



Ragged Mountain Fire Protection District

Master Plan

Final Report March 2015

Prepared For:

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Table of Contents

1.0	Introduction	1-1
1.1	Overview	1-1
1.2	Background	1-1
2.0	Existing Conditions	2-1
2.1	Existing Physical Conditions and Features	2-1
2.1.1	Roadways	2-1
2.1.2	Prominent Physical Features	2-2
2.1.3	Topography	2-4
2.1.4	Climate	2-6
2.2	Environmental Constraints	2-10
2.2.1	Wildfire Hazards	2-10
2.2.2	Flood Hazard Zones	2-12
2.2.3	Geologic Constraints	2-14
2.3	Property Ownership	2-16
2.4	Jurisdiction and Taxing Boundaries	2-19
2.5	Regional Setting and Land Use	2-22
2.5.1	Public Lands Management	2-22
2.5.2	Private Lands Management	2-23
2.6	District Equipment and Facilities	2-27
2.7	District Agreements	2-27
2.8	Regulatory Documents	2-28
2.8.1	Federal and State Documents	2-28
2.8.2	Local Documents	2-28
2.9	Financial Information	2-29
3.0	Service Needs Forecast	3-1
3.1	Build-Out Analysis	3-1
3.2	Population and Demographics	3-9
3.3	Survey Results	3-13
3.3.1	Demographics	3-13
3.3.2	Service Level	3-15
3.4	Fire Service Call Activity	3-16
3.4.1	Annual Fire Service Call Trends	3-17
3.4.2	Fire Service Call Trends by Quarter	3-19
3.4.3	Fire Service Call Location Trends	3-20
3.4.4	Fire Service Call Personnel Utilization Trends	3-20
3.4.5	Fire Service Call Equipment Trends	3-21
3.5	Service Needs Forecast	3-22
3.5.1	Forecasting Methodologies	3-23
3.5.2	Medical Service Call Forecasts	3-24
3.5.3	Fire Service Call Forecasts	3-27
3.5.4	Fire Service Personnel Forecast	3-30
3.5.5	Summary of Preferred Forecasts	3-32



- 4.0 Facility Requirements.....4-1**
 - 4.1 Introduction 4-1
 - 4.2 Overview of Safety and Operations Standards and Criteria 4-1
 - 4.2.1 NFPA Standards 4-1
 - 4.2.2 ISO Minimum Criteria 4-3
 - 4.2.3 Colorado EMS Standards 4-3
 - 4.3 Vehicles/Equipment 4-3
 - 4.3.1 Firefighting & EMS Operations 4-3
 - 4.4 Personnel 4-11
 - 4.5 Land and Structures 4-12
 - 4.5.1 Fire Station Building Space Program 4-12
 - 4.5.2 Fire Station Building Space Program Summary 4-18
 - 4.6 Summary 4-18
- 5.0 Alternatives Analysis5-1**
 - 5.1 Evaluation Criteria 5-1
 - 5.2 Alternatives Considerations 5-1
 - 5.2.1 Organizational Structure and Training 5-1
 - 5.2.2 Equipment 5-3
 - 5.2.3 Emergency Communications 5-3
 - 5.3 Fire Protection District Alternatives 5-8
 - 5.3.1 Alternative 1 5-8
 - 5.3.2 Alternative 2 5-11
 - 5.3.3 Alternative 3 5-15
 - 5.3.4 Alternative 4 5-18
 - 5.3.5 Alternative 5 5-21
 - 5.3.6 Alternative 6 5-22
 - 5.4 Summary of Estimated Costs 5-23
 - 5.5 Preferred Alternative 5-33
- 6.0 Financial Implementation Plan.....6-1**
 - 6.1 revenues And Expenses 6-1
 - 6.2 Environmental Considerations 6-1
 - 6.3 Capital Improvement Plan 6-2
 - 6.4 Phase I – 5 Year CIP (2015-2019) 6-3
 - 6.5 Phase II – 5 to 10 Year CIP (2020-2024) 6-5
 - 6.6 Phase III – 11 to 20 Year CIP (2025-2035) 6-6
 - 6.7 Summary of Development Plan Estimated Project Costs 6-8
 - 6.7.1 Federal and State Grant Funding 6-8



Table of Exhibits

Exhibit 2-1 - Existing Conditions Map	2-3
Exhibit 2-2 - Terrain Slopes Map	2-5
Exhibit 2-3 - Mean Annual Precipitation	2-8
Exhibit 2-4 - Mean Annual Temperature	2-9
Exhibit 2-5 - Wildfire Hazard Map	2-11
Exhibit 2-6- 100-Year Flood Plain Hazard map	2-13
Exhibit 2-7 - Geology Map	2-15
Exhibit 2-8 - Property Ownership Map	2-17
Exhibit 2-9 - Energy Resource Map	2-18
Exhibit 2-10 - Taxing Districts Map	2-21
Exhibit 2-11 - Public Lands Map	2-25
Exhibit 2-12 - Existing Land Use Map.....	2-26
Exhibit 3-1 - Ragged Mountain Estates Build Out.....	3-4
Exhibit 3-2 - Marcellina Estates Build Out.....	3-5
Exhibit 3-3 - Build-Out Map	3-8
Exhibit 3-4 - Gunnison County Population	3-9
Exhibit 3-5 - Ragged Mountain Fire Protection District Population.....	3-10
Exhibit 3-6 - All HouSeholds by Age Groups	3-11
Exhibit 3-7 - Households with More than One Adult and No Children by Age group.....	3-11
Exhibit 3-8 - Households with More than One Adult and with Children.....	3-12
Exhibit 3-9 - Households with One Adult and No Children by Age Group.....	3-12
Exhibit 3-10 - Households with One Adult and Children by Age Group.....	3-13
Exhibit 3-11 - District Land Owners.....	3-14
Exhibit 3-12 - District Age Groups	3-15
Exhibit 3-13 - Annual Fire Service Call Types, 2009-2013	3-18
Exhibit 3-14 - Annual Fire-Related vs Motor Vehicle Service Calls, 2009-2013	3-18
Exhibit 3-15 - Seasonal Fire Service Calls per Quarter, 2009-2013	3-19
Exhibit 3-16 - Types of Fire Service Calls by Quarter, 2009-2013	3-20
Exhibit 3-17 - Annual Medical Service Call Activity Forecast Analysis	3-25
Exhibit 3-18 - 2033 Medical Service Call Forecast by Quarter.....	3-26
Exhibit 3-19 - Annual Fire Service Call Activity Forecast Analysis	3-28
Exhibit 3-20 - 2033 Fire Service Call Forecast By Quarter.....	3-29
Exhibit 3-21 - Annual Personnel Utilization Forecast Analysis	3-30
Exhibit 3-22 - 2033 Personnel Utilization Forecast by Quarter.....	3-31
Exhibit 4-1 - Class A Fire Engine	4-4
Exhibit 4-2- 1,800-Gallon Water Tender Truck	4-5
Exhibit 4-3 - 4x4 Rescue Squad.....	4-5
Exhibit 4-4 - Type 6 Brush Truck.....	4-6
Exhibit 4-5 - Fire Station Space Program	4-14
Exhibit 4-6 - Fire Station Conceptual Layout - 1.....	4-16
Exhibit 4-7 - Fire Station Conceptual Layout - 2.....	4-17
Exhibit 5-1 - Radio Signal Coverage Map.....	5-6
Exhibit 5-2 - Repeater Line-of-Sight Map	5-7
Exhibit 5-3 - Option A - Status Quo	5-10



Exhibit 5-4 - Option B1 - Single Station (South).....	5-25
Exhibit 5-5 - Option B2 - Single Station (North).....	5-26
Exhibit 5-6 - Option C - Two Stations.....	5-27
Exhibit 5-7 - Option D1 - Two Substations.....	5-28
Exhibit 5-8 - Option D2 - Two Substations.....	5-29
Exhibit 5-9 - Conceptual Main Station Sketch 1.....	5-30
Exhibit 5-10 - Conceptual Main Station Sketch 2.....	5-31
Exhibit 5-11 - Conceptual Substation Sketch 1.....	5-32
Exhibit 5-12 - Conceptual Substation Sketch 2.....	5-33

Table of Tables

Table 2-1 - District Speed Limits.....	2-2
Table 2-2 - Terrain Slope.....	2-4
Table 2-3 - Existing Land Use.....	2-24
Table 3-1 - Build-Out Potential Estimate.....	3-6
Table 3-2 - Ragged Mountain Fire Protection District Fire Service Calls, 2009-2013.....	3-17
Table 3-3 - Total Personnel Utilized by Quarter, 2009-2013.....	3-21
Table 3-4 - Average Personnel Utilized per Call.....	3-21
Table 3-5 - Third Quarter Equipment Frequency of Use, 2009-2013.....	3-22
Table 3-6 - Annual Medical Service Call Activity Forecast Scenarios.....	3-26
Table 3-7 - 2033 Medical Service Call Forecast Scenarios By Quarter.....	3-27
Table 3-8 - Annual Fire Service Call Forecast Scenarios.....	3-28
Table 3-9 - 2033 Fire Service Call Forecast Scenarios By Quarter.....	3-29
Table 3-10 - Annual Personnel Utilization Forecast Scenarios.....	3-31
Table 3-11 - 2033 Personnel Utilization Forecast Scenarios by Quarter.....	3-32
Table 3-12 - Preferred Medical Service Call Forecast.....	3-32
Table 3-13 - Preferred Fire Service Call Forecast.....	3-33
Table 3-14 - Preferred Personnel Utilization Forecast.....	3-33
Table 4-1 - Vehicle Requirements.....	4-4
Table 4-2 - Vehicle Equipment.....	4-6
Table 4-3 - BLS Ambulance Minimum Equipment Requirements.....	4-7
Table 4-4 - Fire Apparatus Equipment.....	4-8
Table 4-5 - Extrication Equipment.....	4-8
Table 4-6 - Rescue Squad Equipment.....	4-8
Table 4-7 - Tender Equipment.....	4-9
Table 4-8 - Type 6 Brush Truck Equipment.....	4-9
Table 4-9 - Engine Equipment.....	4-10
Table 4-10 - Communications Equipment.....	4-11
Table 4-11 - Station Equipment.....	4-11
Table 4-12 - Personnel Fire Equipment Requirements.....	4-12
Table 5-1 - Firefighter Training Costs (for 12 Firefighters).....	5-2
Table 5-2 - Vehicle Replacement Schedule.....	5-3
Table 5-3 - Alternative 1 Estimated Costs.....	5-8
Table 5-4 - Alternative 2A Estimated Costs.....	5-11
Table 5-5 - Alternative 2B Estimated Costs.....	5-14



Table 5-6 - Alternative 3A Estimated Costs.....	5-16
Table 5-7 - Alternative 3B Estimated Costs	5-17
Table 5-8 - FTE 24-hour shift Staff Requirements*	5-18
Table 5-9 - Alternative 4A Estimated Costs.....	5-19
Table 5-10 - Alternative 4B Estimated Costs	5-20
Table 5-11 - Alternative 6 Estimated Costs.....	5-23
Table 5-12 - Alternative Cost Estimate Comparison Matrix.....	5-24
Table 6-1 – Phase I Estimated Project Cost Summary.....	6-4
Table 6-2 – Phase II Estimated Project Cost Summary	6-5
Table 6-3 – Phase III Estimated Project Cost Summary.....	6-7
Table 6-4 – 20-Year Development Plan Estimated Project Cost Summary.....	6-9



Appendices

Appendix A – Taxing District’s Mill Levy	A-1
Appendix B – Equipment Inventory	B-1
Appendix C – 2015 Budget	C-1
Appendix D – Local Land Owner Survey Results	D-1
Appendix E – Regulatory Standards	E-1
Appendix F – Alternatives Cost Estimates	F-1



1.0 INTRODUCTION

1.1 OVERVIEW

The Ragged Mountain Fire Protection District (District) plays a vital role in ensuring a safe environment for the local residents through the provision of quality emergency fire and medical services, public education, and fire prevention programs. The District has undertaken a Master Plan process to define the community's vision for future fire protection needs and desires. The goal of this Master Plan is to determine the short-, intermediate-, and long-term needs of the District and provide recommendations regarding the best way to satisfy these needs. The Master Plan records existing conditions within the District, develops a service need forecast, determines facility requirements, identifies alternatives for achieving the necessary facilities (and selects preferred alternatives), and establishes Capital Improvement and Financial Implementations Plans.

1.2 BACKGROUND

The Ragged Mountain Fire Protection District is located in Gunnison County, Colorado, and encompasses an area of approximately 74,367 acres of mountainous terrain. The Ragged Mountain Valley and State Highway 133 split the District to the north and south. The District includes both private- and publicly-owned lands and includes the town of Somerset. Gunnison, Crested Butte, and Paonia are the largest and most populated neighboring towns in the area; however, none of them are located in the District. The primary land uses in the region are agriculture, recreation, and oil/gas development and extraction.

The District is comprised of river valleys, agricultural lands, and high mountainous terrain. Significant landmarks include the Paonia Reservoir State Recreation Area, Bull Mountain, the western flank of the Ragged Mountain Range, Kebler Pass, the Highway 133 corridor (which includes the East Muddy Creek and the North Fork Gunnison River corridor), and the Coal Creek corridor. Further features are identified in the following section.



2.0 EXISTING CONDITIONS

2.1 EXISTING PHYSICAL CONDITIONS AND FEATURES

2.1.1 ROADWAYS

The roadway network within the District includes approximately 100 miles of open roadway, including 86.3 miles of county roads and another 13.7 miles of roads, most of which are under the jurisdiction of the U.S. Forest Service (USFS). The primary roadway through the Ragged Mountain Fire Protection District is State Highway 133. The northern part of the District is accessed by County Road 265 and the southern part of the District by County Road 12. Locally maintained roads provide access to remote areas.

The roadway system plays a vital role in the District's ability to provide fire and emergency services, specifically regarding the drive-time component of emergency response time. Response time will be one of several factors used to analyze potential station locations during the alternatives analysis portion of this Master Plan process. There are several aspects of any road system that affect drive-time for emergency service vehicles, including speed limits, surface type, road grade, curves, and intersections. While a full analysis of these characteristics for the entire road network within the District is beyond the scope of this planning process, information regarding a few of these characteristics for some of the roads within the District is included. For example, from the USFS roads database, most of the USFS roads within the District have a dirt or gravel surface and are rated for high-clearance vehicles. This generally means that travel speeds for emergency surface vehicles on these roads will be relatively slow.

Speed limit data for State Highway 133 from the Colorado Department of Transportation (CDOT) has been obtained. Since speed limits are one of the more important characteristics affecting drive-time, we have created a speed limit database for all of the roads within the District using the data from CDOT for Highway 133 and augmenting that data with field-verified speed limits for County Roads 265, 12, and 77. For the remainder of the road system within the District, a maximum speed limit of 15 mph has been assumed based on input received from members of the District Board during their November 12, 2013 meeting. Further refinement of the speed limit data will be made as additional information is obtained. Based on this database, **Table 2-1** was generated.



TABLE 2-1 - DISTRICT SPEED LIMITS

Miles per Hour	Road Length	Percent of Miles
15	60.26	60.26%
20	1.30	1.30%
25	9.75	9.75%
30	6.13	6.13%
35	10.58	10.58%
40	1.29	1.29%
45	2.25	2.25%
50	7.41	7.41%
55	1.03	1.03%
Total	100.00	100.00%

Source: TG Malloy Consulting, LLC and Jviation Inc.

2.1.2 PROMINENT PHYSICAL FEATURES

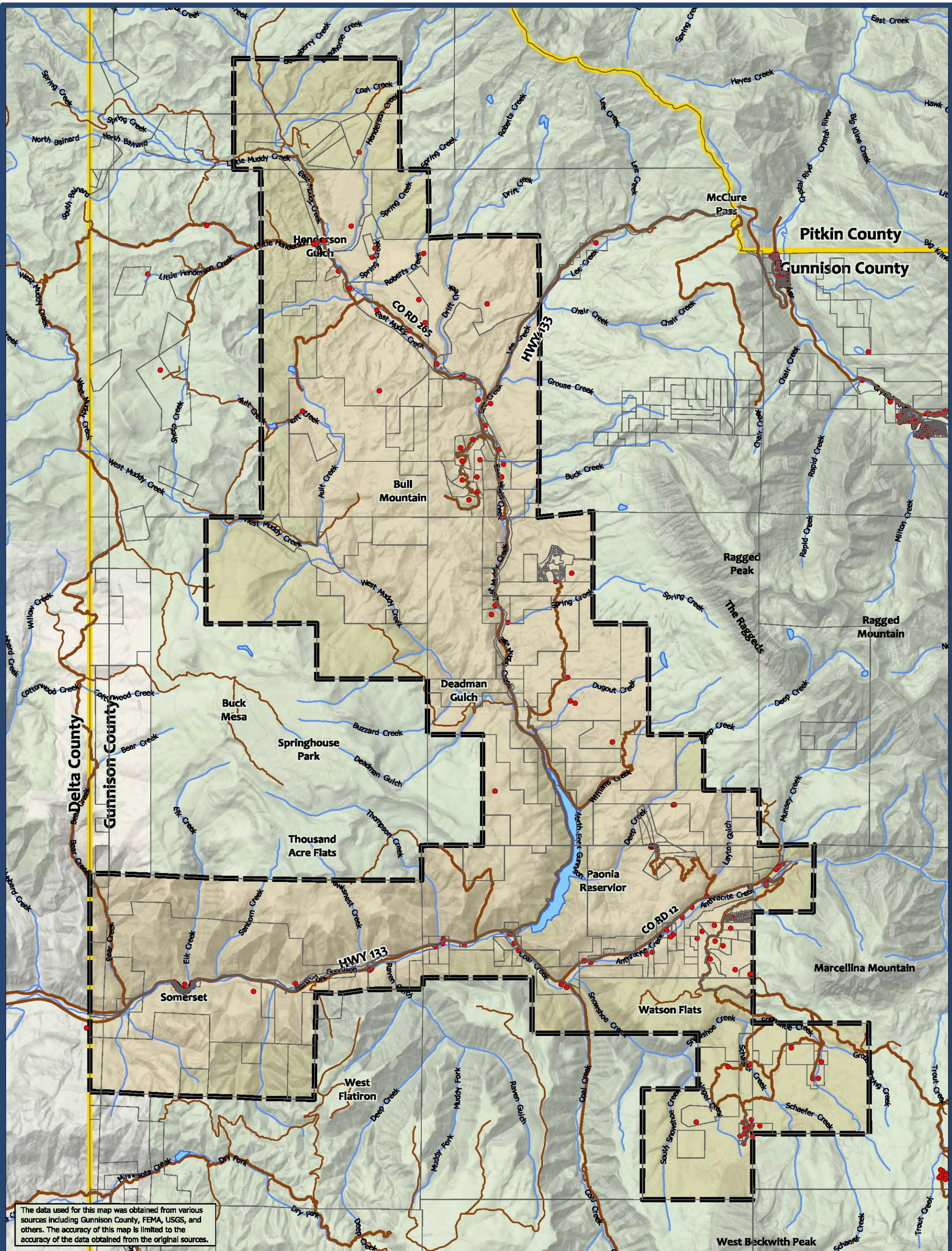
The Ragged Mountain region is largely mountainous terrain divided by Ragged Mountain Valley following State Highway 133. The most prominent physical features, as shown in **Exhibit 2-1**, include the Paonia Reservoir, the western flank of the Ragged Mountain Range, Bull Mountain, Henderson Gulch, Deadman Gulch, and Watson Flats. The diverse terrain of the region supports many recreational activities such as camping, boating, picnic areas, fishing, horseback riding, cross-country skiing, and numerous other outdoor activities.

The town of Somerset is the primary area of residence in the District with a population of 158¹. Somerset was first settled around the Oxbow – Elk Creek coal mine. The mine employs approximately 300 people and is the largest employer in the District.

The Ragged Mountain Fire Protection District is located in the North Fork Gunnison Watershed. Water bodies in this watershed include Cottonwood Creek, Gunnison River – North Fork (Black Bridge to Confluence), Jay Creek, Leroux Creek, and Short Draw Creek.² The Ragged Mountain area also includes the sub watersheds of Bear Creek-North Fork Gunnison River, Paonia Reservoir, Outlet West Muddy Creek, Little Henderson Creek-East Muddy Creek, and Lee Creek.

¹ U.S. Department of Commerce, United States Census Bureau, American Fact Finder, http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml, Accessed October 17, 2013

² Environmental Protection Agency, Watershed Assessment, Tracking and Environmental Results, http://iaspub.epa.gov/tmdl_waters10/attains_watershed_control?p_huc=14020004&p_cycle=&p_report_type=T#assessment_data, Accessed October 8, 2013



The data used for this map was obtained from various sources including Gunnison County, FEMA, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

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Existing Conditions Map

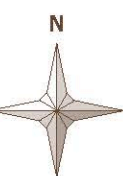
Exhibit 2-1

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Legend

- Address Points
- Roads - USFS
- Roads - County
- HWY 133
- Fire District Boundary
- County Boundaries



No Scale



2.1.3 TOPOGRAPHY

The Ragged Mountain Fire Protection District ranges in elevation from 10,499 feet at the highest point to 5,905 feet at the lowest point. The highest point is located near the southeast corner of the District and is part of the lower portion of the northwest face of West Beckwith Peak. The lowest point in the District is located along the North Fork Gunnison River as it exits the District just to the west of the Town of Somerset. East Muddy Creek, which merges with the North Fork Gunnison River, is the largest drainage. The creek was dammed to form Paonia Reservoir. The Paonia Reservoir, which is approximately 3.3 miles long and averages roughly 1,000 feet in width, is the largest water body in the District and among the District’s most prominent physical features.

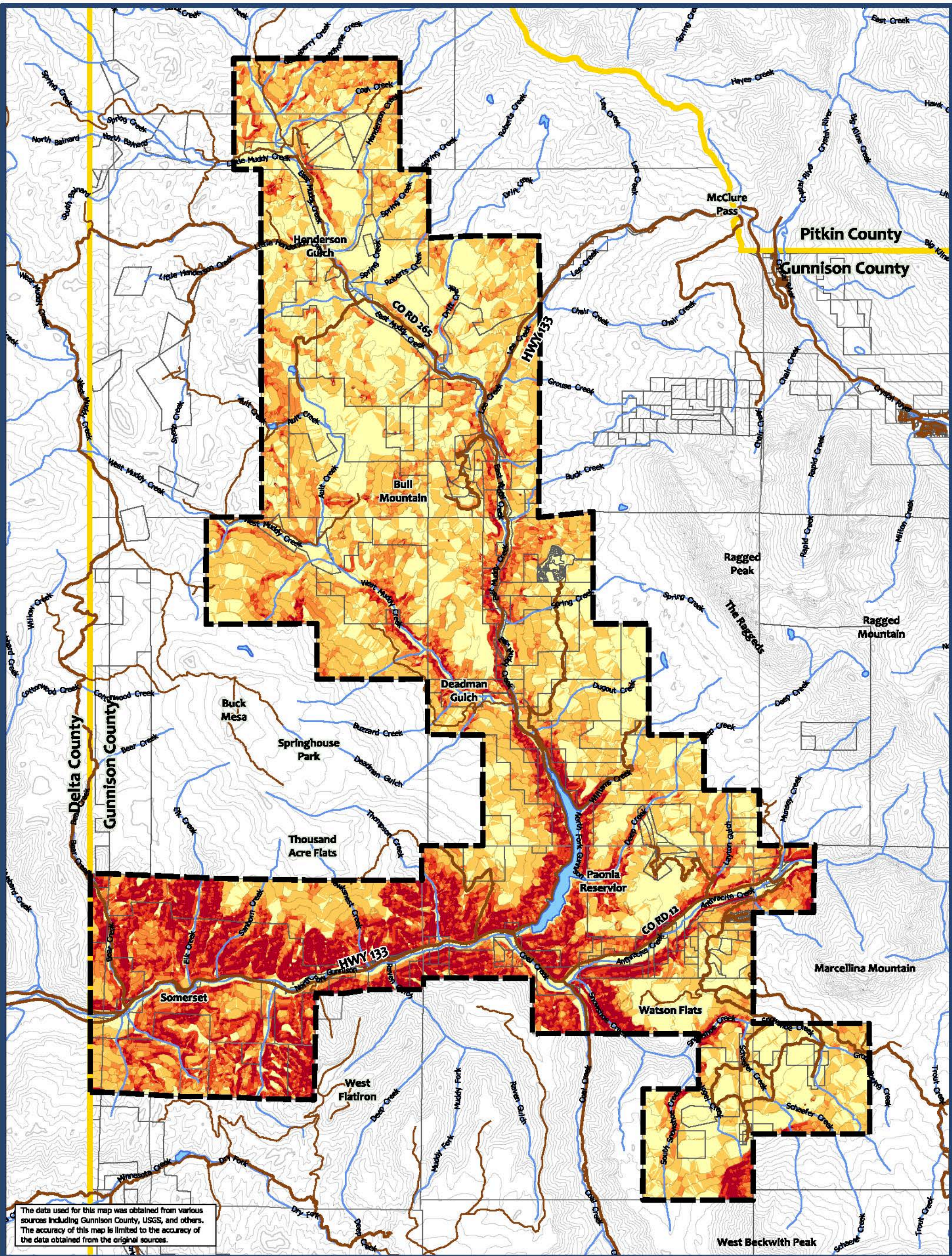
Generally, the terrain within the District is characterized by high plateaus divided by several deep valleys created by major creeks, including Lee Creek, East Muddy Creek, West Muddy Creek, Anthracite Creek, Bear Creek, and Coal Creek as well as numerous minor creeks and drainages. This creates challenges in terms of the provision of emergency services since the District is divided into a number of isolated pockets, many of which are served by a single unpaved, and frequently dead-end, road.

Exhibit 2-2 depicts the slope of the terrain within the District in both percent and degrees. This map helps illustrate the point discussed above regarding the District, especially the southern two-thirds, being divided into discrete areas separated by numerous drainages. **Table 2-2** provides a numeric summary of the slope conditions within the District. Note that almost 42% of the land within the District has slopes in excess of 30% and almost one-quarter of the land has slopes in excess of 45%. This is important not only as it relates to the road grades necessary to access the higher plateaus, but also because slopes are a determining factor related to severity of wildfire hazards (see **Section 2.2.1** of this report for a more detailed discussion regarding wildfire hazard). Slope information will also be useful for analyzing potential station sites during the alternatives portion of the Master Plan process.

TABLE 2-2 - TERRAIN SLOPE

Slope Range %	% District	Acreage
0-15	28.49%	21,185.67
15-30	29.76%	22,133.83
30-45	17.20%	12,792.38
45-60	11.80%	8,773.53
>60	12.75%	9,482.20
	100.00%	74,367.61

Source: TG Malloy Consulting, LLC and Jviation Inc.



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

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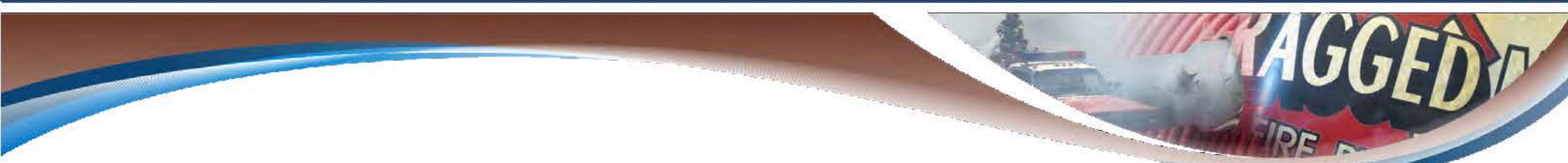
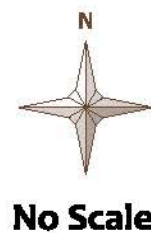
Terrain Slopes Map

Exhibit 2-2

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Slopes

Light Yellow	0 - 15% (0 - 8.5 deg.)
Orange	15 - 30% (8.5 to 16.7 deg.)
Dark Orange	30 - 45% (16.7 - 24.2 deg.)
Red	45 - 60% (24.2 - 31.0 deg.)
Dark Red	> 60% (> 31.0 deg.)





2.1.4 CLIMATE

In order to better plan for the equipment and facilities necessary for the future of the District, it is important to consider basic climate conditions and potential future changes in those conditions. **Exhibit 2-3** and **Exhibit 2-4** illustrate historic and potential future conditions relative to mean annual precipitation and temperature, among the most important climactic factors related to the potential for wildfire.

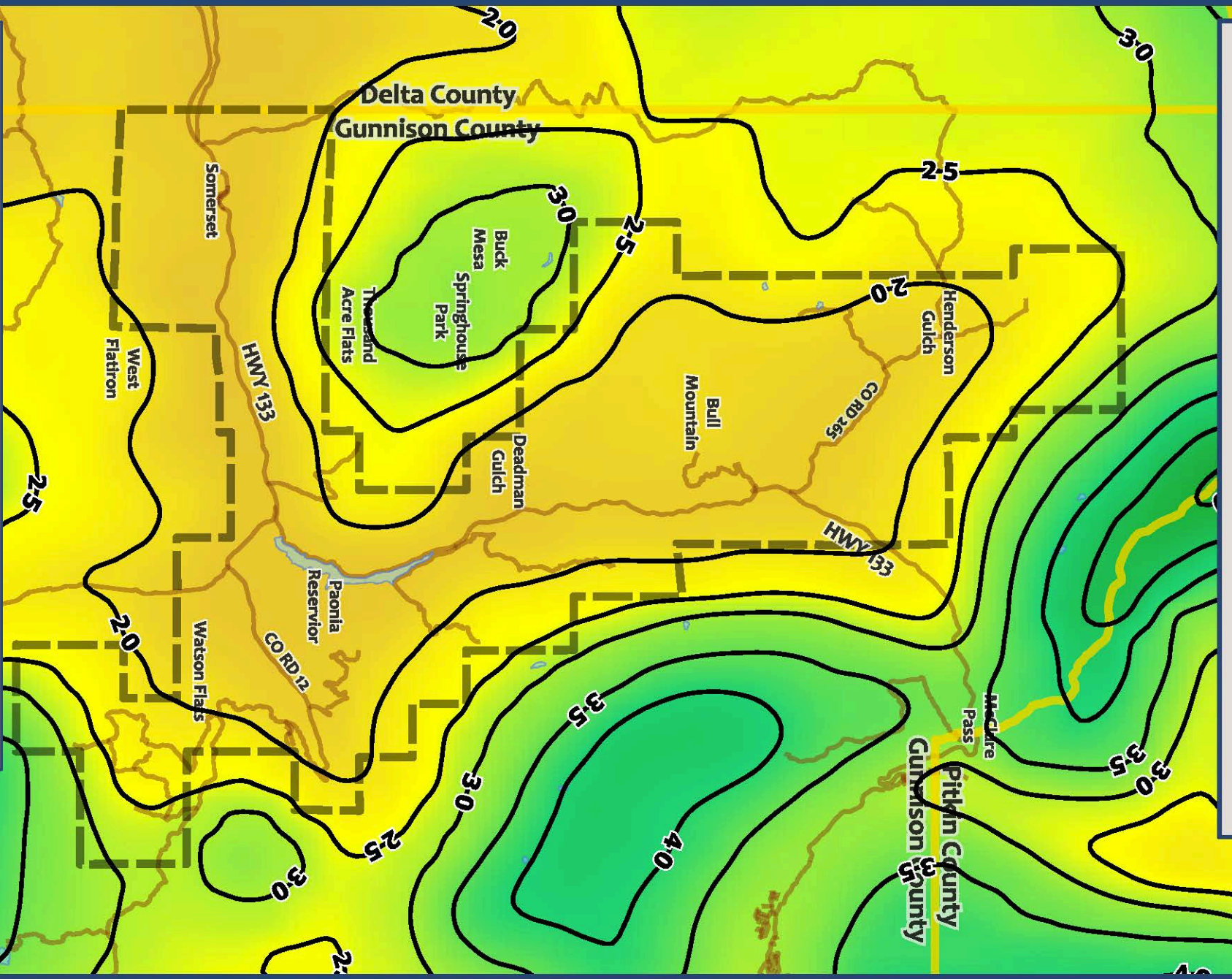
The information depicted on **Exhibit 2-3** and **Exhibit 2-4** is based on two reputable datasets. The historic precipitation and temperature data was obtained from the PRISM Climate Data Group website at the University of Oregon. The PRISM Group (Parameter-elevation Regressions on Independent Slopes Model) gathers climate data from a wide variety of monitoring networks and applies quality control measures to develop its datasets, which cover the period from 1895 to the present. The data illustrated on these exhibits represents a 30-year average from 1981 to 2010 and is the most current dataset available through PRISM. These datasets are carefully maintained and are subject to extensive peer review. It is also important to note that the model used by the PRISM Group was selected because it is believed to be better suited to regions with mountainous terrain.

The second dataset shows the potential change to mean annual precipitation and temperature over the 20-year life of this Master Plan ending in 2034. The data used for the 2034 time period was obtained from the GIS Program of the National Center for Atmospheric Research (NCAR). Sponsored by the National Science Foundation, the NCAR is a federally-funded research center devoted to serving the nation's universities regarding research and education in the atmospheric and related sciences. The forecast precipitation and temperature data illustrated on **Exhibit 2-3** and **Exhibit 2-4** was derived from NCAR's Community Climate System Model (CCSM) and is a general representation of possible change in mean annual precipitation and temperature. The CCSM model generates climate forecasting under several possible scenarios which consider a broad range of policy, technical, economic, and demographic factors that could have an influence on greenhouse gas emissions. The forecast change in precipitation and temperature depicted on **Exhibit 2-3** and **Exhibit 2-4** are based on the medium (A1B) scenario of the CCSM model, which was selected because the projections based on this scenario tend to fall in the middle of the range of possible outcomes over all of the scenarios analyzed.



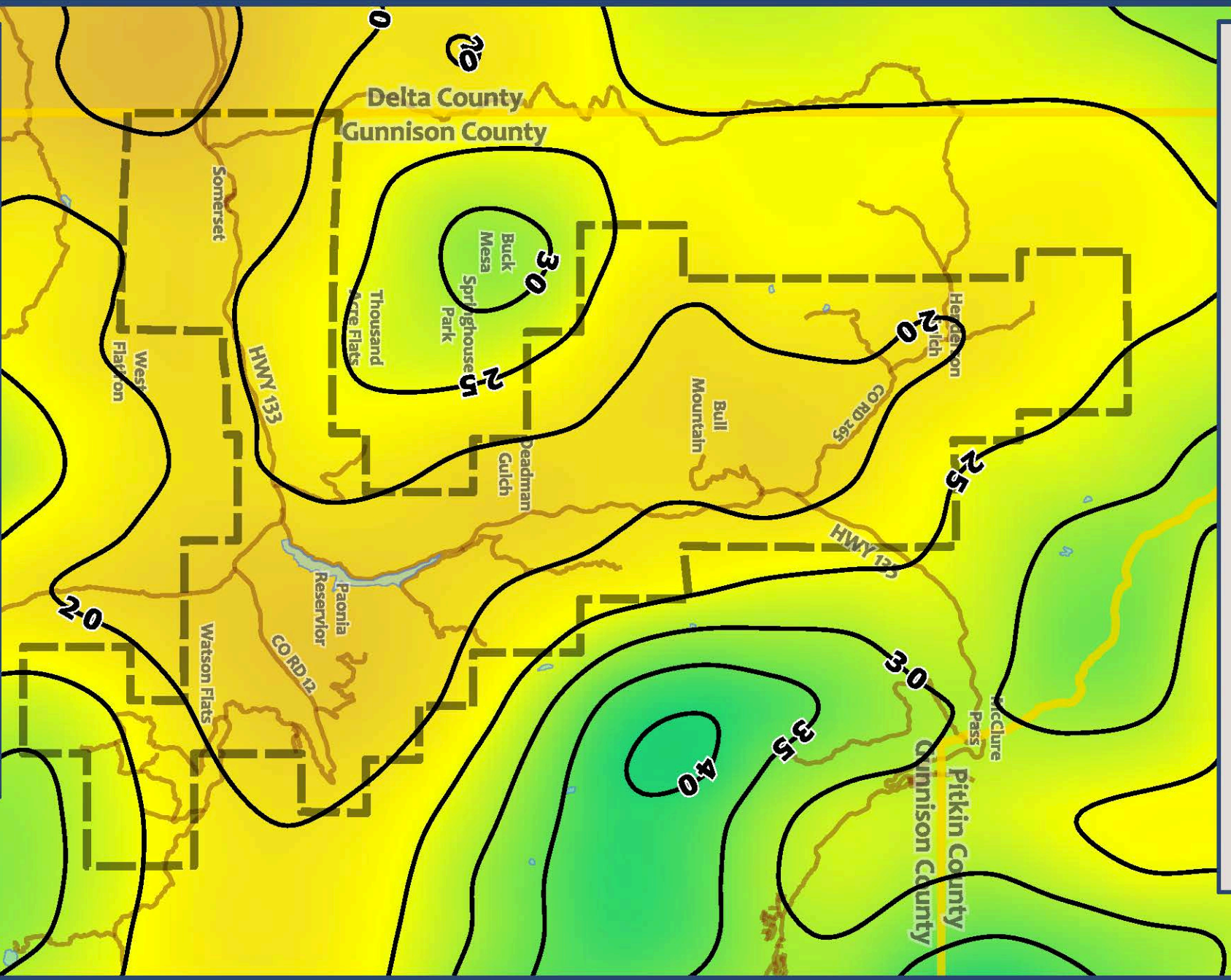
There are several things to keep in mind regarding the 2034 forecasts for mean annual precipitation and temperature depicted on **Exhibit 2-3** and **Exhibit 2-4**, especially when comparing the forecast data to the historic (1981 – 2010) data. *First, the forecast data is derived from a model which, although available on a local and regional basis, is best suited for larger-scale (national and global) prediction. Second, the available output for the forecast data is provided at a lower resolution (data points per square mile) than the historic data obtained from the PRISM Group. This explains why the contour lines for the 2034 forecast maps are more widely spaced and rounded, especially for the temperature data. Further, precipitation is more difficult to forecast and although precipitation projection models are improving, there is still a high degree of uncertainty and specific regional patterns could differ substantially.* Even with these limitations, the forecast data still provides a general indication of potential precipitation and temperature change and they represent the best available data for planning purposes. **Exhibit 2-3** depicts historic and forecast mean annual precipitation in the area of the Ragged Mountain Fire District. This exhibit shows that precipitation within the District is in the range of roughly 18 to 30 inches per year based on the 30-year average. By the end of the 20-year planning period mean annual precipitation is forecast to be in the range of 15 to 27 inches per year, approximately 3 inches per year less than the 30-year average. This is 10 to 15 percent drier than in the recent past. Similarly, **Exhibit 2-4** shows that the mean annual temperature within the District is in the range of 40 to 46°F and could be between 2.5 and 4° F higher by the year 2034. Lower precipitation and higher temperatures will most likely result in an increase in the number of wildfires and a longer wildfire season. These factors should be carefully considered when planning for the facility and equipment needs for the long-term future.

1981 - 2010 Mean Annual Precipitation



1980-2010 Precipitation Data Information: The precipitation data for this map was obtained from the PRISM Climate Data Group website at the University of Oregon. The PRISM Group gathers climate data from a wide variety of monitoring networks and applies quality control measures to develop its datasets which cover the period from 1895 to the present. The data used for this map represents a 30-year average from 1981 to 2010.

2034 Forecast Mean Annual Precipitation



2034 Precipitation Forecast Data Information: The data used to generate this map was obtained from the GIS Program of the National Center for Atmospheric Research (NCAR). The forecast precipitation data was derived from NCAR's Community Climate System Model (CCSM) and is a general representation of possible change in annual precipitation. The generalized temperature contours on this map are based on the the Medium A1B Scenario of the CCSM model for the year 2034.

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Mean Annual Precipitation

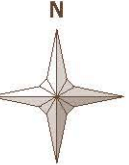
Exhibit 2-3

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Legend

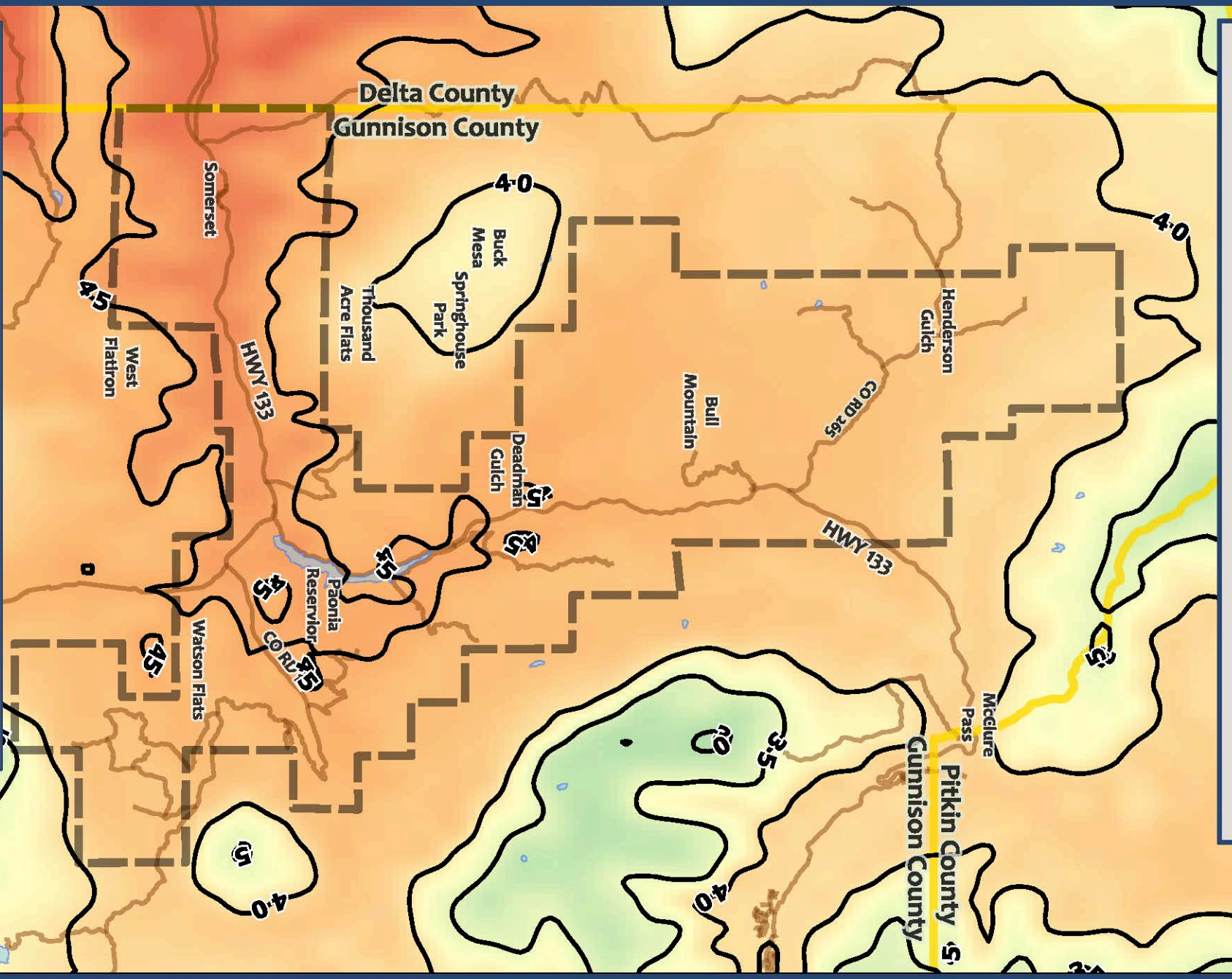
Precipitation (inches)	
	70 Plus
	55
	40
	25
	10 or Less



No Scale

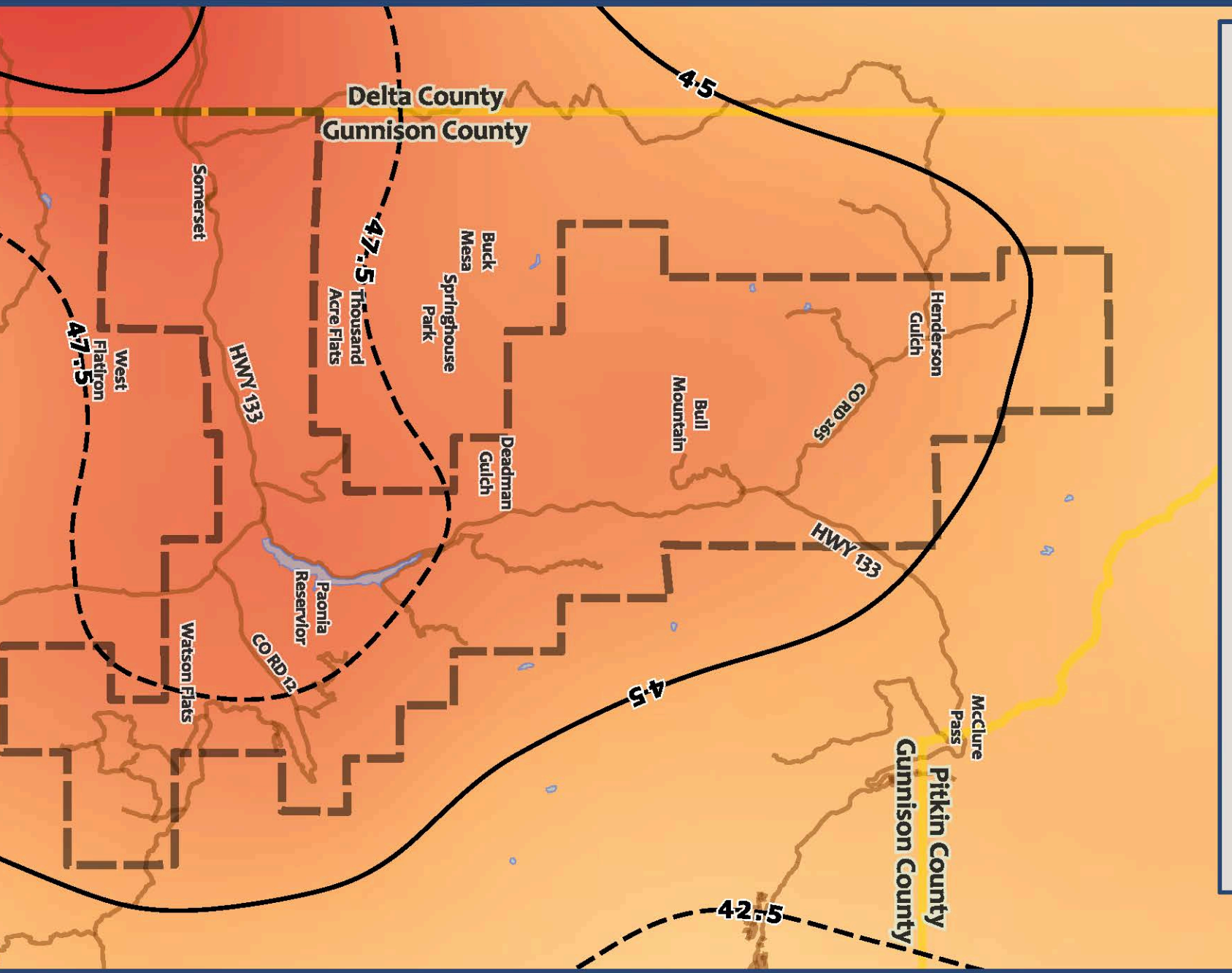


1981 - 2010 Mean Annual Temperature



1980-2010 Temperature Data Information: The temperature data for this map was obtained from the PRISM Climate Data Group website at the University of Oregon. The PRISM Group gathers climate data from a wide variety of monitoring networks and applies quality control measures to develop its datasets which cover the period from 1895 to the present. The data used for this map represents a 30-year average from 1981 to 2010.

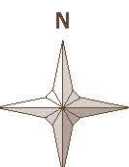
2034 Forecast Mean Annual Temperature



2034 Temperature Forecast Data Information: The data used to generate this map was obtained from the GIS Program of the National Center for Atmospheric Research (NCAR). The forecast temperature data was derived from NCAR's Community Climate System Model (CCSM) and is a general representation of possible temperature change. This map illustrates the Medium A1B Scenario of the CCSM model for the year 2034.

Legend

Temperature (Degrees F)	Color
52	Red
45	Orange
37	Yellow
29	Light Green
22	Blue



No Scale

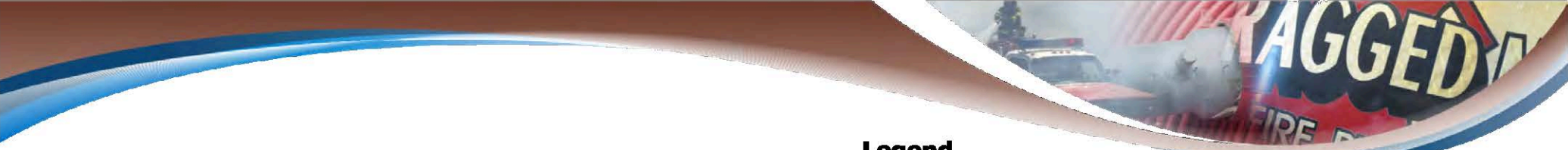
FIRE DISTRICT MASTER PLAN

Mean Annual Temperature

Exhibit 2-4

Date: 11/23/2013

Prepared by:
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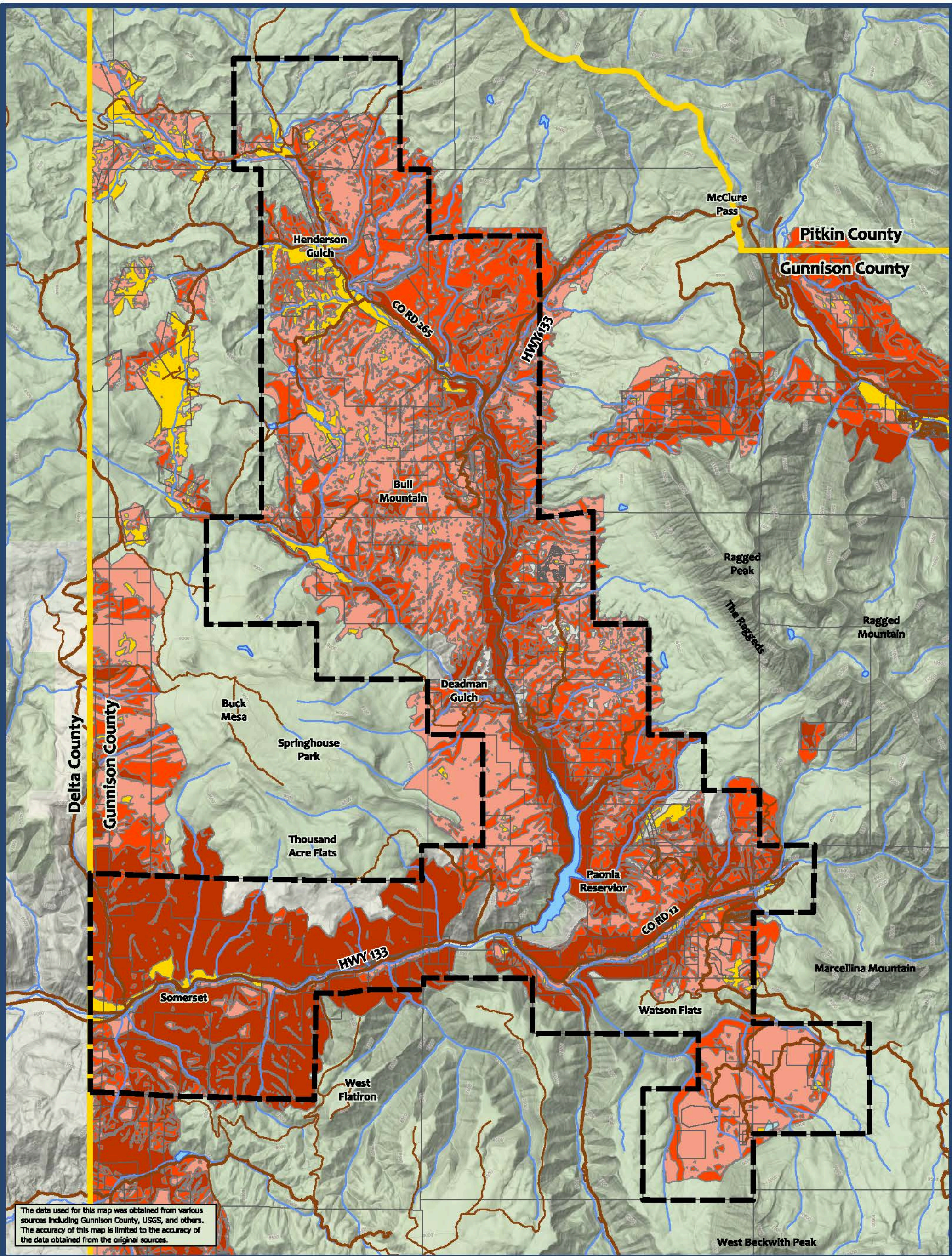


2.2 ENVIRONMENTAL CONSTRAINTS

2.2.1 WILDFIRE HAZARDS

Exhibit 2-5 is a Wildfire Hazard map for the area that includes the Ragged Mountain Fire Protection District, which was prepared using data from Gunnison County and the Colorado State Forest Service. The map shows which areas in the District have the highest fire danger risk. According to **Exhibit 2-5**, 18 percent of the District is located in areas considered to have extreme wildfire hazards. These extreme risk areas are primarily located in the southwest portion of the District around the town of Somerset, along Hwy 133 and County Road 265 through the middle of the district, and along County Road 12 in the southeast part of the District. Areas of high fire risk cover approximately 24 percent of the total District. These areas are spread throughout the District but are mainly found north of the intersection of County Road 265 and Hwy 133, southeast of Henderson Gulch. Bull Mountain, Deadman Gulch, and south of Watson Flats are areas of moderate fire risk, which accounts for 24 percent of the District. Areas with low fire risk make up four percent of the district and are spread out in small pockets. The town of Somerset, southern portion of Henderson Gulch, northern part of Deadman Gulch, and a few small areas east of Paonia reservoir are all areas with low fire risk. In addition to the mapped fire risk areas, there is an additional 30 percent of the District that is unmapped for fire hazards. These are generally public lands and include Watson Flats, the southern part of Paonia Reservoir, the northeast portion of Buck Mesa, and the most northern edge of the District.

It is worth noting that there is a significant amount of overlap between areas mapped for moderate to extreme wildfire hazard and locations with concentrations of coal mining activity and oil and gas wells. These resource extraction uses include activities such as welding and other industrial tasks which pose a risk for wildfire ignition.



FIRE DISTRICT MASTER PLAN

Wildfire Hazard

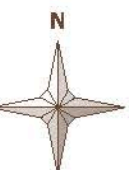
Exhibit 2-5

Date: 9/25/2013

Prepared by:
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 tgmalley@sppris.net

Legend

- EXTREME
- HIGH
- MODERATE
- LOW
- NONE
- NOT MAPPED



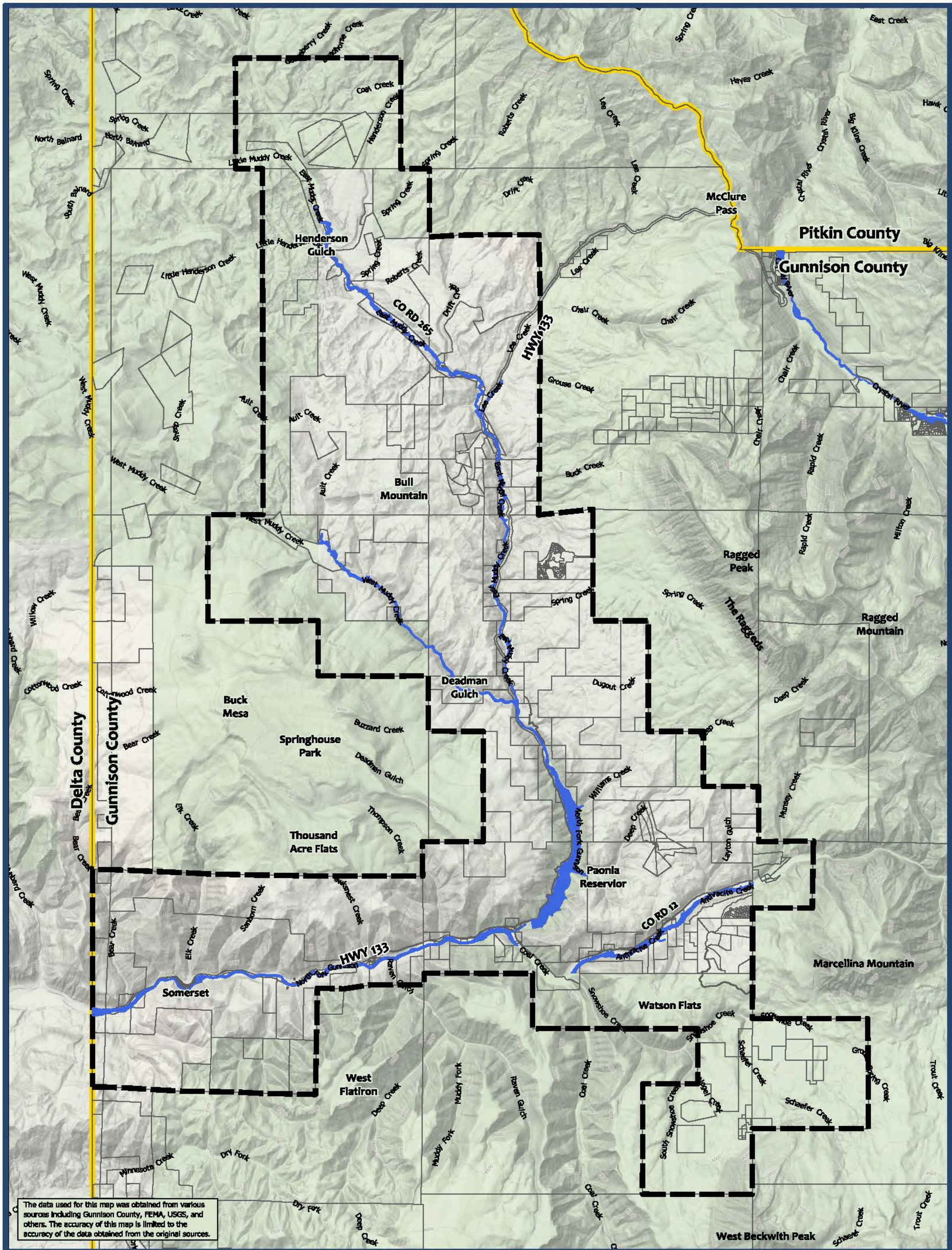
No Scale





2.2.2 FLOOD HAZARD ZONES

A majority of the Ragged Mountain Fire District has minimal flood hazards. However, there are several areas considered by the Federal Emergency Management Agency (FEMA) as being within a 100-year floodplain as shown in **Exhibit 2-6**. The floodplain areas primarily follow the North Fork Gunnison River, East Muddy Creek, Anthracite Creek, and West Muddy Creek. Gunnison County requires developers to secure a Floodplain Development Permit if proposed development projects would occur in a 100-year floodplain. The floodplain data depicted in **Exhibit 2-6** can be used during the process of evaluating alternative station locations to eliminate lands subject to flood hazards.



The data used for this map was obtained from various sources including Gunnison County, FEMA, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

100-Year Floodplain Hazard

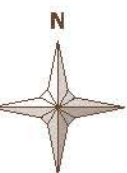
Exhibit 2-6

Date: 9/25/2013

Prepared by:
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Legend

- 100-Year Floodplain
- Fire District Boundary
- County Boundaries



No Scale



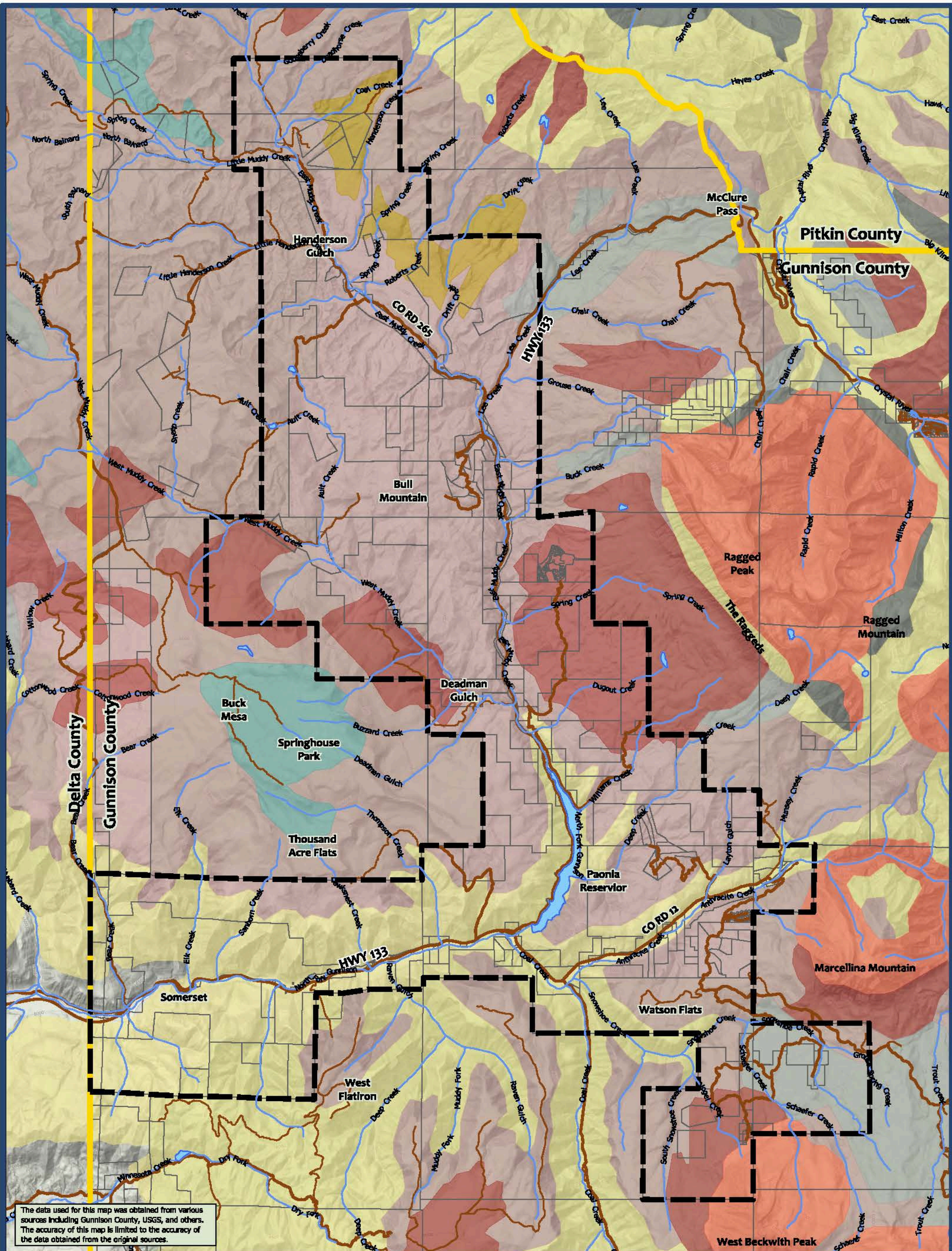
2.2.3 GEOLOGIC CONSTRAINTS

Geologic constraints are a factor for consideration during the site selection process for potential station locations and other facilities requiring land acquisition. The geologic constraints map contained in this Master Plan (**Exhibit 2-7**) was derived from data developed by the Colorado Geologic Survey and is intended for general informational purposes. It is imperative that site specific geologic testing and analysis by a qualified geologist or related professional be conducted prior to the acquisition of any land by the District regardless of the constraints depicted in **Exhibit 2-7**.

Surficial geology within the Ragged Mountain Fire Protection District is composed of various geological deposits and formations. The most common deposits within the District are mudstone and sandstone, as depicted in **Exhibit 2-7**. Henderson Gulch, Bull Mountain, and the Watson Flats area are all underlain by mudstone, while sandstone is found throughout the region surrounding Hwy 133 from Somerset to Paonia Reservoir and along County Road 12.

Other less common geologic components found throughout the District include gravel deposits, areas formed by landslides, plutonic rock, and areas formed by glacial drift. Gravel deposits are found in the northern part of the District, north of the intersection of County Road 265 and Hwy 133. The District contains just a small amount of Plutonic Rock, located south of Watson Flats along Vogel Creek. A small portion of the District, between the Schaefer and the Grouse Spring Creeks, was formed by glacial drift.

Perhaps the most important geologic constraint found within the District, in terms of site selection, is landslide, which represents a significant safety and foundation engineering issue. Fortunately, there are relatively few areas of private lands which are identified as known landslide areas. Areas with active and inactive landslides are found north of Deadman Gulch along the West Muddy Creek, northeast of the Paonia Reservoir from Buck Creek south to Williams Creek, and south of Watson Flats between South Snowshoe Creek and Schaefer Creek. While these areas may be more prone to landslide in the future, it should be understood that landslides can occur throughout mountainous areas where the proper conditions exist, such as a prolonged increase in soil moisture, loss of vegetation due to wildfire, natural erosion at the toe of a slope, major rockfall events, and stream erosion as well as man-made changes, such as road cuts, dam construction, and irrigation ditch failure.



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Date: 9/25/2013

Geology Map Exhibit 2-7

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Legend

- | | | | |
|--|---------------|--|----------------------------|
| | Alluvium | | Mudstone |
| | Glacial Drift | | Plutonic Rock (phaneritic) |
| | Gravel | | Sandstone |
| | Landslide | | Shale |



No Scale

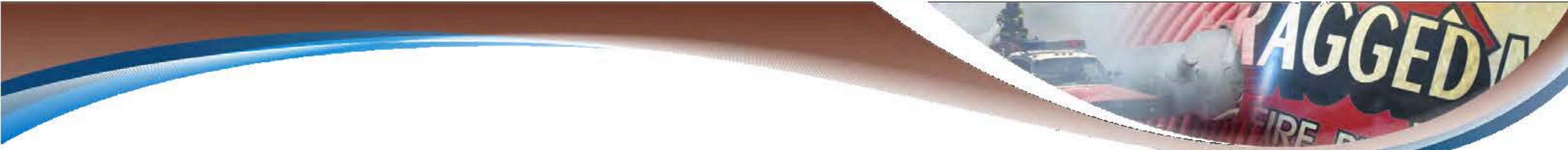
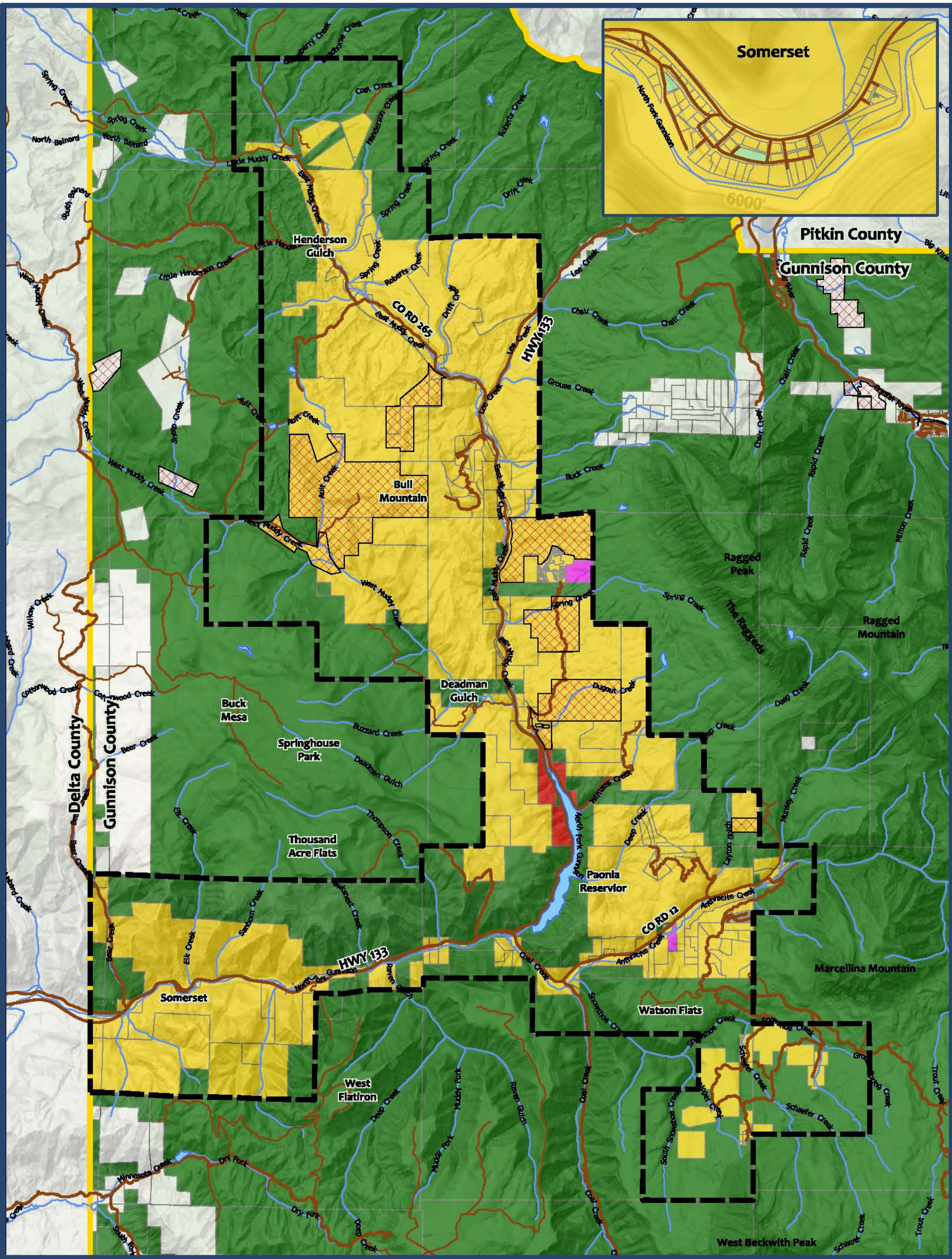


2.3 PROPERTY OWNERSHIP

The Ragged Mountain Fire Protection District is composed of both privately and publicly owned lands as depicted in **Exhibit 2-8**. A majority of the District is privately owned; however, portions of the District are owned by the Federal Government, State Government, and Gunnison County. The privately-owned areas make up 59 percent of the District, while the areas owned by tax exempt entities make up 41 percent.

The primary Federal agencies owning land in the District include the U.S. Bureau of Land Management, U.S. Forest Service, and the U.S. General Services Administration. Federal agencies own 40 percent of the total land in the District. The state agencies, State Land Board and Colorado Department of Transportation, own about one percent of the District. In addition to the Federal and State-owned land, one percent of the District is within right-of-ways and seven percent is protected by conservation easements.

The energy resource industry is active throughout the District and includes oil and gas fields, coal mining, and other minable bituminous areas as depicted in **Exhibit 2-9**. The Oil and Gas Industry is most prominent in the northern and central part of the District; however, there are two permits and four wells located in the southwest as well. In total, there are 72 wells on 10 different permits. The coal industry mines are found in the southwest portion of the District around the town of Somerset and on the western part of Watson Flats. There are 10 mines in the District, with only two still active. As mentioned previously, oil and gas wells can pose both a significant fire hazard and/or medical emergency demand.



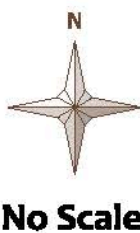
FIRE DISTRICT MASTER PLAN
Property Ownership Map
 Exhibit 2-8

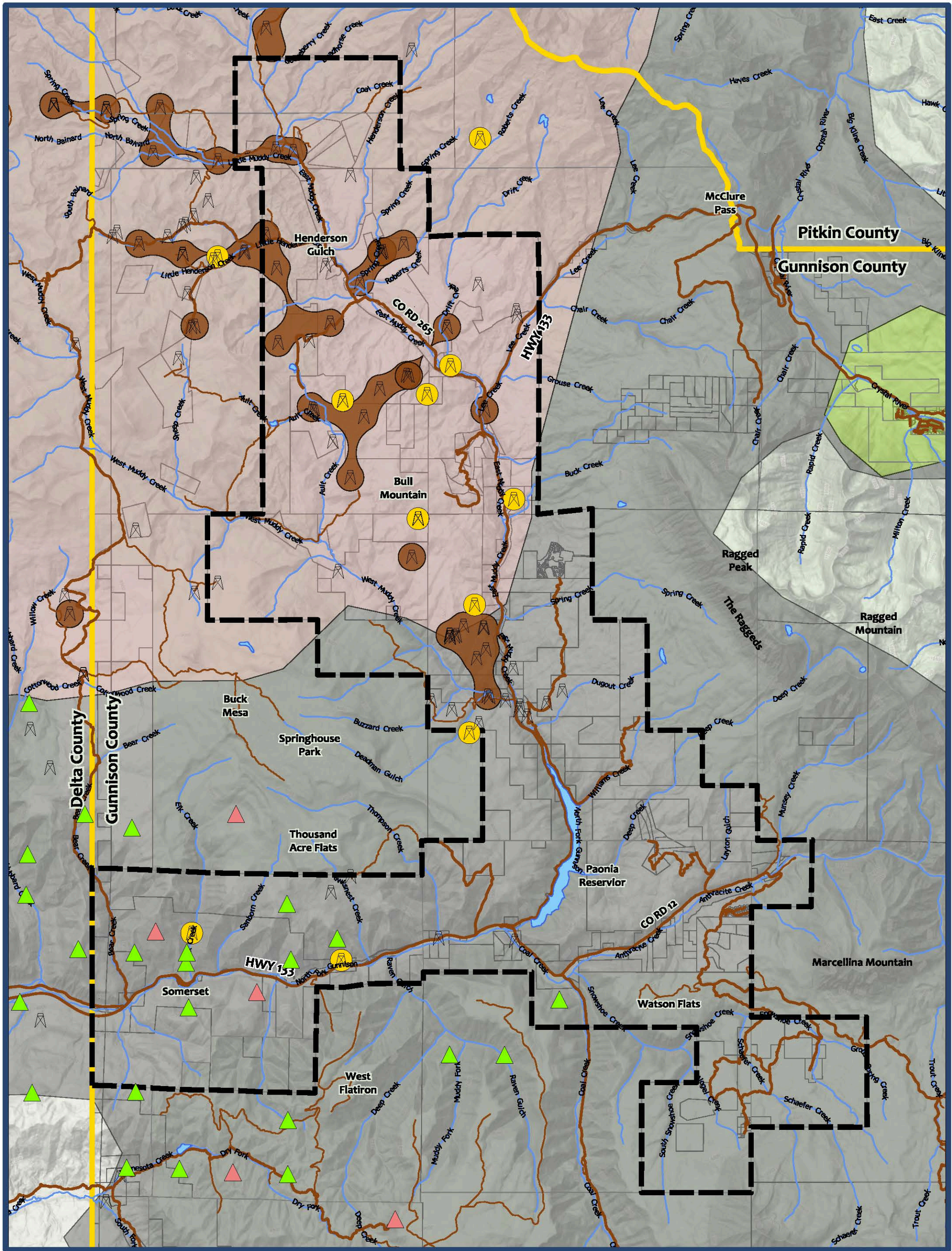
Date: 10/16/2013

Prepared by:
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Legend

- | | |
|--|--|
|  Federal Government |  Private Land |
|  State of Colorado |  Conservation Easements |
|  Gunnison County |  Fire District Boundary |
|  Other Exempt |  County Boundaries |





FIRE DISTRICT MASTER PLAN

Date: 10/17/2013

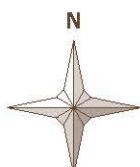
Energy Resource Map

Exhibit 2-9

Prepared by:
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Legend

- Oil & Gas Permits (COGCC)
- Oil & Gas Fields (COGCC)
- Fire District Boundary
- County Boundaries
- Coal Mines (Active)
- Coal Mines (Inactive)
- Anthracite
- Bituminous (minable)
- Bituminous (other uses)
- Wells (COGCC)
- No Scale





2.4 JURISDICTION AND TAXING BOUNDARIES

Understanding the current property tax burden on land owners within the District will be helpful during the process of developing financial strategies for funding the capital improvements necessary to serve the District's emergency service needs in the future. The current tax district boundaries for Ragged Mountain are shown in **Exhibit 2-10**, where the District is divided into three taxing districts: 621, 703, and 704. The primary levying bodies in the region are:

- Gunnison County
- RE1J – Gunnison School District
- 50J - Delta School District
- Colorado River Water District
- North Fork Water District
- Ragged Mountain Fire Protection District

A spreadsheet showing the mill levies for these various taxing districts is provided in **Appendix A**. Of these bodies, the School Districts and Gunnison County have the highest mill levies by far. Though the Ragged Mountain Fire Protection District has a modest mill levy of 2.05, the District levy was one of only two of the taxing bodies listed above whose mill levy was increased between 2011 and 2012. The Fire Protection District levy increased by 0.070 and the Colorado River Water District levy increased by 0.014 between 2011 and 2012. It should be noted that the District's mill levy was approved at 3.351; however, a temporary one year reduction of 1.301 mills was included, reducing the mill levy to 2.05.

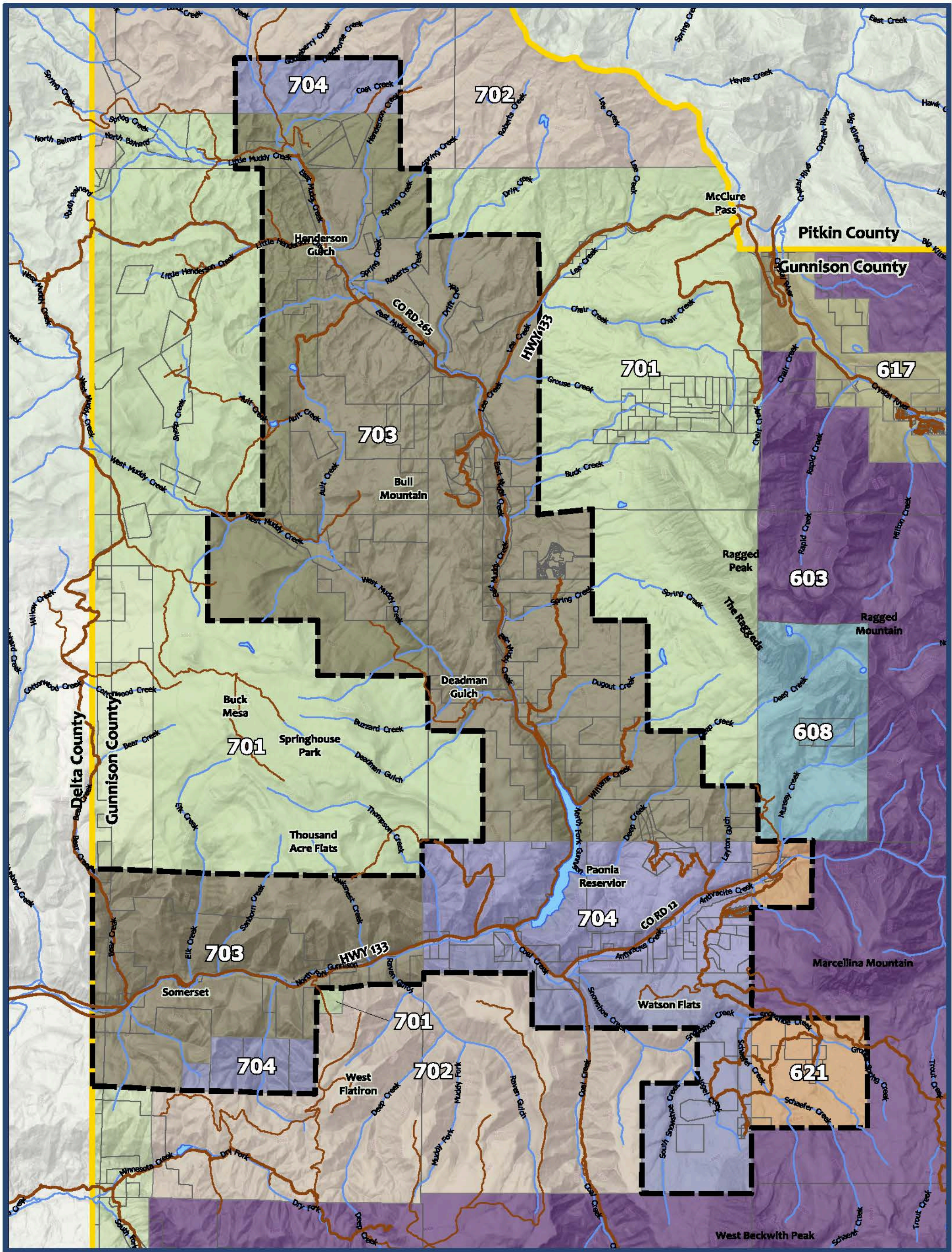
Non-exempt property owners in the District pay taxes to a subset of the above mentioned levying bodies depending on which taxing district their property is within. A portion of the property tax collected from all non-exempt property within taxing districts 621, 703, and 704 goes to the Ragged Mountain Fire District, which is the District's only revenue source. The annual property tax revenue collected on behalf of the District in 2013 was \$222,034 and is anticipated to be \$220,000 for 2014.

In addition to the District, the owners of non-exempt property in tax district 621 pay taxes to Gunnison County, RE1J-Gunnison School District, and the Colorado River Water District. The total 2012 mill levy for tax district 621 was 39.592. Property owners in tax district 703 pay taxes to Gunnison County, 50J-Delta School District, Colorado River Water District, and the North Fork Water District in addition to the Ragged Mountain Fire Protection District. The total 2012 mill levy in tax district 703 was 41.731. Finally, property owners in tax district 704 pay taxes to Gunnison County, 50J-Delta School District, and the Colorado River Water District in addition to the Ragged Mountain Fire Protection District. The total 2012 mill levy for tax district 704 was 41.170.



Compared to other areas of Gunnison County, the mill levies for the three taxing districts contained within the Ragged Mountain Fire District are on the low side. In fact, 23 of the 36 taxing districts in Gunnison County have a higher mill levy than districts 621, 703, and 704. Another comparison worth noting is that the mill levies for all of the other fire protection districts providing service within Gunnison County, including the Gunnison County Fire Protection District, Crested Butte Fire Protection District, the Carbondale and Rural Fire Protection District, and the Arrowhead Fire Protection District are higher than that of the Ragged Mountain District. A list of the other fire protection districts and their mill levies is provided as follows:

- Ragged Mountain Fire Protection District: **2.050**
- Crested Butte Fire Protection District: 3.843
- Gunnison County Fire Protection District: 4.513
- Arrowhead Fire Protection District: 4.518
- Carbondale and Rural Fire Protection District: 9.965



FIRE DISTRICT MASTER PLAN

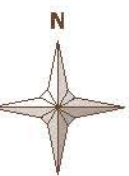
Taxing Districts Map
Exhibit 2-10

Date: 10/15/2013

Prepared by:
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Legend

- 603
- 617
- 621
- 701
- 702
- 703
- 704
- Fire District Boundary
- County Boundaries



No Scale



2.5 REGIONAL SETTING AND LAND USE

The Ragged Mountain Fire District is located in the northwest corner of Gunnison County, which is the legal jurisdiction for land use, local government services, and taxation. Delta County is located just to the west of the District. Pitkin County is located to the northeast, and Mesa County lies to the northwest. The surrounding region is part of a world-renowned resort/recreation area which is known for alpine and cross-country skiing, hiking, biking, backpacking, hunting, fishing, river-rafting, and other outdoor recreation activities. A significant portion of the District is Federally-owned land, some of which is under the jurisdiction of the Bureau of Land Management (BLM), while the remainder is part of the Gunnison National Forest and is under the jurisdiction of the United States Forest Service (USFS). **Exhibit 2-11** shows the public lands within the District and the various government agencies responsible for overseeing those lands. **Exhibit 2-12** differentiates public lands from those which are privately-owned land.

2.5.1 PUBLIC LANDS MANAGEMENT

The USFS maintains a land and resource management plan for the Grand Mesa, Uncompahgre, and Gunnison National Forests (Resource Management Plan). The current Resource Management Plan was approved in 1983 and was amended in 1991 to modify USFS plans and policies related to timber management. The Resource Management Plan has not been updated since 1991 due to a U.S District Court ruling related to USFS planning regulations. However, new USFS planning rules have been adopted in recent years and the USFS expects to kick off a planning process to update the Resource Management Plan sometime in the near future. The current Resource Management Plan shows a variety of uses for the USFS lands within the Fire District. These uses are primarily wildlife habitat management, livestock grazing, recreation, and timber harvesting. There are no major public use facilities on the USFS lands within the Fire District and none are planned under the current Resource Management Plan. Private use of USFS and BLM lands requires a special use permit from the federal government.

The BLM has also adopted a resource management plan for the lands they manage including the BLM lands within the District. The Uncompahgre Basin Resource Management Plan was originally adopted in July of 1989, and it defines the BLM's management strategy and use policies for the land under their jurisdiction within the Uncompahgre Basin Resource Area (UBRA). The UBRA covers a very large area (271,352 acres) that extends along Highway 550 from Ouray on the south to approximately 17 miles north of Delta and to the east approximately 10 miles east of the Black Canyon of the Gunnison National Monument. The District is located in the far northeast corner of the UBRA.



In general, the Uncompahgre Basin Resource Management Plan emphasizes mineral and other resource production while accommodating recreation and livestock grazing where these uses do not conflict with resource production activities. Most of the BLM lands within the District are located within Management Unit 7 of the Resource Management Plan. This management unit contains lands underlain by federal coal estate. This includes the areas currently being mined by the Oxbow Mining Company and Mountain Coal Company. The Resource Management Plan states that “the management unit will be managed for both existing and potential coal development.” The Resource Management Plan also states that federal oil and gas estate will be open to leasing with some seasonal restrictions on drilling in critical wildlife habitat areas.

Several amendments to the BLM Resource Management Plan have been adopted since the establishment of the Plan in 1989. However, most of these amendments relate to a specific resource or topic or are limited to a specific sub-area of the UBRA. Few of the amendments have any significant implications for the BLM lands within the District. Two amendments which do affect lands within the District are the Fire Management Amendment adopted in 1992, and the Gunnison Interim Travel Restrictions Amendment, which was adopted in 2001. The Fire Amendment expanded the use of fire as a vegetation management tool from limited areas of the URBA to all public lands within the resource area, including the lands in the District. The use of fire as a vegetation management tool is subject to site-specific environmental analysis and approved burn plans. The Interim Travel Restrictions Amendment limits the use of motorized or mechanical vehicles to existing roads and trails and prohibits cross-country, off-route travel by such vehicles. Prior to the adoption of this amendment, the use of off highway vehicles (OHV) was unrestricted within most of the URBA.

2.5.2 PRIVATE LANDS MANAGEMENT

Most of the privately-owned land within the District is currently used for agriculture (primarily ranching) and residential purposes, in addition to the coal mining operations located near the town of Somerset. **Table 2-3** below provides a breakdown of the existing land use acreage within the District, including the public lands, while **Exhibit 2-12** illustrates this information graphically. Oil and gas development and production also occurs on both private and public lands, primarily in the northern half of the District. Parcel size for the private lands within the District varies from 2,573.1 acres to less than .5 acre, with the average being 100.7 acres. There are relatively few residential subdivisions within the District and most of those are nearly built out. There are only 25 parcels, not contained within a subdivision, that are listed in the Gunnison County Assessor’s records as vacant. However, this is not a good indicator of the development potential within the District since it ignores the potential associated with the large agricultural parcels. The Town of Somerset is the only significant population center with 66 residential lots, all but five of which are developed.



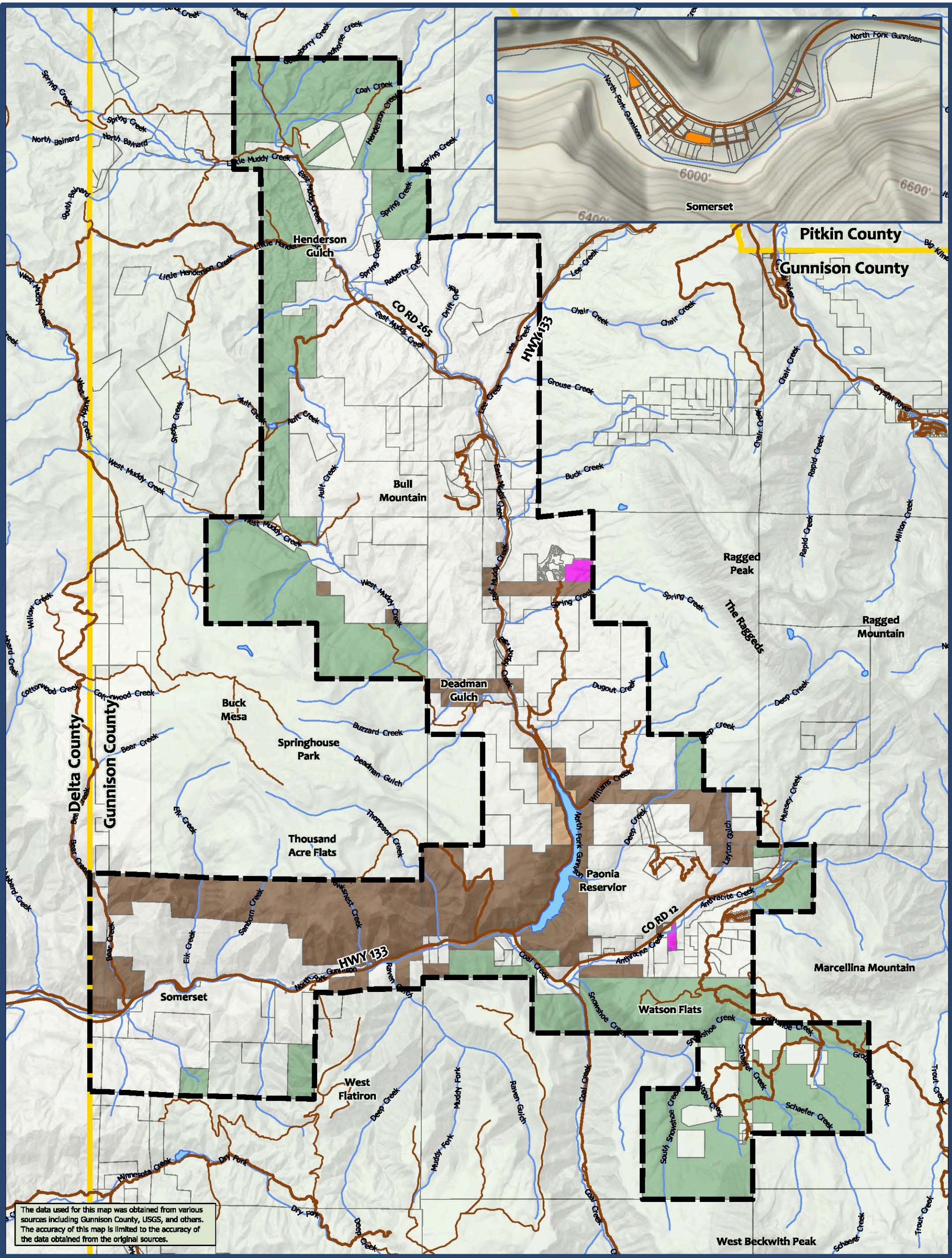
TABLE 2-3 - EXISTING LAND USE

	Parcels	Acres
Agricultural	126	33,805.2
Residential	109	1,215.8
Public Lands	67	30,890.5
Mixed-use	13	2,613.5
Mining	2	3,804.4
Vacant	139	1,918.7
Other	8	118.9
Total	464	74,367.0

Source: TG Malloy Consulting, LLC and Jviation Inc.

Land use and development on the privately-owned lands within the District is governed by Gunnison County. Counties in Colorado generally use a combination of Master Plans and zoning regulations to guide and regulate land use and development. Gunnison County does have a Master Plan to provide guidance related to future land use and environmental practices; however, this plan is limited to a corridor that includes the communities of Crested Butte and Gunnison and the area between them. Since the Ragged Mountain Fire District is not included within this area, there is little long-term guidance regarding future growth and development for the lands within the District.

The primary tool used to regulate land use and development within the County is the Gunnison County Land Use Resolution (GCLUR) which applies to all private lands within the unincorporated areas of the County. This applies to the entire District, including the town of Somerset, which is unincorporated. The GCLUR is somewhat unique in that it does not rely on traditional or Euclidian zoning to direct land use or control the density of development. Rather, the GCLUR employs a performance-based approach, the intent of which is to regulate the use of land based on the impact of such use on surrounding areas, to avoid conflict among different land uses, and to avoid or minimize impacts on the environment. The County's approach to land use regulation is discussed in more detail in the Build-Out Data section of this Master Plan.



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Public Lands Map

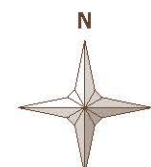
Exhibit 2-11

Date: 12/4/2013

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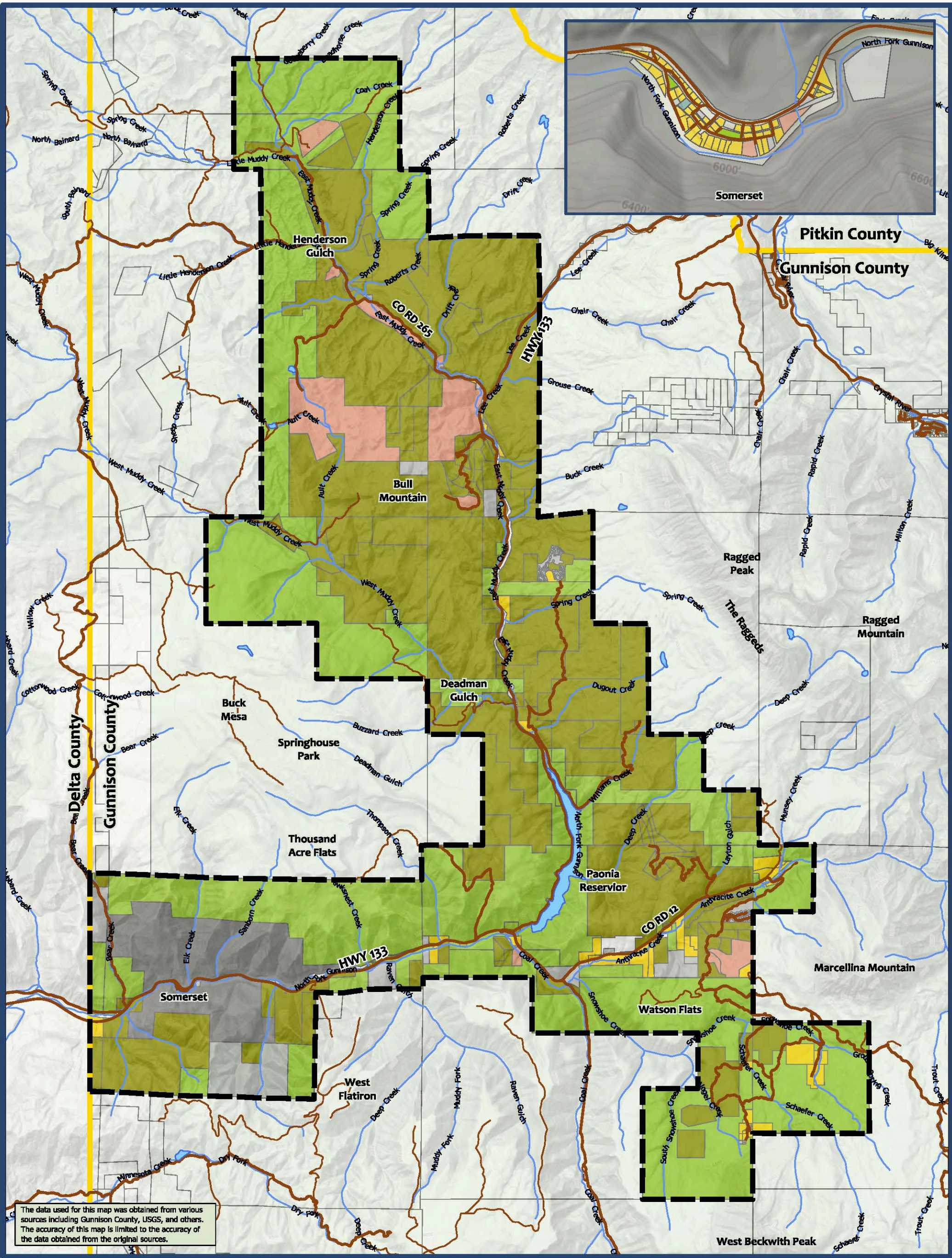
Legend

- U.S. FOREST SERVICE
- BLM
- CDOT
- STATE LAND BOARD
- GUNNISON COUNTY
- OTHER EXEMPT



No Scale





The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

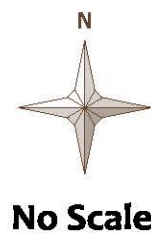
FIRE DISTRICT MASTER PLAN

Existing Land Use Map

Exhibit 2-12

Date: 12/4/2013
 Prepared by:
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- Legend**
- Agricultural
 - Residential
 - Public Lands
 - Mixed Use
 - Mining
 - Vacant
 - Other





2.6 DISTRICT EQUIPMENT AND FACILITIES

The District's ability to respond and effectively provide emergency fire and medical services directly correlates to the type and condition of its equipment and facilities. The District owns a portion of its own equipment but also uses equipment owned by the Paonia Fire District. Sharing equipment allows the District to be properly equipped with the minimal tax funded budget. The 2013 inventory can be found in **Appendix B**.

2.7 DISTRICT AGREEMENTS

On October 7, 2003 an election was held asking voters to support the formation of a special district under Title 32, Colorado Revised Statutes, for purposes of providing fire and emergency medical services. A majority of voters approved the measure and the District was officially organized on November 28th, 2003, by order of the 7th Judicial District Court, Case No. 09-CV119. The District is managed by a Board of Directors with five elected officials.

The District has an Intergovernmental Agreement with the Delta County Fire Protection District #2 (Paonia) dated February 3, 2007. Through this Agreement, Paonia provides fire service response and emergency rescue response services to both the Paonia service territory and the District service territory. The level of service provided to the District by Paonia is determined by the Paonia Fire Chief. The handling of hazardous materials and other services beyond the limits of Paonia's awareness level training are not included in the Agreement. Further, search and rescue services are not included in the emergency rescue services. Other provisions of the agreement include:

- Paonia and the District will maintain an adequate inventory of equipment and supplies to fight fires and perform rescue services within their respective boundaries.
- Paonia will inspect and test District equipment twice a year and notify the District of any deficiencies.
- Paonia may provide mutual aid to other agencies providing that such services do not impact the duties of each District under this agreement.
- The District shall provide sufficient communication equipment to meet reasonable requirements established by Paonia.
- A joint Fire Committee will be established to meet as needed to discuss items of mutual concern. The Committee shall review, modify, and recommend an annual budget and provide a process to do so.
- The District will pay Paonia an annual sum of \$90,000 for services.



- Each entity shall purchase their own capital equipment and provide their own facilities. Any joint acquisition must be agreed to under a separate agreement.
- Paonia will be responsible for overseeing regular maintenance of all equipment and supplies for both parties.
- Paonia will provide the District with a quarterly activity report.
- Paonia will be responsible for all selection and training of all volunteers, staffing, compensation packages including insurance for volunteers, and participation in pension funds.
- Each entity is responsible for hiring personnel for administrative/operations responsibilities.
- Termination notice must be given twelve (12) months prior to the effective date of termination.

2.8 REGULATORY DOCUMENTS

2.8.1 FEDERAL AND STATE DOCUMENTS

The District must follow several specific Federal and State regulatory documents. The following documents will provide the guidance, legal framework, and industry standards necessary to provide meaningful fire protection and emergency medical services to the citizens and visitors of the District. The primary documents applicable to the District are:

- Insurance Services Office (ISO) Fire Suppression Rating Schedule
- National Fire Protection Codes and Standards (NFPA)
- International Fire Code, 2009 edition (IFC)
- State of Colorado Department of Public Health and Environment
- Emergency Medical and Trauma Services Rules and Regulations, 6 CCR 1015-3, Amended 1/16/13 (EMS)
- Colorado Revised Statutes, Title 32, Special Districts

2.8.2 LOCAL DOCUMENTS

Additionally, there are four documents that provide guidance to the District in terms of service levels:

- Gunnison County Annual Operating Plan with federal and state fire service agencies.
- The District Service Plan as adopted on November 28, 2003, by order of the 7th Judicial District Court, Case No. 09-CV119.



- Gunnison County Community Wildfire Protection Plan, Dated June 2011.
- Gunnison County Natural Hazard Mitigation Plan, Comprehensive Update October 2012 (additional Changes February 13, 2013).

2.9 FINANCIAL INFORMATION

The District is funded in entirety by taxes collected from within the District. As of 2012, the District's total taxable assessed valuation was \$103,719,530, with \$414,810 in new construction and \$99,440 in new primary oil or gas production. From the tax revenue, the total revenue for the District in 2013 was approximately \$222,034, which is slightly higher than what is expected in 2014 at \$221,224. After accounting for expenses, the District has a current reserve of \$1,412,064. District expenditures anticipated for 2014 are \$381,650. A copy of the District's 2014 budget is included as **Appendix C**.



3.0 SERVICE NEEDS FORECAST

A service needs forecast is an essential component of this Master Plan to determine future emergency fire and medical response needs for the Ragged Mountain Fire Protection District. In order for the forecast to be most helpful in determining future needs, it should be realistic, based upon the latest available data, reflect current conditions, and provide adequate justification for planning and development. The forecast for this Master Plan will be prepared for short- (5 year), medium- (10 year), and long-term (20 year) periods which cover the planning period of 2013 to 2033. While forecasting is essential for a successful Master Plan, it only serves as an approximation of future activity based on historical data and present conditions. There are many unforeseen factors that can influence forecasts, both positively and negatively, as time progresses. Following the service need forecasts, the Master Plan will examine the facility requirements based on anticipated emergency service demand for the 20-year planning period. The results of the facility requirements analysis will initiate the solutions phase to determine alternatives to accommodate future service demand for the Ragged Mountain Fire Protection District.

This chapter will review a build-out analysis of the potential number of housing units within the District, population and demographics of the area, the results of the District survey conducted as part of this Master Plan, and historic emergency service call activity. These elements will provide a basis for the development of the service need forecasts.

3.1 BUILD-OUT ANALYSIS

A build-out analysis would typically be done using zoning information from the governing jurisdiction(s), which in this case is Gunnison County. However, Gunnison County does not utilize single-use zoning for the regulation of land use and subdivision. Rather, the County uses a performance-based approach to land use regulation, the intent of which is to regulate the use of land based on the impact of such use on surrounding areas, to avoid conflict among different land uses, and to avoid or minimize impacts on the environment. Of course, the subdivision of land into parcels containing 35 acres or more is permitted under Colorado State Statute (C.R.S. 30-28-101 (10)(b)) and is also exempt under the Gunnison County Land Use Resolution (GCLUR). A conversation with a planner in the Gunnison County Community Development Department confirmed that lots created through the 35-acre subdivision exemption are deemed to have a residential development right, which allows the development of a single-family residence. However, subdivisions that create lots smaller than 35 acres require approval of a land use change permit in Gunnison County.



The first step in the County’s review of prospective subdivisions is to determine whether the site complies with a set of locational standards contained in Article 10 of the Gunnison County Land Use Resolution (GCLUR). This section of the GCLUR states that these standards *“are intended to provide planned and orderly use of land and protection of the environment in a manner consistent with constitutional rights, to encourage development in areas closest to existing population centers, to foster growth that is orderly and reasonable in its rate and location, and is compatible with existing uses, and to promote the use of existing infrastructure.”* Section 10-102(B)(1) and (2) of the GCLUR define the area where subdivisions can occur as being within the Three-Mile-Plan area of an existing municipality or adjacent to an established population center or an existing legal subdivision that is served by a central wastewater treatment system.

It should be noted that while Somerset is listed among the eligible population centers in the GCLUR, the land around the Town is entirely owned by the Oxbow Mining Company and the Mountain Coal Company. In addition, these lands are encumbered by steep slopes and extreme wildfire hazard, which makes expansion of the Town of Somerset through significant subdivision of the surrounding lands highly unlikely, especially during the 20-year planning period of this Master Plan.

Other than the proximity to Somerset discussed above, none of the land within the Fire District meets any of the locational standards in Section 10-102(B)(1) and (2). Lack of compliance with these locational standards would not necessarily preclude subdivisions with lots smaller than 35 acres; however, the process for determining whether a particular parcel might be eligible for subdivision at a higher density would require a site-specific evaluation addressing a wide range of environmental factors including floodplain, geologic hazards (rockfall, landslide, avalanche, steep slopes, Mancos shale, etc.), wildfire, wildlife habitat, and water quality to name a few. Since this level of analysis for every privately-owned parcel in the Fire District is impractical, we have made the following assumptions for the purposes of the build-out analysis:

1. All future development is assumed to be residential;
2. Minimum lot size of 35 acres;
3. Parcels less than 70 acres in size, which have an existing residence (defined as having an address point in the County’s address database), are assumed to be fully developed with no further development potential;
4. All exempt lands, as shown on the Property Ownership Map (**Exhibit 2-8**) are excluded from the build-out calculation;
5. Lands encumbered by conservation easements, as shown on the Property Ownership Map (**Exhibit 2-8**), are assumed to be fully developed and are excluded from the build-out calculation;



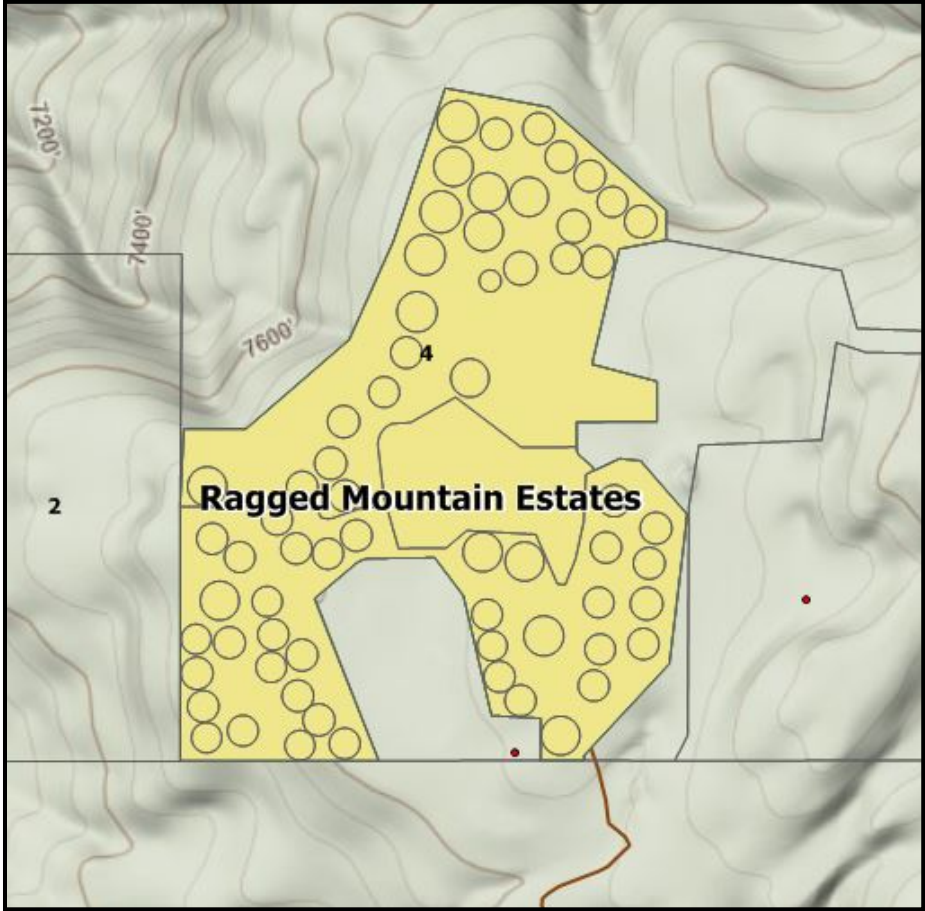
6. All other standards defined in Article 11 (Resource Protection Standards) of the GCLUR are deemed to be either avoidable or capable of being mitigated on parcels of 35 acres or more. Limited reductions in the number of parcels were applied in certain circumstances.

Exhibit 3-3 and **Table 3-1** below provide graphic and numerical summaries of the build-out analysis based on the assumptions listed above. As indicated in assumption number six, there are some instances where the number of 35-acre lots that could be created from a particular parcel was reduced due to the existence of steep slopes, high to extreme wildfire hazard, or 100-year floodplain. In some cases, these reductions were the result of multiple overlapping hazards, typically wildfire and steep slopes. Examples of this are that the large parcels owned by Oxbow Mining Company and Mountain Coal Company located near Somerset were assumed to have no development potential for 35-acre residential lots due to the combination of extreme wildfire hazard and steep slopes. In this particular case, the fact that the potential for future mining activities for these parcels is uncertain was also a factor.

The build-out analysis also considered the development status of the existing subdivisions within the Fire District. The District contains seven known subdivisions that are identified in the Gunnison County GIS database. However, two of these subdivisions, Marcellina Estates and Ragged Mountain Estates, which were platted in the late 1970's, remain undeveloped and have unusual circular lots which do not meet the County's 1-acre minimum lot size requirement for lots with on-site septic systems (**Exhibit 3-1** and **Exhibit 3-2** below show the layouts of these subdivisions). The Gunnison County Community Development Department indicated that if building permits were ever sought for any of the lots in these subdivisions the County would likely require a land use change permit to address concerns related to septic system requirements as well as other resource protections issues. As a result, the lots shown on the GIS mapping for these subdivisions were disregarded and the build-out potential was calculated based on the number of 35-acre lots that could be created from the total acreage within the subdivision boundary. This represents a significant reduction in the overall number of developable lots since there are a total of 112 vacant lots between the two subdivisions versus a total of seven 35-acre lots. **Table 3-1** shows the number of developed and vacant lots for the remaining five subdivisions within the District, and they are depicted on the Build-Out Map (**Exhibit 3-3**) as well. Most of these subdivisions are nearly built out.



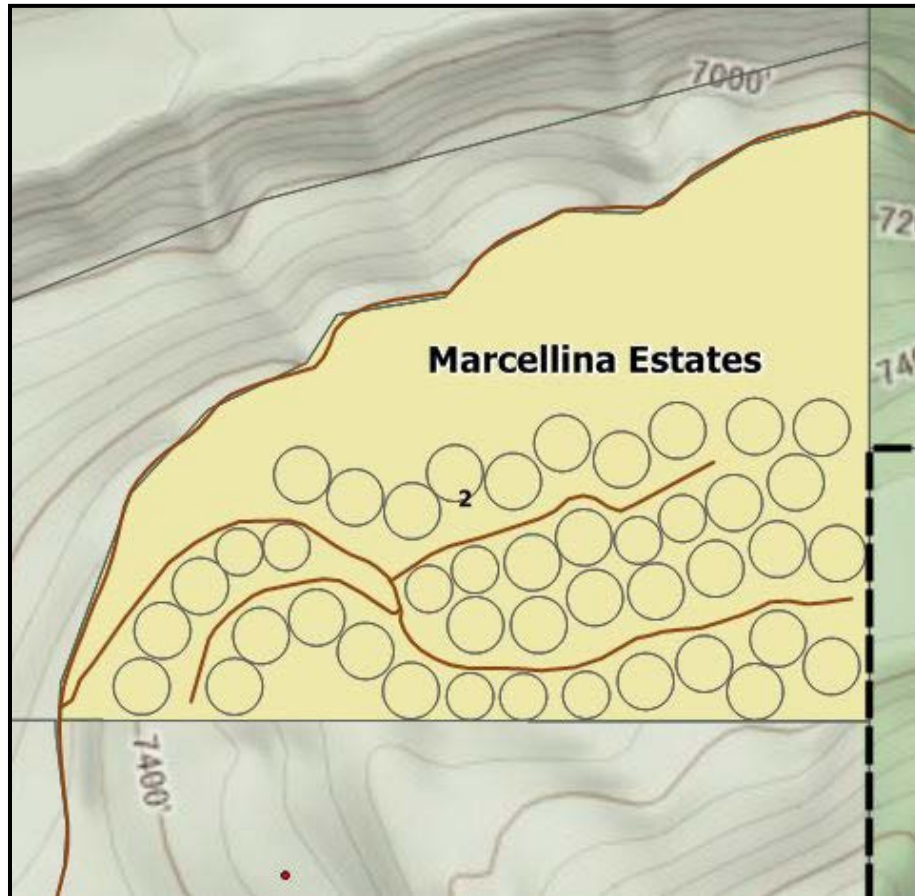
EXHIBIT 3-1 - RAGGED MOUNTAIN ESTATES BUILD OUT



Source: TG Malloy Consulting, LLC



EXHIBIT 3-2 - MARCELLINA ESTATES BUILD OUT



Source: TG Malloy Consulting, LLC

There is one other subdivision within the District which has unusual development characteristics that merit a brief description for clarity. The Bear Ranch Parcels, which the County's GIS database shows as having been platted in 2011, contains approximately 3,200 acres. This property is owned by a single individual and has been divided into 15 lots which accommodate various structures and a variety of uses including ranching and agricultural-related uses, residential dwellings, and a few atypical uses. In addition, the property contains a significant number of structures and the combination of these factors may result in some unique emergency service demands. However, while it is likely that there will be additional development on the Bear Ranch property it is unlikely that it will be developed in a traditional manner. For this reason, **Table 3-1** shows this property as having 15 developed lots and no additional residential development potential. The build-out potential for the Bear Ranch Parcels may need to be adjusted as more information is made available regarding the property owner's long-term plans.



TABLE 3-1 - BUILD-OUT POTENTIAL ESTIMATE
(Private Lands without Conservation Easements)

	Existing Lots			Potential Lots ¹	Total Build-Out Lots ²
	Total	Developed	Vacant		
Subdivisions/Town	102	90	12	0	102
East Bull Mtn Ranch	13	9	4	NA	13
Crystal Meadows Ranch/Resort	5	2	3	NA	5
Erikson Springs	3	3	0	NA	3
Town of Somerset	66	61	5	NA	66
Bear Ranch Parcels	15	15	0	NA	15
Non-Subdivision Parcels	175	74	101	710	841
Fully Subdivided (<70 Acres)	104	47	57	NA	NA
Subdivision Potential (≥ 70 Acres)	71	27	44	710	NA
Total	277	164	113	710	943

¹ Estimated based on 35-acre minimum lot size adjusted for steep slopes, floodplain, and other constraints.

² Total of existing lots plus potential lots.

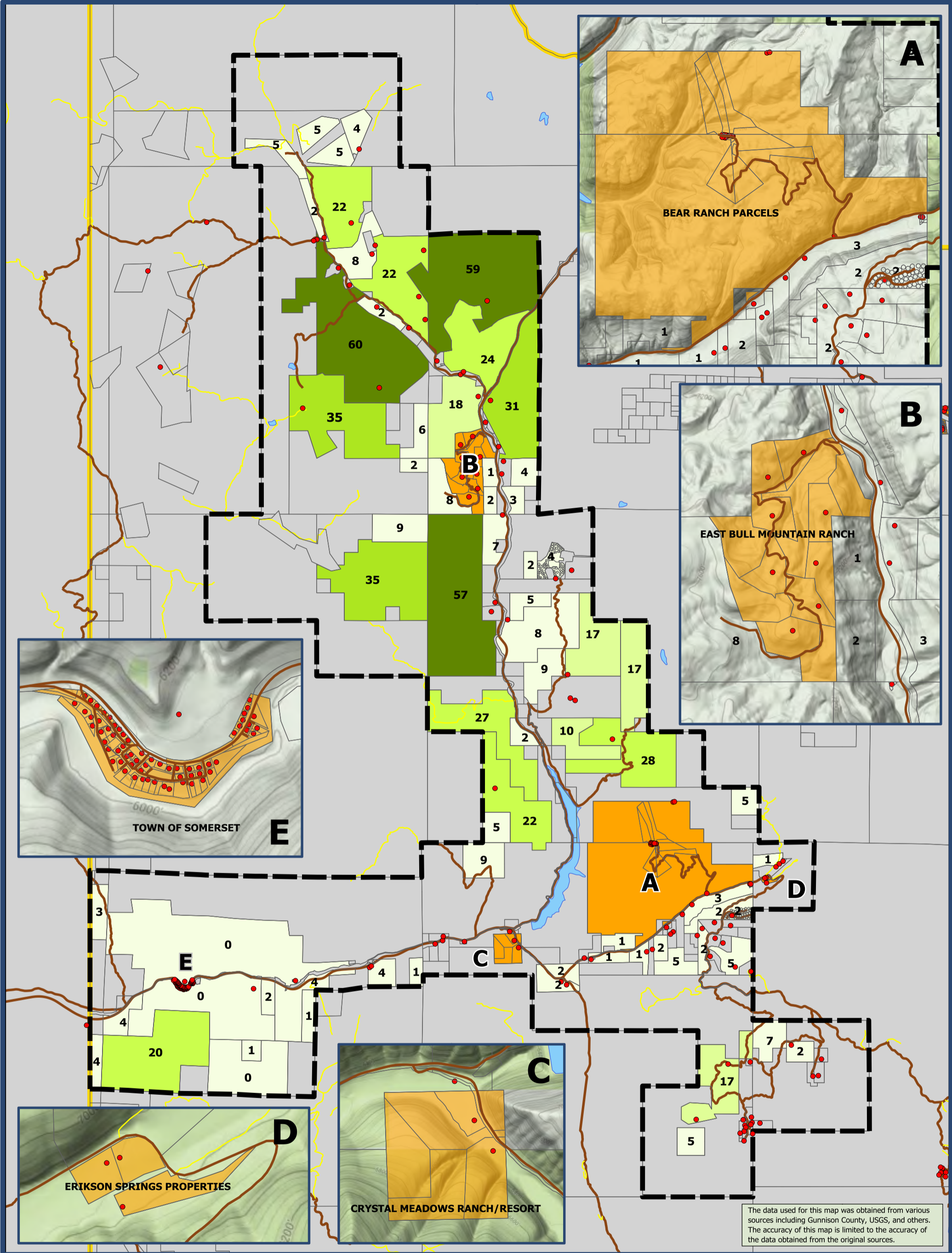
Source: TG Malloy Consulting, LLC

The table above shows that there is substantial development potential within the Fire District Boundaries, even under the assumptions listed above. The future development potential within the District falls into three basic categories: 1) Development of the remaining vacant lots within the existing subdivisions; 2) Development of the existing vacant lots smaller than 70 acres in size; and 3) Further subdivision of parcels containing more than 70 acres (including parcels with no existing residences and those that have one or more residences but could accommodate additional residences through further subdivision). The first two categories represent an increase of 69 residential building sites over the existing condition, while the third category represents an additional 666 residential sites. **Exhibit 3-3** shows each existing parcel and the number of additional residential lots that could be created through 35-acre subdivision. Of course, this is a hypothetical build-out potential which is highly unlikely to be fully realized and will certainly not occur during the 20-year planning period covered by this Master Plan. However, this exhibit does illustrate one interesting characteristic, which is that most of the future development potential within the District is located in the area north of the Paonia Reservoir. This is the reverse of the current situation where roughly 70 percent of the existing development is located in the area that includes the reservoir and everything to the south. This could be a significant factor in defining the number and location of potential fire station sites within the District.



The development potential summarized in **Table 3-1** far exceeds the anticipated growth in the area based on the population growth projection estimates prepared by the Colorado State Demography Office (SDO). The SDO has prepared growth projections for all of the counties in the State based on 2010 US Census Data and other data sources, including the counties themselves. The SDO estimates that Gunnison County's average annual growth rate over the 20-year planning period is expected to be approximately 1.54%. According to the most recent US Census data, the population within the Fire District boundary as of 2010 was approximately 150 persons. At the County's projected average annual growth rate, this translates to a present-day population of approximately 157 persons and a population of 213 persons in 2033, or an increase of only 56 people.

We can estimate the number of additional households required to accommodate this population increase by using the average persons per household (2.31) and housing vacancy rates (49.35%) for the unincorporated areas of Gunnison County, data which is also maintained by the SDO. Accommodating the forecast population growth with an average household size of 2.31 persons would require approximately 24 additional housing units assuming full occupancy. If we apply the 49.35% vacancy rate it would require 49 housing units to accommodate the projected growth. This is less than the number of units that could be accommodated on the existing vacant lots within the District. A more detailed forecasting analysis will be provided in later sections of this chapter.



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

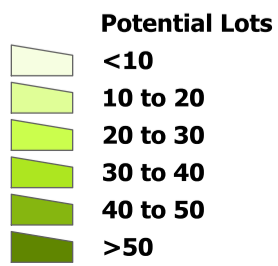
FIRE DISTRICT MASTER PLAN

Build-out Map Exhibit 3-3

Date: 12/1/2013

Prepared by:
TG Malloy Consulting, LLC
 402 Park Drive
 Glenwood Springs, CO 81601
 p. 970-945-0832
 tgmalley@sppris.net

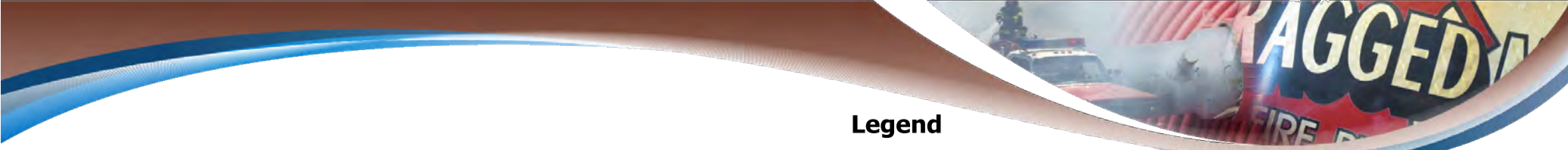
Legend



- Address Points
- Subdivisions
- Fire District Boundary
- County Boundary



No Scale

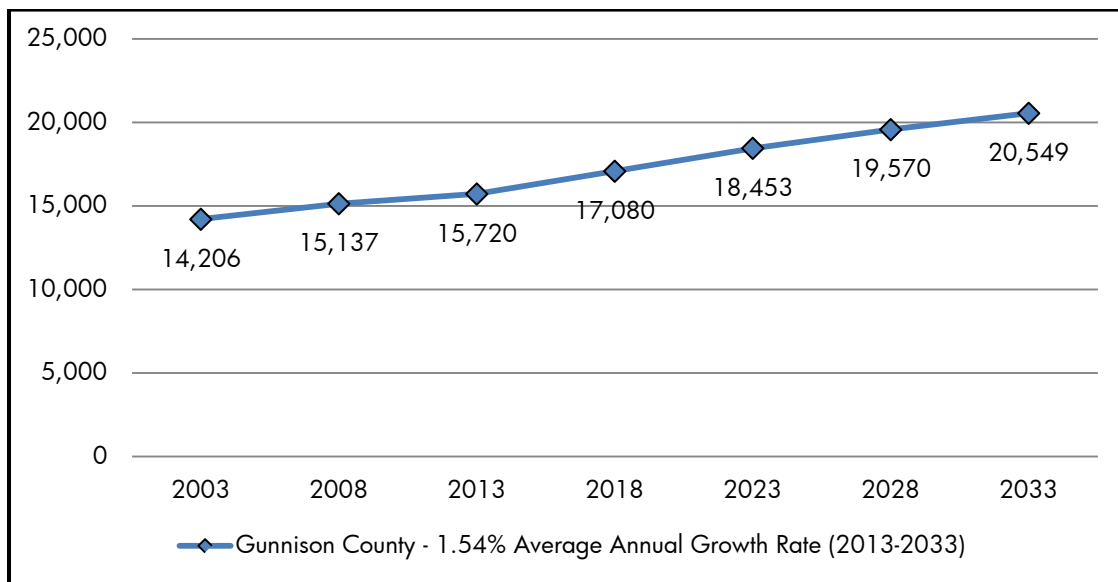




3.2 POPULATION AND DEMOGRAPHICS

Population and demographic growth trends can be a realistic indicator for future service needs of an area. As previously mentioned, Colorado State Demography Office (SDO) prepared growth projection estimates for all counties in the State based on 2010 US Census Data and other data sources, including the counties themselves. **Exhibit 3-4** depicts the projected growth trend for Gunnison County, which translates to an average annual growth rate of a 1.54% over the 20-year planning period. It is assumed that the District would continue to grow at the same rate as Gunnison County as shown in **Exhibit 3-5**. With this growth rate, the District would gain an additional 56 people in the planning period (2013-2033).

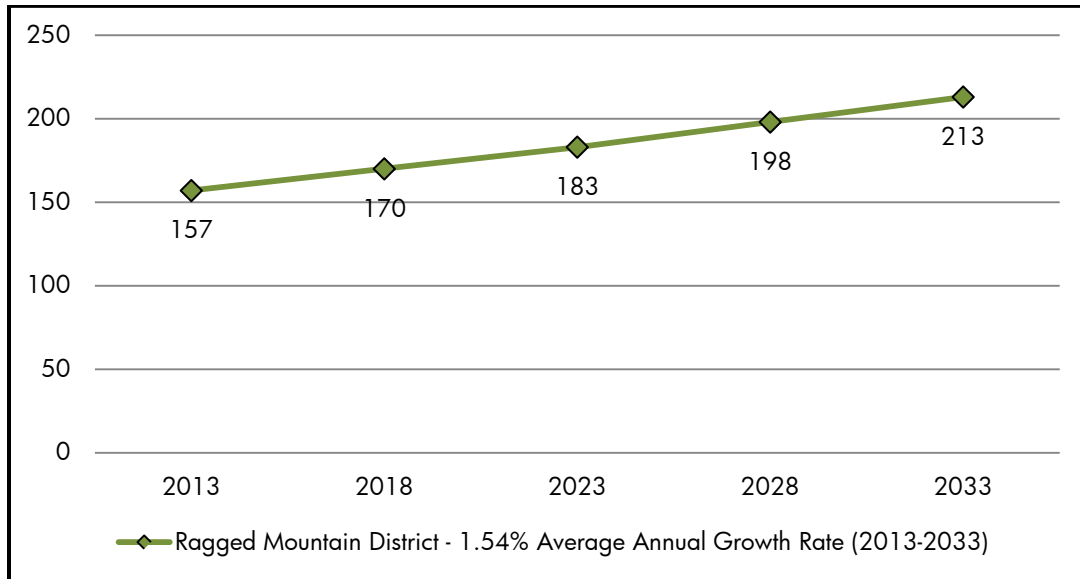
EXHIBIT 3-4 - GUNNISON COUNTY POPULATION



Source: Colorado Department of Local Affairs, State Demography Office, Population Data.



EXHIBIT 3-5 - RAGGED MOUNTAIN FIRE PROTECTION DISTRICT POPULATION

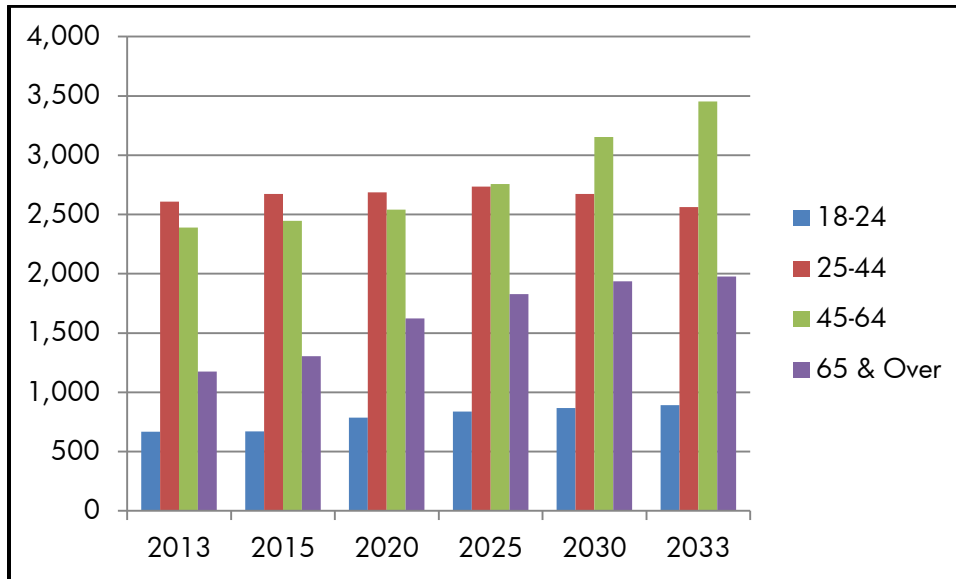


Sources: Colorado Department of Local Affairs, State Demography Office, Population Data; Source: TG Malloy Consulting, LLC.

The demographics of Gunnison County can be broken down further by household type as depicted in **Exhibit 3-6** through **Exhibit 3-10**. The following charts depict household types by age bracket and type of residents. In 2013, the largest data group in the County was households with occupants between the ages of 25-44. By 2033, the largest data group moves to households with occupants between the ages of 45-64, as depicted in **Exhibit 3-6**. **Exhibit 3-6** also shows that this trend projects the primary age group of the County moving from 25-44 to 45-64, which reflects an aging population. **Exhibit 3-7** through **Exhibit 3-10** further support the conclusion that the largest population groups move from younger households with children to older households without children.

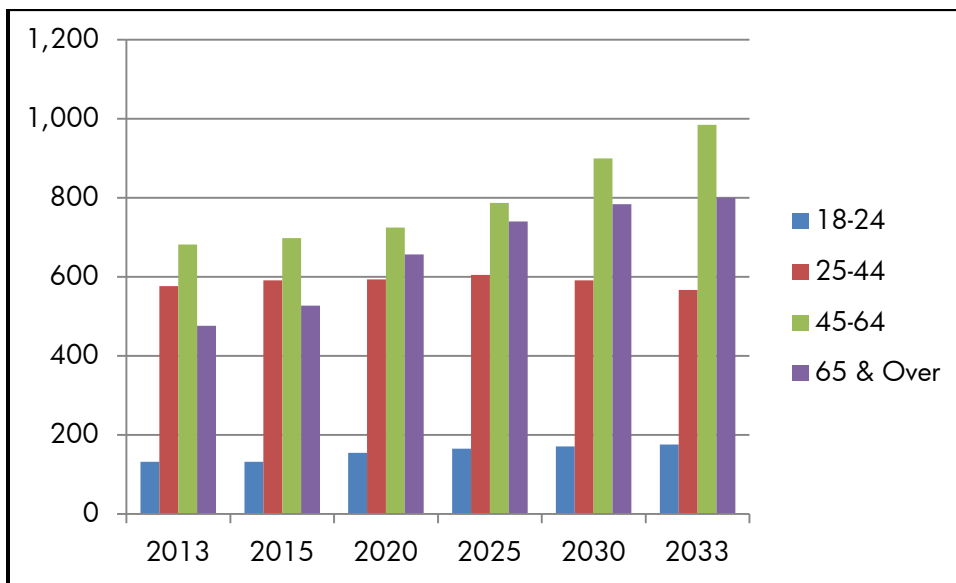


EXHIBIT 3-6 - ALL HOUSEHOLDS BY AGE GROUPS



Sources: Colorado Department of Local Affairs, State Demography Office, Population Data; Source: TG Malloy Consulting, LLC.

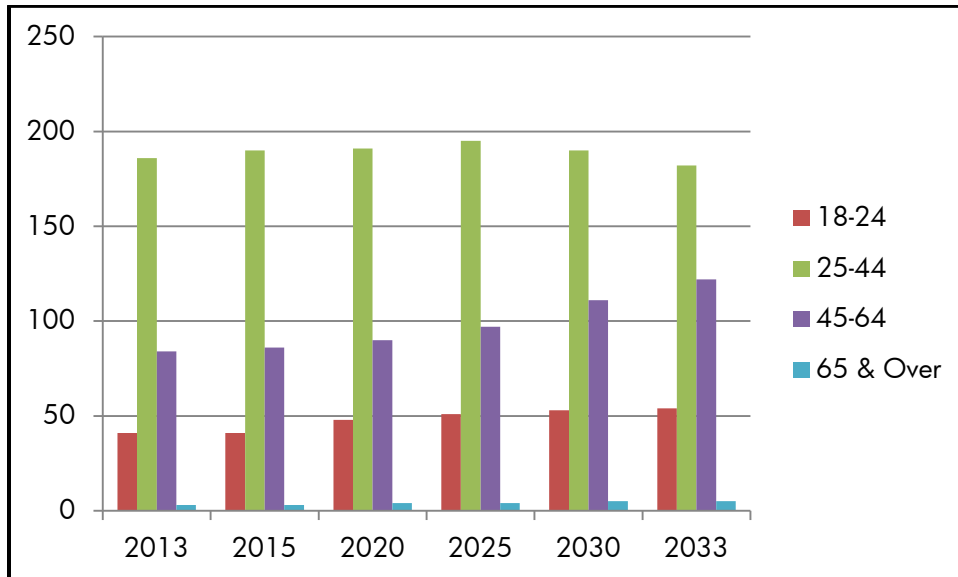
EXHIBIT 3-7 - HOUSEHOLDS WITH MORE THAN ONE ADULT AND NO CHILDREN BY AGE GROUP



Sources: Colorado Department of Local Affairs, State Demography Office, Population Data; Source: TG Malloy Consulting, LLC.

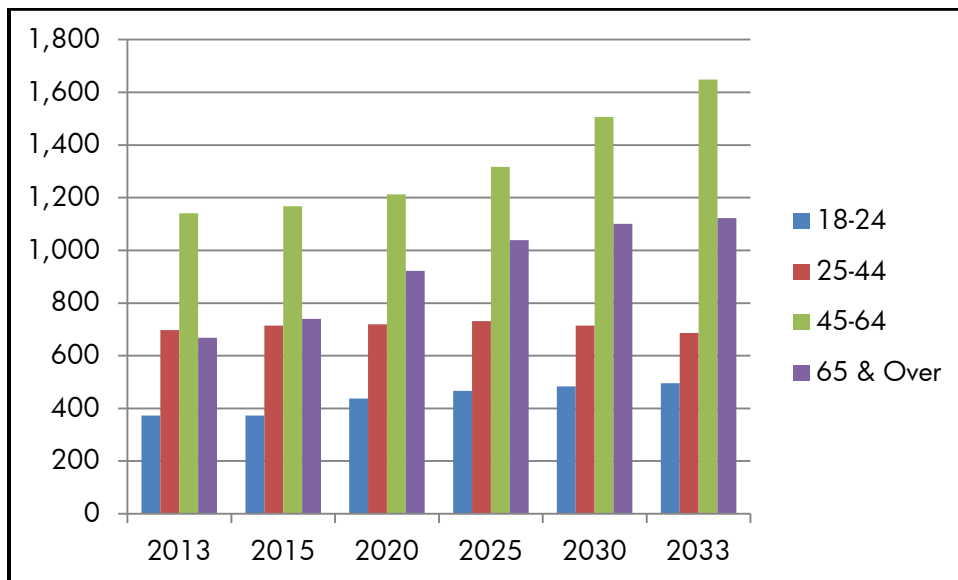


EXHIBIT 3-8 - HOUSEHOLDS WITH MORE THAN ONE ADULT AND WITH CHILDREN



Sources: Colorado Department of Local Affairs, State Demography Office, Population Data; Source: TG Malloy Consulting, LLC.

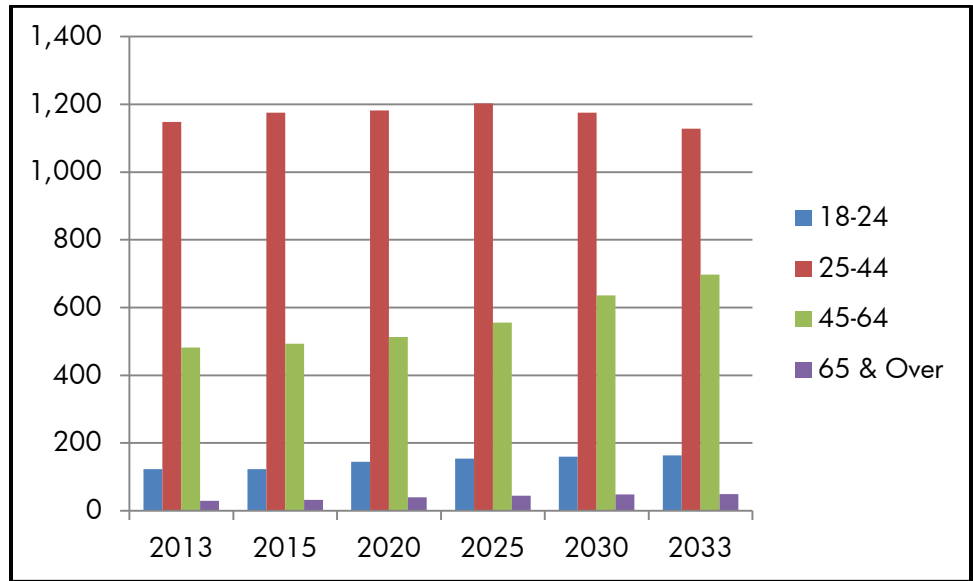
EXHIBIT 3-9 - HOUSEHOLDS WITH ONE ADULT AND NO CHILDREN BY AGE GROUP



Sources: Colorado Department of Local Affairs, State Demography Office, Population Data; Source: TG Malloy Consulting, LLC.



EXHIBIT 3-10 - HOUSEHOLDS WITH ONE ADULT AND CHILDREN BY AGE GROUP



Sources: Colorado Department of Local Affairs, State Demography Office, Population Data; Source: TG Malloy Consulting, LLC.

3.3 SURVEY RESULTS

A survey of the residents and businesses within the Ragged Mountain Fire Protection District was completed to gather local data on the demographics of the District as well as the use of existing fire and medical services. The following provides an overview of the survey responses (as of January 3, 2014). More survey details can be found in **Appendix D**.

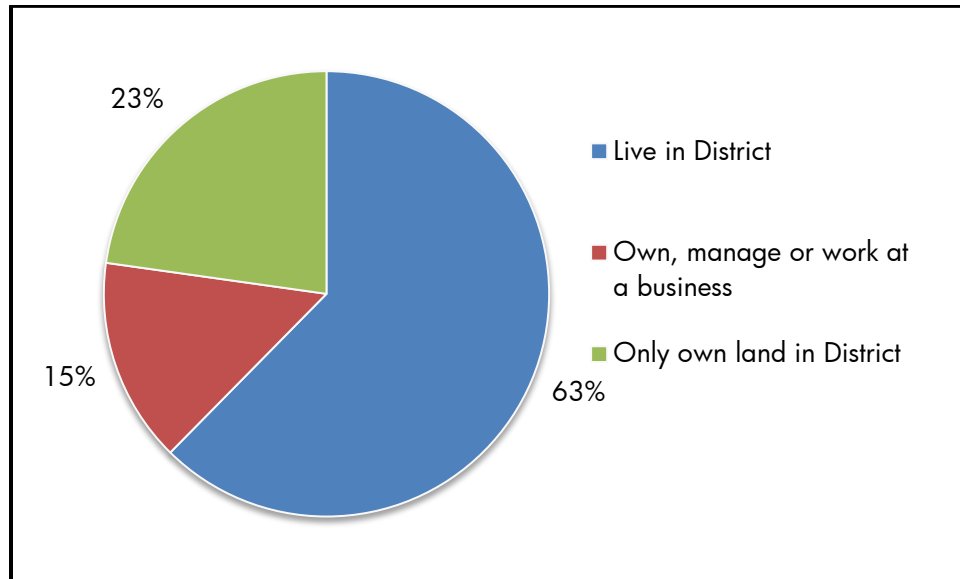
3.3.1 DEMOGRAPHICS

The survey asked respondents basic demographics information such as relationship to the District, employment, residency, age, gender, education, income, and number of dependants. This data aids in providing a clear picture of the make-up of the District and the residents that reside within it. Communities made up of older residents that have lived in the District for a long time are likely to have older homes and are more likely to need medical assistance. **Exhibit 3-11**, **Exhibit 3-12**, and the following bullets highlight the demographics of the District.

- A majority of land owners (63%) live within the District, while 15% own, manage, or work at a business, and only 23% own land within the District (see **Exhibit 3-11**).



EXHIBIT 3-11 - DISTRICT LAND OWNERS

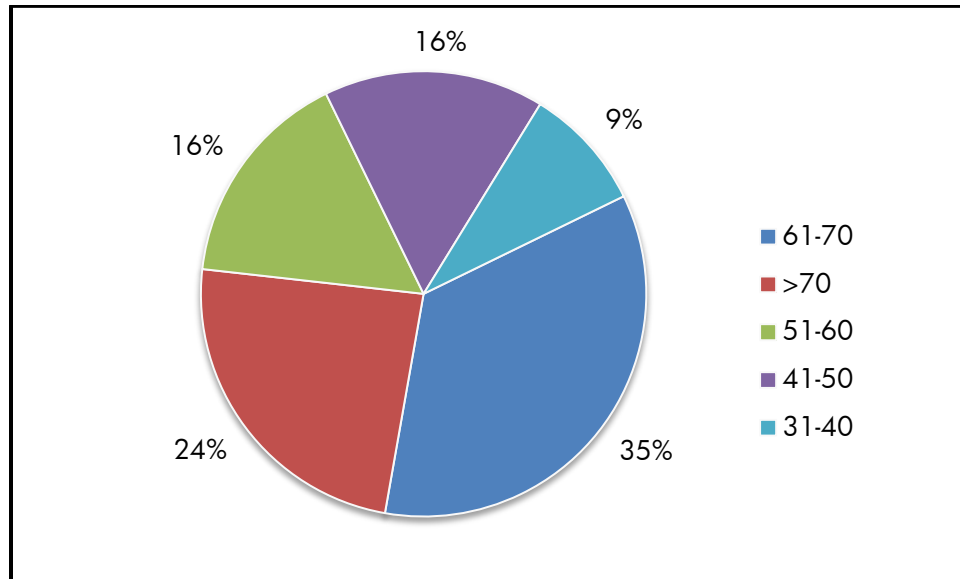


Source: Jviation, Inc.

- Of the respondents that were associated with a business in the District, 50% responded that the business was agriculture related, 7% were energy related, and 43% were some other type of business.
- Of the respondents that are residents of the District, 41% are full-time residents and 59% live there part-time or seasonally.
- 78% of the residents in the District have lived in the district for more than 15 years, 10% for 11-15 years, 4% for 6-10, and 8% for 1-5 years.
- The largest percentage of the District is between the ages of 61 and 70 (35%), while 24% is over 70, 16% is 51-60, 16% is 41-50, and 9% is 31-40 (see **Exhibit 3-12**).



EXHIBIT 3-12 - DISTRICT AGE GROUPS



Source: Jviation, Inc.

- A majority of the respondents were male (74%), while only 26% were female.
- The highest level of education completed by respondents varied with 21% having received a high school diploma or GED, 23% having attended a technical school or some level of college, 33% being college graduates, and 23% having completed postgraduate work.
- The majority of respondents (31%) average more than \$100,000 gross household income, while 19% make \$75,000-\$99,999, 19% make \$50,000-\$74,999, 14% make \$25,000-\$49,999, and 17% make less than \$24,999.
- A majority of respondent’s households do not have dependants (65%), while 35% did have dependants.

3.3.2 SERVICE LEVEL

The survey asked respondents several questions related to the use of existing fire and medical services, satisfaction with the existing service, and precautions taken to minimize fire risks. This data provides an accurate picture of the current use, the resident’s satisfaction with the existing fire and medical services, and resident’s participation in reducing fire risks. The following gives a brief overview of the survey’s service level data.



- Of the respondents that have used fire or medical services, 94% have used emergency medical services, while 24% have used fire services.
- Of the respondents, a majority (75%) have never used the fire or medical services.
- In the last five years, 82% of respondents have not used fire or medical services. Of those that have used the services within the last five years, 16% placed one to two calls and 2% placed three to five calls.
- When asked to rate the overall level of local fire-based emergency services, 58% had no opinion, 4% said excellent, 11% said good, 13% said average, 11% said poor, and 3% said very poor.
- When asked to rate the overall level of local emergency medical services, 60% had no opinion, 11% said excellent, 9% said good, 12% said average, 4% said poor, and 4% said very poor.
- Respondents were asked which services they felt were needed in the District. The top three services found to be needed were fire suppression (98%), response to medical emergencies (83%), and response to motor vehicle rescues (56%).
- 63% of respondents have smoke alarms on all floors of their home, 24% have at least one, 2% are unsure if they have a smoke alarm, and 11% do not have one.
- Respondents were asked if they had undertaken any of the listed wildfire mitigation efforts. The three most popular mitigation measures used were: keep grasses mowed to a maximum height of four inches (79%), create defensible space around your home (75%), and prune lower branches and remove dead or diseased trees and brush (63%).

3.4 FIRE SERVICE CALL ACTIVITY

Information regarding past fire service calls for the Ragged Mountain Fire Protection District was obtained from the Paonia Fire Department and is analyzed in this section. The North Fork Ambulance Association has indicated that historical medical call data specifically in the Ragged Mountain Fire Protection District was difficult to extrapolate, and therefore will not be evaluated in this section.



Fire service call data obtained from the Paonia Fire Department for the years 2009-2013 is summarized in the sections below. Over the last five years, 55% of the calls received were fire-related, which included fire and gas alarms, brush fires, vehicle fires, smoke and flame reports, rescues, lightning, and house, structure, and chimney fires. As shown in **Exhibit 3-13**, 45% of the calls were motor vehicle-related emergencies, which included accidents and rollovers. Trends and patterns that have been identified from the data will be used to support the service needs forecast for the Ragged Mountain Fire Protection District. Over the five-year period, an average of 17 fire calls per year was made in the District, with the most service calls occurring during the months of July to September. The historical fire service call data is shown below in **Table 3-2**, broken down by quarter.

TABLE 3-2 - RAGGED MOUNTAIN FIRE PROTECTION DISTRICT FIRE SERVICE CALLS, 2009-2013

	2009	2010	2011	2012	2013	Average
1 st Quarter	1	4	2	5	1	3
2 nd Quarter	1	2	4	3	6	3
3 rd Quarter	2	10	6	6	3	5
4 th Quarter	4	3	0	2	2	2
Total	8	19	12	16	12	17

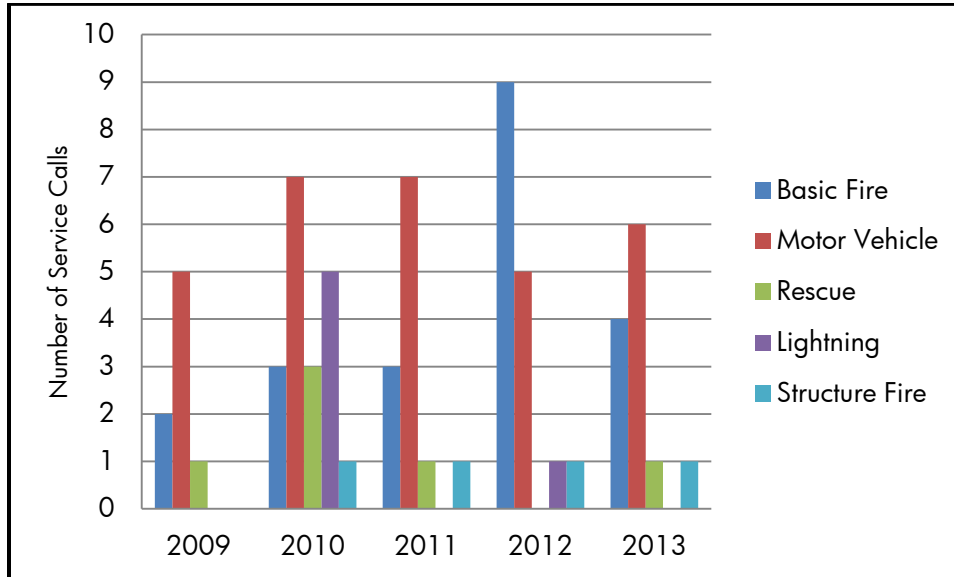
Sources: Paonia Fire Department; Jviation, Inc.

3.4.1 ANNUAL FIRE SERVICE CALL TRENDS

The call data also specified the type of call, fire equipment, location, and amount of personnel used for each service call. For the following exhibit, Basic Fire calls include fire alarm, brush fire, vehicle/transportation fire, smoke report, flame report, and gas alarm. Motor Vehicle calls include motor vehicle accidents (vehicles, semis, motorcycles, bicycles, and rollovers). Structure Fire calls include structure fire, chimney fire, and house fire. Rescue includes rescue-related calls. Two medical rescues were reported from the Paonia Fire Department during the five-year period, which were also included in Rescue category.



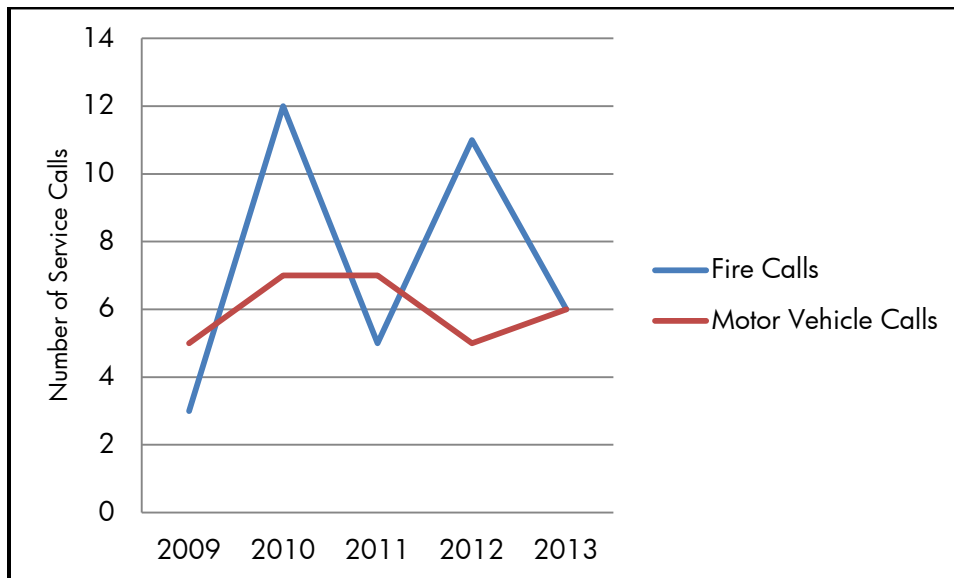
EXHIBIT 3-13 - ANNUAL FIRE SERVICE CALL TYPES, 2009-2013



Sources: Paonia Fire Department; Jviation, Inc.

While motor vehicle-related service calls varied slightly over the past five years, between five to seven calls annually, fire-related calls varied dramatically. In 2010, specific fire-related calls were the highest, with 12 total calls for each year, which was due to lightning strikes, vehicle fires, house and structure fires, and brush fires. This variance in fire and motor vehicle service calls is graphically depicted in **Exhibit 3-14**.

EXHIBIT 3-14 - ANNUAL FIRE-RELATED VS MOTOR VEHICLE SERVICE CALLS, 2009-2013



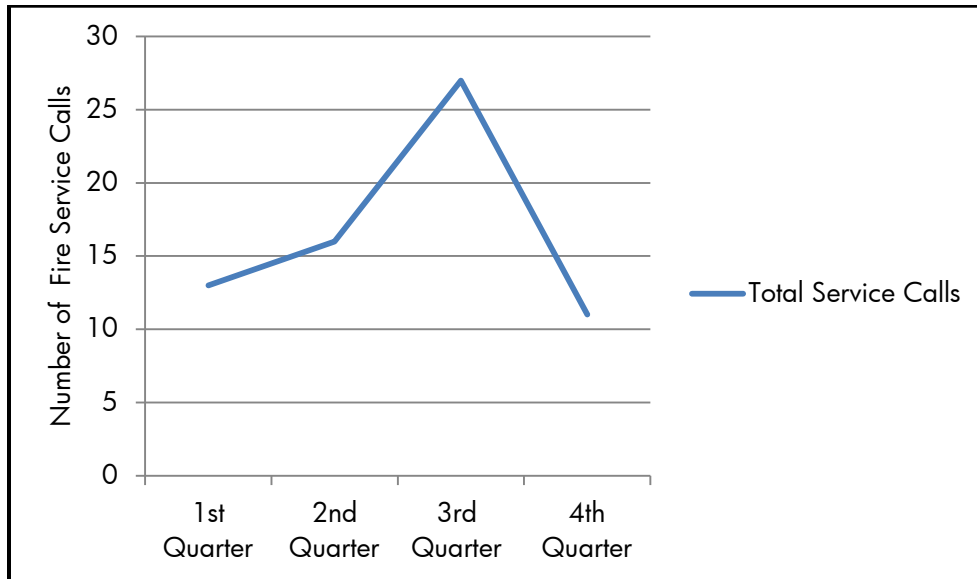
Sources: Paonia Fire Department; Jviation, Inc.



3.4.2 FIRE SERVICE CALL TRENDS BY QUARTER

As mentioned previously, the historic fire service call data indicates that most calls occur during the third quarter. As the seasons change, service calls gradually increase from the beginning of the year until early summer. Service calls spike in the late summer, which drops as the fall and winter seasons begin. This seasonal pattern of service calls is shown in **Exhibit 3-15**.

EXHIBIT 3-15 - SEASONAL FIRE SERVICE CALLS PER QUARTER, 2009-2013

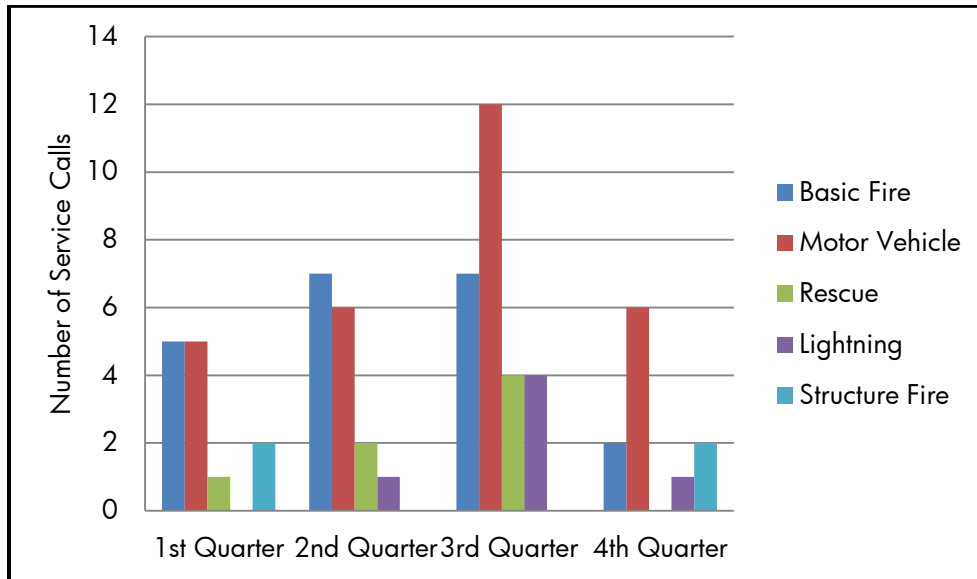


Sources: Paonia Fire Department; Jviation, Inc.

Close to the annual breakdown of fire versus motor vehicle calls, 44% of calls during the third quarter are motor vehicle-related, while 56% are fire-related calls. The majority of basic fire calls, rescues, and lightning strike reports also occurred during the third quarter, as shown in **Exhibit 3-16**.



EXHIBIT 3-16 - TYPES OF FIRE SERVICE CALLS BY QUARTER, 2009-2013



Sources: Paonia Fire Department; Jviation, Inc.

3.4.3 FIRE SERVICE CALL LOCATION TRENDS

Although many of the service calls during the five-year period were scattered throughout the District, there were commonalities in the locations of the calls. Of the fire service calls with common locations, 67% occurred along Highway 133, 25% occurred along County Road 12, 4% occurred approximately one mile west of Somerset, and 4% occurred along County Road 265. Of these common locations, approximately 53% of these service calls were motor vehicle-related calls, and 47% were fire-related calls. Fire calls along Highway 133, County Road 12, and County Road 265 included calls for brush fires, reports of smoke, and residential fire alarms, lightning strikes, and reports of flames.

3.4.4 FIRE SERVICE CALL PERSONNEL UTILIZATION TRENDS

This section reviews the utilization of fire personnel responding to service calls within the District. As **Table 3-3** shows, the amount of personnel responding to fire calls varies per call. For example, in 2009, 12 fire fighters responded to one fire service call during the first quarter, while a total of 109 responders were utilized for 10 total calls during the third quarter of 2010. **Table 3-4** shows the average respondents per fire service call from 2009 to 2013. Over the five-year period, the average of the total average of personnel utilized per call was 76. The highest utilization of personnel over this period occurred during the third quarter, with an average of 32 personnel responding to fire service calls, as shown in **Table 3-4**. It is important to note that these totals include duplicate personnel that responded to multiple calls during each quarter, and they do not directly translate to staffing needs.



TABLE 3-3 - TOTAL PERSONNEL UTILIZED BY QUARTER, 2009-2013

	2009		2010		2011		2012		2013	
	Calls	Pers. Utilized	Calls	Pers. Utilized	Calls	Pers. Utilized	Calls	Pers. Utilized	Calls	Pers. Utilized
1 st Quarter	1	12	4	56	2	21	5	44	1	13
2 nd Quarter	1	7	2	22	4	52	3	16	6	47
3 rd Quarter	2	23	10	109	6	59	6	70	3	32
4 th Quarter	4	41	3	28	0	0	2	20	2	18

Sources: Paonia Fire Department; Jviation, Inc.

TABLE 3-4 - AVERAGE PERSONNEL UTILIZED PER CALL

	2009	2010	2011	2012	2013	<i>Average</i>
1 st Quarter	7	30	12	25	7	16
2 nd Quarter	4	12	28	10	27	16
3 rd Quarter	13	60	33	38	18	32
4 th Quarter	23	16	0	11	10	12
Total	46	117	72	83	61	76

Sources: Paonia Fire Department; Jviation, Inc.

3.4.5 FIRE SERVICE CALL EQUIPMENT TRENDS

Equipment used in response to service calls varies based on the nature of the emergency. Similar to all previous patterns identified of the service calls, the fire station equipment is used most frequently during the third quarter. The following table provides a breakdown of types of equipment and their frequency of use during the third quarters of the five-year period.



TABLE 3-5 - THIRD QUARTER EQUIPMENT FREQUENCY OF USE, 2009-2013

Equipment List	Third Quarter Frequency (%)
Rescue 1	22%
Rescue 2	8%
Truck 1	2%
Truck 2	3%
Truck 3	15%
Ranger 1	13%
Ranger 2	8%
RM Tanker	2%
RM Brush	18%
Engine 1	0%
Engine 2	0%
Personnel ATV	2%
Horses	2%
Tanker 1	3%
Forest Service Truck	2%

Sources: Paonia Fire Department; Jviation, Inc.
 Note: Care Flights are not included.

3.5 SERVICE NEEDS FORECAST

Data sources used for the development of the Ragged Mountain Fire Protection District forecasts were obtained from the Colorado State Demography Office and Colorado State University Wildfire Statistics for Colorado. Growth rates used as independent variables in this forecast analysis include a low, medium, and high forecast growth scenario.

The demand for fire and medical services is largely a function of demographic characteristics, such as age and population growth. As population increases, the demand for fire and medical services will increase accordingly. In the forecast for the District’s fire and medical services, the low growth scenario is based upon the projected population growth rate of Gunnison County, as reported by the Colorado State Demography Office, which is 1.54%. A medium growth rate of 4.1% is based upon the ten-year historical compound average growth rate (CAGR) of the Gunnison County population of the 65-90 age group. This age group was selected since it had the highest overall growth (33%) over the last ten years within the County, compared to the other age groups (18-24, 25-44, and 45-64)³. Further, as indicated in **Section 3.3.1**, the survey results indicated that the largest percentage (35%) of population within the District is between the ages of 61-70, and 24% is over the age of 70.

³ Colorado Department of Local Affairs, Division of Local Government, State Demography Office, Population Data



Both the survey results and the population data for Gunnison County indicate that aging in place is occurring within the District and the surrounding area. For medical service calls, injury hospitalizations data from the Colorado Department of Public Health and Environment was analyzed for Gunnison County, Delta County, Montrose County, and Ouray County. For the period of 2009 to 2011, the compound average growth rate of hospitalizations from fall injuries for the ages 65+ for these counties combined was 6.2%⁴. Because this growth rate has a strong positive correlation (92.2%) with the total population (ages 65-90) for the same counties during the three-year period, it was selected as the high growth forecast scenario for the medical service call forecasts.

Lastly, the number of wildfires and acres burned in Colorado has been increasing since 1978⁵. Colorado State University has combined historical wildfire statistics for Colorado between the years 1978-2009. The combination of terrain, slope, low precipitation/drought conditions, high temperatures, and lightning strikes increase the likelihood of wildfires within the District. To account for the potential for wildfires specifically for fire service calls, the high growth forecast scenario (7.2%) is based upon the growth of total wildfires in Colorado between the years 1999-2008.

3.5.1 FORECASTING METHODOLOGIES

There are several types of methodologies that can be used when developing forecasts. Each forecast methodology must show short- (5 years), medium- (10 years), and long-term (beyond 10 years) periods, while keeping in mind that a forecast prepared through the use of mathematical relationships must ultimately withstand the test of rationality/judgment. The Time Series and Regression Analyses were used in developing forecasts for fire service demand. These different methodologies are briefly described below.

⁴ Colorado Department of Public Health and Environment, Colorado Health Information Dataset (CoHID), Injury Hospitalizations; Delta County, Gunnison County, Montrose County, and Ouray County, hospitalizations from fall injuries, age 65+, 2009-2011.

⁵Colorado State University, Wildfire History, Historical Wildfire Statistics for Colorado, Colorado Wildfires, State & Private Lands, 1978-2009



3.5.1.1 Time Series Analysis

A Time Series Analysis, also known as a Trend or Linear Analysis, uses historic patterns of activity and projects this trend into the future. The time series analysis is a regression analysis with time as the independent variable. The linear extrapolation uses the least squares method to fit a straight line between the historical points and projects that line into the future. This type of forecasting is widely used because it is relatively simple to apply. However, its limitation is that it simply uses past historical data and variables that are not present in past data, such as change in socioeconomic or (in this case) meteorological conditions, which are not considered in the result. The Time Series Analysis models used in this forecast include the historical wildfire growth (for the fire service calls forecast) and the ten-year historical population growth of the 65-90 age group in Gunnison County and the three-year compound average growth rate of hospitalizations from fall injuries, ages 65+ in Delta, Gunnison, Montrose, and Ouray Counties.

3.5.1.2 Regression Analysis

Regression Analysis is a statistical technique that ties the service demand (dependent variable), such as fire service calls (independent variables), to population. The independent variable is considered the explanatory variable because it “explains” the projected estimated value. The explanatory power of this approach is measured by the R² statistic (called the correlation coefficient or the coefficient of determination). An R² helps determine if there is a correlation between the dependent and the independent variables; R² of 0 means there is no statistical relationship between changes of the variable, while a R² of 1.0 means there is a very strong statistical relationship. Regression Analysis should be restricted to relatively simple models with independent variables for which other comparable forecasting is available. The Regression Analysis models used in this forecast are the predicted population growth of Gunnison County.

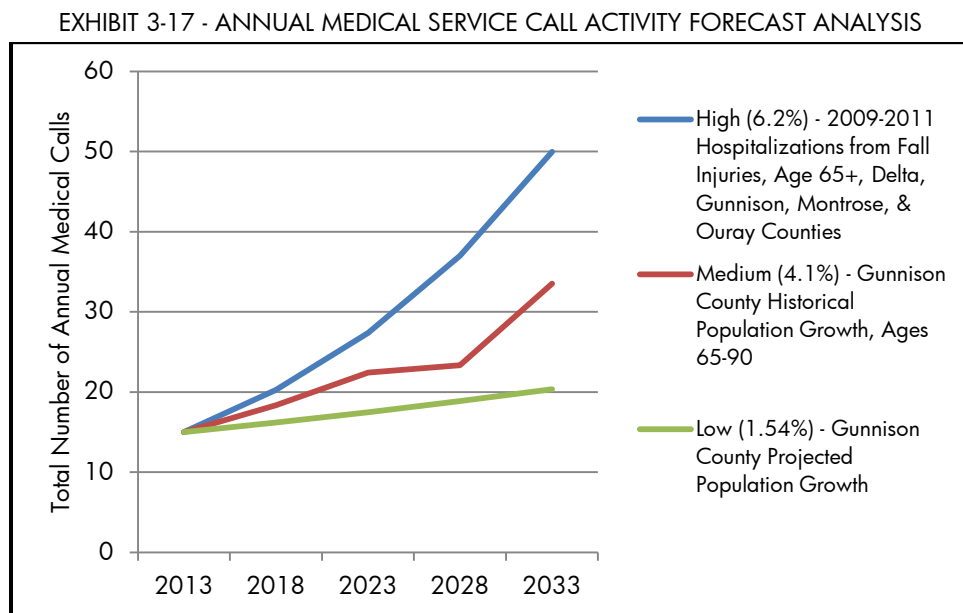
3.5.2 MEDICAL SERVICE CALL FORECASTS

A forecast was developed applying a regression analysis model to Gunnison County’s projected population, as well as time-series/linear analysis models to the historical 65-90 population age group growth of Gunnison County and the compound average growth rate of hospitalizations from fall injuries, ages 65+ in Delta, Gunnison, Montrose, and Ouray Counties (2009-2011). These models represent the low, medium, and high growth forecast scenarios for the District’s medical service calls over the 20-year planning period.



As discussed previously, historical medical service call data was unavailable for this forecast analysis. However, data provided by representatives of the neighboring Carbondale & Rural Fire Protection District indicates that the ratio of the Carbondale District's population⁶ against the average documented EMS transports in the District during 2009-2013 was 0.06. Utilizing this same formula, the 2013 estimated population of the Ragged Mountain District (156) multiplied by the 0.06 ratio resulted in an average estimate of nine EMS transports annually. Further, since the North Fork Ambulance Association responds to all motor vehicle related service calls within the District, the average of motor vehicle related calls (as reported by the Paonia Fire Department) between 2009-2013 was six. Therefore, combining the motor vehicle related calls (six) with the estimate of EMS transports per year for the Ragged Mountain Fire Protection District (nine), the resulting total of 15 is used for the base year for medical service call forecasts.

The output from the different forecasting methodologies for medical service calls is shown in **Exhibit 3-17**, which graphically depicts one regression analysis model and two linear growth projections. The different scenarios provide a range in medical service calls for the 20-year forecast period. By the end of the planning period (2033), the forecast methodologies indicate a range of between 20 and 50 medical service calls. The numerical data is provided in **Table 3-6**.



Sources: Jviation, Inc.; Colorado State Demography Office, Population Data., Colorado Department of Public Health and Environment, Injury Hospitalizations Data.

⁶ 2010 U.S. Census Bureau population data



TABLE 3-6 - ANNUAL MEDICAL SERVICE CALL ACTIVITY FORECAST SCENARIOS

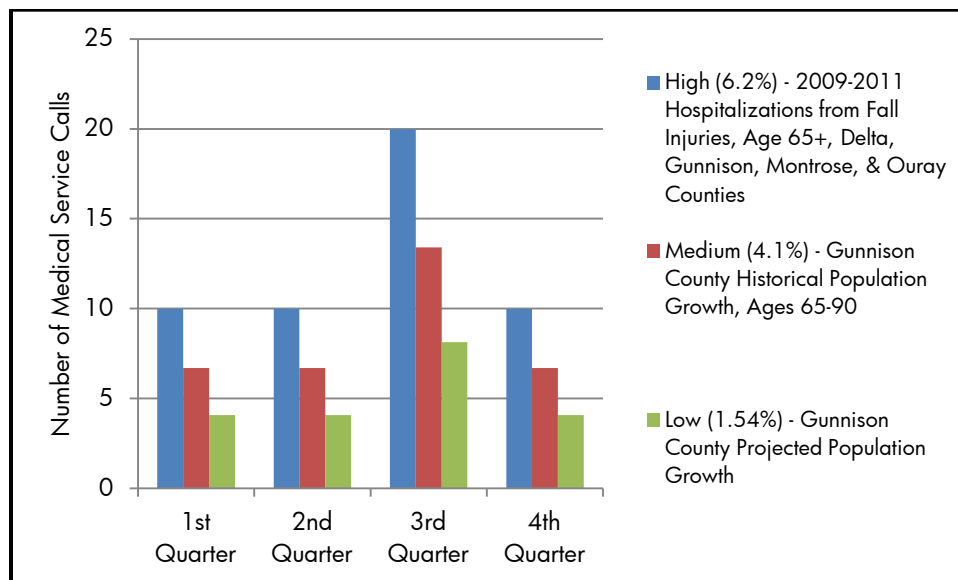
Year	<u>Low – 1.54%</u>	<u>Medium – 4.1%</u>	<u>High – 6.2%</u>
	Gunnison Co. Projected Population Growth	Gunnison Co. Historical Population Growth, Ages 65-90	Four-County Hospitalizations from Falls, Ages 65+
2013	15	15	15
2018	16	18	20
2023	17	22	27
2028	19	23	37
2033	20	34	50

Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado Department of Public Health and Environment, Injury Hospitalizations Data.

Medical service call activity forecasts are further broken down by quarters, to illustrate the projected demand of emergency services by season. **Exhibit 3-18** and **Table 3-7** show the forecast scenarios by quarter for the end of the planning period (2033). As mentioned above, the North Fork Ambulance Association responds to all motor vehicle calls in the Ragged Mountain District. Since medical call data from North Fork was unavailable for this analysis, the percentage break out of motor vehicle calls per quarter from 2009 to 2013 (as reported by Paonia Fire Department) was the methodology applied to determine the medical service call forecast per quarter, as shown in

Table 3-7.

EXHIBIT 3-18 - 2033 MEDICAL SERVICE CALL FORECAST BY QUARTER



Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado Department of Public Health and Environment, Injury Hospitalizations Data.



TABLE 3-7 - 2033 MEDICAL SERVICE CALL FORECAST SCENARIOS BY QUARTER

2033 Quarters		<u>Low – 1.54%</u>	<u>Medium – 4.1%</u>	<u>High – 6.2%</u>
		Gunnison Co. Projected Population Growth	Gunnison Co. Historical Population Growth, Ages 65-90	Four-County Hospitalizations from Falls, Ages 65+
1 st Quarter	(17%)	4	7	10
2 nd Quarter	(21%)	4	7	10
3 rd Quarter	(41%)	8	13	20
4 th Quarter	(21%)	4	7	10

Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado Department of Public Health and Environment, Injury Hospitalizations Data.

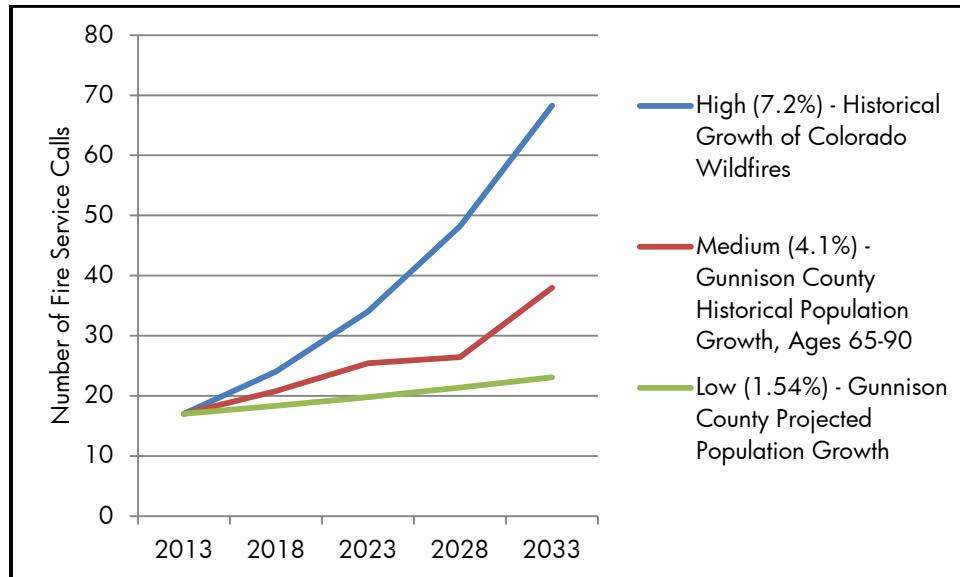
3.5.3 FIRE SERVICE CALL FORECASTS

Similar to the medical service call forecast, a forecast for fire service calls was also developed applying a regression analysis model to Gunnison County projected population, and a time-series/linear analysis model to both the historical 65-90 population age group growth of Gunnison County and the 1999-2008 historical growth of wildfires in Colorado. These models represent the low, medium, and high growth forecast scenarios for the District’s fire service calls over the 20-year planning period.

The result from the different forecasting methodologies for fire service calls is shown in **Exhibit 3-19**, graphically depicting one regression analysis model and two linear growth projections. The different scenarios represent a range in fire service calls each year during the forecast period, as shown in **Table 3-8**. The average annual fire service calls between the years 2009-2013 for the Ragged Mountain Fire Protection District was 17 (as discussed in **Section 3.4**), which was used as the base year for the forecast period.



EXHIBIT 3-19 - ANNUAL FIRE SERVICE CALL ACTIVITY FORECAST ANALYSIS



Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado.

TABLE 3-8 - ANNUAL FIRE SERVICE CALL FORECAST SCENARIOS

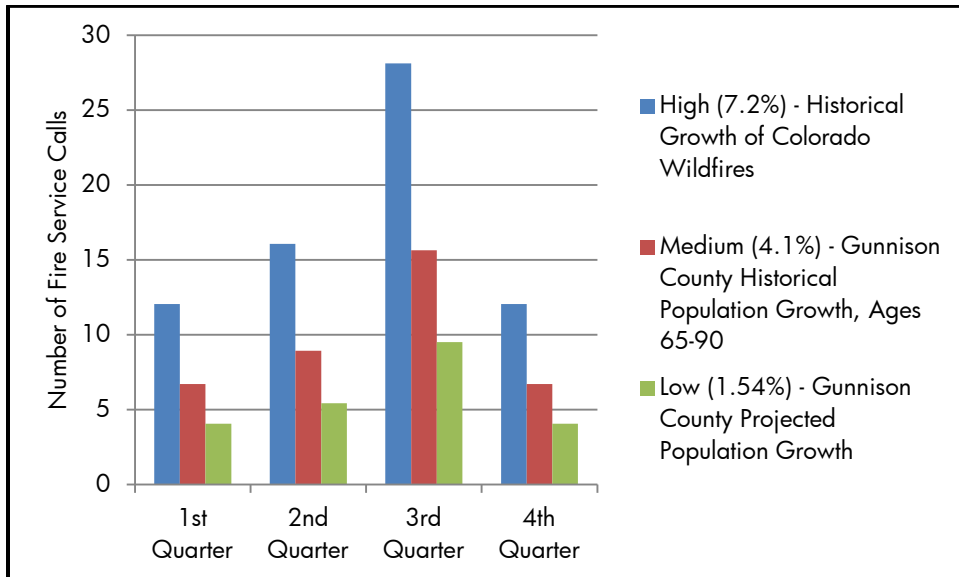
Year	<u>Low – 1.54%</u>	<u>Medium – 4.1%</u>	<u>High – 7.2%</u>
	Gunnison Co. Projected Population Growth	Gunnison Co. Historical Population Growth, Ages 65-90	199-2008 Historical Growth of Wildfires in Colorado
2013	17	17	17
2018	18	21	24
2023	20	25	34
2028	21	26	48
2033	23	38	68

Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado.

Fire service call activity forecasts are further broken down by quarters, to illustrate the projected demand of emergency services by season. **Exhibit 3-20** and **Table 3-9** show the fire service call forecast scenarios by quarter for the end of the planning period (2033). The percentage break out of fire service calls per quarter during 2009-2013 was applied to the base year (17) to determine the forecast of fire service calls for each quarter. As shown in **Table 3-9**, by 2033, the forecast for fire service calls ranges from 23 to 68, with the most calls occurring in the third quarter.



EXHIBIT 3-20 - 2033 FIRE SERVICE CALL FORECAST BY QUARTER



Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado; Paonia Fire Department.

TABLE 3-9 - 2033 FIRE SERVICE CALL FORECAST SCENARIOS BY QUARTER

2033 Quarters		<u>Low – 1.54%</u>	<u>Medium – 4.1%</u>	<u>High – 7.2%</u>
		Gunnison Co. Projected Population Growth	Gunnison Co. Historical Population Growth, Ages 65-90	1999-2008 Historical Growth of Wildfires in Colorado
1 st Quarter	(19%)	4	7	12
2 nd Quarter	(24%)	5	9	16
3 rd Quarter	(40%)	10	16	28
4 th Quarter	(16%)	4	7	12

Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado; Paonia Fire Department.



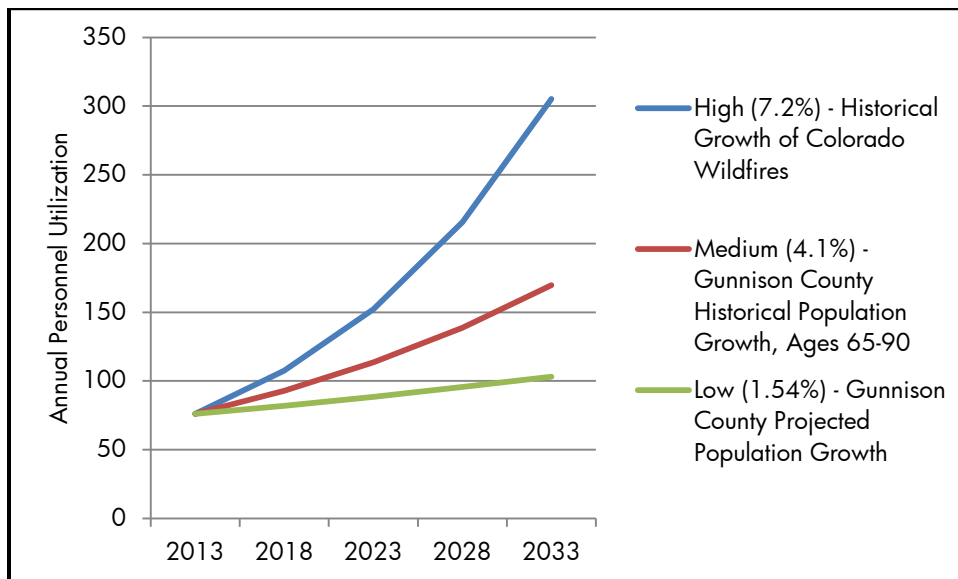
3.5.4 FIRE SERVICE PERSONNEL FORECAST

The National Fire Protection Association (NFPA) provides codes and standards for fire, electrical, and building safety. Standards for emergency personnel in Section 4.3, *Staffing and Deployment*, of NFPA 1720⁷, report that a fire department should identify the minimum amount of staffing requirements needed to ensure an adequate number of personnel are available for safe and effective emergency response operations. The NFPA also indicates that for a rural community (less than 500 people per square mile), approximately six personnel should be able to respond within 14 minutes, 80% of the time.

Forecasts were developed for fire service personnel utilization for projected demand. Using the same forecast growth scenarios as the fire service call forecasts (low – 1.54%, medium – 4.1%, and high – 7.2%), the base year for personnel utilization (76) is based on the average of the total average personnel utilized per call from 2009-2013, as reported by the Paonia Fire Department (see **Table 3-4**). The output from the different forecast scenarios is shown in **Exhibit 3-21**. The different scenarios represent a range in personnel utilization demand for each year of the planning period. By the end of the forecast period (2033), the forecasts for personnel utilization indicate a range from 103 to 305, which is also shown in **Table 3-10**.

It is important to note that similar to historical personnel utilization, (see **Section 3.4.4**) this forecast assumes that duplicate personnel will respond to multiple calls. Therefore, although the forecasted numbers project a range of 103 to 305 personnel utilized on average by 2033, the personnel duplication effect may result in fewer paid and volunteer personnel actually needed than what is presented by the forecast.

EXHIBIT 3-21 - ANNUAL PERSONNEL UTILIZATION FORECAST ANALYSIS



Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado.

⁷ NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, 2014 Edition.



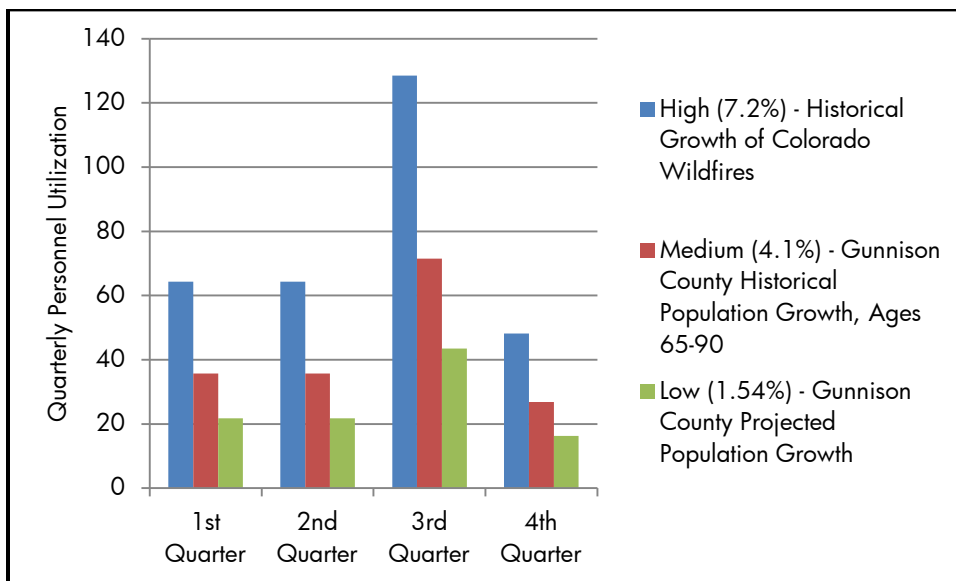
TABLE 3-10 - ANNUAL PERSONNEL UTILIZATION FORECAST SCENARIOS

Year	<u>Low – 1.54%</u>	<u>Medium – 4.1%</u>	<u>High – 7.2%</u>
	Gunnison Co. Projected Population Growth	Gunnison Co. Historical Population Growth, Ages 65-90	1999-2008 Historical Growth of Wildfires in Colorado
2013	76	76	76
2018	82	93	108
2023	89	114	152
2028	96	139	216
2033	103	170	305

Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado.

The fire service personnel utilization forecasts are further broken down by quarters, to illustrate the projected demand for personnel by season. To determine the forecast of personnel utilized per quarter, the base year of 76 was broken down by quarter, as previously shown in **Table 3-4. Exhibit 3-22** and **Table 3-11** illustrate the forecast scenarios by quarter for the end of the planning period (2033).

EXHIBIT 3-22 - 2033 PERSONNEL UTILIZATION FORECAST BY QUARTER



Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado.



TABLE 3-11 - 2033 PERSONNEL UTILIZATION FORECAST SCENARIOS BY QUARTER

2033 Quarters	<u>Low – 1.54%</u>	<u>Medium – 4.1%</u>	<u>High – 7.2%</u>
	Gunnison Co. Projected Population Growth	Gunnison Co. Historical Population Growth, Ages 65-90	1999-2008 Historical Growth of Wildfires in Colorado
1 st Quarter	22	36	64
2 nd Quarter	22	36	64
3 rd Quarter	43	71	129
4 th Quarter	16	27	48

Sources: Jviation, Inc.; Colorado State Demography Office, Population Data; Colorado State University, Historical Wildfire Statistics for Colorado.

3.5.5 SUMMARY OF PREFERRED FORECASTS

Direction and input received from the Ragged Mountain Fire District Board indicated that a low growth forecast scenario may not comfortably accommodate the full breadth of summer service call activity, based on tourism generated from the West Elk Loop Byway (Highway 133) that runs through the District. As previously discussed in **Section 3.4.2**, this tourism activity is reflected during the third quarter, which has the highest amount of fire service calls. However, because it is economically easier to over plan and scale back future development as needed than to under plan and have to expand, the Board has made a fiscal decision to use a financially conservative forecast of 3.0% for the 20-year service needs forecast. By the end of the planning period, the preferred forecasts indicate 27 annual medical calls, 31 annual fire service calls, and personnel utilization of 137 (including duplicates). A summary of the preferred forecasts is provided below in **Table 3-12**, **Table 3-13**, and **Table 3-14**. These selected forecasts will be used as the basis of the facility requirements analysis in **Chapter 4**.

TABLE 3-12 - PREFERRED MEDICAL SERVICE CALL FORECAST

Year	<u>Preferred Forecast – 3.0%</u>				
	Annual Forecast	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2013	15	3	3	6	3
2018	17	3	3	7	3
2023	20	4	4	8	4
2028	23	5	5	9	5
2033	27	5	5	11	5

Source: Jviation, Inc.



TABLE 3-13 - PREFERRED FIRE SERVICE CALL FORECAST

Year	<u>Preferred Forecast – 3.0%</u>				
	Annual Forecast	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2013	17	3	4	7	3
2018	20	3	5	8	3
2023	23	4	5	9	4
2028	26	5	6	11	5
2033	31	5	7	13	5

Source: Jviation, Inc.

TABLE 3-14 - PREFERRED PERSONNEL UTILIZATION FORECAST

Year	<u>Preferred Forecast – 3.0%</u>				
	Annual Forecast	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2013	76	16	16	32	12
2018	88	19	19	37	14
2023	102	22	22	43	16
2028	118	25	25	50	19
2033	137	29	29	58	22

Source: Jviation, Inc.



4.0 FACILITY REQUIREMENTS

4.1 INTRODUCTION

In order for the Ragged Mountain Fire Protection District to meet the demand forecast prepared in the previous chapter, facility requirement needs must be examined. The facility requirements will consider industry standards and practices for rural fire districts as well as the Insurance Services Office (ISO), the National Fire Protection Association (NFPA), and Emergency Medical Services (EMS) standards and recommendations. The extent of minimum improvements required to meet existing and projected demand, to replace items that will exceed their useful life during the planning period, or are needed to support a defined strategic initiative will be determined and documented with appropriate analysis and documentation in this chapter. It is important to note that regardless of the forecasted service calls over the next 20-years, the minimum standards as described in this chapter must be met if there is at least one call that personnel will be responding to. The facility requirements analysis will identify the needed improvements for the following areas:

- Vehicles and Equipment
- Personnel
- Land and Structures

As discussed in **Section 3.2**, population and demographic growth trends can be used as a realistic indicator for future service needs of the Ragged Mountain District. It is assumed that the District's relatively small population (currently 157 people) can be adequately served by the minimum standard requirements. Further, the projected growth of an additional 56 people within the District by 2033 would not significantly increase equipment and personnel needs over the next 20 years. The following section provides an overview of standards, which are used to determine the basic facility needs for the District.

4.2 OVERVIEW OF SAFETY AND OPERATIONS STANDARDS AND CRITERIA

4.2.1 NFPA STANDARDS

NFPA provides codes and standards for fire, electrical, and building safety. NFPA standards used in this chapter are summarized below (and referenced in **Appendix E**).



- **NFPA 450: Guide for Emergency Medical Services and Systems.** This standard provides design, implementation, and guidelines for existing and the development of EMS systems. EMS system criteria policy and regulations for quality, medical oversight, finance, planning, human resources, public relations and education, data reliability, communications, operations, and equipment and facilities are examined in this standard.⁸
- **NFPA 1500: Standard on Fire Department Occupational Safety and Health Program.** This standard presents the safety requirements for members of fire departments/organizations that provide fire suppression, rescue, mitigation of hazardous materials, emergency medical services, and other related activities. This standard provides the requirements for training, medical and physical requirements, health and wellness programs, apparatus, and protective clothing and equipment. ⁹
- **NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments.** This standard provides objectives and functions of fire department emergency service delivery, resources, and response capabilities, which includes response times, levels of service, and staffing. General standards are given for resource and system management and pre-incident planning. ¹⁰
- **NFPA 1851: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.** This standard provides safety requirements for storage and cleaning of personal protective equipment (PPE).¹¹
- **NFPA 1901: Standard for Automotive Fire Apparatus.** This standard defines general requirements for all types of fire apparatus and vehicle types that will be used to transport emergency personnel and equipment during emergency conditions, and is the standard used for apparatus that supports fire suppression and mitigation, as well as other hazardous conditions. ¹²

⁸ NFPA 450: Guide for Emergency Medical Services and Systems, 2009 Edition. <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=450>

⁹ NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013 Edition. <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1500>

¹⁰ NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments, 2010 Edition. <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1720>

¹¹ NFPA 1851: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2008 Edition. <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1851>

¹² NFPA 1901: Standard for Automotive Fire Apparatus, 2009 Edition. <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1901>



4.2.2 ISO MINIMUM CRITERIA

ISO provides information and guidance for property and casualty insurance risk. The Public Protection Classification (PPC™) Program classifies municipal communities' fire suppression abilities, utilizing the Fire Suppression Rating Schedule (FSRS). The FSRS assigns a Public Protection Classification on a scale of 1 to 10, with Class 1 representing superior property fire suppression and protection, and Class 10 representing ISO'S minimum criteria for the fire suppression and protection program is not met.¹³

4.2.3 COLORADO EMS STANDARDS

EMS standards within Colorado are regulated by the Colorado Department of Public Health and Environment (CDPHE) for Health Facilities and Emergency Medical and Trauma Care System (also referenced in the Appendix).

- **Code 6 CCR 1015-3, Emergency Medical Services.** Chapter One – Education and Certification, addresses education programs and certification processes for all EMS Provider levels. Chapter Four – Rules Pertaining to Licensure of Ground Ambulance Services, Section 7 – Minimum Staffing Requirements, and Section 9 – Minimum Equipment Requirements, provide the minimum requirements necessary for basic life support (BLS) ambulance services.¹⁴
- **Code 6 CCR 1015-4, Statewide Emergency Medical and Trauma Care System.** Chapter Two – State Emergency Medical and Trauma Care System Standards, provides minimum acceptable levels of service for BLS ambulance services, as well as emergency response times for ground transport agencies.¹⁵

4.3 VEHICLES/EQUIPMENT

This section provides an overview of the basic requirements for fire fighting and basic life support (BLS) operations in a rural location, based on NFPA, ISO, and CDPHE standards.

4.3.1 FIREFIGHTING & EMS OPERATIONS

In order to meet the existing and anticipated fire service demand, ISO and NFPA standards are utilized to identify District requirements.

Table 4-1 below provides a list of vehicle requirements for the District. An example of each vehicle is also shown in **Exhibit 4-1** through **Exhibit 4-4**. Engine equipment requirements are based off of NFPA 1901 and ISO FSRS equipment requirements.

¹³ Insurance Services Office, Fire Suppression Rating Schedule (FSRS). <http://www.isomitigation.com/ppc/0000/ppc0001.html>

¹⁴ Colorado Department of Public Health and Environment, 6 CCR 1015-3, Emergency Medical Services. Effective date 06/14/2013. <http://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=5205&fileName=6%20CCR%201015-3>

¹⁵ Colorado Department of Public Health and Environment, 6 CCR 1015-4, Statewide Emergency Medical and Trauma Care System, Effective date 03/02/2011.

<http://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=4167&fileName=6%20CCR%201015-4>



TABLE 4-1 - VEHICLE REQUIREMENTS

Description	Quantity
Class A Engine (crew cab 4x4)	1
Water Tender Truck (1,800 gallon 4x4)	1
Rescue Squad (suburban type 4x4)*	1
Type 6 Brush Truck	1

Sources: NFPA 1901 and ISO Fire Suppression Rating Schedule.

* The Rescue Squad can also be used for BLS ambulance operations

EXHIBIT 4-1 - CLASS A FIRE ENGINE



Source: Rescue 81, Carbondale & Rural Fire Protection District, June 2014.



EXHIBIT 4-2- 1,800-GALLON WATER TENDER TRUCK



Source: Tender 83, Carbondale & Rural Fire Protection District, June 2014.

EXHIBIT 4-3 - 4X4 RESCUE SQUAD



Source: Rescue 83, Carbondale & Rural Fire Protection District, June 2014.



EXHIBIT 4-4 - TYPE 6 BRUSH TRUCK



Source: Brush 81, Carbondale & Rural Fire Protection District, June 2014.

Each vehicle requires equipment to perform rescue, fire suppression, and other related activities, per NFPA, ISO, and CDPHE standards. **Table 4-2** shows the basic list of requirements for vehicle equipment. CDPHE 6 CCR 1015-3, Chapter Four, indicates that a BLS ambulance permit is issued by the county when the vehicle is authorized to provide basic ambulance service that meets 6 CCR 1015-3, Chapter Two, requirements and is equipped according to Chapter Four, Section 9 rules. **Table 4-3** provides a list of the minimum equipment required for a permitted BLS ambulance to remain in compliance, as outlined in 6 CCR 1015-3, Chapter Four, Section 9 – Minimum Equipment Requirements. Equipment for fire apparatus, extrication, rescue squad, tender equipment, the type 6 brush truck, and engines are also listed in the tables below.

TABLE 4-2 - VEHICLE EQUIPMENT

Description	Quantity and/or Type
Extrication Tool	1
Extrication Equipment	--
Portable Pump	250 gpm
Engine Equipment	--
Rescue Squad Equipment*	--
Tender Equipment	--
Brush Truck Equipment	Type 6

Sources: NFPA 1901; ISO Fire Suppression Rating Schedule; CDPHE Code 6 CCR 1015-3.

* Includes BLS responder safety equipment, including body substance isolation (BSI) equipment requiring individual fit testing.



TABLE 4-3 - BLS AMBULANCE MINIMUM EQUIPMENT REQUIREMENTS

Ventilation & Airway Equipment	Patient Assessment Equipment
<ul style="list-style-type: none"> • Portable suction unit & house (fixed system) or backup suction unit • Bulb syringe • House oxygen & portable oxygen bottle • Transparent, non-re breather oxygen masks & nasal cannula • Hand operated, self inflating bag-valve mask resuscitators with oxygen reservoirs • Nasopharyngeal airways • Oropharyngeal airways 	<ul style="list-style-type: none"> • Blood pressure cuffs • Stethoscope • Penlight
Dressing Materials	Splinting Equipment
<ul style="list-style-type: none"> • Bandages • Multiple dressings (including occlusive dressings)* • Sterile burn sheets per ambulance service requirements* • Adhesive tape per ambulance service requirements* 	<ul style="list-style-type: none"> • Lower extremity traction splint • Upper & lower extremity splints • Long board, scoop™, vacuum mattress or equivalent • Short board, Kendrick Extrication Device (KED) or equivalent • Pediatric spine board or adult spine board adaptable for pediatric use • Adult & pediatric head immobilization equipment • Adult & pediatric cervical spine immobilization equipment*
Miscellaneous Equipment	Obstetrical Supplies
<ul style="list-style-type: none"> • Heavy bandage scissors, shears, or equivalent • Two working flashlights • Blankets and appropriate heat source for patient compartment 	<ul style="list-style-type: none"> • Sterile obstetric kit • Neonate stocking cap or equivalent

Sources: CDPHE 6 CCR 1015-3, Chapter Four, Section 9 – Minimum Equipment Requirements.

*Medical director protocol

Note: Specifications and sizes for BLS ambulance equipment listed above are not included.



TABLE 4-4 - FIRE APPARATUS EQUIPMENT

Description	Quantity
Structural PPE (Coat & Pants)	12
Structural Helmet	12
Structural Boots	12
Structural Gloves	12
Nomex Hood	12
Self Contained Breathing Apparatus (SCBA)	6
Individual SCBA face pieces	12
Spare SCBA Bottles	6
Wildland Pants	12
Wildland Shirt	12
Wildland Helmet	12
Wildland Gloves	12
Wildland Goggles	12

Sources: NFPA 1901, NFPA 150, and ISO Fire Suppression Rating Schedule.

TABLE 4-5 - EXTRICATION EQUIPMENT

Description	Quantity
Extrication Tool - Cutter, Spreader, Power Unit	1
Extrication - Cribbing	1 set
Extrication - Hydraulic Rams (2)	2
Extrication - Vehicle Stabilizers (rescue jacks)	4
Air chisel	1

Sources: NFPA 1901, NFPA 150, and ISO Fire Suppression Rating Schedule.

TABLE 4-6 - RESCUE SQUAD EQUIPMENT

Description	Quantity
Automatic External Defibrillator (AED)	1
Basic Life Support Bag (BLS) w/ equipment	1
Low angle rescue - uphaul kit	1
Stokes litter	1
Oxygen cylinder – “E” cylinder	2
Long backboard	2
Patient immobilization kit	2
Portable suction unit	1

Sources: NFPA 1901, NFPA 150, and ISO Fire Suppression Rating Schedule.



TABLE 4-7 - TENDER EQUIPMENT

Description	Quantity
Porta Tank - 2500 gallon	1
Hose – 3’ supply hose	200’
Hose - 1.5” wildland hose	200’
Hose – 1” wildland hose	400’
Nozzle - 1.5” wildland	2
Nozzle - 1” wildland	2
Gated wye 1.5” x 1’	1
Hydrant/spanner wrench set	1
Porta Tank – 2,500 gallon	1

Sources: NFPA 1901, NFPA 150, and ISO Fire Suppression Rating Schedule.

TABLE 4-8 - TYPE 6 BRUSH TRUCK EQUIPMENT

Description	Quantity
Fireline Pack w/ fire shelter	4
Hose pack (progressive hose lay)	2
Nozzle - 1.5” wildland	2
Nozzle - 1” wildland	4
Nozzle - 3/4” wildland	4
Pulaski	4
Shovel	4
Mcleoud tool	2
Miscellaneous adapters & fittings - wildland	
Chain saw	1
Hose - 1.5” wildland	400’
Hose - 1” wildland	400’
Hose - 3/4” wildland	400’
Small portable pump - wildland	1

Sources: NFPA 1901, NFPA 150, and ISO Fire Suppression Rating Schedule.



TABLE 4-9 - ENGINE EQUIPMENT

Description	Quantity
Hose - 1.75" in attack hose	400'
Hose – 3" supply hose	1200'
Hose - 2.5 attack hose	400'
Nozzles - 1.5"	2
Nozzles - 2.5"	1
Solid Stream Nozzle - 2.5"	1
Combination Nozzle - 1.5"	1
Distributing Nozzle - 1.5"	1
Master Stream Device - 500 gpm minimum	1
Foam eductor - Class B	1
Class B foam	15 gallons
Salvage covers	2
Electric Generator - 5kw	1
Portable floodlights	2
Smoke ejector fan	1
Ventilation saw (chain type)	1
Demo saw (K-12 type)	1
Handlights	4
Hose clamp	1
Hydrant hose gate 2.5"	1
Burst hose jacket (leather)	1
Gated wye 2.5' x 1.5"	1
Pike poles – 6', 8', 12'	3
24' extension ladder	1
14' roof ladder	1
10' collapsible ladder	1
Pick head axe	1
Flat head axe	1
Crowbar or pry bar	1
Bolt cutter	1
Halligan tool	1
Fire extinguisher - dry chemical 20lb	1
Fire extinguisher - water	1
Hydrant/spanner wrench set	2

Sources: NFPA 1901, ISO, and CDPHE 6 CCR 1015-3.

CDPHE 6 CCR 1015-3 and NFPA 1901 also provide standards for communications equipment. **Table 4-10** below provides the basic requirements for communications equipment for the District.



TABLE 4-10 - COMMUNICATIONS EQUIPMENT

Description	Quantity
VHF Motorola pagers	12
VHF Mobile radios	4
VHF Portable radios	12
Mountain top repeater	1
Base station radio with station antenna	1

Sources: NFPA 1901 and CDPHE 6 CCR 1015-3.

Standards on station equipment requirements are discussed in NFPA 1851 and ISO Fire Suppression Rating Schedule. **Table 4-11** provides the basic requirements for fire station equipment.

TABLE 4-11 - STATION EQUIPMENT

Description	Quantity
Breathing air compressor	1
Oxygen cascade system	1
Station hose 3"	200'
Station hose 2.5"	200'
Station hose 1.75"	200'
Spare Class B foam	30 gallons
Tool chest & basic automotive tool set	1

Sources: NFPA 1851 and ISO Fire Suppression Rating Schedule.

4.4 PERSONNEL

This section reviews the minimum personnel requirements for fire fighting and BLS ambulance service. As described in **Section 3.5.4**, standards for emergency personnel described in Section 4.3, *Staffing and Deployment*, of NFPA 1720¹⁶, report that a fire department should identify the minimum amount of staffing requirements needed to ensure an adequate number of personnel are available for safe and effective emergency response operations. The NFPA also indicates that for a rural community (less than 500 people per square mile), approximately six personnel should be able to respond within 14 minutes, 80% of the time. CDPHE 6 CCR 1015-4, Chapter Two, indicates ambulance response times for low density/rural areas encompassing less than 12,000 people should be able to respond within 45 minutes, 90% of the time. However, the optimal time of arrival to and departure from the scene for a BLS ambulance should be 15 minutes, 90% of the time.

CDPHE 6 CCR 1015-4, Chapter Two, also requires that BLS ambulance service must have at least one first responder or higher level of EMS training. To provide greater functionality on a scene in the District, it is recommended that every fire fighter also be cross-trained as an Emergency Medical Technical (EMT)-Basic, which ensures BLS ambulatory service on all fire fighter rotations.

¹⁶ NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, 2014 Edition.



The personnel baseline of six includes two staff members for the initial attack team, two for the exterior hose team, and two for the rapid intervention team. However, one incident commander and one safety commander are also recommended, for a total of eight minimum personnel. It is also assumed that District personnel will be available for incident response on a rotating shift basis, which would double the minimum baseline of six responders to 12.

Firefighting personal protective equipment (PPE) for responders is based upon the minimum PPE requirements in NFPA 1500 and 1851. PPE requirements are scoped for 12 personnel, since each piece of equipment must be individualized to properly fit each responder in all rotating shifts. PPE requirements are shown below in **Table 4-12**.

TABLE 4-12 - PERSONNEL FIRE EQUIPMENT REQUIREMENTS

Description	Quantity
Structural PPE (coat & pants)	12
Structural Helmet	12
Structural Boots	12
Structural Gloves	12
Nomex Hood	12
Self Contained Breathing Apparatus (SCBA)	6
Individual SCBA face pieces	12
Spare SCBA bottles	6
Wildland pants	12
Wildland shirt	12
Wildland gloves	12
Wildland goggles	12

Sources: NFPA 1500 and NFPA 1851.

4.5 LAND AND STRUCTURES

As part of the alternatives analysis contained in Chapter 5 of this Master Plan, the number and type of fire stations (including substations) necessary to meet the District’s needs and desires will be evaluated, along with a no-build alternative. The location, size, and capabilities of these stations will be of critical importance in order to accommodate existing and forecast service demand in the most cost efficient manner while meeting applicable safety and operations standards and criteria. The discussion below provides the general requirements for the land and structures for a new fire station.

4.5.1 FIRE STATION BUILDING SPACE PROGRAM

The fire station building space program was developed by investigating precedent rural fire stations, utilizing industry standards for fire stations layout, and was further customized specifically for the Ragged Mountain Fire Protection District through consideration of their particular equipment and personnel needs. In addition to NFPA standards referenced in previous sections, other NFPA codes with standards for fire station design include:



- NFPA 1: Fire Code
- NFPA 1581: Standard on Fire Department Infection Control Program
- NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems
- NFPA 1989: Standard on Breathing Air Quality for Emergency Services Respiratory Protection

The fire station must also comply with the Americans with Disabilities Act (ADA) standards, and all applicable building codes enforced by the Authority Having Jurisdiction (AHJ), which includes the following:

- International Building Code
- International Building Code adopted and amended by Gunnison County
- International Energy Conservation Code
- International Mechanical Code
- International Fuel Gas Code
- NFPA 70, National Electrical Code®
- International Plumbing Code

Industry precedent rural fire stations investigated for the development of the fire station program for the Ragged Mountain Fire Protection District fire station building program include:

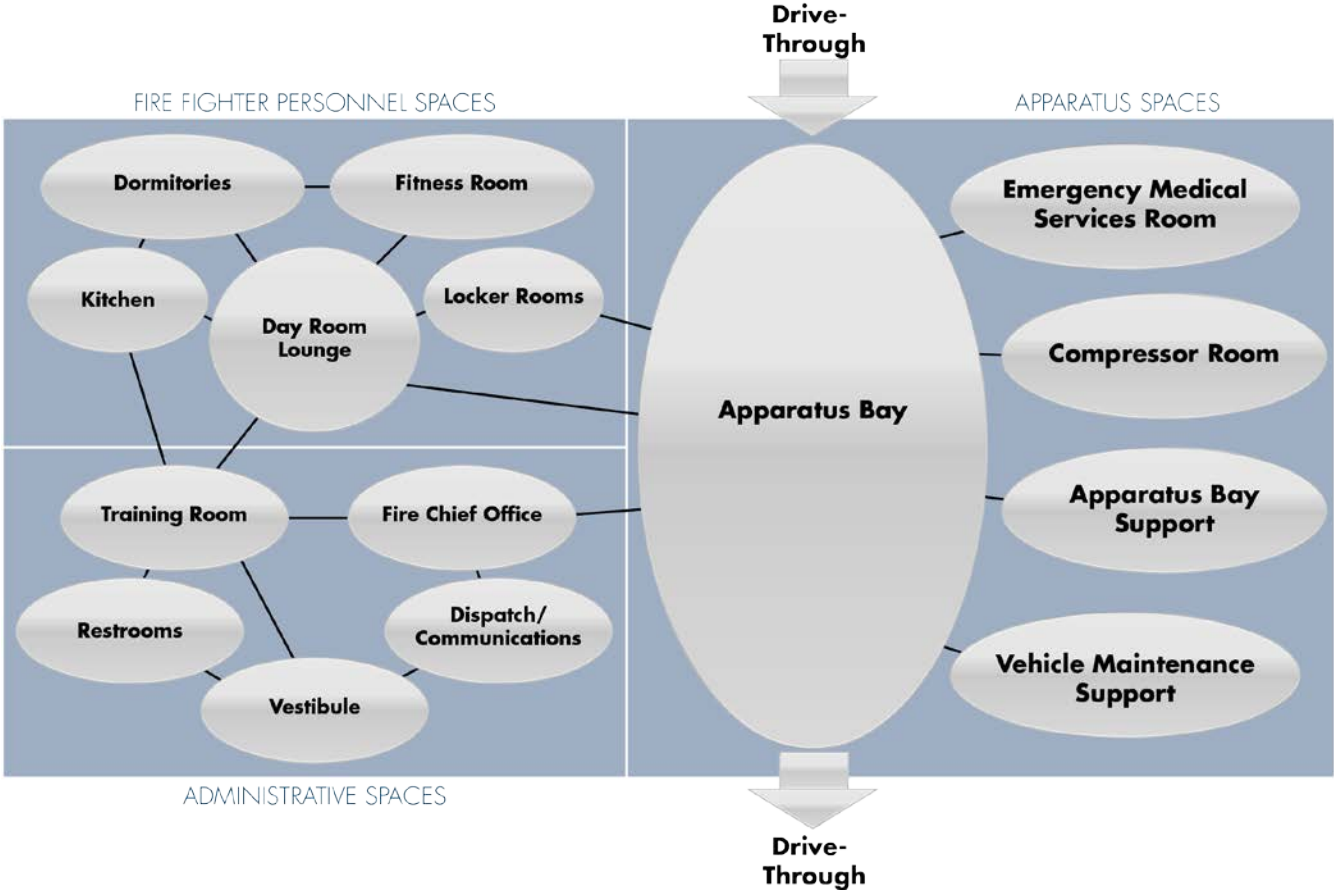
- Winona Fire Department, Winona, KS
- North Fork Volunteer Fire Department, Buffalo Creek, CO
- Sourdough Fire Department, Bozeman, MT
- Article: “National Institute of Building Sciences, Whole Building Design Guide: Fire Station by Eric G. Mion (of Lewis and Zimmerman Associates, Inc.), 06/01/2009, <http://www.wbdg.org/design/firestation.php>

Additional guidance from FAA Advisory Circular 150/5210-15A, *Aircraft Rescue and Firefighting Station Building Design*, was used as a reference for clearance around equipment and apparatus.



The following sections provide a detailed description of the general needs for each functional space within the fire station. **Exhibit 4-5** provides a diagram of the relationship between the functional spaces within the fire station. **Exhibit 4-6** and **Exhibit 4-7** shown at the end of this section provide two conceptual floor plan layouts for the District’s fire station space program, which will be further developed and customized during the Alternatives Analysis.

EXHIBIT 4-5 - FIRE STATION SPACE PROGRAM



Source: Jviation, Inc.

4.5.1.1 Apparatus Bay Spaces

The Apparatus Bays are sized to allow for four feet of clearance around the perimeter of the largest apparatus, to ensure safe walking and loading zones around equipment. At this preliminary stage, this allows for a versatile and conservative layout of the bays. Adjacent to the bays are the support and storage spaces of critical items that need to be located in close proximity to the Apparatus Bay. These spaces include the Emergency Medical Service Room, the Compressor Room, the Apparatus Bay Support, and the Vehicle Maintenance Support spaces.



4.5.1.2 Administrative Spaces

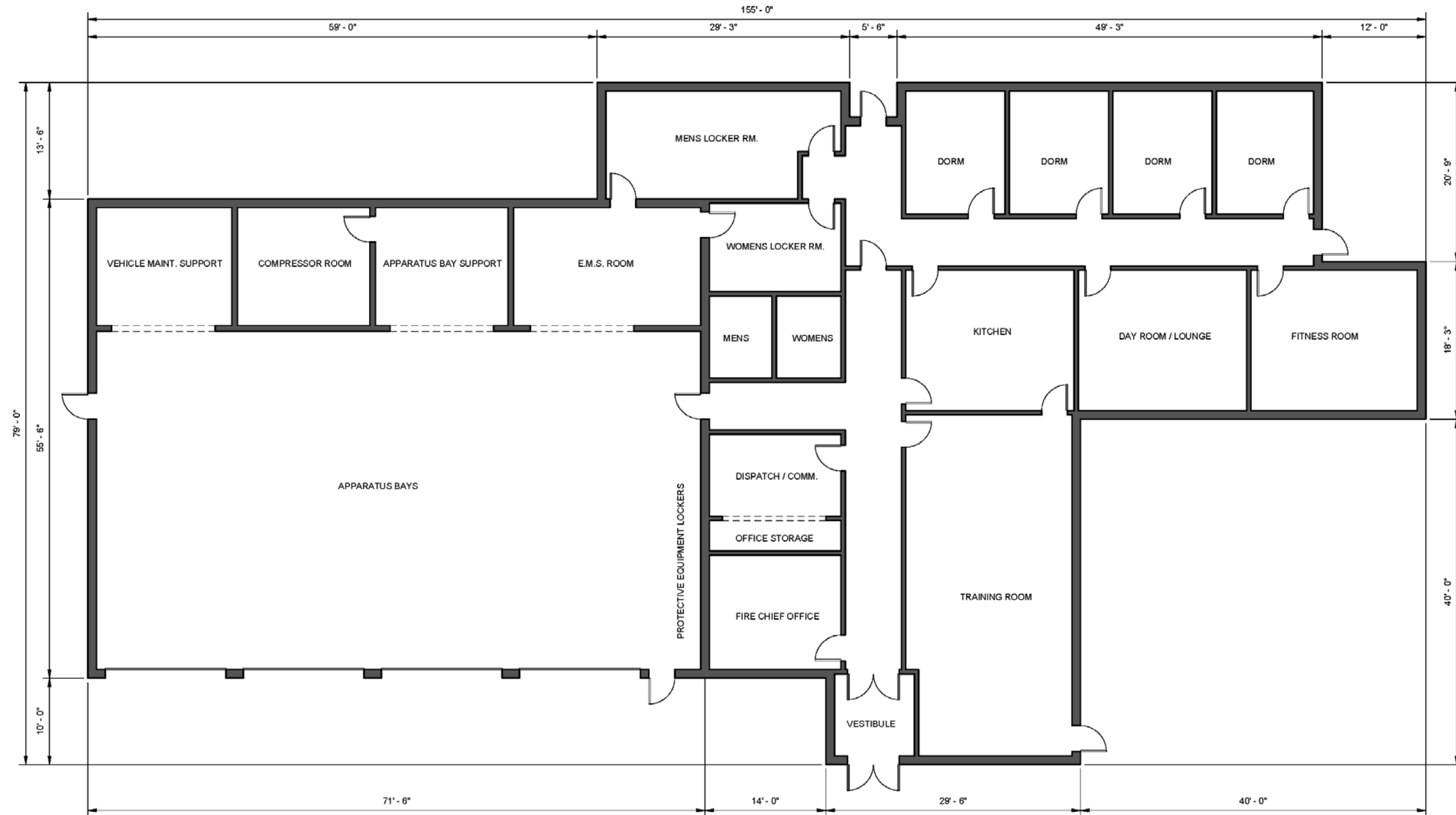
The Administrative spaces are the public front-of-the-house spaces and work spaces of the station. This includes the Fire Chief's Office, a Dispatch and Communications Room, and supporting office storage space. Also included in this area is a Training Room which is a versatile space typically used for large staff gatherings, which can also be used as an incident command center, or it can be opened to the public to host community events. This space is anticipated to have an occupant capacity of approximately 30-40 people. Public restrooms are included in this area as well. Standard factors for circulation, mechanical, electrical, and storage spaces were used to approximate the size of these areas.

4.5.1.3 Fire Fighter Personnel Spaces

The Fire Fighter Personnel Spaces are the back-of-the-house spaces for fire fighter personnel. These spaces include a kitchen which should be located adjacent to the day room/lounge and the training room. Also included are four dormitories (approximately 12 feet by 14 feet each), a fitness room, and a day room/lounge to serve as a gathering area for fire fighter personnel. This space also includes locker rooms for personnel to change into duty uniforms. Protective clothing lockers can be located either concurrently in the main locker rooms, or in cubbies within the Apparatus Bays.



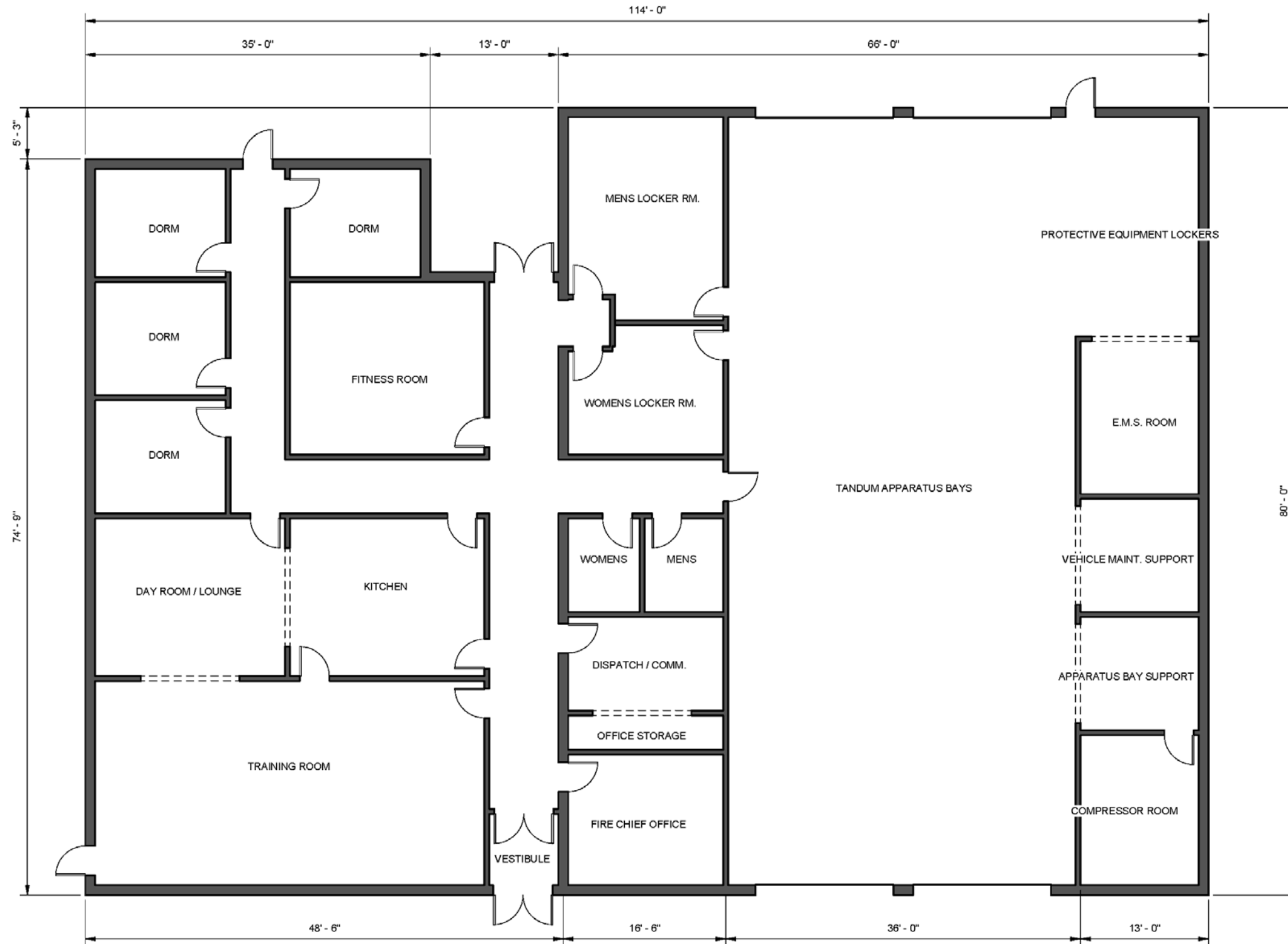
EXHIBIT 4-6 - FIRE STATION CONCEPTUAL LAYOUT - 1



Sources: Jviation, Inc.; Fire station facility standards found in NFPA 1, 1500,1581,1851,1989,1221; Equipment and apparatus equipment guidelines found in FAA Advisory Circular 150/5210-15A, Aircraft Rescue and Firefighting Station Building Design.



EXHIBIT 4-7 - FIRE STATION CONCEPTUAL LAYOUT - 2



Sources: Jviation, Inc.; Fire station facility standards found in NFPA 1, 1500,1581,1851,1989,1221; Equipment and apparatus equipment guidelines found in FAA Advisory Circular 150/5210-15A, Aircraft Rescue and Firefighting Station Building Design.



4.5.2 FIRE STATION BUILDING SPACE PROGRAM SUMMARY

In total, the building footprint is approximately 8,810 square feet. Approximately 5,000 square feet of pavement is needed to maneuver apparatus in front of the main vehicle bays; however, 10,000 square feet would be required for drive-through bays. Approximately 6,000 square feet of pavement is needed for a parking lot to accommodate 15 vehicles, along with an access drive connecting to the nearest road.

Given the iterative nature of the architectural design process, identifying the space program is only the first step. As various layouts and designs are explored, and various constraints and opportunities are developed to react to the various conditions that occur (site constraints, structural possibilities, and economic factors), it should be anticipated that various elements and spaces of the fire station building space program may be adapted and modified.

4.6 SUMMARY

Based on industry standards and practices for rural fire districts from NFPA, ISO, CDPHE, and applicable building codes, this chapter summarizes the minimum requirements to be met for the Ragged Mountain Fire Protection District. Alternatives to address the facility requirements analyzed in this chapter will be further examined in **Chapter 5, *Alternatives Analysis***.



5.0 ALTERNATIVES ANALYSIS

This chapter describes and evaluates various development alternatives considered for the selection of a development plan for the Ragged Mountain Fire Protection District. Conceptual alternatives to accommodate the facility requirements identified in **Chapter 4** are analyzed and presented in this chapter. In evaluating practical development alternatives to satisfy existing and forecast needs, analysis will include alternative concepts and rough order of magnitude cost estimates for facilities, equipment, and training. The alternatives take into account the development needs to meet forecasted demand, as presented in **Chapter 3**. The preferred alternatives discussed at the end of this chapter will accommodate demand and facility requirements for equipment, personnel, and structures.

5.1 EVALUATION CRITERIA

Development alternatives align with facility requirements and development needs to meet forecast demand, as well as a comprehensive view of development impacts. Alternatives are evaluated on various factors, including but not limited to, the District's mission, prevention, maintenance, operations, administration, training financial feasibility, fire service industry standards, and other factors. The alternatives presented in this chapter were developed in consultation with the District's fire service consultant and the District Board and were reviewed for compliance with ISO criteria.

5.2 ALTERNATIVES CONSIDERATIONS

Conclusions reached in **Chapter 4**, *Facility Requirements*, serve as a basis for the development of the alternatives described in this chapter. This chapter provides an analysis of each alternative and a recommended alternative to address defined needs (established in **Chapter 4**), emphasizing approaches that yield an optimum solution. These development concepts provided for the defined needs may be accommodated through a combination of organizational structures, physical facilities, and existing systems already established. For those needs, this chapter provides supporting narrative to outline expected timeframes of each concept, based on call demand, for the organizational structure, land, and station. These alternatives will be discussed in the following sections.

5.2.1 ORGANIZATIONAL STRUCTURE AND TRAINING

Each alternative below analyzes options for meeting the staffing requirements. The Facility Requirements chapter identified the minimum personnel requirements for emergency response operations, which included a baseline of two staff members for the initial attack team, two for the exterior hose team, two for the rapid intervention team, and a recommendation of one incident commander and one safety commander. Alternatives that include staffing options will include the minimum of six personnel (one fire chief and five staff); however, to cover all shifts in a 24-hour period, cost estimates are calculated using 12 staff. It is also assumed that the Ragged Mountain Fire Protection District Board will continue to oversee the District.



Training requirements (hours and costs) are also described as it is important to consider training within the total cost estimates, depending upon the type of organizational structure preferred by the District Board. Training and certifications required for firefighters for the District include Fire Fighter I, Emergency Vehicle Driver, First Responder, and Incident Command System (ICS) 100.

The Fire Fighter I training certification requires approximately 253 total hours, and costs approximately \$2,000 per student to cover the cost of instructor fees, tuition, and books. A First Responder training course requires approximately 40-50 hours for the initial certification, and costs roughly \$250 per student. An Emergency Vehicle Driving course requires approximately 12 hours of instructor training, and the remaining 30 hours are completed with ride-alongs on emergency vehicles, at a cost of approximately \$750 per student to cover the instructor fees. The ICS 100 course is completed online at no cost.

Optional training includes the S130/190 Wildland firefighter course and EMT-Basic. The Wildland firefighter course at the Colorado Wildfire Academy requires 50-60 hours of classroom instruction and field exercises, and costs approximately \$1,000 to cover tuition, books, meals, and travel. An EMT-Basic certification would require 207-231 hours of training and cost approximately \$1,000 per student. **Table 5-1** summarizes training costs for 12 firefighters.

TABLE 5-1 - FIREFIGHTER TRAINING COSTS (FOR 12 FIREFIGHTERS)

Course	Total Cost
Emergency Vehicle Driving	\$9,000
First Responder	\$3,000
Fire Fighter I	\$8,000
Wildland	\$12,000
EMT-Basic	\$12,000

Source: Jviation, Inc.; Representatives of Carbondale & Rural Fire Protection District



5.2.2 EQUIPMENT

Equipment needs are a consideration for developing alternatives, as the options presented will have different equipment requirements, which impacts the overall estimated costs. Replacement costs for the District’s existing equipment inventory, as provided in **Appendix B**, are considered in each of the alternatives. **Appendix F – Alternatives Cost Estimates**, provides the basis for vehicle and equipment costs for each alternative.

The timing for equipment replacement is contingent upon the existing equipment’s current condition. At the time of this report, the District’s existing inventory is reported to be in good condition. Vehicles are recommended to be replaced based on the phasing schedule shown in **Table 5-2** below.

TABLE 5-2 - VEHICLE REPLACEMENT SCHEDULE

Vehicle	Current Condition	Year to Replace
1985 Ford K9000 Engine	Good	2022
2007 Water Tender	Good	2023
2009 GMC Brush Truck	Good	2024

Source: Jviation, Inc.

5.2.3 EMERGENCY COMMUNICATIONS

Each alternative will also include communication improvements within the District to ensure adequate fire service coverage for all residents. Efficient and effective communication among fire agencies is vital in order for accurate and timely information to be provided to firefighters on scene and in transit to an emergency, to ensure quick response time. Fire agency communication is also necessary for responders to communicate with other emergency responders involved, such as EMTs, police, etc to provide adequate scene size-up, resource needs and hazard assessment. This communication is critical in ensuring scene safety for all responders.

Currently, Delta County handles dispatching for the Ragged Mountain Fire Protection District through the service agreement with Paonia Fire. In order to increase communications, the key items below should be included for each alternative. The cost for all communications equipment is provided in **Appendix F** and is also included in the cost estimates for each alternative.

5.2.3.1 Dispatch Center

The dispatch center for the Ragged Mountain Fire Protection District will be the Gunnison County Combined Communications Center (GCCCC) located in Gunnison, Colorado. The use of the Gunnison County dispatch center will require an annual service charge to the District by the GCCCC, based on call volume. The District will also be part of the GCCCC users’ group.



5.2.3.2 Paging

A communications system capable of alerting its volunteer firefighters of 911 emergency calls for service will be required. This will be accomplished by use of a voice pager system. Each firefighter will carry a VHF voice pager while on duty. A minimum of 12 pagers will be needed to cover all shifts, which will cost a total of approximately \$4,800 (\$400 per pager, including chargers).

5.2.3.3 Operational Communication

Depending upon the alternative chosen for a fire station, a base station radio with a station antenna will be needed to provide communication with all personnel responding to incidents. The estimated cost for installing a 45-watt base station radio with a station antenna and a four-hour back-up system console is approximately \$10,000. Further, a CenturyLink T-1 phone line will need to be leased to carry the radio signal from the main Ragged Mountain fire station to the GCCC and vice versa. The annual cost to lease a T-1 line is \$4,320. Also, the District currently leases a satellite phone to provide similar functionality to ground-based mobile telephones. The cost for continuing satellite phone service is \$1,300 annually.

The District will also need to apply for a VHF emergency radio frequency from the Federal Communications Commission (FCC), which will be dedicated for use in the Ragged Mountain Fire Protection District. The frequency application will need to be coordinated by the FCC.

Each emergency vehicle owned by the District will need to be equipped with a 45-watt mobile VHF radio to connect with the base station radio. The estimated cost for four VHF radios (four vehicles) is approximately \$10,000. Firefighters will also be required to carry portable five-watt VHF radios. The cost for 12 portable VHF radios is approximately \$18,000. The total cost estimate for operational communication needs is \$48,420.

5.2.3.4 Coverage Limitations

A coverage analysis was requested from Motorola, Inc. to determine how much of the District would have radio coverage from a particular site. As shown in **Exhibit 5-1**, the District has near total coverage from the site, which is also discussed in detail below in the alternatives discussion for repeater site locations.

5.2.3.5 Remote Location Communications

In order to ensure communication is covered in remote locations within the District, such as Watson Flats where no cellular or landline service exists, a mountain top repeater will be necessary to contact the base station. There are two options for a repeater site to provide radio coverage to the District.

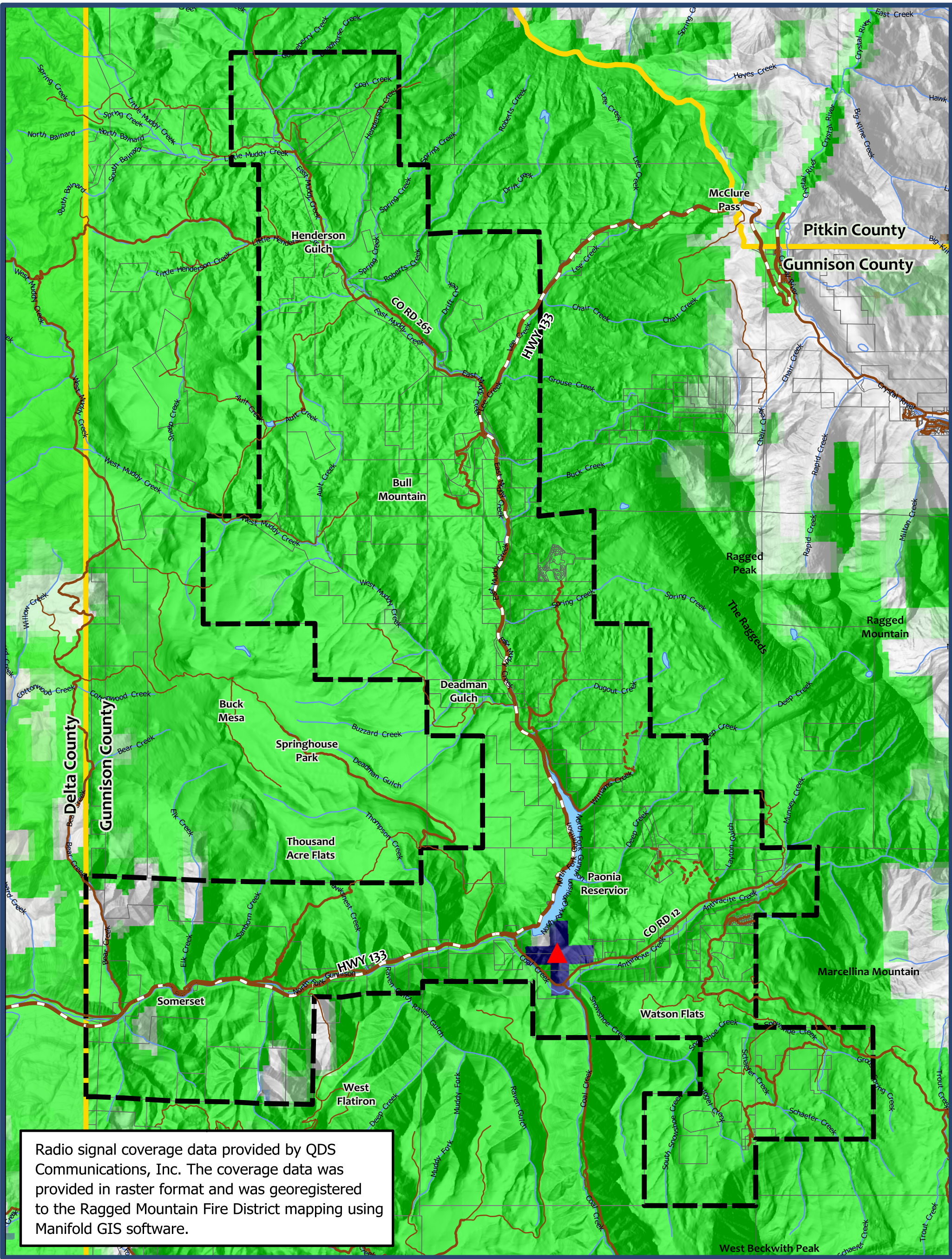


Option 1: The repeater site for the District will be located at the proposed site indicated on **Exhibit 5-1**. This exhibit provided by QDS Communications, Inc.¹⁷ graphically depicts the radio signal coverage commissioned by Motorola, Inc. from this repeater site. **Exhibit 5-2** shows the line-of-sight for the repeater in this location. The site is owned by the Bureau of Land Management and a land use agreement/lease will need to be negotiated. An access agreement will need to be negotiated with Bear Ranch for access to the repeater site as well. The site currently does not have electricity or telephone service; therefore, the costs to develop these services at the site are undetermined at this time. A small solar bank may also be an option for power supply to the repeater site. Should a main station be developed, as discussed in the following sections, the signal from the repeater site would be transmitted via radio frequency to the base station located in the main station and onto the Delta County Communications Center through a telephone line. The cost of the repeater radio, development of a small building to house the repeater, installation, and the BLM special use permit for a private mobile radio service is approximately \$30,550 (including legal and consulting costs).

Option 2. Option 2 includes a repeater site for the District located at the Gunnison County Communications Site on McClure Pass. The site is owned by Gunnison County and a lease agreement will have to be negotiated with the County for placement of the Ragged Mountain Repeater. The site also does not currently have electricity or telephone service; however, a small solar bank is an alternative to provide power for the repeater site. No costs to develop these services at the site are included at this time. The signal from the repeater site would be transmitted via radio frequency to the base station located in the future main fire station and onto the Delta County Communications Center through a telephone line. The estimated cost of the repeater radio, development of a small building to house the repeater, and installation is approximately \$30,000 (including legal and consulting costs).

As mentioned previously, infrastructure development costs are not included in either of these options.

¹⁷ QDS Communications, Inc. is an authorized agent and manufacturer's representative for Motorola, Inc.



Radio signal coverage data provided by QDS Communications, Inc. The coverage data was provided in raster format and was georegistered to the Ragged Mountain Fire District mapping using Manifold GIS software.

FIRE DISTRICT MASTER PLAN







Radio Signal Coverage Map

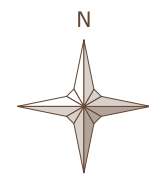
Date: 9/25/2014

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 tgmalley@sopris.net

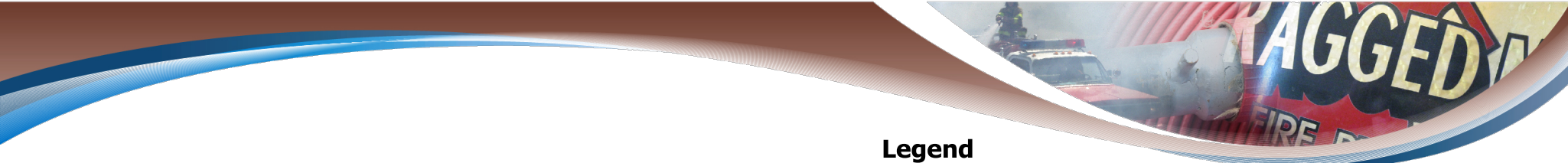
Exhibit 5-1

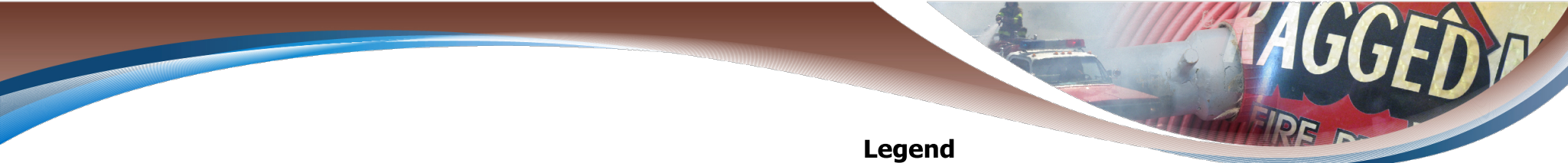
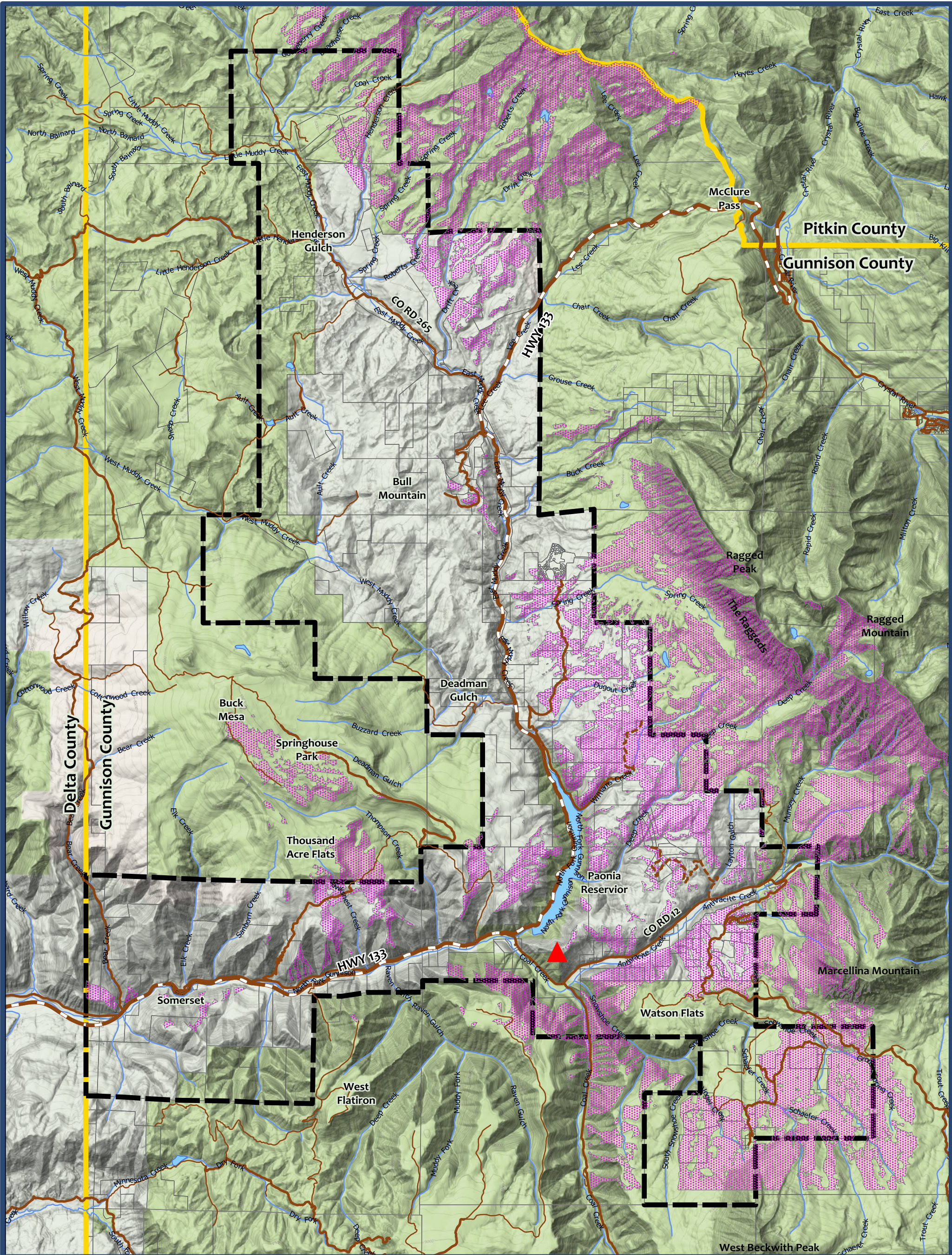
Legend

-  Repeater Site
-  Radio Coverage
-  Fire District Boundary
-  County Boundaries
-  Roads - County
-  Roads - USFS



No Scale





FIRE DISTRICT MASTER PLAN

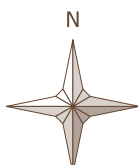
Repeater Line-of-Sight Map

Date: 9/16/2014

Prepared by:
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 Glenwood Springs, CO 81601
 p. 970-945-0832
 tgmalley@sppris.net

Legend

-  Repeater Site
-  Visible Areas (25' Tower)
-  Fire District Boundary
-  County Boundaries
-  Roads - County
-  Roads - USFS



No Scale



5.3 FIRE PROTECTION DISTRICT ALTERNATIVES

Six alternatives for the Ragged Mountain Fire Protection District have been identified. Each alternative explores different options for the organizational structure of firefighting staff and fire station options. Rough order-of-magnitude costs are also provided for each alternative.

5.3.1 ALTERNATIVE 1

Alternative 1 is a status quo alternative since the level of service remains as is. This scenario continues fire services with a pass-through district through the intergovernmental agreement for fire protection provided by the Delta County Fire Protection District #2 (Paonia), with ambulance services provided by North Fork Ambulance Association. This alternative has no staff, and costs would continue to come out of the annual sum paid to Paonia by the District. It is estimated that the annual sum for expenditures will increase to approximately \$110,000 by the end of the planning period, assuming a 1% consumer price index inflation rate. Further, existing vehicles and equipment will need to be replaced, starting within 10 years. Other operating costs include the North Fork Ambulance Association (NFAA) annual membership and satellite phone. A summary of the costs for Alternative 1 are as follows:

TABLE 5-3 - ALTERNATIVE 1 ESTIMATED COSTS

Item	Estimated Cost
Capital Costs	
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
<i>Total Capital Costs</i>	<i>\$676,470</i>
Operational Costs	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Annual Sum Paid to Paonia Fire District	\$110,000
<i>Total Operational Costs</i>	<i>\$114,300</i>
Total Estimate for Alternative 1	\$790,770

Source: Jviation, Inc.

Exhibit 5-3 (Option A – Status Quo) is a map depicting current conditions under Alternative 1, including proximity to the Paonia Fire Station and the time needed to drive from the Paonia station to the homes and properties throughout the Ragged Mountain Fire District. This map reveals that the furthest portions of the Ragged Mountain Fire District are more than 20 miles from the Paonia station and require 60 minutes or more for emergency service vehicles to reach the District. The drive time zones shown on this map are based on the existing road system, assuming speeds of five miles per hour over the posted speed limits, as is allowed for emergency service vehicles under State Statutes.



5.3.1.1 Drive-Time vs Response-Time

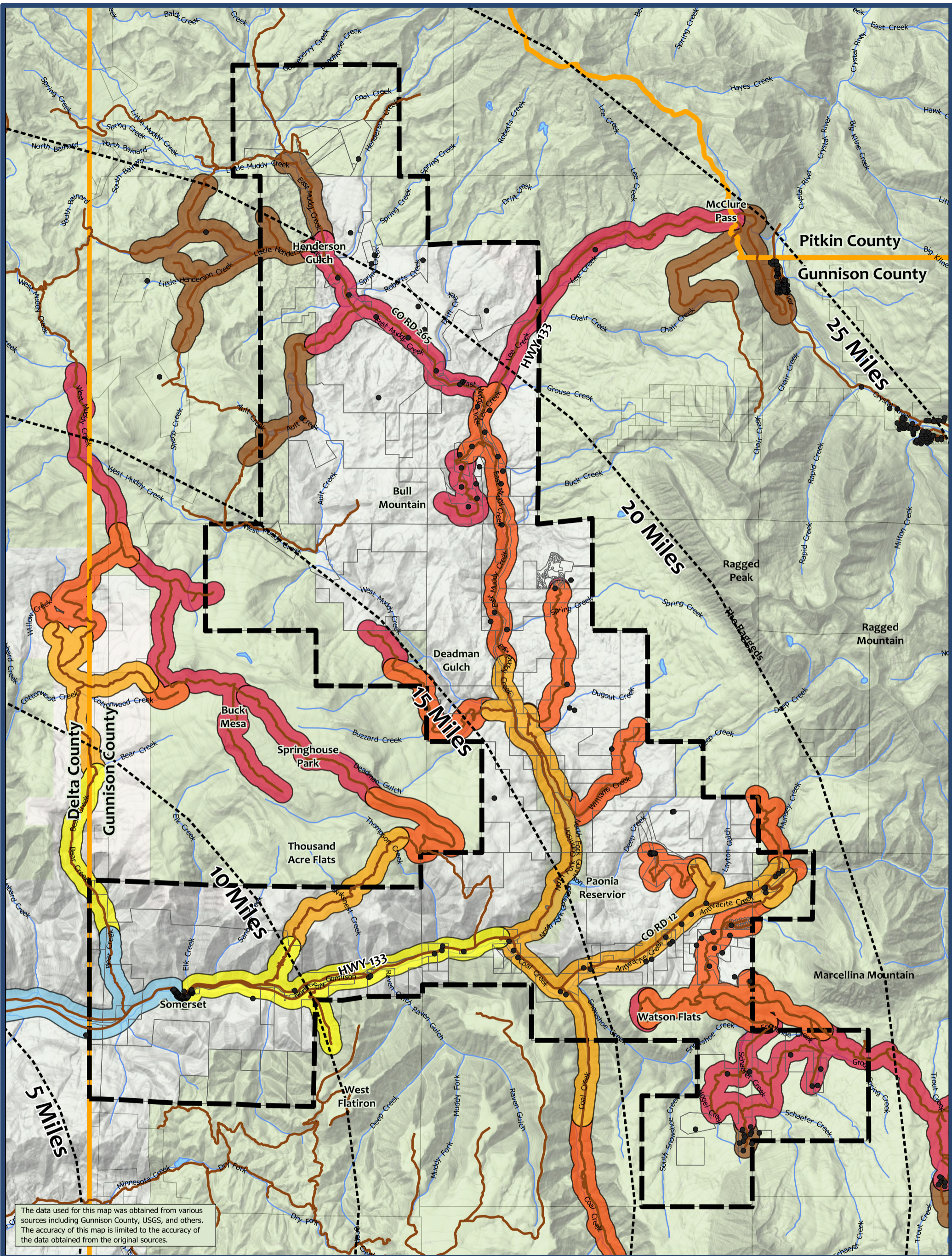
It should be noted that **Exhibit 5-3** shows only the drive time from the Paonia station and not the full response time that could be experienced during any given emergency. Response time is the time from the original 911 call to the moment when emergency personnel actually begin working on the emergency (fire, medical, etc.). Based on information obtained from the Carbondale and Rural Fire District, the following is a breakdown of the components of emergency response time:

1. Dispatch Time (two minutes)
 - a. 911 call received;
 - b. Determine nature of emergency;
 - c. Verify emergency location;
 - d. Determine appropriate resources;
 - e. Notify units needed for response.
2. Turnout Time (15 minutes)
 - a. Time between call to emergency personnel and vehicle departure from station.
3. Drive Time (see maps)
4. Access and Setup Time (three minutes)
 - a. Time from moment when emergency service stops and emergency personnel begin addressing emergency situation.

Based on this information, the total emergency response time for any location in the Ragged Mountain Fire District can be derived by adding approximately 20 minutes to the drive times shown on **Exhibit 5-3**. Therefore, total response time to Somerset under current conditions would be approximately 32 minutes, while response time in the furthest portions of the Henderson Gulch area would be 80 minutes or more. This same math can be applied to the maps provided for all of the alternatives discussed in this chapter. It's also important to remember that the drive times shown for the various alternatives in this chapter do not account for traffic delays that might be caused by accidents or other road damage or obstructions.

5.3.1.2 Distance from the Nearest Station (ISO Criteria)

In addition to drive time zones, the maps in this chapter also provide radius rings which show the distance from the nearest responding fire station in five-mile increments. The radius rings provide a general idea of the relative distance from the station locations for each of the alternatives, which can be used in the evaluation process. In addition, distance from the nearest fire station is one of the many factors the ISO uses in establishing fire insurance ratings for communities. The ISO awards maximum points for properties that are within five miles of the nearest responding station. It should be noted that radius rings indicate the distance (as the crow flies) from the nearest responding fire station, while the actual ISO standard is based on driving distance. Under Alternative 1, the nearest station (Paonia) is off the map.



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Option A - Status Quo

Exhibit 5-3

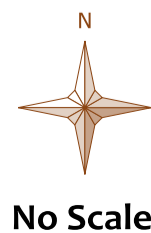
Date: 8/25/2014

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Legend

- 12 Minutes (from Paonia)
- 20-Minute Zone
- 30-Minute Zone
- 40-Minute Zone
- 50-Minute Zone
- 60-Minute Zone

- Address Points
- Road Network
- District Boundary
- County Boundary





5.3.2 ALTERNATIVE 2

5.3.2.1 Alternative 2A

Alternative 2A is a minimum cost organizational structure, which includes one volunteer Fire Chief, and five volunteer firefighters. All training and certification costs would be the responsibility of the District. Firefighter training would be required for a total of 12 people to accommodate shift rotation of the volunteer staff.

Alternative 2A also includes the development of one main fire station centrally located within the District. The main station would need to accommodate three vehicle bays, and reserve space for a potential expansion of a fourth bay. The station would provide an apartment and large training room for firefighters, and would need adequate space to accommodate bunker gear for 12 people. Equipment requirements would be met in this alternative by using the existing equipment owned by the District until replacement is required. Estimated costs for Alternative 2A include:

TABLE 5-4 - ALTERNATIVE 2A ESTIMATED COSTS

Item	Estimated Cost
Capital Costs	
Main Station Construction	\$2,512,300
Land Lease	\$25,000
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$73,350
<i>Total Capital Costs</i>	<i>\$3,387,200</i>
Operational Costs	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Operating Costs	\$10,320
Training (12 firefighters)	\$32,000
<i>Total Operational Costs</i>	<i>\$89,620</i>
Total Estimate for Alternative 2A	\$3,476,820

Note: Operational costs are also included. BLM permitting application process costs and District insurance costs are not included.

Source: Jviation, Inc.



For this alternative, two potential options were analyzed for the location of the single main fire station. The assumption under this alternative is that the District should be able to serve the needs of the residents and businesses within the District boundary with a single centrally-located station for the foreseeable future. As a result, it's important to have a clear understanding of the term "centrally-located" as it applies to the Ragged Mountain Fire District. Centrally-located can be defined as being relative to the existing, and anticipated, future homes and businesses. This is most appropriate when considering emergency medical services. However, it can also be defined as being relative to the geographic boundaries of the District (geographic center), which is an important factor when considering response times for wildfires and other non-structure fires, which can occur anywhere in the District. Unfortunately, in the case of the Ragged Mountain Fire District, the geographic center of the District and the geographic center of the existing residences and businesses are nowhere near each other.

In the inventory section of this report we learned that 70% of the existing development (homes and businesses as defined by address points) are located in the southern one-third of the District. The geographic center of the address points was calculated and is shown on **Exhibit 5-4** (Option B1 – Single Station South). Using this location as a guide, nearby properties were evaluated as potential station locations. Based on the space program information provided in **Section 4.5.1** of this report, the minimum land area necessary to accommodate a main station would be in the range of one-half to one acre. For the purpose of this analysis, it was assumed that larger parcels could provide the necessary land area through long-term lease or subdivision.

The potential station identified on **Exhibit 5-4** is located on Lot 1 of the Crystal Meadows Resort Subdivision. This 25-acre parcel is owned by Bear Ranch LLC and contains the maintenance building and cabin which the District had been considering as a potential station when this Master Plan process was initiated. Another site that was considered is the Gunnison County maintenance facility site, which contains approximately one acre and is located along Highway 133, approximately one mile to the west of the Crystal Meadows site. However, the Crystal Meadows site provides better response times to the properties along County Road 12 without significantly reducing the response time for Somerset due to the higher speed limits on Highway 133. As a result, the Crystal Meadows site was used for the drive time analysis shown on **Exhibit 5-5**.

The advantages of Option B1 are that it offers 10-minute drive times for Somerset as well as for many of the existing businesses and residences in the southern portion of the District, including the active coal mining facility. The disadvantage is that the drive time to the northern end of the District is 40 minutes. This is an important factor when considering the ability to respond to potential wildfires that might occur in the northern portion of the District. In addition, in the Build-Out Analysis section of this report (**Section 3.1**) we learned that most of the future development potential is associated with the lands in the northern part of the District. Another disadvantage of Option B1 is that roughly one-quarter of the land within the five-mile radius ring from the station location lies outside of the District Boundaries to the south.



The station location shown on **Exhibit 5-5** (Option B2 – Single Station North) is located near the geographic center of the District boundary. The actual site evaluated for Option B2 is located at the southeast corner of Highway 133 and County Road 2. This one-acre parcel also happens to be owned by Bear Ranch LLC and is currently used for corrals. There may also be other potential sites in this area and the intent of this analysis is not to define the actual site but to define an area within which to seek potential sites. As shown on **Exhibit 5-5**, a station at this location reduces the drive time to the northern portion of the District but increases the drive time for the more populated southern portion of the District. Under this scenario, the Somerset area shifts from the far end of the 10-minute drive zone to the far end of the 20-minute drive zone. Similarly, the drive times increase for the County Road 12 area and Watson Flats. One of the advantages of this option is that it places more of the District’s developable parcels within five miles of the station and almost the entire district is located within 10-miles of the station. This option would also better serve the future development potential identified in the build-out analysis, which is predominantly located in the northern portion of the District.

5.3.2.2 Alternative 2B

Alternative 2B maintains the same organizational structure as Alternative 2A, as well as a main fire station, but also adds a substation within the District to increase fire protection services. The substation would be required to have three bays to accommodate a water tender truck, fire engine, and ultimately a brush truck. Space for bunker gear would be split between both stations; bunker gear space for six people at the main station, and bunker gear for six people at the substation would be accommodated in this alternative. It is estimated that service call demand for a substation would not be necessary until the end of the 20-year planning period.

Existing equipment owned by the District would be utilized at the main station; however, equipment would be needed to be acquired to support the substation, in addition to equipment replacement costs. Costs for Alternative 2B include the following:



TABLE 5-5 - ALTERNATIVE 2B ESTIMATED COSTS

Item	Estimated Cost
Capital Costs - Main Station	
Main Station Construction	\$2,512,300
Land Lease	\$25,000
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$73,350
<i>Total Capital Costs - Main Station</i>	<i>\$3,387,200</i>
Operational Costs - Main Station	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Operating Costs	\$10,320
Training (12 firefighters)	\$32,000
<i>Total Operational Costs - Main Station</i>	<i>\$46,620</i>
Capital Costs - Substation	
Substation	\$768,720
Substation Land Acquisition	\$6,500
Class A Engine & Water Tender Truck	\$475,000
Class A Engine & Water Tender Equip.	\$46,780
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$19,700
<i>Total Capital Costs - Substation</i>	<i>\$1,416,780</i>
Operational Costs - Substation	
Operating Costs	\$6,320
Training (6 firefighters)	\$16,000
<i>Total Operational Costs - Substation</i>	<i>\$22,320</i>
Total Estimate for Alternative 2B	\$4,872,920

Note: Operational costs are also included. BLM permitting application process costs and District insurance costs are not included.

Source: Jviation, Inc.



Exhibit 5-6 (Option C – Two Stations) shows the drive time analysis and radius rings for the two stations contemplated in this alternative. Since the substation would not be needed until the end of the 20-year planning period, the station sites for this alternative were selected assuming that the main station would be located in the more populated southern portion of the District and the substation would be located in the northern portion of the District where future development potential is greatest. As a result, the Crystal Meadows site was selected for the main station, though, as stated previously, there may be other suitable sites in this same area, such as collocating on the Gunnison County maintenance facility site. The location for the substation site was selected in response to drive times for the main station and the desire to provide the shortest possible drive times for the largest portion of the District. This resulted in the selection of a site further to the north near the intersection of County Road 265 and Highway 82. A substation requires much less land area and can be accommodated on parcels as small as one-quarter acre or less. As a result, there could be a number of ways to accommodate a substation in the area of this intersection. The substation site analyzed on **Exhibit 5-6** is assumed to be located on a piece of excess right-of-way along the west side of Highway 133 just south of the intersection with County Road 265. Conceptual renderings of the main station and substation are provided on **Exhibit 5-9** through **Exhibit 5-12**.

One of the obvious benefits of this alternative is that a majority of the existing residences and businesses would be within the 10-minute drive zone and most of the more remote areas can be reached in 30 minutes or less. One oddity of this alternative is that while Somerset would be within the 10-minute drive zone it would be further than five miles from the nearest responding fire station. If the main station were to be located at the Gunnison County site Somerset would continue to be outside, though right at the edge, of the five-mile radius ring. However, this would significantly increase the drive time for the areas along County Road 12 due to the lower speed limits on the county road. Option C provides the best situation for emergency service response though at a significantly increased cost.

5.3.3 ALTERNATIVE 3

5.3.3.1 Alternative 3A

Alternative 3A incorporates both paid staff and volunteer staff with one paid Fire Chief and five volunteer firefighters. The District will provide funding for volunteer staff training; however, a salary and benefits package would be provided for the fire chief in this alternative. In this alternative, one main fire station would be centrally located within the District, with enough space to accommodate bunker gear for 12 firefighters. The issues and opportunities related to station location and response times for this alternative would be the same as those discussed for Alternative 2A. The estimated costs for Alternative 3A include the following:



TABLE 5-6 - ALTERNATIVE 3A ESTIMATED COSTS

Item	Estimated Cost
Capital Costs	
Main Station Construction	\$2,512,300
Land Lease	\$25,000
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$73,350
<i>Total</i>	<i>\$3,387,200</i>
Operational Costs	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Operating Costs	\$10,320
Paid Fire Chief	\$75,000
Training (12 firefighters)	\$32,000
<i>Total</i>	<i>\$89,620</i>
Total Estimate for Alternative 3A	\$3,476,820

Note: Operational costs are also included. BLM permitting application process costs and District insurance costs are not included.

Source: Jviation, Inc.

5.3.3.2 Alternative 3B

Similar to Alternative 3A, the organizational structure in Alternative 3B provides one paid fire chief, and five volunteer firefighters. Alternative 3B includes one main fire station, centrally located within the District, and one substation later in the planning period as triggered by demand. The issues and opportunities related to station location and response times would be the same as those discussed for Alternative 2B. The estimated costs for Alternative 3B include the following:



TABLE 5-7 - ALTERNATIVE 3B ESTIMATED COSTS

Item	Estimated Cost
Capital Costs - Main Station	
Main Station	\$2,512,300
Land Lease	\$25,000
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$73,350
<i>Total Capital Costs - Main Station</i>	<i>\$3,324,170</i>
Operational Costs - Main Station	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Operating Costs	\$10,320
Paid Fire Chief	\$75,000
Training (12 firefighters)	\$32,000
<i>Total Operational Costs - Main Station</i>	<i>\$121,620</i>
Capital Costs - Substation	
Substation	\$768,720
Substation Land Acquisition	\$6,500
Class A Engine & Water Tender Truck	\$475,000
Class A Engine & Water Tender Equip.	\$46,780
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$19,700
<i>Total Capital Costs - Substation</i>	<i>\$1,416,780</i>
Operational Costs - Substation	
Operating Costs	\$6,320
Training (6 firefighters)	\$16,000
<i>Total Operational Costs - Substation</i>	<i>\$22,320</i>
Total Estimate for Alternative 3B	\$5,077,520

Note: Operational costs are also included. BLM permitting application process costs and District insurance costs are not included.

Source: Jviation, Inc.



5.3.4 ALTERNATIVE 4

5.3.4.1 Alternative 4A

Alternative 4A assumes one paid Fire Chief and one paid firefighter (actually 2/3rds of a paid firefighter since one of the three daily shifts is intended to be staffed by a volunteer), with the option of gradually increasing the amount of paid firefighters on staff. Under this scenario, the District would be required to pay for all training costs for every paid and volunteer firefighter. Five full-time equivalents (FTE) would be required to meet the staffing needs necessary to provide one 24-hour firefighter position (firefighter on duty 24 hours a day, seven days a week, 365 days a year). One FTE is equivalent to one employee working full time (40 hours per week/2,080 hours per year). The number of required FTE's is derived by dividing the number of hours in a year (8,760) by the number of total annual hours associated with each FTE (2,080), which comes to 4.2 FTE. Another 0.8 FTE is added to cover paid holidays, vacations, and sick leave. However, since one of the three daily shifts would be covered by a volunteer, the number of paid employees would be reduced to four for each 24-hour firefighter position. The following table illustrates the number of paid staff that would be required to support each 24-hour firefighter position, assuming one of the three daily shifts is staffed by a volunteer.

TABLE 5-8 - FTE 24-HOUR SHIFT STAFF REQUIREMENTS*

FTE 24-Hour Shift	Number of Paid Staff Required
1	4
2	8
3	13
4	17
5	21

Source: Jviation, Inc.
Paid fire chief is not included.

In this alternative scenario, one main fire station would be centrally located within the District, with enough space to accommodate bunker gear for 12 firefighters. The issues and opportunities related to station location and response times for this alternative would be the same as those discussed for Alternative 2A. The estimated costs for Alternative 4A include the following:



TABLE 5-9 - ALTERNATIVE 4A ESTIMATED COSTS

Item	Estimated Cost
Capital Costs	
Main Station	\$2,512,300
Land Lease	\$25,000
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$73,350
<i>Total Capital Costs</i>	<i>\$3,387,200</i>
Operational Costs	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Operating Costs	\$10,320
Paid Fire Chief	\$75,000
Paid Staff	\$220,000
Training (12 firefighters)	\$32,000
<i>Total Operational Costs</i>	<i>\$341,620</i>
Total Estimate for Alternative 4A	\$3,728,820

Note: Operational costs are also included. BLM permitting application process costs and District insurance costs are not included. Training costs do not include EMT-Basic.

Source: Jviation, Inc.

5.3.4.2 Alternative 4B

Alternative 4B maintains the same organizational structure as Alternative 4A, with one paid fire chief, one paid firefighter for rotating day shifts, and the remaining as volunteer staff. However, this scenario provides a centrally located main station, as well as a substation within the District. The issues and opportunities related to station location and response times would be the same for this alternative as those discussed for Alternative 2B. The estimated costs for Alternative 4B are as follows:



TABLE 5-10 - ALTERNATIVE 4B ESTIMATED COSTS

Item	Estimated Cost
Capital Costs - Main Station	
Main Station	\$2,512,300
Land Lease	\$25,000
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$73,350
<i>Total Capital Costs - Main Station</i>	<i>\$3,387,200</i>
Operational Costs - Main Station	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
Operating Costs (main & substation)	\$16,640
Paid Fire Chief	\$75,000
Paid Staff	\$220,000
Training (12 firefighters)	\$32,000
<i>Total Operational Costs - Main Station</i>	<i>\$347,940</i>
Capital Costs - Substation	
Substation	\$768,720
Substation Land Acquisition	\$6,500
Class A Engine & Water Tender Truck	\$475,000
Class A Engine & Water Tender Equip.	\$46,780
Station Equipment	\$25,620
Firefighter Equipment	\$74,460
Communication Equipment	\$19,700
<i>Total Capital Costs - Substation</i>	<i>\$1,416,780</i>
Operational Costs - Substation	
Operating Costs	\$6,320
Training (6 firefighters)	\$16,000
<i>Total Operational Costs - Substation</i>	<i>\$22,320</i>
Total Estimate for Alternative 4B	\$5,174,240

Note: Training costs do not include EMT-Basic. Operational costs are also included. BLM permitting application process costs and District insurance costs are not included.

Source: Jviation, Inc.



5.3.5 ALTERNATIVE 5

5.3.5.1 Alternative 5A

Alternative 5A is an all paid staff, including one paid Fire Chief and five paid firefighters. Under this scenario, the District would be required to pay for all training costs for every employee. However, five paid employees would be required to fill the full-time equivalent obligation for one position available 24 hours, seven days a week, 365 days a year, which would equal 25 paid firefighters for this alternative. This alternative scenario provides one main fire station, centrally located within the District. The issues and opportunities related to station location and response times for this alternative would be the same as those discussed for Alternative 2A.

5.3.5.2 Alternative 5B

Alternative 5B maintains the same organizational structure as Alternative 5A, with one paid fire chief and five paid firefighters. However, this scenario provides a centrally located main station, as well as a substation within the District. The issues and opportunities related to station location and response times for this alternative would be the same as those discussed for Alternative 2B.

The scenarios presented in Alternative 5 were evaluated; however, neither Alternative 5A nor 5B are considered financially viable.



5.3.6 ALTERNATIVE 6

5.3.6.1 Alternative 6A

After receiving input from the District Board, a sixth alternative has been developed, which includes continuing as a pass-through district with the Paonia Fire Department providing fire protection services, and the development of two substations. With this alternative, costs for PPE and firefighter training would not be required. Two options have been analyzed for Alternative 6 (Alternative 6A and 6B). The intent of this analysis was to determine the best location for the northernmost substation given the current and potential future development patterns as described in the Build-Out discussion in this report. Alternative 6A, as shown on **Exhibit 5-7**, has one substation located within Somerset, and the second substation located along Highway 133 near the intersection with County Road 77. The drive-time analysis for this alternative shows that while the central portion of the District would be well served (within the 10-minute drive zone), the northern portion of the District would be located 30 minutes or more from the nearest substation.

5.3.6.2 Alternative 6B

Alternative 6B maintains the same organizational structure as Alternative 6A, with the continued operation as a pass-through district. Although this alternative also has two substations, with one located in Somerset, the second substation would be located to the north at the junction of Colorado Road 265 and Highway 133, as shown on **Exhibit 5-8**. The northernmost substation on this Alternative is assumed to be in the same location that was analyzed for Alternative 2B (see **Exhibit 5-6**). The drive-time analysis for this alternative shows that while the portion of Highway 133 between Deadman Gulch and the Paonia Dam moves from the 10-minute to the 20-minute drive zone, a greater percentage of the District is within the 10 and 20-minute drive zones than on Alternative 6A. Since there is relatively little development along the Paonia Reservoir, shifting the northernmost substation further north will provide superior coverage overall. The estimated cost for Alternative 6 (both 6A and 6B have equivalent cost estimates) is presented in **Table 5-11**.



TABLE 5-11 - ALTERNATIVE 6 ESTIMATED COSTS

Item	Estimated Cost
Capital Costs – Substation 1	
Substation 1	\$1,177,920
Land Lease	\$6,500
Vehicle Replacement	\$620,000
Vehicle Equipment Replacement	\$56,470
Station Equipment	\$25,620
Firefighter Equipment	N/A
Communication Equipment	\$6,320
<i>Total Capital Costs – Substation 1</i>	<i>\$1,892,830</i>
Operational Costs – Substation 1	
Satellite Phone	\$1,300
NFAA Membership	\$3,000
<i>Total Operational Costs – Substation 1</i>	<i>\$4,300</i>
Capital Costs – Substation 2	
Substation	\$918,720
Substation Land Acquisition	\$6,500
Class A Engine & Water Tender Truck	\$475,000
Class A Engine & Water Tender Equip.	\$46,780
Station Equipment	\$25,620
Firefighter Equipment	N/A
Communication Equipment	\$40,550
<i>Total Capital Costs – Substation 2</i>	<i>\$1,513,170</i>
Operational Costs – Substation 2	
Operating Costs	\$6,320
<i>Total Operational Costs – Substation 2</i>	<i>\$6,320</i>
Total Estimate for Alternative 6	\$3,416,620

*Note: Training costs do not include EMT-Basic. Operational costs are also included. BLM permitting application process costs and District insurance costs are not included.
Source: Jviation, Inc.*

5.4 SUMMARY OF ESTIMATED COSTS

The summary of estimated costs for each alternative is provided below. As previously discussed in **Section 5.3.5**, Alternatives 5A and 5B were not considered financially viable and were eliminated from evaluation against the other alternatives. Operational costs include the annual costs for the satellite phone, Paonia service agreement, NFAA membership, supplies, T-1 line, maintenance contracts, communication board fees, supplies, salaries, and training. Capital costs include construction/site development, land acquisition and leases, vehicle replacement and acquisition, and all communication, station, and vehicle equipment replacement and acquisition costs.

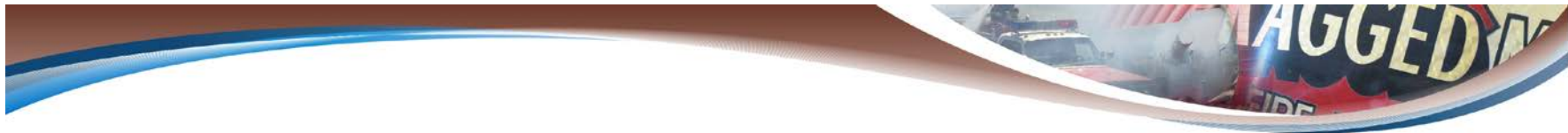
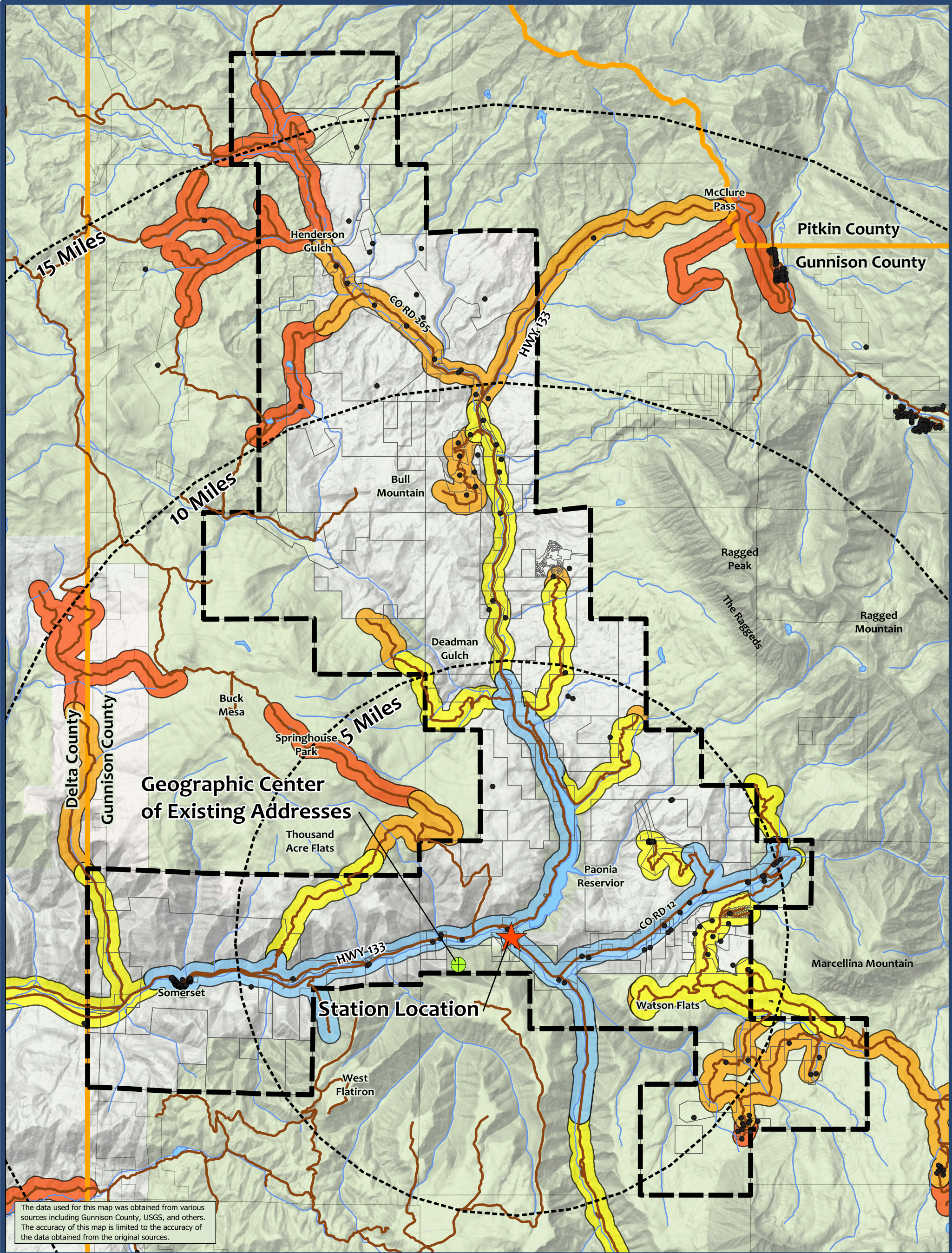


TABLE 5-12 - ALTERNATIVE COST ESTIMATE COMPARISON MATRIX

	Alternatives:								5A	5B	6
	1	2A	2B	3A	3B	4A	4B				
Total Operational Cost	\$114,300	\$46,620	\$68,940	\$89,620	\$143,940	\$341,620	\$370,260	ELIMINATED		\$10,620	
Total Capital Cost	\$676,470	\$3,387,200	\$4,803,980	\$3,387,200	\$4,740,950	\$3,387,200	\$4,803,980			\$3,406,000	
Total Cost	\$790,770	\$3,433,820	\$4,872,920	\$3,476,820	\$5,077,520	\$3,728,820	\$5,174,240			\$3,416,620	

Source: Jviation, Inc.



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Option B1 - Single Station (South)

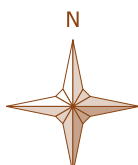
Exhibit 5-4

Date: 8/25/2014

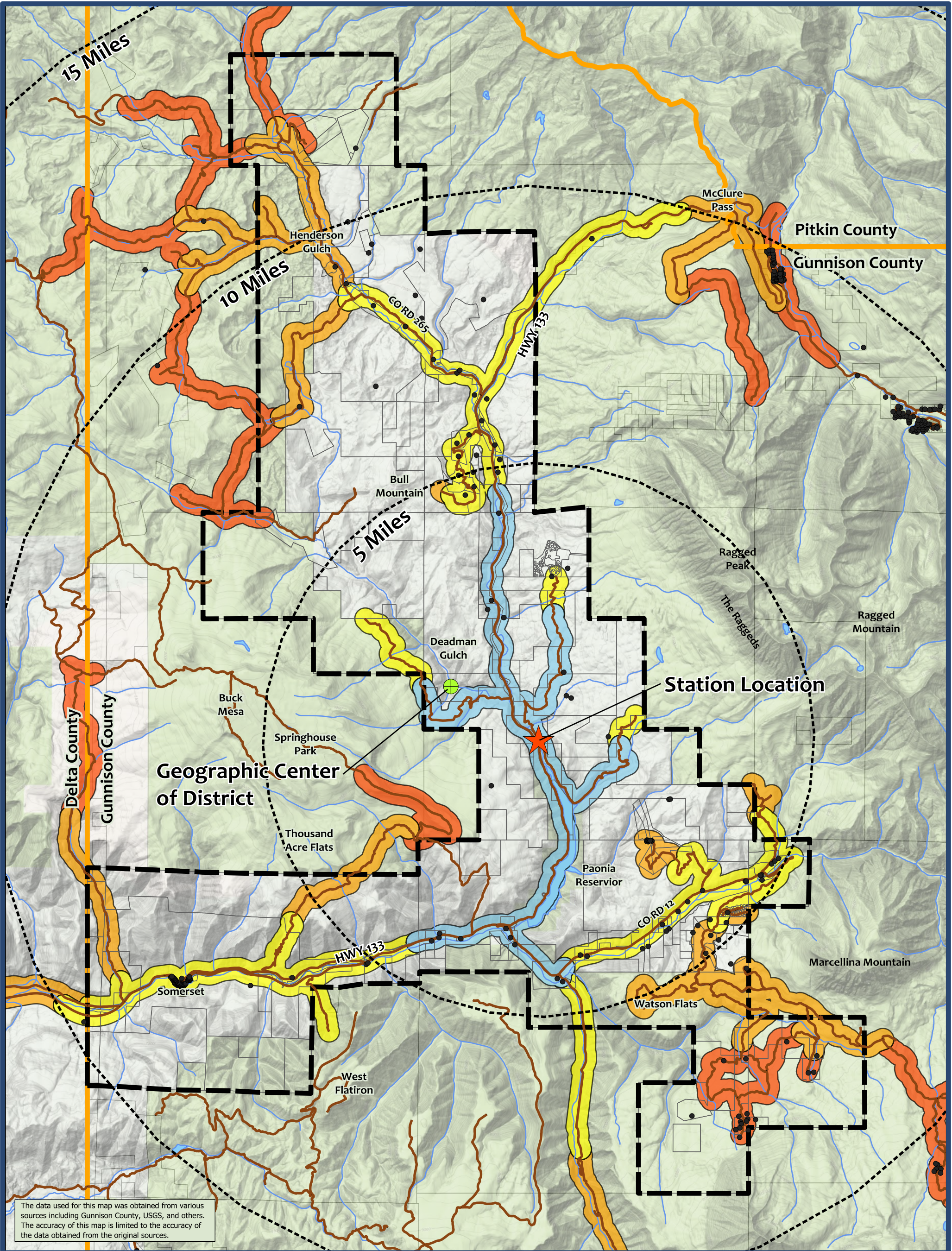
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Legend

- Station Location
- Address Points
- Road Network
- District Boundary
- County Boundary
- 10-Minute Drive Zone
- 20-Minute Drive Zone
- 30-Minute Drive Zone
- 40-Minute Drive Zone



No Scale



The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Option B2 - Single Station (North)

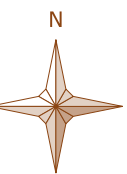
Exhibit 5-5

Date: 8/25/2014

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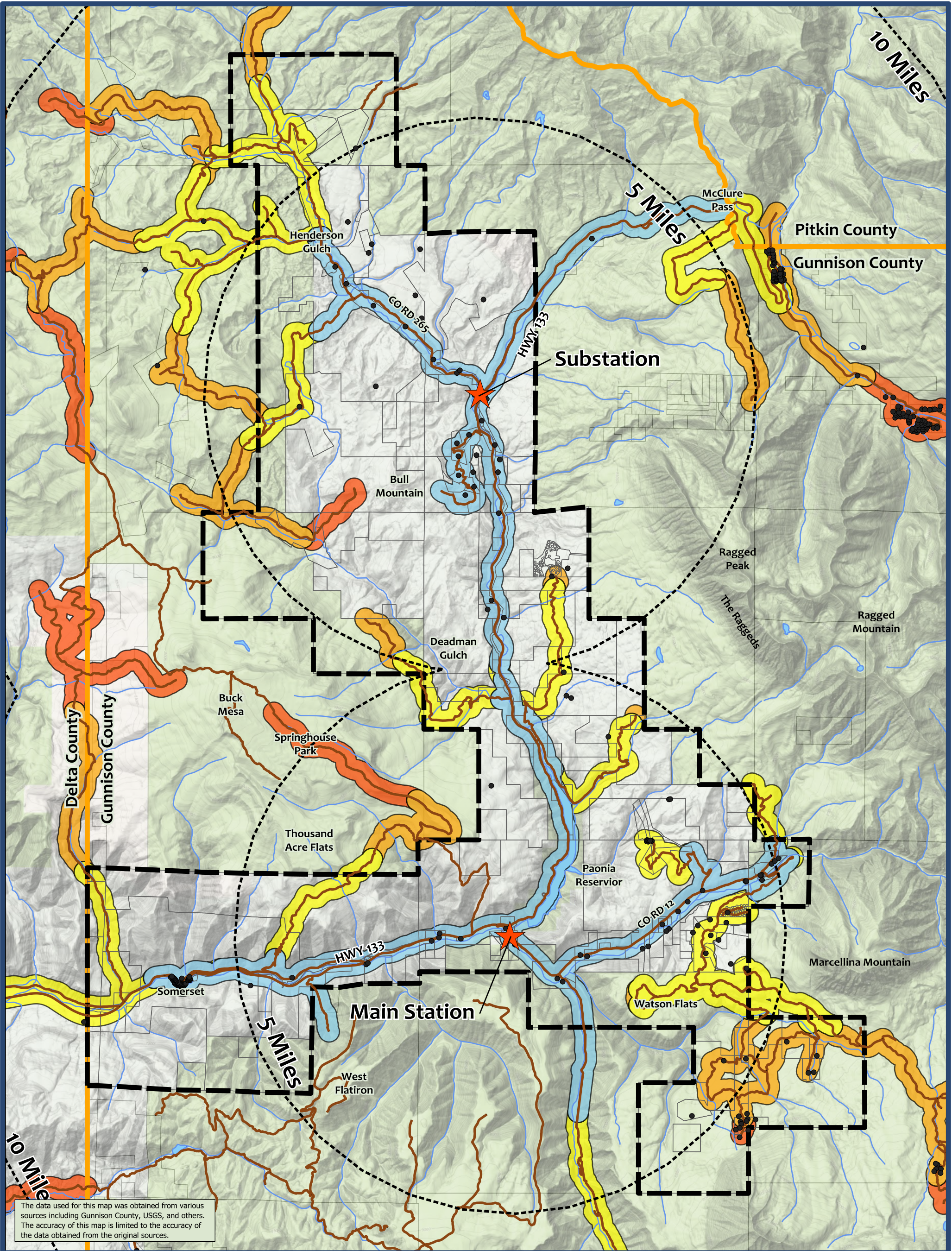
Legend

- ★ Station Location
- Address Points
- Road Network
- District Boundary
- County Boundary
- 10-Minute Drive Zone
- 20-Minute Drive Zone
- 30-Minute Drive Zone
- 40-Minute Drive Zone



No Scale





The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Option C - Two Stations

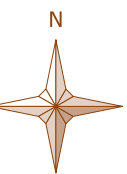
Exhibit 5-6

Date: 8/25/2014

Prepared by:
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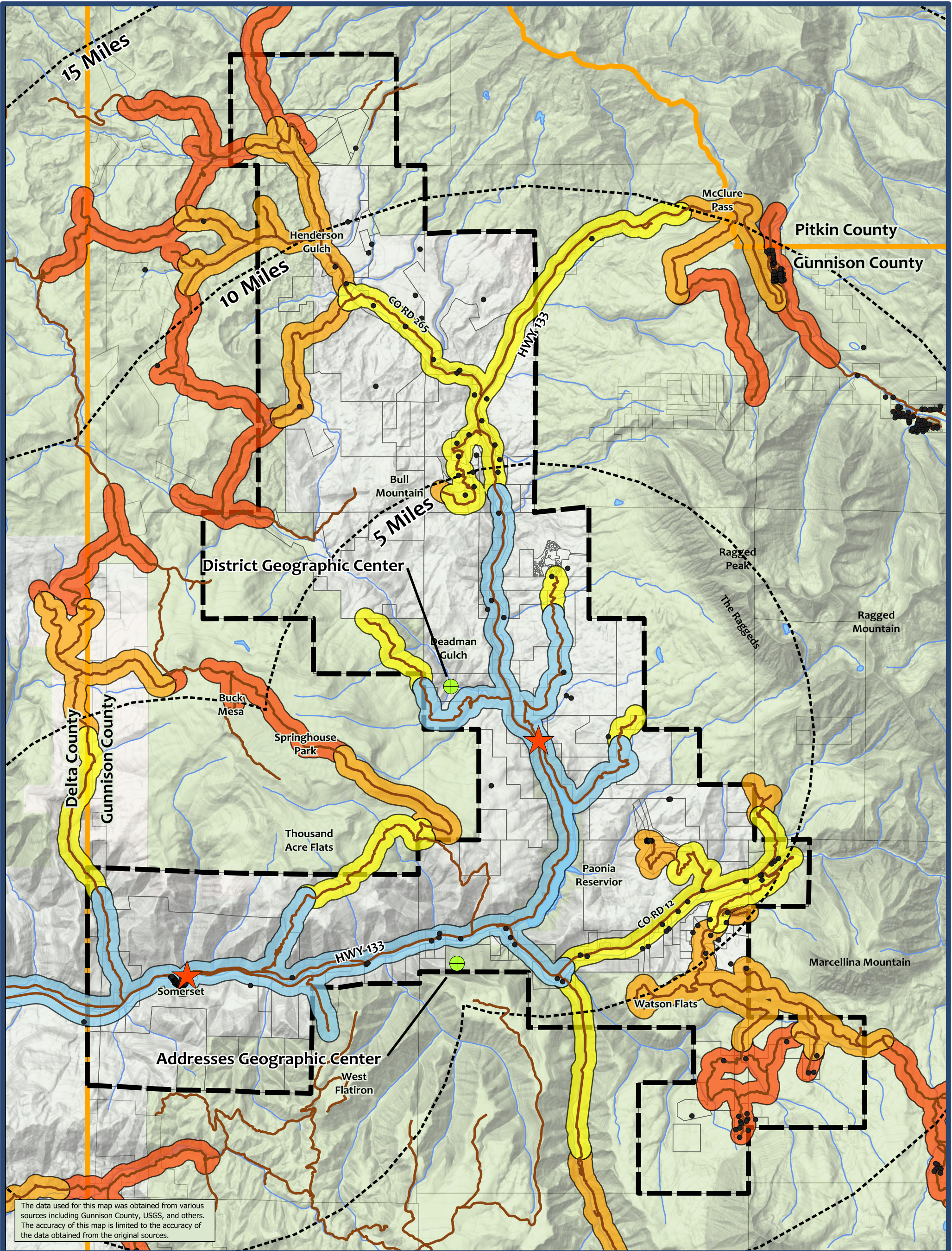
Legend

- Station Site
- Address Points
- Road Network
- District Boundary
- County Boundary
- 10-Minute Drive Zone
- 20-Minute Drive Zone
- 30-Minute Drive Zone
- 40-Minute Drive Zone



No Scale





The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Option D1 - Two Substations

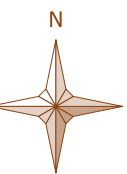
Exhibit 5-7

Date: 11/21/2014

Prepared by:
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 Glenwood Springs, CO 81601
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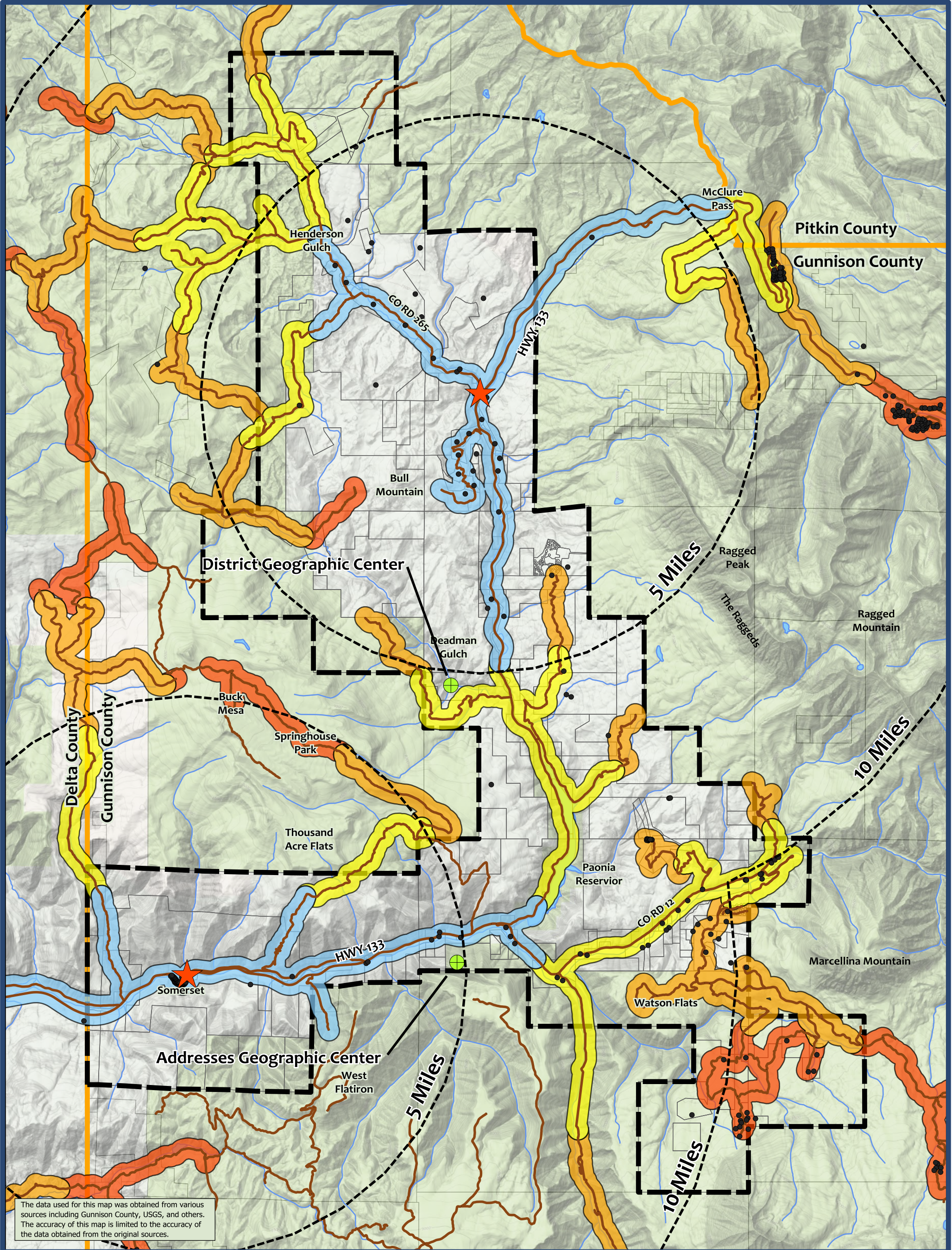
Legend

- Substation Locations
- Address Points
- Road Network
- District Boundary
- County Boundary
- 10-Minute Drive Zone
- 20-Minute Drive Zone
- 30-Minute Drive Zone
- 40-Minute Drive Zone



No Scale





The data used for this map was obtained from various sources including Gunnison County, USGS, and others. The accuracy of this map is limited to the accuracy of the data obtained from the original sources.

FIRE DISTRICT MASTER PLAN

Option D2 - Two Substations

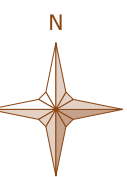
Exhibit 5-8

Date: 11/21/2014

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Legend

- Substation Locations
- Address Points
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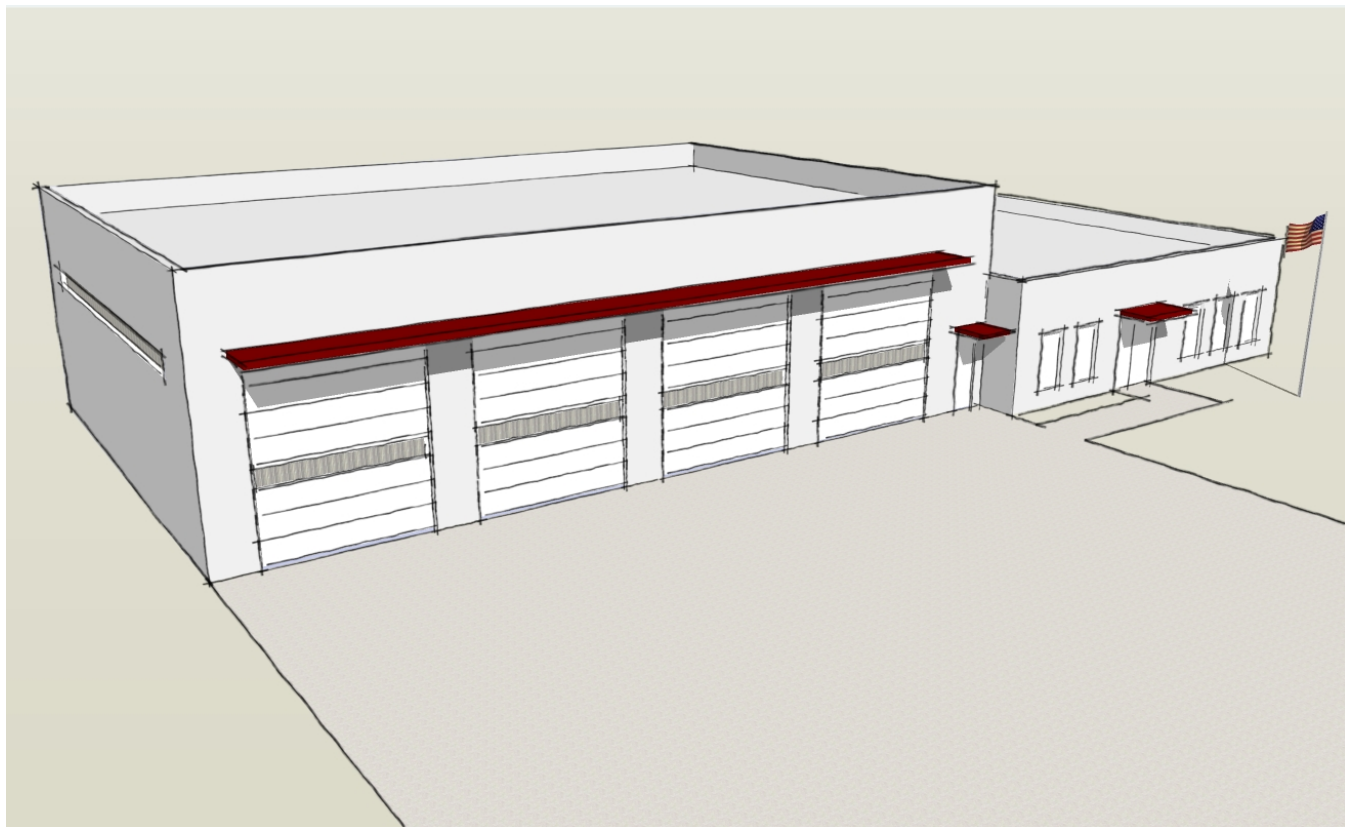


No Scale





EXHIBIT 5-9 - CONCEPTUAL MAIN STATION SKETCH 1



Source: Jviation, Inc.



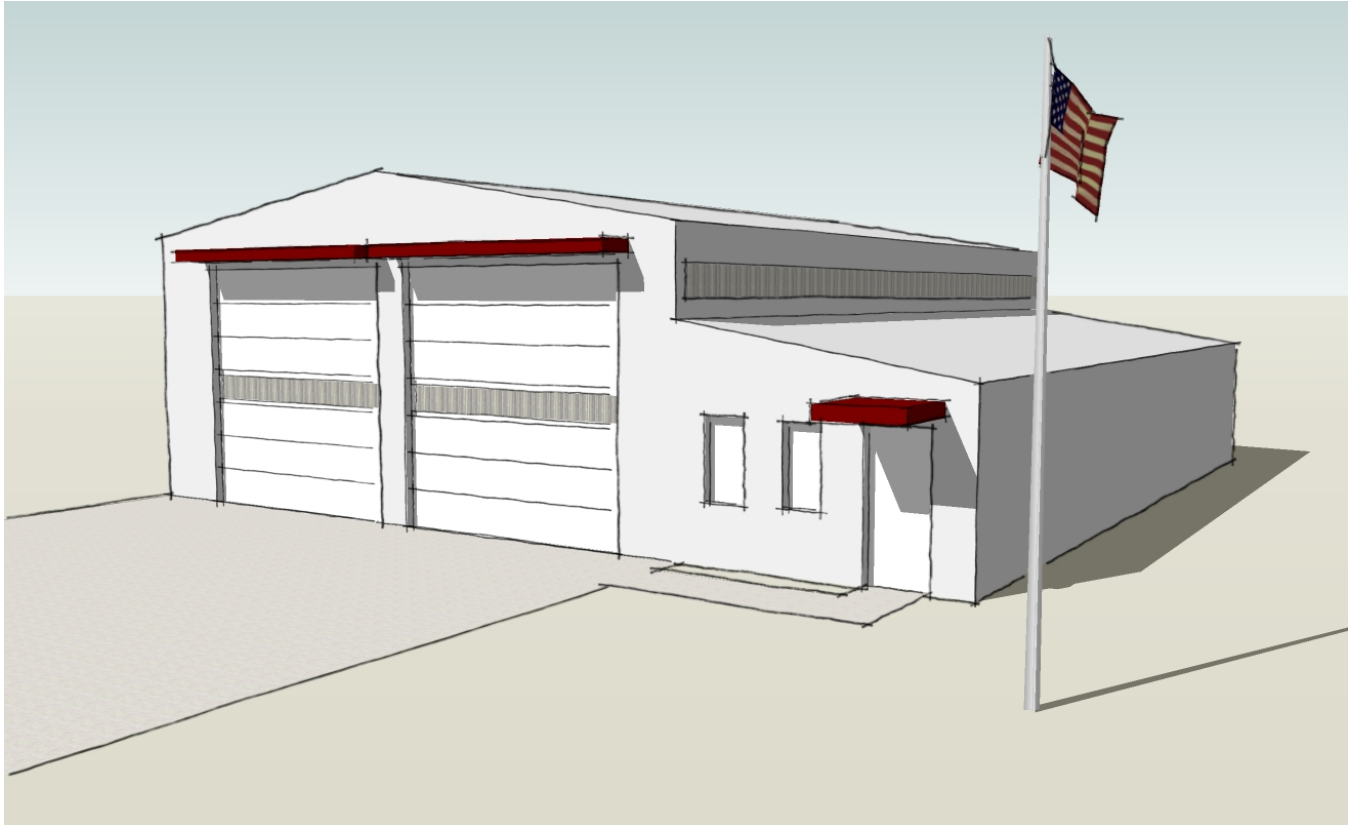
EXHIBIT 5-10 - CONCEPTUAL MAIN STATION SKETCH 2



Source: Jviation, Inc.



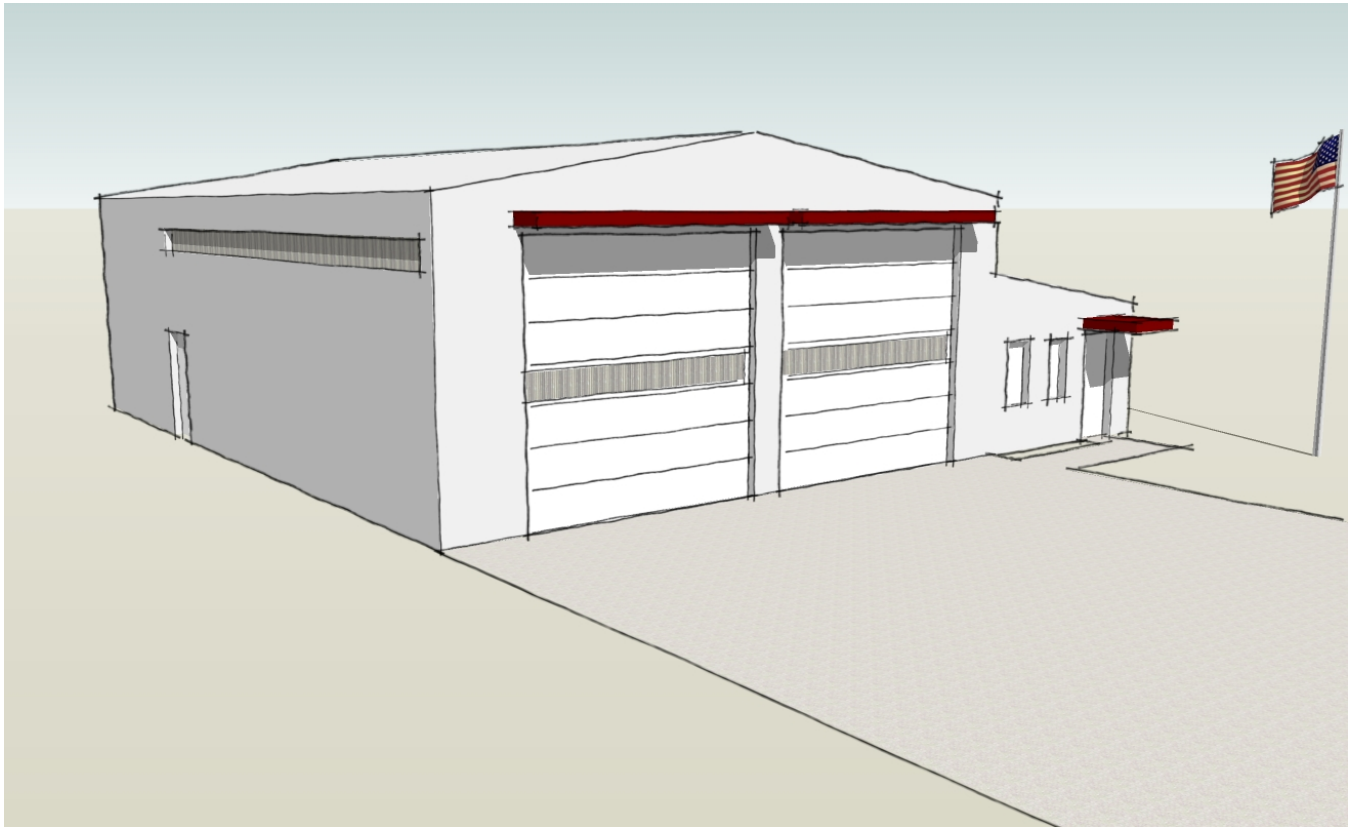
EXHIBIT 5-11 - CONCEPTUAL SUBSTATION SKETCH 1



Source: Jviation, Inc.



EXHIBIT 5-12 - CONCEPTUAL SUBSTATION SKETCH 2



Source: Jviation, Inc.

5.5 PREFERRED ALTERNATIVE

Based on input received by the Board of Directors, the preferred alternative is to redevelop the existing Oxbow Mine site into a fire station. Existing buildings will need to be retrofitted appropriate for an operating fire station. The Ragged Mountain Fire Protection District will continue to operate as a pass-through district with fire services provided by the Paonia Fire District. Costs for the preferred alternative are included in the Capital Improvement Plan (CIP), which is discussed in the following chapter, *Financial Implementation Plan*.



6.0 FINANCIAL IMPLEMENTATION PLAN

There are various projects planned for the Ragged Mountain Fire Protection District in the upcoming years to meet the preferred alternative. Understanding the costs of these projects and the funding programs available, as well as the District's current finances, is essential to determine the feasibility of the planned projects. This chapter will discuss the District's revenues and expenses, and the potential funding sources for all identified needs to achieve the implementation of the preferred alternative. A summary of the Capital Improvement Plan (CIP) for all of the planned development is provided at the end of this chapter.

6.1 REVENUES AND EXPENSES

The District operates as an enterprise under a single operating fund, which provides for all revenues and expenditures of the District. The District's current revenues consist of property tax, specific ownership tax, and interest on deposits. As described in **Chapter 2**, the Ragged Mountain Fire Protection District is a pass-through district with the Paonia Fire District.

As of the date of this report, approximately \$230,354.27 in revenue has been received from property taxes. Revenue from property taxes is subject to property valuations. No additional property tax revenue is anticipated for the remainder of the planning period.

Typical operating and non-operating expenditures for the District include wages, insurance, communications and utilities, building maintenance, firefighter equipment, and equipment and vehicle maintenance. Total operating and capital expenditures for 2014 (estimated) were approximately \$282,427.56.

6.2 ENVIRONMENTAL CONSIDERATIONS

It is important to note that any improvements necessary to accommodate the needs of the Fire District, including retrofitting the existing mine structures, must comply with all federal, state, and local environmental regulations. Specific details as to which regulations apply and how they might affect the District's ability to utilize any or all of the proposed sites may vary. It is recommended that a Phase I Environmental Site Assessment (ESA) be conducted to determine whether the proposed sites contain, or are likely to contain, any recognized environmental conditions (RECs). The term "recognized environmental conditions" means the presence, or likely presence, of hazardous substances on a site that indicate an existing release, a past release, or a material threat of hazardous substances or petroleum products into structures or into the ground, groundwater, or surface water on the sites(s) in question.



Given the properties' past use for coal mining purposes, it should be understood that such recognized environmental conditions are possible, if not likely. If any RECs are discovered, further studies or analysis would be advised to determine the exact nature and extent of the hazardous substance(s) and to define appropriate mitigation measures. Depending on the findings of the environmental analyses, the District may determine that the site(s) are not appropriate for their purposes. It can be assumed that there will be additional costs associated with any environmental analyses, related mitigation, permitting, and any other efforts required to demonstrate compliance with applicable environmental regulations. These costs are beyond the scope of this Master Plan and have not been included on the CIP. The District should also be aware that the proposed sites are part of an area which is subject to the requirements of a reclamation plan that has been filed with the Colorado Division of Reclamation Mining and Safety. Any improvements and activities necessary to accommodate the needs of the Fire District should be analyzed for compliance with the reclamation plan.

6.3 CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) has been developed to show the future development plans and anticipated funding sources for the District. A quality CIP must be realistic and reflect the maximum practical amount of funds available from the District's reserves, mill levy, grants, and private investment. The CIP should reflect eligibility and priorities of the District and Tax Districts 621, 703, and 704. The result is a CIP with a higher probability for accomplishment.

Future development for the District, as included in this study, covers a 20-year period. Estimated development costs are included in the CIP and are based on the recommended facility requirements discussed in **Chapter 4**. The phasing of projects assists the District Board in budgetary planning for construction improvements necessary to meet the needs of the District. The demand for certain facilities, especially in the latter timeframe, and the economic feasibility of their development are the prime factors influencing the implementation of a project's timeframe. All costs are provided in 2014 dollars and include design, construction, and contingency. All projects programmed beyond 2015 will need to account for escalation for the year they are accomplished. See **Appendix F** for preliminary cost estimates for each project for the base year (2015) CIP, which is expressed in current-year dollars (2014). Out years in the CIP have an escalated cost with a one percent annual inflator.

All funding in the CIP is contingent upon annually appropriated funding levels for all involved agencies and sources. Development included in this Master Plan does not constitute a commitment on the part of the District to participate in the funding of such development. **Table 6-4** at the end of this chapter provides a summary of total project development costs for 2015-2035.



6.4 PHASE I – 5 YEAR CIP (2015-2019)

Phase I is the short-term plan of capital improvements anticipated for the District over the next five years (2015 to 2019). **Table 6-1** shows the summary of the project schedule and funding estimates in Phase I.

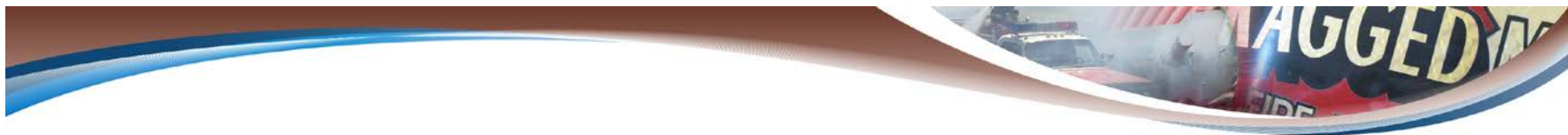


TABLE 6-1 – PHASE I ESTIMATED PROJECT COST SUMMARY

	2015	2016	2017	2018	2019
REVENUE					
Ongoing Property Tax Revenue	\$188,009	\$189,889	\$191,788	\$193,706	\$195,643
Elimination of Temporary Mill Levy	\$0	\$65,017	\$65,667	\$66,324	\$66,987
One-Time Revenue	\$60,000	\$0	\$0	\$0	\$0
Total Revenue	\$248,009	\$254,906	\$257,455	\$260,030	\$262,630
EXPENSES					
Operating Expenses	\$135,000	\$136,350	\$137,714	\$139,091	\$140,482
Net Revenue	\$113,009	\$118,556	\$119,742	\$120,939	\$122,148
Capital Expenses					
<i>Capital Acquisition</i>					
Land Use Change Fees	\$25,000	\$0	\$0	\$0	\$0
Station Equipment	\$0	\$0	\$23,470	\$0	\$0
Oxbow Mine Site Building Renovation	\$0	\$0	\$250,000	\$0	\$0
Oxbow Mine Site Warehouse/Cold Storage Renovation	\$0	\$0	\$0	\$200,000	\$0
Road/Site Improvements	\$100,000	\$200,000	\$200,000	\$0	\$0
Total Capital Acquisition	\$125,000	\$200,000	\$473,470	\$200,000	\$0
<i>Capital Maintenance & Other</i>					
Environmental Study	\$75,000	\$0	\$0	\$0	\$0
Electric	\$3,500	\$0	\$3,535	\$0	\$3,570
Propane	\$3,000	\$0	\$3,030	\$0	\$3,060
Radios, Pagers, Satellite Phone	\$7,506	\$7,581	\$7,657	\$7,733	\$7,810
Repair, Maintenance, and Storage	\$808	\$816	\$824	\$832	\$841
Miscellaneous	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Total Capital Maintenance & Other	\$90,814	\$9,397	\$16,046	\$9,566	\$16,282
Total Capital Expenses	\$215,814	\$209,397	\$489,516	\$209,566	\$16,282
CAPITAL FUNDING					
Reserve Balance	\$1,105,051	\$914,237	\$704,840	\$238,795	\$29,229
<i>Other Capital Funding Sources</i>					
Mill Levy	\$0	\$0	\$0	\$0	\$0
Grants	\$25,000	\$0	\$23,470	\$0	\$0
3rd Party/Private Investment	\$0	\$0	\$0	\$0	\$0
Total Funding	\$1,130,051	\$914,237	\$728,310	\$238,795	\$29,229
Net Reserves	\$914,237	\$704,840	\$238,795	\$29,229	\$12,947

Sources: Jviation, Inc.; Ragged Mountain Fire Protection District; and representatives of Carbondale & Rural Fire Protection District.

Notes: Cost estimates, based upon 2014 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation. Unless otherwise noted, cost estimates include contingency and engineering. Various costs, as specifically noted, include an escalated cost with a 1% annual inflator. Pension costs not included in operating costs. According to the Tax Payer Bill of Rights (TABOR) in Article X of the Colorado Constitution (amended in 1992), the District is required to maintain a reserve balance of 3% annually for operating expenses.

A) An annual inflator of 1% was applied; B) Eligible for FEMA Assistance to Firefighters Grant Program and Colorado Division of Fire Prevention and Control Grants
 C) Revenue from elimination of temporary Mill Levy rate reduction; D) Additional funding from Mill Levy; E) Revenue from selling District-owned property; F) Eligible for Federal Mineral Lease District funds.

6.5 PHASE II – 5 TO 10 YEAR CIP (2020-2024)

Phase II is the mid-term plan of capital improvements anticipated for the District for the 10-year planning period (2020-2024). **Table 6-2** shows the summary of the project schedule and funding estimates in Phase II.

TABLE 6-2 – PHASE II ESTIMATED PROJECT COST SUMMARY

		Phase II 2020-2024
REVENUE		
Ongoing Property Tax Revenue	A	\$1,007,955
Elimination of Temporary Mill Levy	A,C	\$348,570
One-Time Revenue		\$0
Total Revenue		\$1,356,525
EXPENSES		
Operating Expenses	A	\$902,298
Net Revenue		\$454,227
Capital Expenses		
<i>Capital Acquisition</i>		
Acquire Rescue Squad	B	\$65,000
Acquire Rescue Squad Equipment	B	\$5,050
Replace Class A Engine (New-crew cab 4x4)	B	\$300,000
Replace Water Tender Truck (New- 1800 gal 4x4)	B	\$175,000
Replace Type 6 Brush Truck (New)	B	\$80,000
Replace Extrication Tool	B	\$15,000
Replace Extrication Equipment	B	\$7,345
Replace Portable Pump - 250 gpm	B	\$850
Replace Engine Equipment	B	\$20,420
<i>Total Capital Acquisition</i>		<i>\$668,665</i>
<i>Capital Maintenance & Other</i>		
Electric	A	\$7,248
Propane	A	\$6,213
Radios, Pagers, Satellite Phone	A	\$7,506
Repair, Maintenance, and Storage	A	\$4,332
Miscellaneous		\$5,000
<i>Total Capital Maintenance & Other</i>		<i>\$30,298</i>
Total Capital Expenses		\$698,963



TABLE 6-2 – PHASE II ESTIMATED PROJECT COST SUMMARY (CONTINUED)

			Phase II (2020-2024)
CAPITAL FUNDING			
Reserve Balance			\$12,947
Other Capital Funding Sources			
Mill Levy	D		\$20,000
Grants	B		\$668,665
3rd Party/Private Investment			\$0
Total Funding			\$701,612
Net Reserves			\$2,649

Sources: Jviation, Inc.; Ragged Mountain Fire Protection District; and representatives of Carbondale & Rural Fire Protection District.

Notes: Cost estimates, based upon 2014 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation. Unless otherwise noted, cost estimates include contingency and engineering. Estimates for annual revenue, operating expenses, and capital maintenance are cumulative sums for the years 2020-2024. Various costs, as specifically noted, include an escalated cost with a 1% annual inflator. Pension costs not included in operating costs. According to the Tax Payer Bill of Rights (TABOR) in Article X of the Colorado Constitution (amended in 1992), the District is required to maintain a reserve balance of 3% annually for operating expenses.

A) An annual inflator of 1% was applied; **B)** Eligible for FEMA Assistance to Firefighters Grant Program, Colorado Division of Fire Prevention and Control Grants, and Federal Mineral Lease District grants; **C)** Revenue from elimination of temporary Mill Levy rate reduction; **D)** Additional funding from Mill Levy

6.6 PHASE III – 11 TO 20 YEAR CIP (2025-2035)

Phase III is the long-term plan of capital improvements anticipated for the District for the final 10 years of the planning horizon (2025-2035). **Table 6-3** shows the summary of the project schedule and funding estimates in Phase III.



TABLE 6-3 – PHASE III ESTIMATED PROJECT COST SUMMARY

Phase III (2025-2035)		
REVENUE		
Ongoing Property Tax Revenue	A	\$2,402,188
Elimination of Temporary Mill Levy	A, C	\$830,721
One-Time Revenue		\$0
Total Revenue		\$3,232,909
EXPENSES		
Operating Expenses	A	\$2,150,383
Net Revenue		\$1,082,526
Capital Expenses		
<i>Capital Acquisition</i>		
Replace Rescue Squad	B	\$65,000
Replace Rescue Squad Equipment	B	\$5,050
Replace Class A Engine (New-crew cab 4x4)	B	\$300,000
Replace Water Tender Truck (New- 1800 gal 4x4)	B	\$175,000
Replace Type 6 Brush Truck (New)	B	\$80,000
Replace Extrication Tool	B	\$15,000
Replace Extrication Equipment	B	\$7,345
Replace Portable Pump - 250 gpm	B	\$850
Replace Engine Equipment	B	\$20,420
Building Improvements		\$200,000
Cold Storage/Garage Improvements		\$200,000
<i>Total Capital Acquisition</i>		<i>\$1,068,665</i>
<i>Capital Maintenance & Other</i>		
Electric	A	\$22,630
Propane	A	\$19,397
Radios, Pagers, Satellite Phone	A	\$17,888
Repair, Maintenance, and Storage	A	\$10,324
Miscellaneous		\$10,000
<i>Total Capital Maintenance & Other</i>		<i>\$80,239</i>
Total Capital Expenses		\$1,148,904
CAPITAL FUNDING		
Reserve Balance		\$2,649
Other Capital Funding Sources		
Mill Levy	D	\$480,239
Grants	B	\$668,665
3rd Party/Private Investment		\$0
Total Funding		\$1,151,553
Net Reserves		\$2,649

Sources: Jviation, Inc.; Ragged Mountain Fire Protection District; and representatives of Carbondale & Rural Fire Protection District.

Notes: Cost estimates, based upon 2014 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation. Unless otherwise noted, cost estimates include contingency and engineering. Estimates for annual revenue, operating expenses, and capital maintenance are cumulative sums for the years 2025-2035. Various costs, as specifically noted, include an escalated cost with a 1% annual inflator. Pension costs not included in operating costs. According to the Tax Payer Bill of Rights (TABOR) in Article X of the Colorado Constitution (amended in 1992), the District is required to maintain a reserve balance of 3% annually for operating expenses.

A) An annual inflator of 1% was applied; **B)** Eligible for FEMA Assistance to Firefighters Grant Program, Colorado Division of Fire Prevention and Control Grants, and Federal Mineral Lease District grants; **C)** Revenue from elimination of temporary Mill Levy rate reduction; **D)** Additional funding from Mill Levy



6.7 SUMMARY OF DEVELOPMENT PLAN ESTIMATED PROJECT COSTS

Table 6-4 provides a summary of revenue, expenses (including capital development costs), and funding sources for the 20-year planning period.

6.7.1 FEDERAL AND STATE GRANT FUNDING

Grant funding has been identified as a source of funding for capital acquisition and maintenance projects in the 20-year CIP. Over the 20-year period, approximately 28% of capital projects are anticipated to be funded through grants. Although grant funding is not guaranteed, projects such as acquiring new and replacing old equipment and vehicles identified in the CIP may be eligible under Federal Emergency Management Agency (FEMA) and Colorado Division of Fire Prevention grants, as described below.

FEMA provides grant funding for fire departments and nonaffiliated Emergency Medical Service organizations. These grants include the Assistance to Firefighters Grant (AFG) program, Fire Prevention and Safety Grants (FP&S) program, and the Staffing for Adequate Fire and Emergency Response Grants (SAFER) program.

The AFG provides financial assistance to fire departments and nonaffiliated emergency medical service organizations to obtain critically needed firefighting equipment, emergency vehicles, training, protective gear, and other related resources.¹⁸ The FEMA Fire Prevention & Safety Grants (FP&S) is also part of the AFG funding program. FP&S grants support projects that enhance firefighter and public safety from fire and fire-related hazards. The primary goal of the FP&S grant program is to target high-risk populations for the reduction of injury and prevention of death.¹⁹

The SAFER grant provides grant funding directly to fire protection departments and volunteer firefighter interest organizations to assist in increasing trained frontline firefighters available in their community. The goal of this funding program is to enhance the ability of local fire departments to comply with response, operational, and staffing standards according to National Fire Protection Association (NFPA) 1710²⁰ and Occupational Safety and Health Administration (OSHA) 1910.34.²¹

The Colorado Division of Fire Prevention and Control also provides funding assistance for equipment and training through the Firefighter Safety and Disease Prevention Grant (FSDPG). The Ragged Mountain Fire Protection District would also be eligible for funding through the FSDPG.²² It is encouraged that the District pursues these grants to finance eligible capital projects as prioritized on the CIP. **Table 6-4** provides the total amount of grant funding in each phase of the CIP.

¹⁸ <https://www.fema.gov/assistance-firefighters-grant>

¹⁹ <https://www.fema.gov/fire-prevention-safety-grants>

²⁰ 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*. <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1710>

²¹ https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12886

²² <http://dfs.state.co.us/programs-2/dfpc-firefighter-safety-and-disease-prevention-grant>

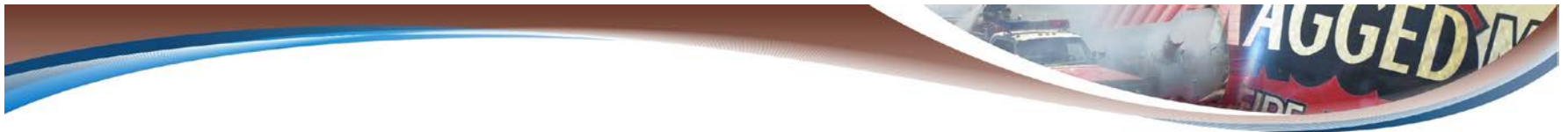


TABLE 6-4 – 20-YEAR DEVELOPMENT PLAN ESTIMATED PROJECT COST SUMMARY

Phase	Total Revenue	Operating Expenses	Net Revenue	Capital Expenses	Reserve Balance	Mill Levy Funding	Grant Funding	3 rd Party/Private Funding	Net Reserves
Phase I (2015-2019)	\$1,283,030	\$688,636	\$594,394	\$1,140,574	\$2,992,153	\$0	\$48,470	\$0	\$1,900,049
Phase II (2020-2024)	\$1,356,525	\$902,298	\$454,227	\$698,963	\$12,947	\$20,000	\$668,665	\$0	\$2,649
Phase III (2025-2035)	\$3,232,909	\$2,150,383	\$1,082,526	\$1,149,904	\$2,649	\$480,239	\$668,665	\$0	\$2,649
Grand Total (2015-2035)	\$5,872,464	\$3,741,317	\$2,131,147	\$2,989,441	\$3,007,749	\$500,239	\$1,385,800	\$0	\$1,905,347

Sources: Jviation, Inc.; Ragged Mountain Fire Protection District; and representatives of Carbondale & Rural Fire Protection District.

Notes: Cost estimates, based upon 2014 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation. Unless otherwise noted, cost estimates include contingency and engineering. Estimates for annual revenue, operating expenses, and capital maintenance are cumulative sums for the years 2025-2035. Various costs, as specifically noted, include an escalated cost with a 1% annual inflator. Pension costs not included in operating costs. According to the Tax Payer Bill of Rights (TABOR) in Article X of the Colorado Constitution (amended in 1992), the District is required to maintain a reserve balance of 3% annually for operating expenses.