent Fire Companies, respectively) should be afforded easy access to commercial/industrial developments thanks to four-lane highways. However, in the short term, access may be a problem as these areas develop. Currently, several developments are being built concurrently with highway upgrades. Construction could cause significant delays in response times.

Further, firefighters not only save lives, they save property. They attempt to reduce losses by mitigating fires and quickly responding to actual events. An increase in the value of owner-occupied units (if assuming that the value for owner-occupied units is representative of the entire residential housing stock) equals an increase in potential losses.

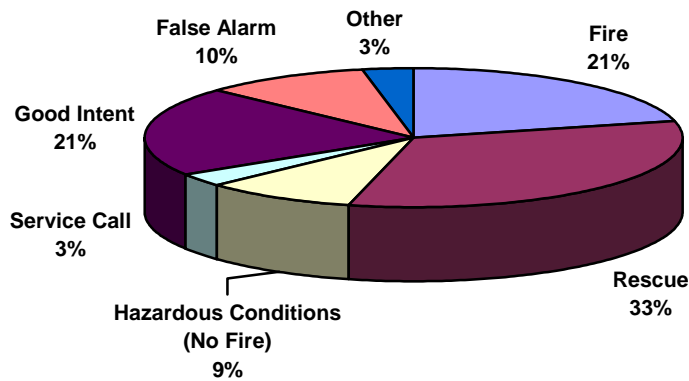
### 3. HISTORICAL ACTIVITY

A very important element in determining the county's fire risk is to analyze the types of events to which local fire service providers actually respond. For example, the types of calls, frequency of calls, and the dollar losses of past incidents can serve as baselines from which to determine fire risk. The following data are taken primarily from the National Fire Incident Reporting System (NFIRS) database, which is maintained locally by the Independent Fire Company. Response data maintained separately by the Shepherdstown Fire Company is also included.

#### 3.1 RESPONSES BY INCIDENT TYPE

The time period analyzed is January 1, 2002 to December 31, 2004. During this period, Jefferson County fire and rescue departments responded to 2,289 incidents. Figure 3.1.1 details the demand by service type. The "other" category includes "special" incident, severe weather and natural disaster, and explosion calls. The actual number of responses is shown in Figure 3.1.2.

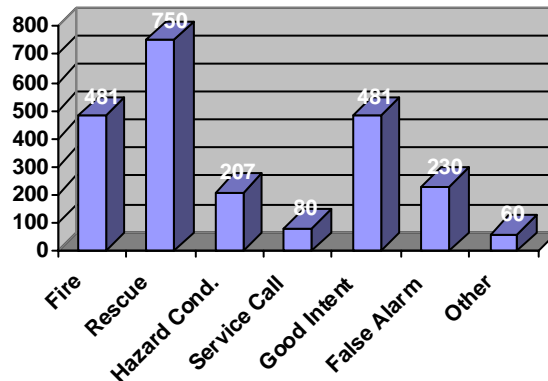
*Figure 3.1.1*



Much of this information is ancillary to the factors comprising the local “fire risk”. Such a statement demonstrates the multi-dimensional nature of a firefighter’s job. It can be said that rescue and emergency medical service, hazardous condition (no fire), service, false alarm, severe weather, and special incident calls do not contain fires and thus do not contribute to the fire risk. Many elements of the “good intent” category can be removed as well (see below). Please note that it is assumed that if a hazardous condition or severe weather call, for instance, were to result in an ignited fire, the event would be reclassified accordingly.

*Figure 3.1.2*

**Total Responses 2002-2004**



The “good intent” category contains many items that are not traditional fire calls. For the purposes of this report, only the following items within “good intent” are analyzed. (The number of incidents recorded for each item is listed in parentheses.)

- Authorized controlled burning (32)
- Prescribed fire (3)
- Steam, other gas mistaken for smoke (4)
- Smoke scare, odor of smoke (9)
- Steam, vapor, fog or dust thought to be smoke (3)

When all necessary categories are removed or revised, the actual number of recorded fire-related incidents becomes 539. These 539 incidents are further classified as follows.

*Figure 3.1.3*

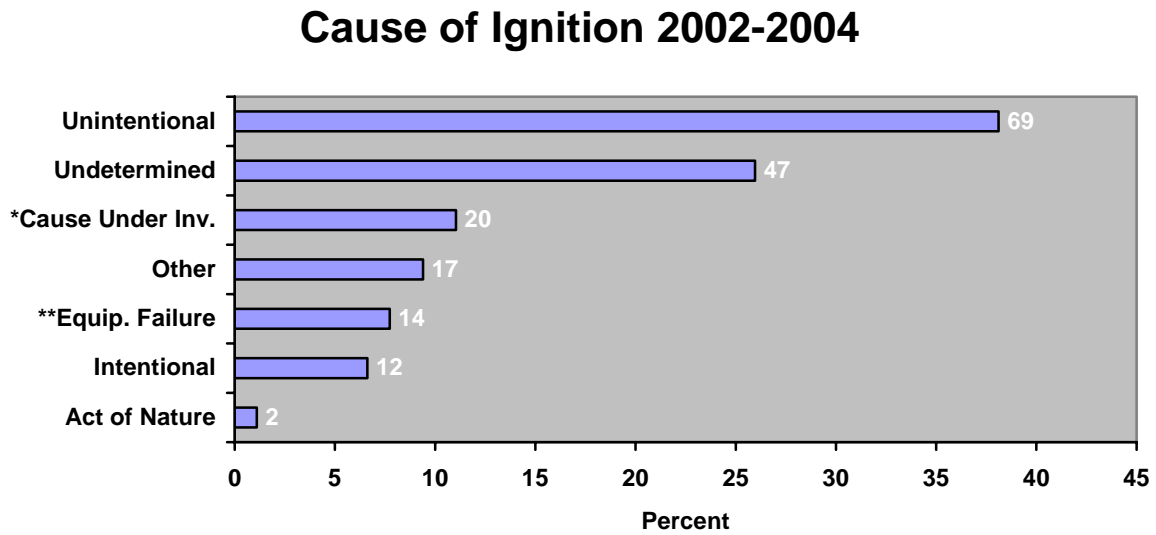
<b>CLASSIFICATION OF FIRE-RELATED CALLS</b>	
<b>Incident Type</b>	<b>Count</b>
Building fire	131
Passenger vehicle fire	54
Brush or brush-and-grass mixture fire	39
Chimney or flue fire, confined to chimney	39
Fire, other	39
Fires in structure other than a building	36
Authorized controlled burning	32
Cooking fire, confined to container	18
Outside rubbish fire, other	15
Outside rubbish, trash or waste fire	14
Natural vegetation fire, other	13
Forest, woods or wildland fire	11
Fuel burner/boiler malfunction, fire	10
Mobile property (vehicle) fire, other	10
Smoke scare, odor of smoke	9
Structure fire, other (conversion only)	9
Dumpster or other outside trash receptacle	8
Fire in mobile home used as fixed residence	6
Special outside fire, other	6
Excessive heat, scorch burns	5
Off-road vehicle or heavy equipment fire	5
Road freight or transport vehicle fire	4
Steam, other gas mistaken for smoke	4
Grass fire	3
Prescribed fire	3
Steam, vapor, fog or dust thought to be smoke	3
Trash or rubbish fire, contained	3
Cultivated trees or nursery stock fire	2
Cultivated grain or crop fire	1
Cultivated vegetation, crop fire, other	1
Explosion (no fire), other	1
Fire in mobile prop used as a fixed structure	1
Fireworks explosion (no fire)	1
Garbage dump or sanitary landfill fire	1
Outside mailbox fire	1
Water vehicle fire	1

Building fires, with 131 incidents, are the most frequently-occurring events. Accordingly, based on NFIRS records from 2002 to 2004, the greatest fire risk can be said to be associated with building fires. However, this statement does not specifically identify all elements of the fire risk. What causes these frequent building fires? Where within the building do they start? Such data is maintained in the local NFIRS system. However, this area of origin information in Jefferson County’s NFIRS system is not as complete as other information.

The area of fire origin is listed in 78 of the total reports in the county’s NFIRS database. This information is divided into four (4) categories: building fire origins, vehicle fire origins, outdoor fire origins, and undetermined.

Cause of ignition is another important element to consider when determining the fire risk. Again, local reporting in this category is somewhat less comprehensive than in other categories. Of the total events reported in Jefferson County, 181 contain entries for “cause of ignition”, the results of which follow in Figure 3.1.4.

Figure 3.1.4



Total Number of Reported Incidents Appears in White to Right of Bars  
 \*Cause Under Investigation  
 \*\*Failure of Equipment or Heat Source

### 3.2 FREQUENCY

Jefferson County fire companies are dispatched often. Multiple fire companies are dispatched to a single event in many cases. Due to the number of dispatches, equipment must be in reliable condition and personnel training must be maintained. On average, any one (1) county department is dispatched 326 times annually. However, this average is misleading. Those companies serving the more heavily populated areas of Charles Town and Ranson are dispatched significantly more often than are the other three (3) fire companies. This is easily explained by the greater population and structure inventory located in the Citizens (Charles Town) and Independent (Ranson) first due areas.

In total, fire companies are dispatched an average of 1,630 times per year during the period of 2000 to 2005. Total dispatches by year were as follows:

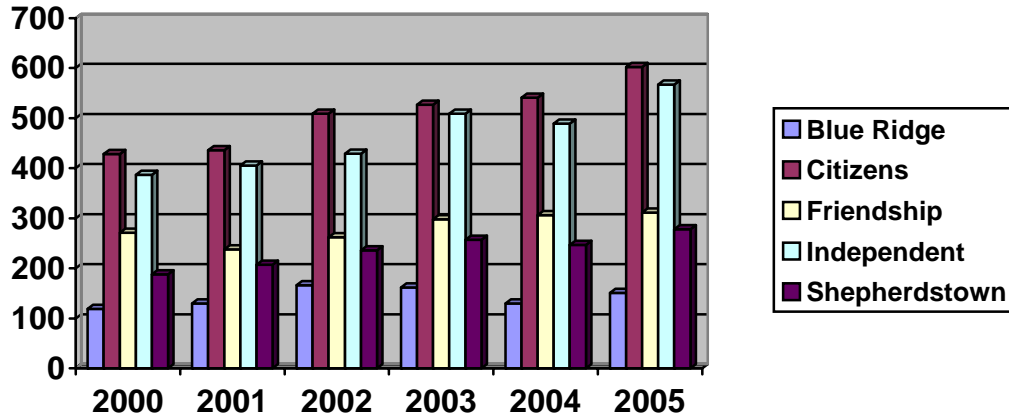
- 2000: 1,393
- 2001: 1,416
- 2002: 1,602
- 2003: 1,753
- 2004: 1,713
- 2005: 1,909

By simply analyzing the number of dispatches, one calculates that nearly five (5) dispatches occur on a daily basis. It is significant to note that the above dispatch numbers do not correlate with the actual number of emergency calls that are received. In reality, multiple dispatches can occur during a single call, either for the size of the incident as reported or for mutual aid, etc.

Analyzing the county fire companies individually is another way to depict call frequency. During the period 2000 to 2005, the Blue Ridge Fire Company was dispatched a low of 119 times in 2000 and a high of 166 times in 2002. On average, the Blue Ridge Company is dispatched 143 times. During the same period, Citizens Fire Company was dispatched a low of 428 times in 2000 to a high of 602 in 2005. Citizens' average number of dispatches is 507. Friendship Fire Company's average number of dispatches over the six (6)-year period is 281, with a low of 238 dispatches in 2001 and a high of 311 in 2005. Independent Fire Company averages 464 dispatches per year with a low of 387 in 2000 and a high of 567 in 2005. Finally, Shepherdstown Fire Company is dispatched an average of 236 time annually, with a low of 188 in 2000 and a high of 278 in 2005. Figure 3.2.1 depicts these estimates graphically.

Figure 3.2.1

### Fire Company Dispatches 2000-2005



Further analysis can be done on an individual basis. The Blue Ridge Fire Company was dispatched a total of 858 times during the 2000 to 2005 period for an average of approximately 0.4 dispatches per day. This figure yields nearly 3 dispatches per week. Citizens Fire Company was dispatched a total of 3,043 times during the time period, for an average of 1.39 dispatches per day (or approximately ten [10] dispatches per week). Friendship Fire Company was dispatched a total of 1,686 times, for an average of 0.77 dispatches per day. Friendship’s approximate weekly dispatches were 5.4 times per week. Dispatches called on Independent Fire Company 2,786 times between 2000 and 2005, for an average of 1.3 dispatches per day (nearly nine [9] dispatches per week). Finally, Shepherdstown Fire Company was dispatched a total of 1,413 times, for an average of 0.65 times per day, or 4.5 dispatches per week. Figure 3.2.2 relates the daily frequency with which local fire companies are dispatched. Figure 3.2.3 relates the weekly dispatch frequencies.

Figure 3.2.2

#### Daily Dispatch Frequency

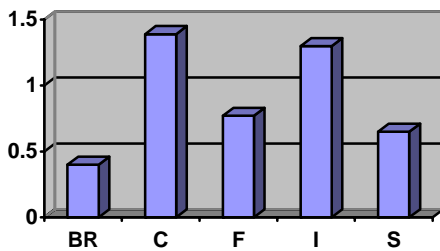
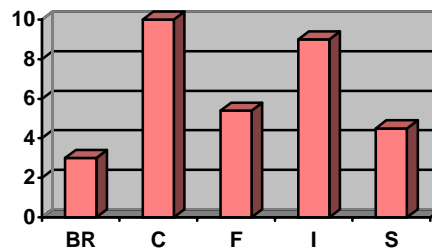


Figure 3.2.3

#### Weekly Dispatch Frequency



Source: Jefferson County, West Virginia Comprehensive Plan, 2004  
 BR = Blue Ridge Fire Company C = Citizens Fire Company  
 F = Friendship Fire Company I = Independent Fire Company  
 S = Shepherdstown Fire Company

As can be seen, the Citizens Fire Company is the most frequently-dispatched company in the county, following very closely by the Independent Fire Company.

### 3.3. LOSSES

The following table illustrates, by incident type, the total dollar value saved and lost as a result of fire. The information in Figure 3.3.1 was compiled by the Jefferson County Ambulance Authority as part of Jefferson County’s National Fire Incident Reporting System (NFIRS). The values for 2002 are considerably lower than those of 2003 and 2004; this could be attributable to starting regular NFIRS reporting late in 2002.

Figure 3.3.1

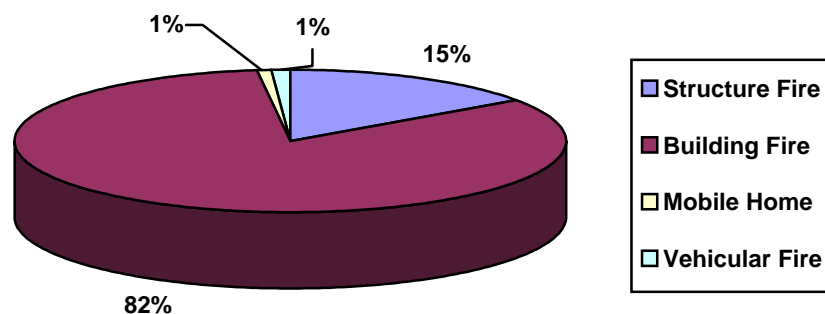
**Dollar Value Saved and Loss Analysis (2002-2004)**

Incident Type	Number of Incidents	Total Value	Total Losses	Total Saved	Percent Lost	Percent Saved
Structure Fire	7	\$840,000	\$627,200	\$212,800	74.7%	25.3%
Building Fire	49	\$12,231,200	\$3,443,900	\$8,787,300	28.2%	71.8%
Mobile Home Fire	4	\$98,000	\$45,000	\$53,000	45.9%	54.1%
Vehicular Fire	19	\$65,800	\$55,050	\$10,750	83.7%	16.3%
Natural Vegetation Fire	6	\$15,150	\$5,100	\$10,050	33.7%	66.3%
Electrical Fire	1	\$1,060,000	\$0	\$1,060,000	0%	100%
<b>Totals</b>	<b>86</b>	<b>\$14,310,150</b>	<b>\$4,176,250</b>	<b>\$10,133,900</b>	<b>29.2%</b>	<b>70.8%</b>

The following pie chart (Figure 3.3.2) illustrates the percentage of total losses by incident type. As can be seen, building fires accounted for the majority of the total losses.

Figure 3.3.2

**Percent of Total Losses by Incident Type**



### *Structure Fire*

There are an estimated 24,458 structures in Jefferson County, approximately 82% of which are considered residential. Structure fires accounted for 8% of the incident types reported and resulted in 15% of the total losses from 2002 through 2004. Approximately 75% of the structure fires reported resulted in losses. According to the Jefferson County Ambulance Authority, total losses as a result of structure fires between 2002 and 2004 were \$627,200.

### *Building Fire*

Building fires comprised 82% of the total losses and were the most frequently reported incident type. However, only 28% of the reported building fires resulted in losses. According the Jefferson County Ambulance Authority, building fires resulted in \$3,443,900 in losses between 2002 and 2004, which is by far the highest loss reported for any incident type.

### *Mobile Home Fires*

There were only four (4) mobile home fires reported between 2002 and 2004. Nearly half of the reported mobile home fires resulted in losses, primarily due to the fact that mobile homes burn at a very rapid pace. According the Jefferson County Ambulance Authority, fire companies were able to quell significant losses as mobile home fires resulted in only \$45,000 in losses between 2002 and 2004.

### *Vehicular Fires (Passenger, Water, and Off-Road)*

Vehicular fires accounted for 22% of the total incidents reported. This type of incident resulted in losses in approximately 84% of reported occurrences, which is the highest among the incident types analyzed. According the Jefferson County Ambulance Authority, vehicular fires resulted in losses of \$55,050 between 2002 and 2004.

### *Natural Vegetation Fires*

The majority of Jefferson County's land cover is wooded or forested; nearly half of the total land cover is forested. There were only six (6) reported natural vegetation fires reported between 2002 and 2004, resulting in \$5,100 in losses. According to the Jefferson County Ambulance Authority, natural vegetation fires result in losses only 34% of the time.

However, it should be noted that wildland fires are not required to be reported in NFIRS. As such, the number of wildland fires that actually occurred is likely to be much higher. However, according to officials with the West Virginia Division of Forestry, the overwhelming majority of wildland fires in

Jefferson County consume less than one acre. Consequently, total losses are low, which is consistent with the figure above that represents few events.

*Electrical Fires*

There was only one (1) electrical fire reported between 2002 and 2004; this incident did not result in a reportable monetary loss.

## 4. COMMUNITY RISK ANALYSIS

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### 4.1 DEFINITION OF THE PROBLEM

Jefferson County, West Virginia is in a unique position. Its extreme residential growth has led to an increase in the demand for fire services, as well as an increase in the number of calls to which firefighters respond. Local officials feel that there was a great fire risk prior to the advent of this development and fear that the risk has only increased.

Local fire departments are 100% volunteer. Many county residents, including volunteer firefighters, commute to work outside of the county. As such, during working hours, very few fire service personnel are available to respond. Further, many local volunteers serve as paid firefighters in neighboring states. Those individuals would be responsible to their paying department during large, regional incidents, further depleting the resources available in Jefferson County. To further complicate this problem, local fire departments have difficulty recruiting additional members.

Infrastructure has also become a concern. As new development continues, existing systems become strained. In the case of public water, the more daily consumption increases within a system, the less water is available for fire protection. As such, do existing infrastructure systems add to the fire risk?

### 4.2 ANALYTICAL METHODS

Jefferson County has completed a qualitative fire risk assessment. This qualitative assessment does contain loss analyses, but not to the level of considering it a “quantitative” assessment. Several analytical methods were used to accomplish this project, including risk matrices, risk indices and a modified “what-if” analysis.

Historical records and polling of local officials and residents were used to generate risk matrices. Historical records indicated how often a particular fire event occurs. Historical records, particularly loss data, indicated the severity of fire events. Comments from local officials and residents verified and strengthened the results of the historical records review.

The modified “what-if” analysis was conducted in two (2) stages. First, during the data collection phase of the project, an extensive survey of local residents was performed. Over 100 responses were received, providing such information as fire safety measures people undertake in their home, the

community's perception of the greatest fire risks, and the community's ideas as to measures to take to lessen the existing fire risk.

Risk matrices and local comments were used to prioritize projects (or organize risk indices). Probability, severity, public perception, and dollar losses affected prioritization, as did the availability of funds to complete projects. For example, if funding was immediately available for a specific project, then that project's priority increased.

As a second modified "what-if" analysis, the project workgroup was assembled to generate mitigation strategies to lessen the fire risk. Ideas were generated in a brainstorming open-forum style of meeting. Participants were given scenarios and/or examples of particular events and asked to provide ideas to mitigate those situations. The results of these methods are presented below.

#### **4.3 COMMUNITY SURVEY**

The Jefferson County Office of Homeland Security (OHS) facilitated a community survey regarding the county's fire risk throughout the months of September, October and November of 2005. The survey was entitled "Community Questionnaire"; a summary of the results is provided in Appendix 1. The OHS received 105 completed questionnaires.

##### *Questionnaire Development*

The OHS and the consulting firm assisting with this project developed the questionnaire. Questions ranged from general rankings (e.g. On a scale of 1 to 5, 5 being the most, how concerned are you about the county's fire hazard?) to family preparedness questions (e.g. Do you have a smoke detector in your home? Have you or your family received training for fire safety?) to specific ideas for lessening the risk (e.g. In your opinion, how can fire companies recruit more volunteers? How can the fire risk be lessened in the community?).

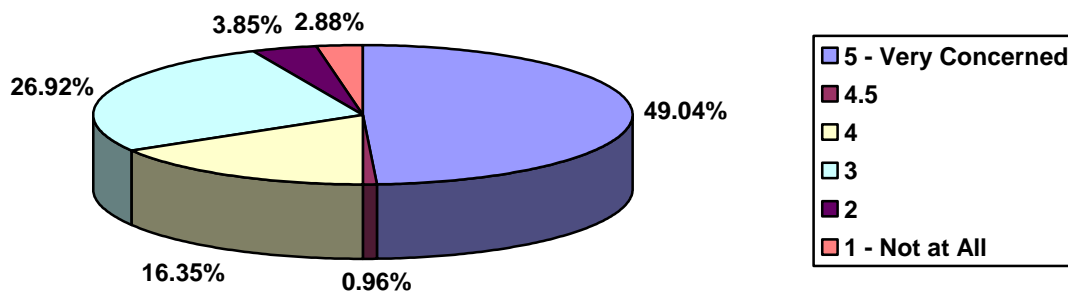
##### *Completing the Questionnaire*

Respondents were given many ways to complete and return the questionnaire. Paper copies were distributed by local fire departments and the OHS. Respondents could either complete a paper copy and mail or fax it to the consultant or the OHS. Respondents could also access the form online where they filled in answer blanks and submitted the form directly to the consultant. Both methods were utilized extensively.

*Survey Results*

According to the survey, Jefferson County residents are concerned about the fire hazard. Respondents were told to rank their concern for the hazard on a scale of 1 (Not at All Concerned) to 5 (Very Concerned). Figure 4.3.1 illustrates the level of concern throughout the county. The survey also suggests that this concern carries over into basic home fire safety. The vast majority of survey respondents (99.03%) have at least one (1) smoke detector in their homes. (More than half of those with smoke detectors change the batteries twice per year.) Smoke detectors were the most-used fire safety device, by percentage, among respondents, followed by maintenance of electrical cords and outlets and cutting brush away from homes.

**Figure 4.3.1**



Many of the respondents to this survey were well-versed in fire safety. 94.29% of those responding can properly work a fire extinguisher. 95.24% of respondents indicated that everyone in their household can properly call for help in an emergency. 76.19% of those responding indicated that they have designated a meeting place outside of the home to ensure that everyone is out safely and 73.33% of the total respondents have identified two (2) ways out of every room in their house. Nearly 80% of those surveyed indicated that they have participated in a fire drill and/or received training at their place of work. Firefighters visiting schools and the efforts of the Community Emergency Response Team (CERT) are among the top two (2) means of receiving fire safety information.

Respondents listed 22 potential causes of fires. However, carelessness, electrical problems and cigarette fires topped the list as the leading causes. Several answers were given when asked how to lessen the community fire risk. However, two (2) issues were repeatedly listed: increased public awareness and access issues in the Shannondale/Blue Ridge Mountain area of the county.

While it appears that firefighters are recognized members of the community (68.34% of respondents indicated knowing a local firefighter), the actual duties of firefighters do not appear to be well known. Questionnaires asked how many times per year firefighters respond to calls and the number of hours per year firefighters spend training and fundraising. Multiple answers were received for each of these three (3) questions, with no real consensus being formed. Such a range of responses can be explained as follows.

- Respondents misunderstood the question. Low number responses could be intended to be the number of responses one (1) department makes or the number of hours one (1) firefighter spends training and fundraising. Higher numbers are combinations of all county fire companies and/or summations of all local firefighters.
  - During workgroup meetings, attendees disagreed on how to interpret the question. The majority of attendees thought that the questions were meant to be answered collectively with a combination of all fire companies and personnel. However, some attendees did interpret the question as a single company or firefighter.
- There is a general lack of knowledge as to the actual duties firefighters undertake and the time they spend undertaking them.
  - This is likely a fact. There is a range of very high responses, indicating that even those who interpreted the question collectively disagree on the number of calls and hours in training/fundraising. The same can be said of the low numbers.
- Due to the evidence presented, data irregularities seem to be indicative of both of the above.

However, one (1) important implication can be derived from this discussion. As there appears to be a disagreement in thoughts within both the “collective” and “single” groups, greater public awareness should be a priority of local fire service providers. Residents clearly do not understand the true frequency with which the fire service responds; nor do they understand the number of hours firefighters spend in training or the hours they spend fundraising.

#### **4.4 OTHER DATA**

Several additional sets of data are examined to determine the overall county fire risk. These data sets are detailed in this section.

*Equipment Inventory*

According to a general countywide equipment inventory maintained by the Independent Fire Company, the county has the equivalent of one (1) engine for every 21 square miles. Such a figure allows the county to maintain an insurance rating of six (6) in incorporated areas and eight (8) in rural areas. Currently a total of 44 fire and rescue vehicles are in service throughout Jefferson County. A breakdown of these vehicles is as follows:

*Figure 4.4.1*

<b>FIRE AND RESCUE VEHICLES (by department)</b>								
	<b>Engine</b>	<b>Tanker</b>	<b>Ladder</b>	<b>Brush</b>	<b>Rescue</b>	<b>Boat</b>	<b>*Amb.</b>	<b>Other</b>
<b>Blue Ridge</b>	2	3	2	1	0	1	2	1
<b>Citizens</b>	2	2	1	1	1	0	2	1
<b>Friendship</b>	2	1	1	1	1	0	2	1
<b>Independent</b>	2	1	1	1	1	1	2	1
<b>Shepherdstown</b>	2	1	1	1	1	1	2	2
<b>TOTAL</b>	<b>10</b>	<b>8</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>10</b>	<b>6</b>

*\*Ambulance*

The final vehicle is a brush truck owned by the Jefferson County Office of Emergency Management. The estimated life of fire equipment is 15 to 20 years, whereas the estimated life of an ambulance is five (5) to seven (7) years.

The Insurance Services Organization (ISO) rating system is a very common system used to rank a community's susceptibility to the fire hazard. ISO uses a variety of criteria to develop its rating, including fire company equipment capabilities, age of firefighting equipment, training opportunities, water supply, and mutual aid opportunities. Communities receive an ISO rating from one (1) to ten (10); a score of one (1) represents superior fire protection and a score of ten (10) indicates that a community did not meet the minimum criteria. Jefferson County departments could increase equipment capabilities to reduce the overall community fire risk.

According to fire company representatives, Jefferson County ranges from a six (6) to a nine (9) in terms of its ISO rating. The "mountain" area, which is served by the Blue Ridge Volunteer Fire Company, is rated at a nine (9). This low rating is primarily attributed to a lack of hydrants in the area served by that department. Representatives from the Citizens Fire Company indicated that portions of its first-due area are either a six (6) or an eight (8). However, according to the Chief of the company,

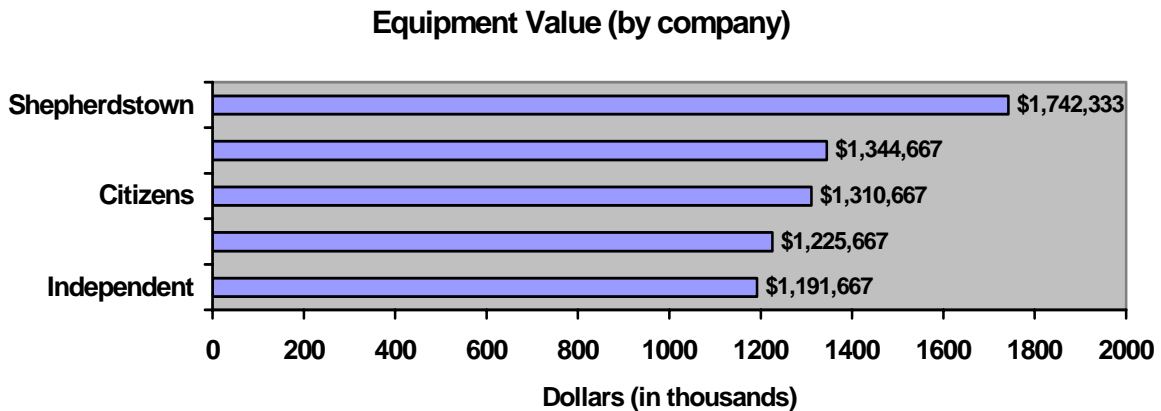
the City of Charles Town recently upgraded its water distribution system with additional lines and hydrants. Consequently, much of the Citizens area that is rated eight (8) may increase.

According to the equipment inventory maintained by the Independent Fire Company, approximately \$6,815,000 of equipment is in service throughout the county. The average cost of a unit is as follows:

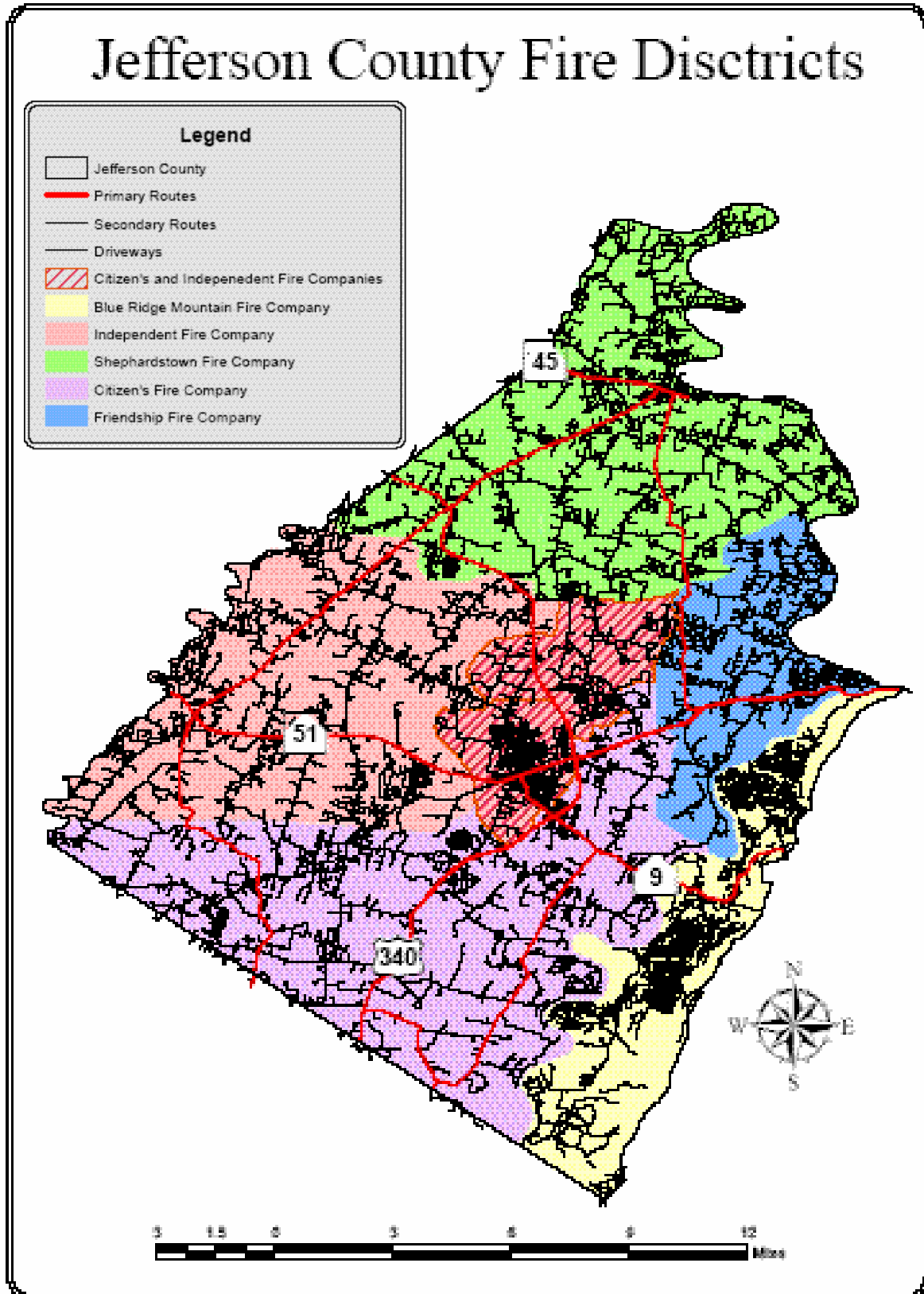
- Engine           \$300,000
- Tanker           \$215,000
- Ladder Truck   \$500,000
- Brush Truck    \$44,000
- Rescue Truck   \$150,000
- Boat             \$10,000
- Ambulance      \$100,000

Further according to this equipment list, each fire department in the county operates a significant portion of the \$6,815,000 total. Figure 4.4.2 shows the approximately value of equipment maintained by each department. An exact equipment breakdown, as provided by each department, is contained in Appendix 2.

*Figure 4.4.2*



It is significant to note that the above costs are reflective of the purchase price of the vehicle itself. These costs do not include the costs of outfitting and supplying a vehicle for responses. However, these figures provide a general sketch of the type of funding required to provide fire protection to the county’s residents.



*Training Capabilities*

In general terms, Jefferson County’s firefighters are adequately trained. In other words, although individual firefighters within a department are trained to different levels, each county fire company can deploy adequately trained personnel in the vast majority of situations. Still, training issues can arise. Some of the more significant issues are as follows.

- Will adequately trained personnel be available to respond at all times of day?
- How available are specialized personnel?
- Do local fire companies have the capabilities to provide training to their own members as a means of alleviating the above concerns or are training opportunities relatively infrequent?

Each of the local fire companies record their training capabilities differently. However, several classes are standard training courses and can be compared from department to department: Firefighter I, Firefighter II, Hazmat Awareness, First Aid, and EMT. Figure 4.4.3 details the capabilities of each department in these courses. (Capability is denoted by the percentage of firefighters on their roster that have completed the courses.)

*Figure 4.4.3*

<b>FIREFIGHTER TRAINING CAPABILITIES (by department)</b>					
<b>Fire Company</b>	<b>Firefighter I</b>	<b>Firefighter II</b>	<b>Hazmat Awareness</b>	<b>First Aid</b>	<b>EMT</b>
<b>Blue Ridge</b>	100%	45%	100%	100%	50%
<b>Citizens (50)</b>	100%	30%	100%	100%	40%
<b>Friendship (40)</b>	73%	40%	85%	28%	30%
<b>Independent</b>					
<b>Shepherdstown (77)</b>	70%	51%	61%	35%	18%
<b>TOTALS</b>					

As mentioned earlier, ISO uses a variety of criteria to rate community fire risks, one (1) of which is training opportunities. Such items as facilities and aids, company training, classes for officers, driver and operator training, hazmat training, recruit training, and pre-fire planning inspections are considered. Figure 4.4.4 details ISO’s training recommendations. Bear in mind that the recommendations depict ideal conditions. In other words, the overall fire risk in Jefferson County can be significantly reduced even if individual departments lack some of the capabilities below, but can combine to cover all of the following items.

Figure 4.4.4

<b>TRAINING RECOMMENDATIONS</b>	
Facilities and Aids	<ul style="list-style-type: none"> <li>• Drill tower</li> <li>• Fire building (including smoke room)</li> <li>• Combustible liquid pit <i>In areas where federal, state or local officials prohibit the use of combustible liquid pits, credit may be available for a video depicting extinguishment of flammable liquid fires.</i></li> <li>• Library and training materials</li> <li>• Slide of overhead projectors</li> <li>• Movie projector or VCR</li> <li>• Pump cutaway</li> <li>• Hydrant cutaway</li> </ul>
Use	<ul style="list-style-type: none"> <li>• Half-day (3-hour) drills, 8 per year</li> <li>• Half-day (3-hour) multiple company drills, 4 per year</li> <li>• Night drills (3-hour), 2 per year <i>ISO may credit a single company drill under the first and last of these items; ISO May credit multiple company drills under all three.</i></li> </ul>
Miscellaneous	<ul style="list-style-type: none"> <li>• Company training at fire stations, 20 hours per member per month</li> <li>• Officer Classes – 2 days (6 hours each) per year for all officers</li> <li>• Driver and Operator Training – 4 half-day (3-hour) sessions per year</li> <li>• New Driver and Operator Training – Classes offered, 40 hours apiece</li> <li>• Hazmat (Radioactive) Training – 1 half-day (3-hour) session per member per year</li> <li>• Recruit Training – 240 hours per recruit</li> <li>• The community should run a prefire planning inspection of each commercial, industrial, institutional and other similar structure twice a year for maximum credit.</li> <li>• If a community’s records are incomplete, ISO will reduce the total points credited for training.</li> </ul>

*Water Supply*

The following table figure 4.4.5 illustrates the population each of the community water systems serve as well as the source from which the water is taken as of April, 2003. The rapid growth in population, and the rapid development of residential and commercial structures brings with it an increase in the demand for water, both for living purposes and fire protection purposes.

**Figure 4.4.5**

<b>PUBLIC WATER SUPPLY</b>		
<b>Water System</b>	<b>Population Served</b>	<b>Water Source</b>
Cave Quarter Estates	58	Well
Charles Town City	9,115	Evitts Run
Fox Glen Utilities	683	Well
Glen Haven Utilities	163	Spring, Well
Green Acres MHP	65	Well
Harpers Ferry City	2,032	Potomac River, Elk Run
Harpers Ferry Job Corps	250	Well
Keyes Ferry Acres	142	Well
Kratz MHP	25	Well
Leights MHP	78	Well
Russell's MHP	55	Well
Shenandoah Junction	370	Well
Shepherdstown	5,530	Potomac River
Tuscowilla Utilities	1,288	Well
Valley View MHP	42	Well
Walnut Grove Utilities	700	Well
Westridge Water Department	220	Well
Potomac Farms	65	Well
Oak Hill MHP	110	Spring
Harpers Ferry Campsites	245	Well
Parkview Woodland	328	Well
Shenandoah Plantation	25	Well
Cavaland	98	Well
Shenandoah Mini Homes	65	Well
Potomac Terrace	50	Well
Meadowbrook	110	Well

**4.5 PLANNING ASSUMPTIONS**

- Data collected from local fire companies, Jefferson County’s NFIRS system, and other sources was assumed to be complete for the purposes of this report.
- Even in areas without fire protection from a public water supply, it is assumed that tankers from the first due department and the two nearest departments will be dispatched.
- Specific response times were not considered at any point in this risk assessment. General response times were considered as an analysis of hindrances to responders to various communities was completed.
- By their very nature, fires are unpredictable. This assessment uses historical data to *characterize* the hazard rather than *predict* occurrences.
- Local officials will use the information contained in this assessment to better plan for fire prevention and fire response.

**4.6 PROBABILITY VS. SEVERITY**

Probability vs. severity was determined by the frequency of fire occurrences and the losses by fire type. Probability vs. severity is show graphically by Figure 4.6.1. Data for this section are taken primarily from Section 3.3 above. An explanation of the following matrix is also contained in the figure.

*Figure 4.6.1*

Hazard Probability Classification		Hazard Severity Classification	
Description	Frequency	Description	Mishap Definition
Frequent	Continuously experienced	Catastrophic	Death or major structural loss
Probable	Experienced several times	Critical	Marginal structural damage
Occasional	Experienced	Marginal	Minimal structural damage
Remote	Unlikely to have been experienced	Negligible	No structural damage
Improbable	Not experienced		

HAZARD SEVERITY	PROBABILITY				
	Frequent	Probable	Occasional	Remote	Improbable
Catastrophic	2		1		
Critical		4		3	
Marginal			5		
Negligible				6	

*1 – Structure Fire*  
*2 – Building Fire*  
*3 – Mobile Home Fire*  
*4 – Vehicular Fire*  
*5 – Natural Vegetation Fire*  
*6 – Electrical Fire*

#### 4.7 RESULTS

- Due to the increase in population totals and the increase in calls for service, more firefighters are needed at the local level.
- At current personnel levels, local fire companies cannot provide adequate coverage of the entire county during normal work hours (8 a.m. to 5 p.m.).
- The public is very uneducated as to the nature of a firefighter’s position and the amount of time invested by individual firefighters.
- Basic public education efforts should be increased to ensure proper smoke detector maintenance and fire prevention in the home.
- Currently, equipment inventories for local fire companies are adequate. However, this equipment must be updated.
- While firefighters are well trained throughout Jefferson County, fire companies must ensure that adequately trained personnel are available at all times. To do so, more training opportunities may need to be offered.
- The rural areas of the county are not afforded adequate fire protection from public infrastructure systems (i.e. the hydrant network is incomplete, dry hydrants need to be installed, service needs to be extended into other areas).
- Extensions to public water supplies should include measures for fire protection.

## 5. FIRE MITIGATION PROGRAM

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In late 2005 and early 2006, the Jefferson County Fire Risk Assessment and Mitigation Plan Workgroup Committee generated a list of strategies and projects to mitigate the fire hazard in Jefferson County. These projects are preventive in nature, and many seek to supplement the capabilities of emergency services providers. All projects are generated with the understanding that the risk cannot be eliminated; it can only be reduced. All strategies are based on the findings of the accompanying fire risk assessment.

The following goals, objectives and strategies apply to each of the municipalities, fire company jurisdictions and Jefferson County government unless otherwise specified in this section. Estimates costs for project implementation are listed with each project. These figures are estimates only; a thorough cost analysis should be performed before fully implementing these projects.

### **Goal FIRE-1: Improve the general understanding of the fire protection system throughout all of Jefferson County.**

#### **Objective FIRE-1.1: Develop and distribute public awareness materials regarding fire protection.**

*Strategy FIRE-1.1.1: Update the county website to provide easily-accessible fire-related information.*

- Project: The Jefferson County Commission website has information about disaster preparedness and related activities. A section on fire safety will be included with this information.
  - Coordinating Agency: Jefferson County Commission, Consultant
  - Timeframe: On-going
  - Funding (*Cost Estimate*): Local funding, PDM. (Up to \$3,000 to \$5,000 for website development).
  
- Project: Integrate into the website information concerning appropriate NFPA training on the proper use of fire extinguishers, and encourage local employers to use this information to train employees.
  - Coordinating Agency: Jefferson County Commission, Consultant
  - Timeframe: 6 months
  - Funding (*Cost Estimate*): Local funding, PDM. (Up to \$3,000).

*Strategy FIRE-1.1.2: Utilize technology to distribute public awareness materials.*

- Project: Encourage county fire companies to develop websites (or a page on their associated municipality's website). These sites could contain news about the fire company, statistics about the fire company such as annual number of calls, upcoming events such as training opportunities or fundraisers, home fire safety instructions, etc.
  - Coordinating Agency: Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$3,000 for website development)
  
- Project: As (and if) fire companies develop their own websites, link those sites to the County Commission, Office of Emergency Management, Office of Homeland Security, and/or municipal websites.
  - Coordinating Agency: Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company, County Commission, OEM and OHS.
  - Timeframe: Contingent upon completion of fire company websites
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$8,000 for website development, and integration with other county agencies).

*Strategy FIRE-1.1.3: Distribute fire protection materials to special populations.*

- Project: Create a public awareness and education campaign complete with fire safety tips aimed at senior citizens and the caretakers of senior citizens.
  - Coordinating Agency: Jefferson County Office of Homeland Security (OHS), Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company
  - Timeframe: 1 year
  - Funding (*Cost Estimate*): Assistance to Firefighters Grant Program (\$6,000)
  
- Project: Create a public awareness campaign complete with fire safety tips targeting children under the age of 14 and caretakers of children under the age of five (5).

- Coordinating Agency: Jefferson County OHS, Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company
  - Timeframe: 1 year
  - Funding (*Cost Estimate*): Assistance to Firefighters Grant Program (\$6,000)
- Project: Create a public awareness campaign complete with fire safety tips targeting Shepherd University students.
    - Coordinating Agency: Shepherd University, Jefferson County OHS, Shepherdstown Fire Department
    - Timeframe: 2 years
    - Funding (*Cost Estimate*): Assistance to Firefighters Grant Program, Local Funding (\$1,500)

*Strategy FIRE-1.1.4: Train interested citizens to provide fire safety information.*

- Project: Expand funding and training for the Community Emergency Response Team (CERT) in an effort to enlist at least one (1) individual from every subdivision to be a member.
  - Coordinating Agency: Jefferson County OHS
  - Timeframe: On-going
  - Funding (*Cost Estimate*): Local Funding
- Project: Within subdivisions, assign younger residents to ensure their elderly neighbors are warned and can evacuate their homes if threatened by a fire.
  - Coordinating Agency: Applicable Homeowners Associations, Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company
  - Timeframe: On-going
  - Funding (*Cost Estimate*): N/A (*This is a volunteer type of project requiring no monetary investment.*)
- Project: Expand funding for local neighborhood watch programs in an effort to more quickly spread warning of a fire that is threatening a community and to facilitate a more effective evacuation, if necessary.

- Coordinating Agency: Jefferson County Sheriff's Department
- Timeframe: On-going
- Funding (*Cost Estimate*): No additional funding necessary

**Goal FIRE-2: Enhance the capabilities of fire companies and firefighters.**

**Objective FIRE-2.1: Improve the general information about Jefferson County that is available to firefighters.**

*Strategy FIRE-2.1.1: Update, maintain and improve the resources available to firefighters and other emergency services personnel.*

- **Project:** Update, standardize and organize the entries in the Jefferson County Resource Manual. Entries should be consistent with application National Incident Management System (NIMS) terminology.
  - Coordinating Agency: Jefferson County Office of Emergency Management (OEM)
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): USDHS, Local Funding (*up to \$15,000*)
- **Project:** Update the Jefferson County Map to show new roadways, developments and landmarks. Once an initial update is completed, the map should be updated annually.
  - Coordinating Agency: Jefferson County Addressing and Jefferson County Emergency Communications
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): Local Funding, (Up to \$3,000 to \$5,000 to update map)

*Strategy FIRE-2.1.2: Make equipment owned and operated by various public agencies in Jefferson County available to responding fire companies.*

- **Project:** Encourage coordination between homeowners associations in Jefferson County for equipment sharing. Any available equipment should be communicated to the Jefferson County OEM for inclusion into the county resource manual.
  - Coordinating Agency: Applicable Homeowners Associations
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): N/A (*The coordination of sharing the equipment and the development of MOUs for post event cost recovery can be accomplished at no cost. Costs for resource recovery can be reimbursed through normal procedures.*)

*Strategy FIRE-2.1.3: Increase access to water supplies to improve fire protection.*

- **Project:** Identify and remove “fake” hydrants the residents have installed in an effort to lower their insurance rates.
  - Coordinating Agency: Local fire companies, public water providers, Jefferson County Addressing (for mapping purposes)
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): N/A (*This strategy could be accomplished with normal personnel time and proper record keeping when fire companies find fake hydrants during routine testing.*)
  
- **Project:** Identify suitable locations for the installation of dry hydrants to provide more access to water for fire protection.
  - Coordinating Agency: Local fire companies
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): WV Division of Forestry (*up to \$1,000 per hydrant*)
  
- **Project:** Examine the feasibility of requiring subdivisions and other “clustered” areas to install ponds with dry hydrants, especially in areas not serviced by public water systems.
  - Coordinating Agency: Jefferson County Commission; Jefferson County Planning, Zoning and Engineering
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): Local Funding (*Development of any regulations will not require additional funding; however, enforcement of any regulations may require significant funding.*)

**Goal FIRE-3: Increase the effectiveness of existing fire hydrants as a means of fire protection throughout Jefferson County.**

**Objective FIRE-3.1: Institute increased training for the testing of hydrants to ensure that they are in proper working conditions.**

*Strategy FIRE-3.1.1: Develop and provide training exercises for county firefighters to increase hydrant testing capabilities.*

- **Project:** Coordinate with county fire departments to schedule training exercises concerning hydrant testing procedures.

- Coordinating Agency: Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company
- Timeframe: 2 years
- Funding (*Cost Estimate*): No additional funding necessary

**Objective 3.2: Develop the means to more efficiently locate fire hydrants during emergency situations.**

*Strategy 3.2.1: Utilize available technology to enhance the ability of fire departments to locate fire hydrants.*

- **Project:** Coordinate with the Planning and Zoning Department to GPS all existing hydrant locations and develop a map that illustrates those locations.
  - Coordinating Agency: Planning and Zoning Department
  - Timeframe: 3 years
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$30,000 to GPS and develop map)
  
- **Project:** Update mapping to illustrate the location of newly installed hydrants primarily in the Walnut Grove area.
  - Coordinating Agency: Planning and Zoning Department
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$8,000)
  
- **Project:** Purchase and install reflective flags on all hydrants to allow fire companies to locate hydrants more efficiently.
  - Coordinating Agency: Jefferson County OHS
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$2,000)
  
- **Project:** Coordinate with the County Commission and Public Works Department to remove old dead hydrants in Shepherdstown.
  - Coordinating Agency: Public Works Department, Contractor
  - Timeframe: 3 years
  - Funding (*Cost Estimate*): CDBG, PDM (Up to \$50,000)

*Strategy 3.2.2: Consider the differences in, or lack of opinion as to the appropriate distance between hydrants.*

- **Project:** Work with county fire companies and utilities to establish a countywide standard concerning the distance between hydrants.
  - Coordinating Agency: County Fire Companies, County Utilities
  - Timeframe: 1 year
  - Funding (*Cost Estimate*): No additional funding necessary

**Goal FIRE-4: Enhance early warning capabilities throughout Jefferson County.**

**Objective FIRE-4.1: Develop and/or provide more avenues for early warning.**

*Strategy FIRE-4.1.1: Exploit all possibly methods for providing warning of a major fire incident to residents.*

- **Project:** Continue to develop a county website on which notification and warning information is posted.
  - Coordinating Agency: Jefferson County Commission and Jefferson County Office of Emergency Management
  - Timeframe: On-going
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$3,000 to integrate warning information onto county website).
  
- **Project:** Develop the capability to text message and/or call to residents as a means of additional warnings.
  - Coordinating Agency: Jefferson County Commission and Jefferson County Office of Emergency Management
  - Timeframe: On-going
  - Funding (*Cost Estimate*): Local funding, PDM (Up to \$2,000 to develop text message capabilities).
  
- **Project:** Work with residents to develop “phone trees” to quickly disseminate warning information, especially in rural areas.
  - Coordinating Agency: Jefferson County OEM, Applicable Homeowners Associations
  - Timeframe: 2 years

- Funding (*Cost Estimate*): N/A (*Participation in a “phone tree” would be entirely voluntary; thus, no additional cost would be incurred.*)
- **Project:** Establish a telephonic outdial system (reverse 911) within Jefferson County 911 to alert residents of a specific area of a fire or other hazard threatening their community.
  - Coordinating Agency: Jefferson County 911
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): USDHS, Local Funding (*up to \$75,000 for initial purchase; up to \$5,000 annually for maintenance*)
- **Project:** Establish a program whereby NOAA weather radios will be distributed to interested citizens. Consider two (2) options: (1) county applies for funding to purchase x-number of radios and distributes them at no cost, or (2) county acts as an “ordering service” whereby citizens can order radios through the county.
  - Coordinating Agency: Jefferson County OEM
  - Timeframe: 2 years
  - Funding (*Cost Estimate*): (*up to \$200 per radio*)

*Strategy FIRE-4.1.2: Further develop countywide and county-operated means of notification and warning.*

- **Project:** Activate the Jefferson County Public Channel and post fire safety tips on it.
  - Coordinating Agency: Jefferson County Commission
  - Timeframe: 1 year
  - Funding (*Cost Estimate*): Local Funding [which is already committed] (\$84,000)

**Goal FIRE-5: Develop a countywide communications system that will provide interoperable communications.**

**Objective FIRE-5.1: Enhance or upgrade the existing communications system in Jefferson County to lessen the potential for a communications failure.**

*Strategy FIRE5.1.1:* Establish a communications system that will allow all jurisdictional fire and police departments, as well as other applicable agency and organizations to communicate with each other during large-scale emergency situations.

- Project: Determine what types and to what extent the existing communications system would need upgraded to provide for interoperable communications amongst all county first responders.
  - Coordinating Agency: Jefferson County Communications Center
  - Timeframe: 2 years.
  - Funding (Cost Estimate): Local funding, (Up to \$15,000)

**Goal FIRE-6: Reduce the potential losses if a fire was to threaten one of the county's historical treasures.**

**Objective FIRE-6.1: Inventory historical structures, as well as the items within them, and make such inventories available to local fire companies.**

*Strategy FIRE-6.1.1: Update historical structures listings maintained by Jefferson County.*

- Project: Update the historical structures database in the county's GIS system to include new structures/areas that have been added to the National Registry of Historic Places. One an initial update is completed, develop policies to ensure that an annual update occurs.
  - Coordinating Agency: Historic Landmarks Commission, Jefferson County OEM and Jefferson County 911
  - Timeframe: 1 year.
  - Funding (Cost Estimate): Local funding, (Up to \$5,000)

*Strategy FIRE-6.1.2: Prioritize historical items and establish special procedures for protecting them.*

- Project: Compile lists of historical artifacts that can be removed from historical structures for protection if a fire threatens the historical structure.
  - Coordinating Agency: Historic Landmarks Commission
  - Timeframe: 2 years
  - Funding (Cost Estimate): No additional funding necessary
  
- Project: Create floor plans for each of the county's historical structures and provide them to the appropriate fire company. Such floor plans will assist firefighters in safely and quickly removing important items from the structure.
  - Coordinating Agency: Jefferson County Engineer, Historic Landmarks Commission
  - Timeframe: 3 years

- Funding (Cost Estimate): Local funding, (Up to \$125,000)
  
- Project: Develop plans for the relocation and protection of historical artifacts if a fire threatens the facility in which it is housed, as well as plans for the identification of a permanent relocation if the facility in which it is housed is destroyed by fire.
  - Coordinating Agency: Historic Landmarks Commission
  - Timeframe: 3 years
  - Funding (Cost Estimate): Local funding, PDM (Up to \$5,000)

**Goal FIRE-7: Increase county firefighter's ability to review the existing state fire code.**

**Objective FIRE-7.1: Develop a means to more efficiently review, and eliminate the complexity and confusion concerning the state fire code.**

*Strategy FIRE-7.1.1: Coordinate with fire company chiefs, and state fire marshal's office to establish training concerning the review of the state fire code.*

- Project: Provide training for local firefighters on how to navigate through the existing electronic version of the state fire code.
  - Coordinating Agency: WV State Fire Marshal's Office, Blue Ridge Mountain Fire Company, Citizens Fire Company, Friendship Fire Company, Independent Fire Company and Shepherdstown Fire Company
  - Timeframe: 3 years
  - Funding (Cost Estimate): Local funding, PDM (Up to \$5,000)

## 6. PLANNING PROCESS

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In 2004, the Jefferson County Office of Homeland Security (OHS) applied for a fire safety grant on behalf of the Jefferson County Commission for three (3) projects: (1) Develop a fire risk assessment and mitigation plan, (2) Create a public awareness and education program aimed at senior citizens and caretakers of senior citizens, and (3) Create a public awareness campaign targeting children under the age of 14 and caretakers of children under the age of five (5). The projects are funded by a combination of US Department of Homeland Security, Office for State and Local Government Coordination and Preparedness, Assistance to Firefighters Grant Program and Jefferson County Commission funds.

While a fire risk assessment and mitigation plan is not a requirement for local communities, Jefferson County recognizes that fires are one of the greatest risks to the property and life safety of residents in the county. Jefferson County's original hazard mitigation plan also formally identifies fires as a significant hazard risk to the county. Additionally, all fire companies are eligible to apply for funding under the Assistance to Firefighters Grant Program. If they have based their expenditures on a formal risk assessment process, they will receive additional consideration on those grant applications.

Jefferson County hired R.D. Zande & Associates, Inc. (RDZ) to facilitate the completion of this project. RDZ's responsibilities included data collection; coordination with local fire service agencies, local government, and state/federal agencies; facilitation of workgroup meetings; data analysis; and data compilation. All tasks were completed at the direction of the Jefferson County OHS.

The Jefferson County OHS compiled a "workgroup" to work with RDZ to complete this project. The workgroup was composed of members of the original Risk Assessment Committee that worked with the OHS (then Jefferson County Project Impact) to complete the county's Risk Assessment/All Hazards Mitigation Plan in 2003, as well as additional representatives from the fire service. This workgroup met several times with OHS representatives and RDZ to review progress on the project and suggest ideas. To ensure local objectives were properly met, the workgroup was connected via email with RDZ throughout the completion of the risk assessment. The workgroup also met with the OHS and RDZ to generate mitigation projects aimed at fire prevention and public awareness. Coordinating agencies, cost estimates and potential funding sources were assigned to each project and included in this document. The project was approved by the County Commission in January of 2006 and submitted to the USDHS Office of State and Local Government Coordination and Preparedness in March of 2006.

## 7. MONITORING, EVALUATING AND UPDATING THE PLAN

To be successful, plans of this sort must be dynamic, “living” documents. The Jefferson County Commission, Jefferson County Office of Homeland Security (OHS), and the project workgroup has agreed to base the maintenance process for this plan on the process delineated in the county’s all hazards plan.

### *Monitoring*

As was done in the *Jefferson County Risk Assessment/All Hazards Mitigation Plan*, all projects contained in this plan are listed with an implementation schedule and a coordinating agency responsible for its implementation. The Jefferson County Commission and the OHS will periodically track the process of the projects listed in this plan as per the guidelines set forth in the all hazards plan. The OHS will be responsible for communicating with the coordinating agencies in order to develop applicable status reports.

### *Evaluation*

According to the all hazards plan, the county commission and OHS will develop an end-of year report detailing mitigation activities undertaken throughout the course of the year (as well as any mitigation projects completed). Considerations for the projects posited by this plan will be included into the end-of year report.

In addition to the implementing local agencies, local governments, citizens, the West Virginia Division of Homeland Security and Emergency Management, and FEMA Region III, a copy of the end-of year report should be made available to the US Department of Homeland Security, Office of State and Local Government Coordination and Preparedness.

### *Updating*

The *Jefferson County Risk Assessment/All Hazards Mitigation Plan* was completed in 2003 and placed on a five (5)-year monitoring and updating cycle. This plan will become a part of the entire all hazards plan and, therefore, will follow the same review cycle. As such, this plan will be updated in 2008.

## 8. REFERENCES

- *Fire Data Analysis Handbook*. Second Edition. FA-266. Federal Emergency Management Agency. January 2004.
- *Guide for the Evaluation of Fire Risk Assessments 2004 Edition*. NFPA 551. National Fire Protection Association. 2004
- *Jefferson County Risk Assessment/All Hazards Mitigation Plan*. Jefferson County Project Impact Partnership and Jefferson County Commission. June 2003.
- *Jefferson County, West Virginia, Comprehensive Plan 2004*. Jefferson County Department of Planning, Zoning and Engineering. March 2004.
- *National Fire Incident Reporting System (NFIRS) Database: Jefferson County*. Local fire companies contributing. Maintained by Jefferson County Ambulance Authority.
- *RHAVE: Risk, Hazard and Value Evaluation*. United States Fire Administration and Commission on Fire Accreditation International.
- *Uses of NFIRS: The Many Uses of the National Fire Incident Reporting System*. FA-171. US Fire Administration. June 1997.

## 9. LIST OF APPENDICES

- Appendix 1: Results of the 2005 Community Survey
- Appendix 2: Equipment Listings for County Fire Companies
- Appendix 3: West Virginia State Fire Code