

## 7. Risk Assessment

Vegetative conditions vary widely throughout the County, ranging from semi-desert grass and shrubland to sub-alpine forests. Much of the development in the County is located in the lower elevation zones of sagebrush, Gambel oak, and pinyon-juniper woodlands. The combination of steep terrain, highly flammable vegetation, and hot, dry summers creates a high-risk situation for wildland fire.

People living in or near wildland settings in Garfield County are vulnerable to the threat of wildfire. The development of homes and other structures is encroaching into the forest wildland and natural areas and is expanding the Wildland-Urban Interface. Interface neighborhoods are characterized by a diverse mixture of varying housing structures, development patterns, ornamental and natural vegetation, and natural fuels. Problems can arise if this new development increases the amount of fuel without coordinated thinning of the forests and the creation of defensible space around homes.

In the event of a wildfire, vegetation, structures, and other flammables can combine to create unwieldy and unpredictable events. Factors relevant to the fighting of such fires include access, firebreaks, proximity of water sources, distance from fire stations, and available firefighting personnel and equipment. The vulnerability of structures and homes in the interface area is increased by: combustible roofing and construction material; no/insufficient defensible space; poor access to structures; heavy natural fuel types; steep slopes; limited water supply; and winds over 30 miles per hour.

Much of the land in Garfield County is publicly owned and managed under federal regulations. While this land may have higher fire risk, the risk incurred by people, economic factors, or physical infrastructure in these areas is minimal.

### Wildfire History

Wildfire occurrence throughout Garfield County is a common and prevalent hazard event. The major fire season in Garfield County primarily runs from April through October; however, wildfires can occur throughout the year and many fire officials have stated fire season lasts all year long in Colorado. Fires occur in all FPDs with lightning strikes being the primary cause.

Garfield County is a fire-prone area. Data from the Upper Colorado River Interagency Fire Management Unit shows that between the years of 1980 to 2016, Garfield County experienced 2,288 events and averaged 64 fires per year. There are undoubtedly more fires occurring that are unaccounted for through the federal/state reporting system.

While most fires are relatively insignificant in terms of size and fire intensity, several high-intensity fires have not only burned thousands of acres but also posed significant threats to structures or other human developments. Large, catastrophic fires have occurred south of the Colorado River and east of Battlement Mesa on BLM and private lands below 6,500 feet due to tremendous amounts of oak brush, sagebrush and grass, and pinion-juniper vegetation. Large fires have also occurred in the conifer forests in the north-eastern portion of the County on USFS lands. Most large fires in the County quickly cross ownership lines and require a multi-jurisdictional response.

Historically notable fires include: the Battlement Creek Fire (1976: 3 firefighter fatalities and 1 pilot fatality); Battlement Mesa Fire (1987); the South Canyon Fire (1994: 14 firefighter fatalities); the Coal

Seam Fire (2002) that burned into the town limits of Glenwood Springs and covered over 12,000 acres; Pine Gulch Fire (2020) which burned 139,007 acres (101,714 BLM acres and 35,791 private acres); and the Grizzly Creek Fire (2020) which burned 32,631 acres.

Specifically, the Battlement Creek Fire (1976) had four fatalities – three fire fighters, one pilot fatality the day prior, and one fire fighter with severe injuries - while the South Canyon Fire (1994) had 14 firefighter fatalities associated with them. The Coal Seam Fire (2002) burned into the town limits of Glenwood Springs and covered over 11,000 acres. The 2020 fire season was particularly devastating for Garfield County. While full comprehensive data for the season is not yet available, two major fires, Pine Gulch Fire and Grizzly Creek led to considerable resource expenditure and effort for local fire districts. Summaries from these events are listed below:

- **Pine Gulch:** The Pine Gulch Fire was started by a lightning strike on July 31, 2020, approximately 18 miles north of Grand Junction, Colorado. Initial Attack resources were unable to corral this remote wildfire as it spread rapidly through grass, sage, pinyon juniper and fir. The combination of drought-stressed vegetation, unseasonably hot weather and steep terrain led to weeks of active burning. Smoke columns were often visible from Grand Junction and the surrounding area as the wildfire exhibited extreme fire behavior. During the night of August 18, the fire grew quickly due to thunderstorm winds up to 40 mph for a three to four hour period. As a result, the fire increased by more than 30,000 acres that night. Firefighters worked to protect homes and outbuildings using a combination of bulldozers and handcrews to build firelines. Road systems were used as control lines where crews initiated firing operations to slow the fire spread. On August 27, 2020, the Pine Gulch Fire became the largest wildfire in Colorado State history at the time, surpassing the Hayman Fire that burned near Colorado Springs in the summer of 2002.
- **Grizzly Creek:** The Grizzly Creek fire was a human caused wildfire event which originated on Monday, August 10<sup>th</sup> approximately one mile east of Glenwood Springs. The fire expanded to consume over 32,631 acres and was officially announced as 100 percent contained due to snow conditions in Grizzly Creek drainage basin. This fire event prompted a 13-day closure of Interstate 70 through Garfield County.

## Wildland Urban Interface Definition

The WUI should be flexible in its definition to be able to accommodate local areas of concern and priority landscapes. For the purpose of this plan, the core planning team defined the WUI as the areas adjacent and within development which meet landscapes at risk to wildland fire. This definition allows areas to be included in the WUI such as within a set radius of a community; those that have specific geographic features which influence fire behavior; areas surrounding key transportation corridors for evacuation; remote residential lots; or where tree mortality has significantly impacted available fuel loads. Specific areas of concern identified by members of the planning team were included in the WUI boundaries. The WUI boundaries were presented at a planning team meeting for discussion and approval.

## Study Area Analysis

To assist in the evaluation of wildfire risk in the planning area, available GIS data was evaluated between three study areas: Forest, Resource Lands, and Urban Interface. Available development and infrastructure data from Garfield County GIS was overlaid with wildfire hazard data from the Colorado

Forest Service to evaluate assets at risk. The following maps and tables show the wildfire hazard areas and summarize the percentage of assets at risk (high or highest risk) within each study area.

Figure 11: Wildland Urban Interface

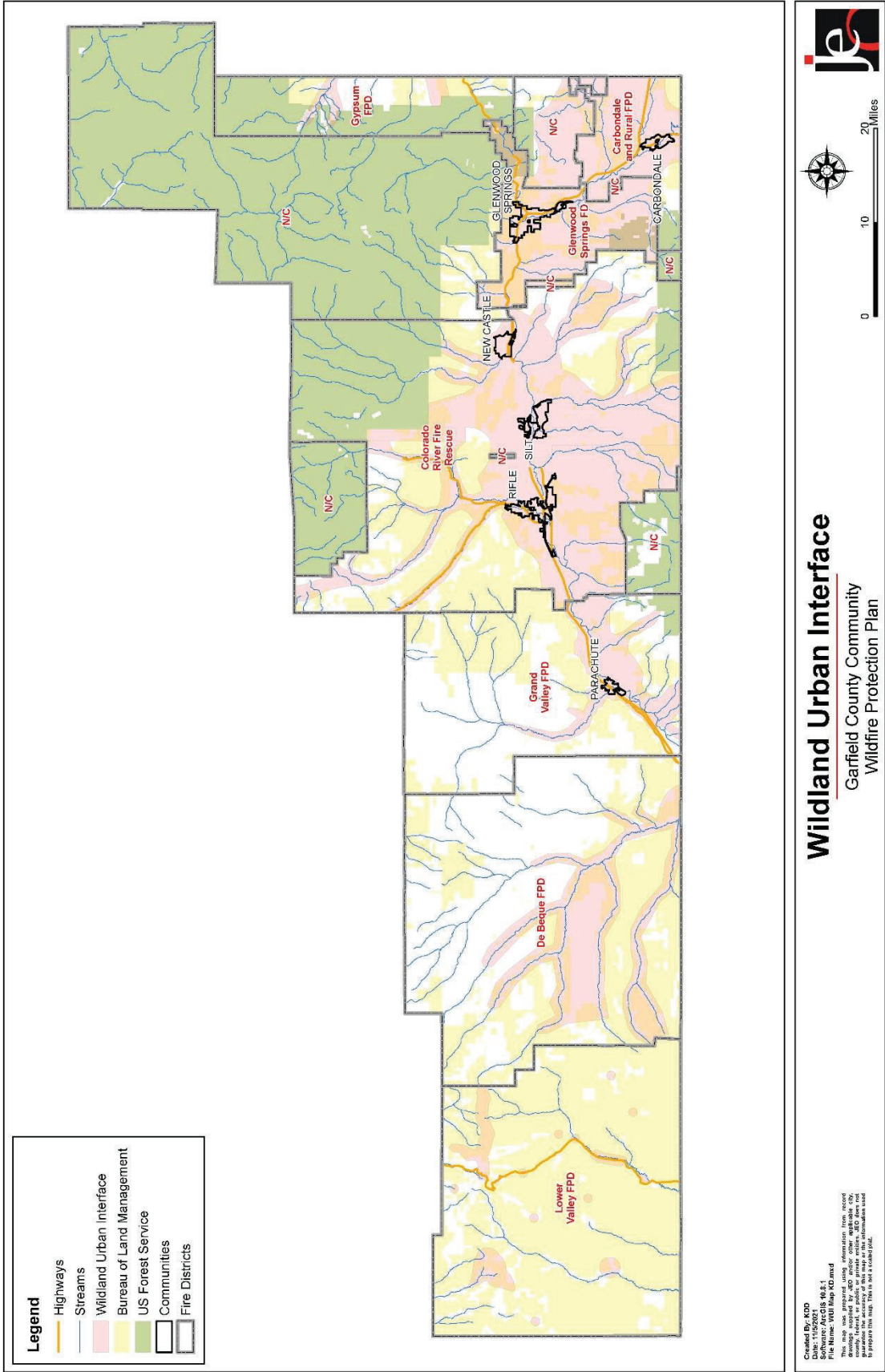


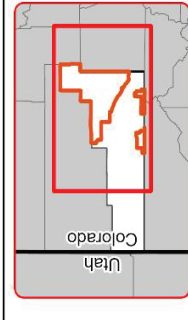
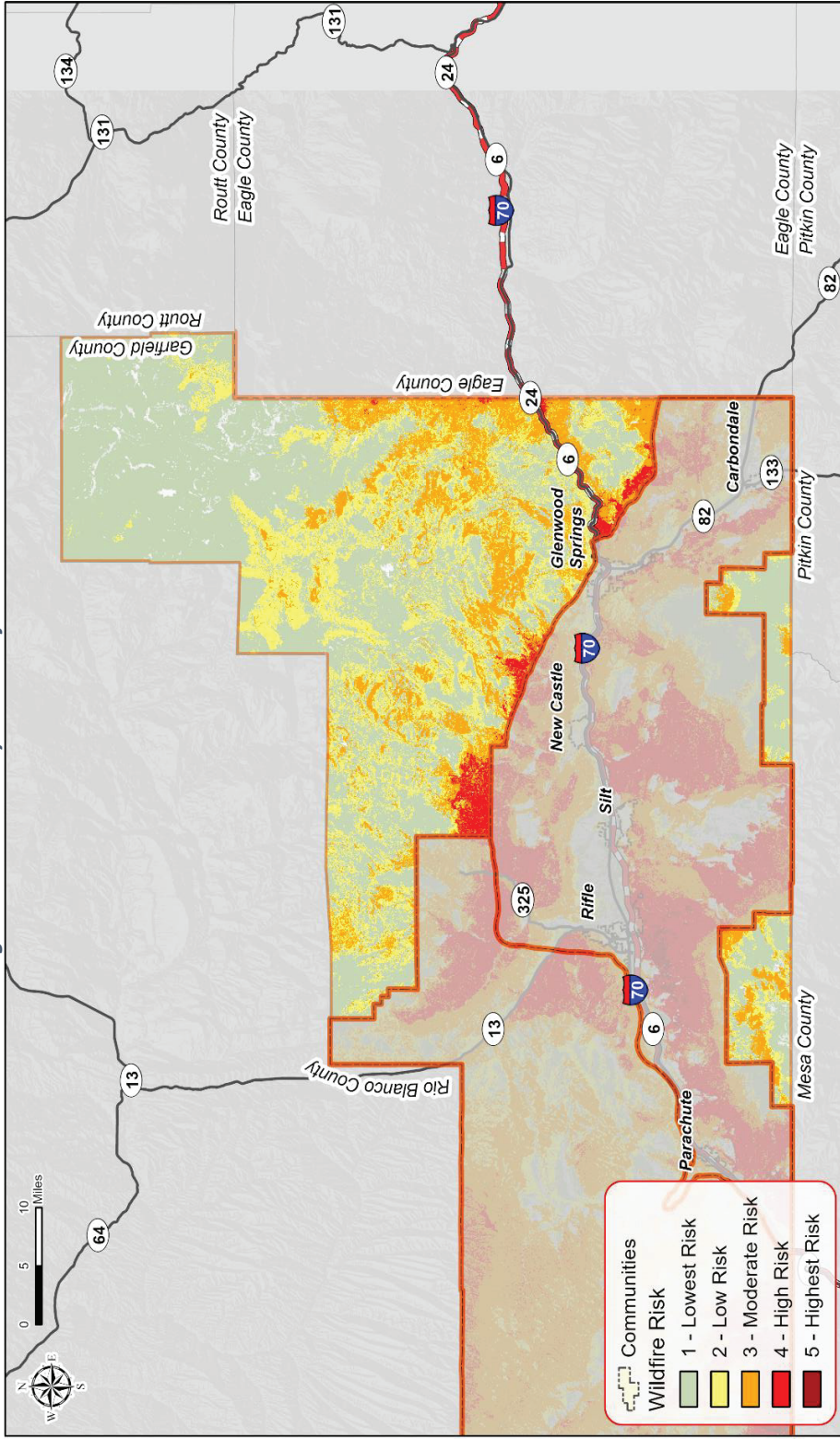


Table 13: Forest Study Area Assets Vulnerable to Wildfire

Infrastructure	Total Sites	Percentage of Sites Vulnerable to Wildfire	Structures	Total Sites	Percentage of Sites Vulnerable to Wildfire
Right of Way (Miles)	25.30 mi	64.3%	Residential	15	8.9%
Public Airport	N/A	N/A	Commercial	N/A	N/A
Highway Bridges	1	2.3%	Public Structures	N/A	N/A
Communication Facilities	0	0%	Agricultural	N/A	N/A
Electric Utilities Lines (Miles)	19.38 mi	100%	Church	N/A	N/A
Railroad (Miles)	21.6 mi	100%	Schools	N/A	N/A
Railroad Bridges	1	12.5%	Hospital	N/A	N/A
Road - Asphalt High Traffic (Miles)	0 mi	0%	Other	1	5%
Road - Chip seal Moderate Traffic (Miles)	6.17 mi	36.6%	Improvements Value		
Road - Gravel Low Traffic (Miles)	29.04 mi	22.1%	60	\$30,597,640	
Gas Wells	0	0%			
Pipeline (Miles)	22.34 mi	61.5%			
Ag and Natural Resource Lands (Square Miles)	58.95 sq mi	94.5%			

Source: Garfield County GIS, Colorado Forest Service, JEO Consulting Group

Figure 12: Forest Study Area Wildfire Hazard Area



## Forest Study Area

### 2022 Hazard Mitigation Plan Wildfire Hazard

Created By: MTW  
Date: 10/1/2022  
Software: ArcGIS Pro 2.9.2  
File: 101100500  
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Source:  
Wildfire Risk, Colorado State Forest Service

Table 14: Resource Lands Study Area Assets Vulnerable to Wildfire

Infrastructure	Total Sites	Percentage of Sites Vulnerable to Wildfire	Structures	Total Sites	Percentage of Sites Vulnerable to Wildfire
Right of Way (Miles)	7.86 miles	9.8%	Residential	15	13.4%
Public Airport	N/A	N/A	Commercial	0	0%
Highway Bridges	4	28.6%	Public Structures	0	0%
Communication Facilities	0	0%	Agricultural	0	0%
Electric Utilities Lines (Miles)	6.32 miles	55.2%	Church	N/A	N/A
Railroad (Miles)	N/A	N/A	Schools	N/A	N/A
Railroad Bridges	N/A	N/A	Hospital	N/A	N/A
Road - Asphalt High Traffic (Miles)	7.65 miles	31.1%	Other	0	0%
Road - Chip seal Moderate Traffic (Miles)	7.62 miles	85.7%	<b>Number of Improvements</b>	<b>Improvements Value</b>	
Road - Gravel Low Traffic (Miles)	80.55 miles	47.5%	114	\$38,162,950	
Gas Wells	342	4.2%			
Pipeline (Miles)	613.22 miles	42.0%			
Ag and Natural Resource Lands (Square Miles)	85.41 sq mi	97.4%			

Source: Garfield County GIS, Colorado Forest Service, JEO Consulting Group



Figure 13: Resource Lands Study Area Wildfire Hazard Areas

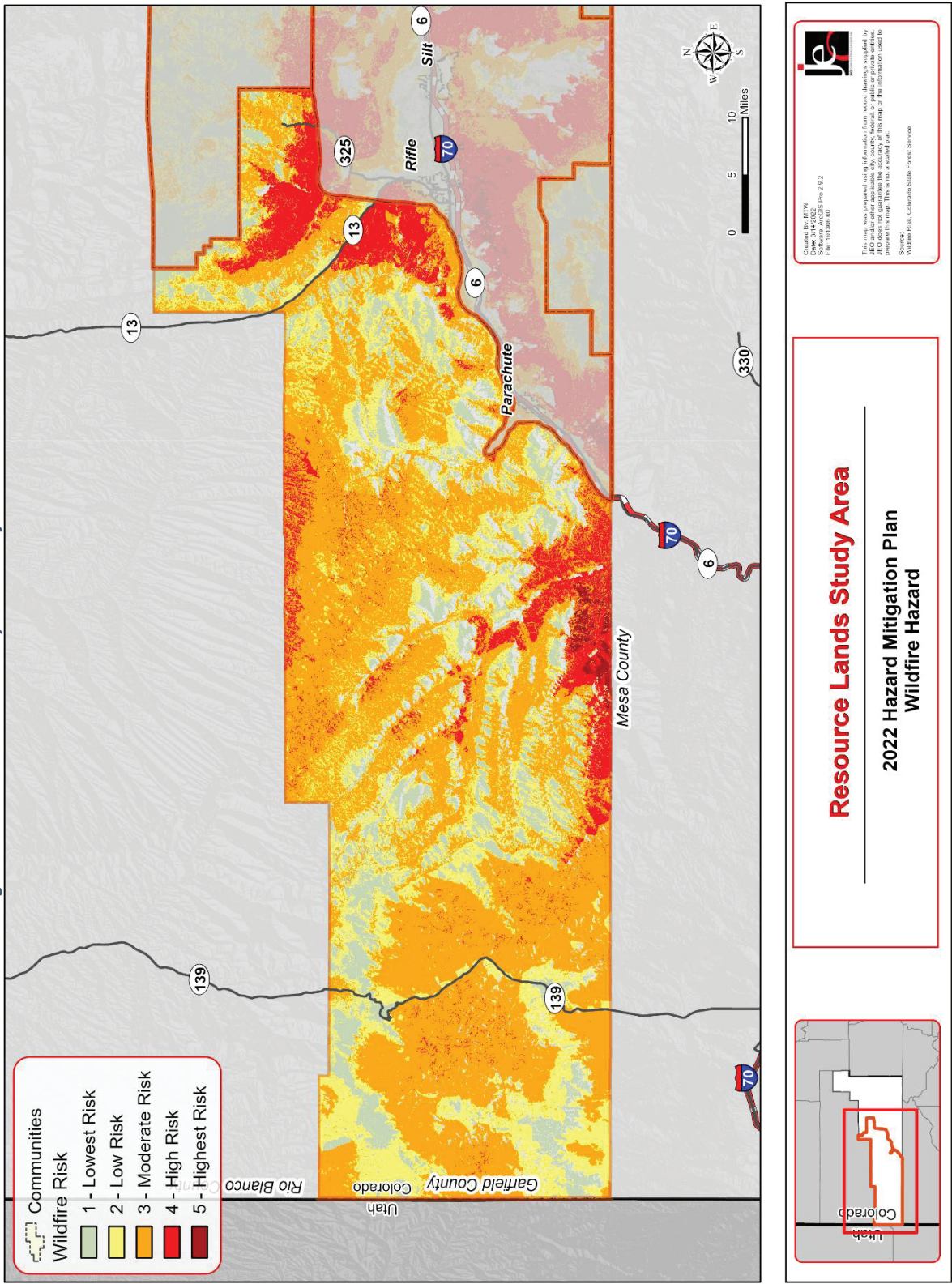


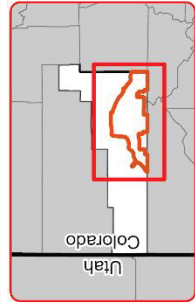
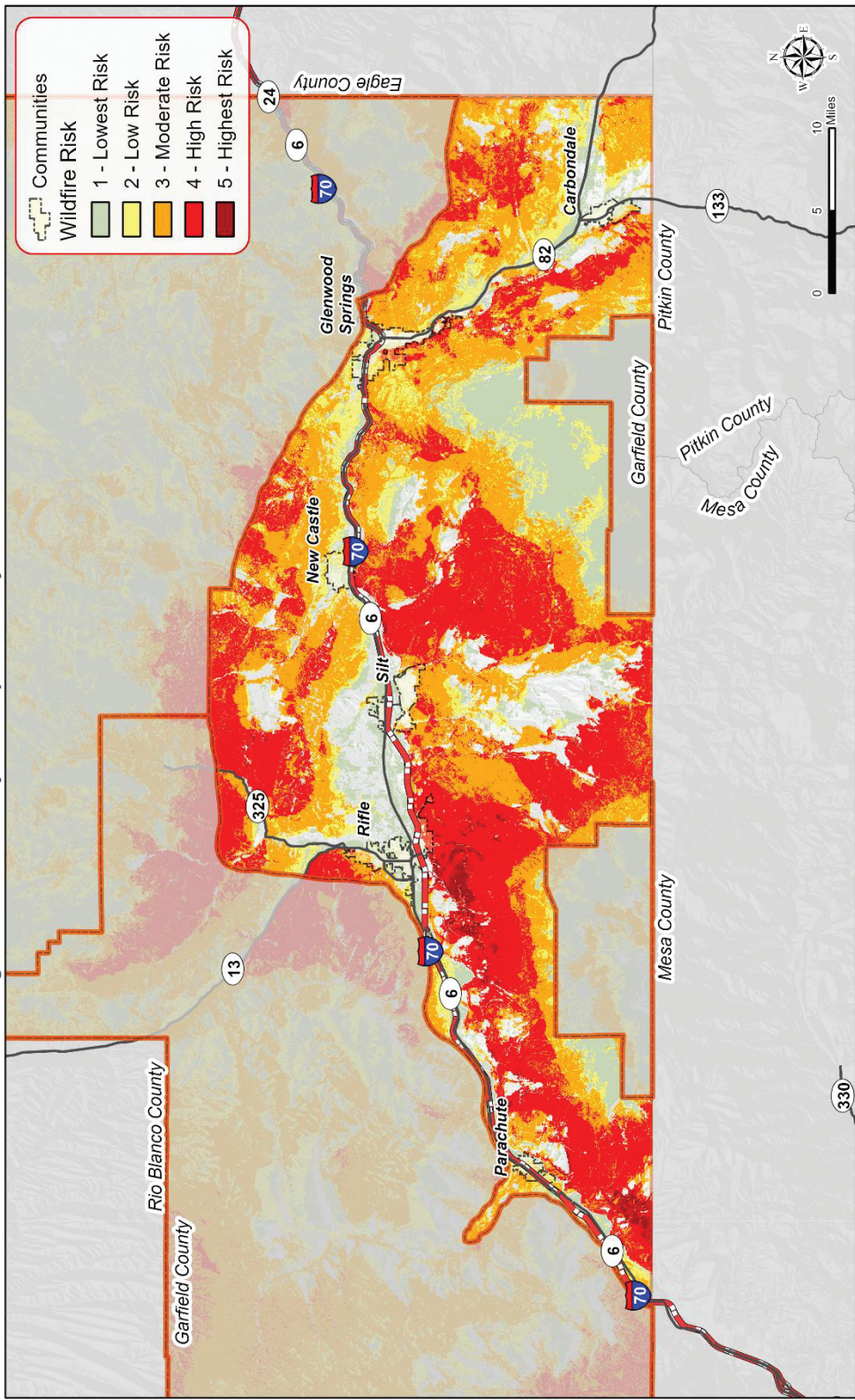
Table 15: Urban Interface Lands Study Area Assets Vulnerable to Wildfire

Infrastructure	Total Sites	Percentage of Sites Vulnerable to Wildfire	Structures	Total Sites	Percentage of Sites Vulnerable to Wildfire
Right of Way (Miles)	530.08 miles	53.9%	Residential	1,100	7.5%
Public Airport	1	50%	Commercial	15	1.8%
Highway Bridges	6	4.1%	Public Structures	5	16.7%
Communication Facilities	31	31.3%	Agricultural	5	17.2%
Electric Utilities Lines (Miles)	109.62 miles	62.4%	Church	0	0%
Railroad (Miles)	39.18 miles	56.8%	Schools	0	0%
Railroad Bridges	1	2.8%	Hospital	0	0%
Road - Asphalt High Traffic (Miles)	86.1 miles	59.6%	Other	46	7.2%
Road - Chip seal Moderate Traffic (Miles)	107.35 miles	57.4%	<b>Number of Improvements</b>	<b>Improvements Value</b>	
Road - Gravel Low Traffic (Miles)	98.41 miles	65.6%	4,208	\$1,509,530,850	
Gas Wells	3,760	42.5%			
Pipeline (Miles)	582.32 miles	59.6%			
Ag and Natural Resource Lands (Square Miles)	65.46 sq mi	97.5%			

Source: Garfield County GIS, Colorado Forest Service, JEO Consulting Group



Figure 14: Urban Interface Study Area Wildfire Hazard Areas



### Urban Interface Study Area

2022 Hazard Mitigation Plan  
Wildfire Hazard

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Date: 3/11/2022  
Software: ArcGIS Pro 2.0.2  
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Source:  
Wildfire Risk, Colorado State Forest Service



A comprehensive community wildfire assessment takes into account a variety of factors in order to fully identify and assess wildfire risks and hazards. These include the nature of community infrastructure, terrain, proximity of hazardous fuels, and probability of wild-fire occurrence. By analyzing these elements, including input from residents and FPDs, an understanding of wildfire risks and hazards can be developed that provides guidance for developing effective vegetation-fuel treatments and other mitigation opportunities to improve FPD response capabilities.

The FPDs analyzed communities within their district based on their knowledge of fire occurrence and community risk. The FPDs identified factors that affect wildfire risk within each of these areas and summarized them below.

**Table 16: Community Hazard Contributing Factors**

FPD	Community	Contributing Factors
Colorado River Fire Rescue	New Castle	(+) More than one way in and out (+) All season paved roads with turnarounds (+) Reflective street signs (+) Defensible space 30-71 feet (+) Generally fire resistant roofs and construction (+) Excellent wildfire response capability and hydrants (-) Moderate to heavy fuels in proximity to homes (-) Steep slopes in proximity to homes (-) Terrain and weather conditions conducive to extreme fire behavior (-) Area with fire history (-) Above ground gas and electrical utilities
Colorado River Fire Rescue	Silt	(+) More than one way in and out (+) All season paved roads with turnarounds (+) Reflective street signs (+) Light to fuels in proximity to homes (+) Defensible space 30-71 feet (+) Fire resistant roofs and construction (+) Excellent wildfire response capability and hydrants (-) Steep slopes in proximity to homes (-) Terrain and weather conditions conducive to extreme fire behavior (-) Area with fire history (-) Above ground gas and electrical utilities
Colorado River Fire Rescue	Rifle	(+) More than one way in and out (+) All season paved roads with turnarounds (+) Reflective street signs (+) Light fuels in proximity to homes (+) Defensible space 71-100 feet (+) Fire resistant roofs and construction (+) Excellent wildfire response capability and hydrants (-) Above ground gas and electrical utilities (-) Steep slopes in proximity to homes

FPD	Community	Contributing Factors
		(-) Terrain and weather conditions conducive to extreme fire behavior (-) Area with fire history
Carbondale & Rural	Carbondale	(+) More than one way in and out (+) All season paved roads with turnarounds (+) Reflective street signs (+) Light to moderate fuels in proximity to homes (+) Defensible space 30-71 feet (+) Generally fire resistant roofs and construction (+) Excellent wildfire response capability and hydrants  (-) Above ground electrical utilities (-) Terrain and weather conditions conducive to extreme fire behavior
Carbondale & Rural	Missouri Heights	Assessment results based on Carbondale & Rural Fire Protection District CWPP
De Beque	Dispersed	(+/-) Fire resistant roofs with non-resistant siding and decks (-) Generally one way in and out (-) Non-surface roads (-) Moderate to heavy fuels in proximity to homes (-) Defensible space generally <30 feet (-) Steep slopes in proximity to structures (-) Terrain and weather conditions conducive to extreme fire behavior (-) Area with fire history (-) Water is hauled by fire department and drafting from ponds (-) Fire department >5 miles from structures (-) Above ground gas and electrical utilities
Glenwood Springs	Greater Glenwood Springs	Assessment results based on Glenwood Springs Fire Protection District CWPP
Grand Valley	Battlement Mesa	(+) More than one way in and out (+) All season paved roads with turnarounds (+) Reflective street signs (+) Moderate fuels in proximity to homes (+) Defensible space 30-71 feet (+) New homes with fire resistant roofs and construction (+) Excellent wildfire response capability and hydrants  (-) Steep slopes in proximity to community with heavy fuels (-) Area with fire history (-) Terrain and weather conditions conducive to extreme fire behavior (-) County Road 300 is a choke point in emergency and prone to be closed for use
Grand Valley	Parachute	(+) More than one way in and out (+) All season paved roads with turnarounds

FPD	Community	Contributing Factors
		(+) Reflective street signs (+) Moderate fuels in proximity to homes (+) Defensible space 30-71 feet (+) Excellent wildfire response capability and hydrants  (-) Older homes non-fire resistant roofs and construction (-) Steep slopes in proximity to community with heavy fuels (-) Terrain and weather conditions conducive to extreme fire behavior (-) Area with fire history (-) Above ground gas and electrical utilities
Grand Valley	Rulison	(+) More than one way in and out (+) All season paved roads with turnarounds (+) Reflective street signs (+) Defensible space 30-71 feet (+) 10,000 gallon storage tank and storage ponds  (-) Houses with combustible roofs and siding (-) Heavy fuels in proximity to homes (-) Above ground gas and electrical utilities (-) Steep slopes in proximity to homes (-) Terrain and weather conditions conducive to extreme fire behavior (-) Area with fire history (-) No hydrants
Gypsum	Dispersed	(-/+) Fire resistant roofs with nonresistant siding and decks  (-) Generally one way in and out (-) Non-surface roads (-) Moderate to heavy fuels in proximity to homes (-) Defensible space < 30 feet (-) Steep slopes in proximity to structures (-) Terrain and weather conditions conducive to extreme fire behavior (-) Water is hauled by fire department (-) Above ground gas & electrical utilities (-) Fire department > 5 miles from structures
Lower Valley	Dispersed	(+) Defensible space 30-71 feet  (+/-) Fire resistant roofs with nonresistant siding and decks  (-) Generally one way in and out (-) Non-surface roads with steep grades (-) Street signs and house numbers not present (-) Moderate to heavy fuels in proximity to homes (-) Steep slopes in proximity to structures (-) Terrain and weather conditions conducive to extreme fire behavior (-) Water is hauled by fire department

FPD	Community	Contributing Factors
		(-) Area with fire history (-) Fire department >5 miles from structures (-) Above ground gas and electrical utilities

## Fire Regime Condition Class

The Fire Regime Condition Class (FRCC) is a metric that classifies current vegetation cover according to its departure from an acceptable reference condition such as conditions prior to European settlement (Table 17). Vegetation changes from the historical conditions have resulted because of disturbance caused by European settlers and an aggressive fire exclusion policy.

The FRCC considers the current wildfire regime (i.e., wildfire return interval and its severity) and vegetation structure (i.e., vegetation composition and structure) in comparison to the reference condition. FRCC may be utilized, in combination with other factors, to help guide management objectives and set priorities for vegetation-fuel treatments and management. The classification of vegetation into FRCC considers only wildland vegetation and not vegetation associated with agricultural or urban areas. FRCC classes and the hazard ratings used for WUI assessment are shown in Table 17. The majority of Garfield County wildland vegetation can be classified as FRCC II or FRCC III with 824,177 and 178,434 acres, respectively.

**Table 17: Fire Regime Condition Class Definition, Hazard Rating, and Garfield County Occurrence**

Fire Regime Condition Class	Definition	CWPP Hazard Rating	Garfield County Acres
I	FRCC I - Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g., native species, large trees, and soil) is low.	Low	738,110
II	FRCC II – Fire behavior, effects, and other associated disturbances show moderate departure from the natural or historical conditions (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of loss of key ecosystem components is moderate.	High	824,177
III	FRCC III – Fire behavior, effects, and other associated disturbances show a high departure from natural or historic conditions (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.	Extreme	178,434

Source: [www.landfire.gov](http://www.landfire.gov)