



MORONGO BASIN CWPP

2023: COMMUNITY WILDFIRE PROTECTION PLAN

[DESERTFIRE.ORG](https://desertfire.org)



Dear Morongo Basin Community Member,

I am pleased to submit the Community Wildfire Protection Plan (CWPP) for the Morongo Basin on behalf of Desert Region Fire Safe. This comprehensive document represents a collaborative effort between various stakeholders, including local residents, fire districts, government agencies, and community organizations, and is intended to address the critical issue of wildfire prevention, mitigation, and preparedness in our region.

As you may be aware, the Morongo Basin, situated in the heart of the Mojave Desert and Joshua Tree National Park, is known for its unique blend of natural beauty and growing rural communities. The region's natural resources and the well-being of its residents are of paramount importance to us, and we recognize the urgent need to safeguard them from the increasing threat of wildfires.

The CWPP outlines a strategic approach to managing the risk of wildfires in the Morongo Basin. It includes an assessment of current wildfire risks, a review of existing resources and capabilities, and a detailed plan for mitigating wildfire hazards. Additionally, it addresses strategies for community engagement and emergency response.

The CWPP is regularly updated to ensure that it remains effective in the face of evolving wildfire risks and changing community needs. These updates are typically conducted every 5 years, with the involvement of local stakeholders and experts to incorporate the latest research and best practices.

We believe that this CWPP Summary is an essential step in enhancing the safety and resilience of the Morongo Basin community in the face of wildfire threats. It reflects the dedication of all involved parties to work together for the greater good.

We are eager to engage in dialogues to discuss how we can collaborate in the implementation of this plan. Your insights and partnership will be invaluable in achieving the objectives laid out in the CWPP Summary.

Thank you for taking the time to review this document. We look forward to the opportunity to discuss it in greater detail and to explore how we can move forward together to protect our community from the growing threat of wildfires.

Sincerely,

Justin Merino,
Managing Director
merino@hdeaa.org



Morongo Basin

Community Wildfire Protection Plan

2023



**Fire Adaptive
Solutions**

4445 COMANCHE DRIVE
BOULDER, CO 80303
www.FireAdaptiveSolutions.com

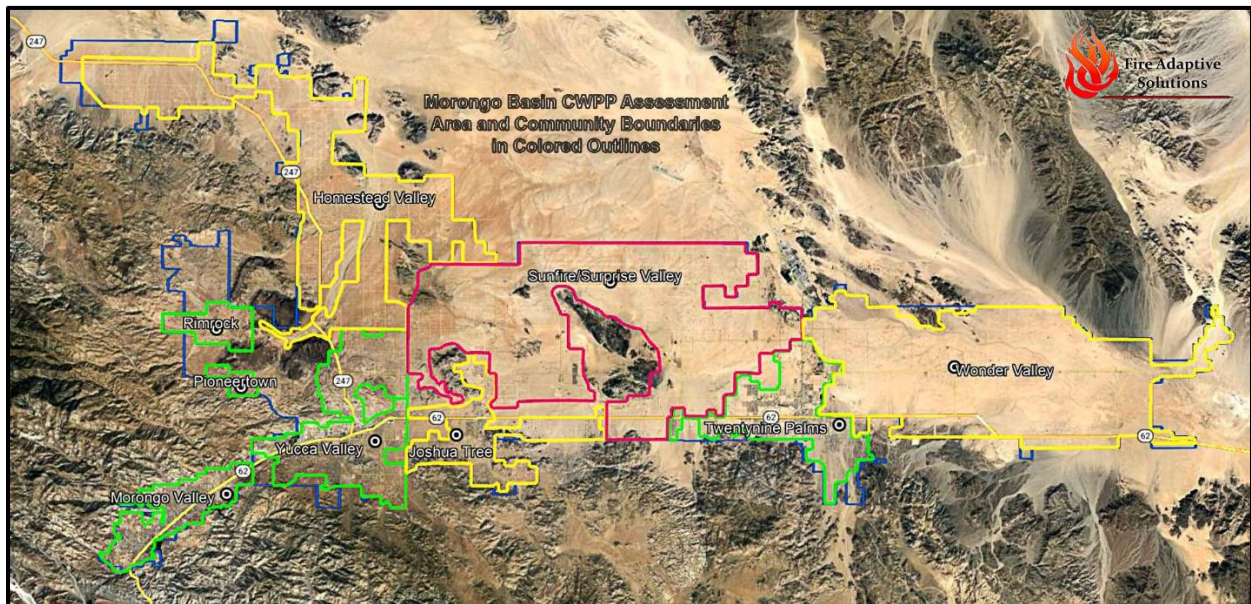
TABLE OF CONTENTS

Mutual Agreement Page	1
Collaboration: Community and Agencies.....	2
Mountain Rim Safe Council (MRFSC), Morongo Basin Fire Safe Council (MBFSC) and High Desert Emergency Action Alliance (HDEAA)	2
San Bernardino County Fire Department (SBCFD).....	2
Morongo Valley Fire Department (MVFD).....	2
CAL FIRE.....	2
Bureau of Land Management (BLM).....	2
MCAGCC Combat Center Fire Department (MCCFD).....	2
Introduction.....	3
Goals and Objectives	6
How to Use This Report	7
Assessment area Overview	8
Communities.....	8
Areas of Special Interest.....	8
Probability Situation	9
Community Ignitability Analysis.....	10
Purpose	10
Description.....	10
Firefighting Capabilities and Local Preparedness	12
Recommendations	15
Water Supply for Fire Suppression.....	16
Recommendations	18
General Recommendations	19
Landscape Scale Recommendations.....	20
Recommendations	20
Access/Egress Routes & Evacuation Recommendations	23
Access	23
Evacuation	24
Recommendations	25
Areas of Special Interest.....	27
Recommendations	29
Conclusion	30
Grant Resources.....	31
Federal Emergency Management Agency (FEMA) Grants.....	31
CAL FIRE Grants	32
Natural Resources Conservation Service (NRCS)	32
Other Organizations and Services.....	32
References/Citations	33

TABLE OF CONTENTS

FIGURES

Figure 1, Morongo Basin Interface/Intermix Community Hazard Zones.....	11
Figure 2, SRAs and LRAs with Federal Responsibility Areas.....	14
Figure 3, CAL FIRE FHSZs (Fire Hazard Severity Zones).....	14
Figure 4, Fire Station Locations.....	15
Figure 5, Morongo Basin Water Providers Coverage Areas.....	17
Figure 6, SBCFD Hydrant Map.....	17
Figure 7, Hydrant Overgrown by Vegetation in Yucca Valley.....	18
Figure 8, Pipes Canyon Fuels Management Project.....	22
Figure 9, Typical Dirt Road in Yucca Valley.....	23
Figure 10, Wooden Street Marker in Pioneertown.....	23
Figure 11, Current Fire Danger Sign Example.....	26
Figure 12, High Fire Danger Area Sign Example.....	26
Figure 13, Yucca Valley Airport.....	28
Figure 14, Burns Canyon ASI.....	28



MUTUAL AGREEMENT PAGE

The Community Wildfire Protection Plan (CWPP) developed for Desert Region Fire Safe (DRFS) with funding provided by Mountain Rim Fire Safe Council (MRFSC):

- Was collaboratively developed.
- This plan identifies and prioritizes areas for hazard reduction and recommends mitigation methods designed to improve fire survivability of people, property and the environment in the Morongo Basin assessment area.
- This plan recommends measures to reduce ignitability of structures throughout the area addressed by the plan.

The following entities attest that the standards listed above have been met and mutually agree with the content of this Community Wildfire Protection Plan:

Justin Merino Feb 5, 2024
Justin Merino (Feb 5, 2024 08:36 PST)

Desert Region Fire Safe and HDEAA, by Justin Merino, Managing Director

Laura Dyberg Feb 5, 2024

Mountain Rim Fire Safe Council, by Laura Dyberg, President

Dan Munsey Feb 29, 2024
Daniel R. Munsey (Feb 29, 2024 14:07 EST)

County of San Bernardino Fire Protection District, by Dan Munsey, Fire Chief/Fire Warden

Shane Littlefield Feb 5, 2024
Shane Littlefield (Feb 5, 2024 13:22 PST)

CAL FIRE, San Bernardino Unit, by Shane Littlefield, Unit/Fire Chief

Stuart A. Primack Feb 5, 2024
Stuart A. Primack (Feb 5, 2024 08:56 PST)

Morongo Valley Fire Department, by Stuart Primack, Fire Marshal

COLLABORATION: COMMUNITY AND AGENCIES

Organizations involved in the development of the Morongo Basin CWPP are listed below with their roles and responsibilities.

Desert Region Fire Safe (DRFS) and High Desert Emergency Action Alliance (HDEAA) and Mountain Rim Safe Council (MRFSC)

Primary development of the CWPP update and community outreach. Provides information regarding community values. Coordinates the development of community protection priorities and community input regarding the feasibility and desirability of fuels treatment project areas and methods. Hosting and maintenance of the (Web Map Interface) WMI.

San Bernardino County Fire Department (SBCFD)

Aids in review and approval of the CWPP process and content.

Morongo Valley Fire Department (MVFD)

Aids in review and approval of the CWPP process and content.

CAL FIRE

Aids in the establishment of minimum standards and review of the CWPP process and content. Provides fire behavior and hazard information for State Responsibility Areas (SRA) within the assessment area. Coordinates agency review feedback. Provides information and support regarding fire suppression resources and hazard reduction in the Home Ignition Zone (HIZ).

Bureau of Land Management (BLM)

The Bureau of Land Management (BLM) manages a large amount of land within the assessment area. Joshua Tree National Park (which is adjacent to the southern border of the assessment area) is managed by the National Park Service (NPS). Although there was no information available for this CWPP regarding mitigation programs from the BLM or NPS we recommend collaborating with both federal agencies for future CWPP updates and other large scale planning efforts.

MCAGCC Combat Center Fire Department (MCCFD)

The Marine Corps Air Ground Combat Center Fire Department aids in review of the CWPP.

INTRODUCTION

This CWPP was developed for the Desert Region Fire Safe (DRFS) with funding provided by Mountain Rim Fire Safe Council (MRFSC). Assistance was also provided by the High Desert Emergency Action Alliance (HDEAA), and the California Department of Forestry and Fire Protection (CAL FIRE). Information in this plan will be provided at the level of specificity determined by the community and appropriate agencies.

Some of the recommendations in this report are addressed by California Public Resource Codes (PRC) and other laws and ordinances. It is not the intention of this study to reiterate all applicable code, but rather to stress practices and concepts likely to mitigate undesirable effects of fire to life, property and the environment in the assessment area. Every attempt has been made to ensure compliance with federal and state law, however, many of the recommendations in this document and the associated appendices do not have the force of law or differ from existing legal standards. Legal requirement should not be inferred for any recommendation in this report without the specific reference to a legal standard. Codes and ordinances may vary depending on location and the authority having jurisdiction. Readers are encouraged to familiarize themselves with all legal statutes affecting their location and situation.

This document presents the results of a study to identify and quantify wildland fire hazards in the Wildland-Urban Interface (WUI) and Wildland Intermix (WI) Communities of the assessment area. The WUI is the area where encroaching wildland fuels could create a fire hazard to what would be an urban development in a different setting. The WI consists of communities where wildland fuels surround homes. Several authorities including the US Fire Administration, the International Wildland-Urban Interface Code (IWUIC) and the National Fire Protection Association (NFPA) also recognize an “Occluded” category of interface communities that includes developed areas surrounding wildland fuel islands of less than 1,000 acres.¹ In terms of hazard analysis and mitigation these communities are defined and treated as similar to WUI Communities, therefore it is unnecessary and confusing for the purposes of this study to create a separate class for them. The Interface/Intermix Community Hazard Rating system (ICHR) used in this analysis takes into account significant fuel islands inside WUI Communities as an additional hazard source.

This study focuses on areas of the highest residential density and deals primarily with life safety and structural ignitability. Future studies may be necessary should the need arise to focus on unpopulated land, sparsely populated areas, other values at risk or areas of special interest.

This report is the result of an analysis of the expected severity of fire effects utilizing a combination of computer modeling and field data analysis. A discussion of the dominant structural ignitability hazards in the Communities of the assessment area is included as a separate appendix. This information allows for the prioritization of mitigation efforts. From an analysis of this data, solutions and mitigation recommendations are provided to aid land managers, residents, fire officials, and other collaborators in planning and implementation. This format is designed to help Communities clarify and refine priorities for protecting life, property, and critical infrastructure in the WUI/WI.

For the purposes of this report the following definitions apply:

Communities (AKA Community Hazard Zones) – This study divides WI/WUI areas of the highest residential density into Communities (AKA Community Hazard Zones) that represent similar dominant wildfire hazards and are geographically contiguous. For the purposes of this report Community boundaries are based on these factors rather than political, HOA or traditional neighborhood boundaries. Non-residential land such as large commercial or government-owned tracts have been excluded. **Figure 2** on page 12 shows the community boundaries for this study.

FireShed - The National Hazard and Risk Model (NoHARM) divides the landscape into units based on topography. FireSheds correlate to the vegetation and the direction fires will burn in the absence of wind. FireSheds are useful for dividing the landscape into planning units and providing data in a spatial context that matches fire behavior. FireShed units tend to be roughly 150 to 200 acres in size.

Frequency - A simulation-based prediction of the probability of future wildfire occurrences derived from NoHARM. NoHARM assigns a numeric value ranging from the least likely for a wildfire occurrence to the most likely. Frequency is different from Probability of Ignition in that Frequency only considers ignitions likely to develop into fires large enough to create a significant threat to Values at Risk.

Hazard is the combination of the Interface/Intermix Community Hazard Rating (ICHR) derived from the WUI/WI Community field surveys and the analysis of fire behavior potential, which is derived from NoHARM Severity analysis outputs. Data generated by the NoHARM model has been integrated into the ICHR rating system to provide a single measure of hazard in the developed portions of the assessment area. Hazard attempts to quantify the severity of undesirable wildfire effects to the values at risk.

NoHARM - NoHARM is a proprietary decision support tool for wildfire hazard assessment owned by **Precisely**. NoHARM calculates relative fire danger ratings by taking the predicted severity and the predicted frequency of wildfire in a given location and incorporating elements within and surrounding communities that affect the vulnerability of structures. NoHARM gives a comprehensive view of the threat context a structure, or group of structures, is exposed to from an approaching wildland fire, however NoHARM does not address the flammability of man-made structures themselves.

Home Ignition Zone (HIZ) – As defined by NWCG, the home itself and the area within 100 feet.² Other authorities extend this to 200 feet or the property boundary. Hazards in this zone principally determine the likelihood of home ignition during intense wildfires.

Interface/Intermix Community Hazard Rating (ICHR) - A model designed to create a relative rating of fire hazard to Communities within the Wildland Urban Interface and Wildland Intermix (WUI/WI). ICHR is based on data collected in the field emphasizing home ignition zone ignitability and operational factors whereas NoHARM focuses on the Frequency and Severity of fire in the wildland fuels of the FireSheds. The data generated by NoHARM is integrated into ICHR to provide a single measure of Community hazard.

NWCG – National Wildfire Coordinating Group.

Probability - The likelihood of a significant fire occurrence. This is primarily determined by the fire history of the area and a probability model (Frequency) derived from NoHARM.

Risk – The definition of risk varies widely depending on the source. In some cases, it involves the probability of a wildfire event capable of severe negative effects on values. In other cases it is synonymous with the predicted severity of undesirable fire effects. Due to the lack of agreement regarding a precise definition the authors of this study have chosen not to use the term “Risk”, other than in the context of Values at Risk, relying instead on Hazard (or Severity in NoHARM) to describe the predicted severity of fire effects and Probability (or Frequency in NoHARM) to describe the likelihood of a significant wildfire occurrence.

Severity - An estimate derived from NoHARM of how severe fire behavior would be in the event of an ignition. NoHARM assigns an increasing numeric value from the lowest severity to the highest.

Values at Risk are the tangible values identified by citizens as being important to sustainable life in the assessment area (e.g., life safety, property conservation and critical infrastructure.)

Wildland Intermix (WI) – Areas of concentrated residential development (Communities) where homes are surrounded by wildland fuels. Homes in these areas exist in the context of natural fuels rather than as typical urban/suburban development.

Wildland-Urban Interface (WUI) – The area where encroaching wildland fuels create a fire hazard to structures that would in a different setting be considered a traditional urban/suburban development.

GOALS AND OBJECTIVES

Strategic goals for this project include the following:

1. Improve life safety with respect to wildfire hazards to residents, visitors, and responders.
2. Evaluate and recommend methods to mitigate undesirable fire effects to property, infrastructure, and the environment.
3. Evaluate previous and on-going mitigation efforts, if applicable, in the assessment area.

To accomplish these goals, the following objectives have been identified for this report:

1. Provide a scientific analysis of the fire behavior potential of the assessment area.
2. Group densely populated areas into residential “Communities” that represent relatively similar hazard factors. See **Figure 1** on Page 11 for the Community boundaries for this CWPP.
3. Identify and quantify factors that limit (mitigate) undesirable fire effects to the values at risk and recommend actions to reduce those hazards.

Other desired outcomes include:

1. Promote community awareness: Quantifying the probability of a significant ignition and the severity of wildfire effects will facilitate public awareness and assist in creating public action to mitigate the defined hazards.
2. Improve wildfire prevention through education: Community awareness through education will help reduce the risk of unplanned human-caused ignitions. Education can limit injury, property loss and even unnecessary death.
3. Facilitate and prioritize appropriate hazardous fuel removal projects: Organizing and prioritizing fuel management actions will provide stakeholders with the tools and knowledge to ensure projects are valuable and viable for residents.
4. Identify and promote other actions designed to mitigate hazards and improve response: The identification of Community planning areas and their associated hazards affecting probability and severity of undesirable fire effects will improve focus and accuracy of pre-planning and facilitate the implementation of cross-boundary, multi-jurisdictional hazard mitigation.

The authors and stakeholders of this study acknowledge the potential for complex issues associated with balancing the management of vegetation for fire resilience and ecosystem health with economic and lifestyle concerns of the residents.

HOW TO USE THIS REPORT

This report is intended to summarize and facilitate understanding of the technical analysis of the probability and hazards of wildfire to the Communities of the assessment area. A discussion of response capabilities, suppression/mitigation resources and other relevant topics follows along with recommendations specific to those topics. The primary emphasis of this report is on specific recommendations intended to mitigate wildfire hazards. A brief discussion of non-residential Areas of Special Interest (ASI) is also included. The report concludes with a selection of potential funding resources.

To serve the goal of keeping the main report as direct and streamlined as possible some of the information generated for this project has been included in separate appendices. This organization makes information available to those interested into going further into those topics without requiring more general readers to deal with a large, potentially cumbersome single document. More detailed information included in the appendices is as follows:

- A one-page hazard summary for each of the Communities of the assessment area is included in *Appendix A: Community Hazard Zones*. The Community hazard summaries are also useful as briefing material for outside responders or consultants who are not familiar with the assessment area.
- General information regarding reducing hazards in the Home Ignition Zone (HIZ), including structure hardening as well as hazard mitigation within 200 feet of homes, is included in *Appendix B: Home Ignition Zone Recommendations*. These recommendations apply to all the Communities of the assessment area and are presented here to prevent repetition.
- Technical information regarding methodology employed to generate the fire behavior and Community hazard analyses is discussed in *Appendix C: Methodology*.

Inclusion in an appendix rather than the main report does not in any way diminish the importance of the information presented. All the appendices are of interest in understanding the threat wildfire poses to the assessment area and where and how to focus efforts to mitigate undesirable effects of wildfire on life, property and the environment of the Communities.

We wish to reinforce the focus of this analysis, and the resulting report and appendices, is on wildfire hazards in the WI/WUI areas of concentrated residential development and mitigation actions designed to promote life safety and reduce structural ignitability. Unpopulated areas, commercial facilities and interests, government lands and other resource values that may be affected by wildfire are beyond the scope of this report.

ASSESSMENT AREA OVERVIEW

The Morongo Basin assessment area encompasses approximately 431 square miles (275,937 acres) stretching from the Little San Bernardino Mountains to the Mojave Desert within San Bernardino County. Average elevations range from 4,878 feet in Rimrock to 1,191 feet in Wonder Valley. The assessment area includes approximately 65,600 residents.³ The most densely populated areas are concentrated along Hwy 62 (Twentynine Palms Highway). Joshua Tree National Park (JTNP) is located south of the assessment area. JTNP's North, West, Black Rock and Indian Cove entrances are all accessed from the assessment area. The Marine Corps Twentynine Palms Combat Center (MCAGCC) is located immediately to the north.

Vegetation in and around the Communities of the assessment area consists primarily of a mix of dry-climate shrubs and grasses including creosote bush and rabbitbrush and succulent species such as cholla and yucca. There is also a significant population of Joshua Trees in the southwestern portion of the assessment area. The Joshua Tree is a candidate species under the California Endangered Species Act. Many other native desert species are protected under the California Desert Native Plants Act. Single and small groups of tree species including Palo Verde, palms, Italian cypress and other evergreens, such as pinyon pine and juniper, exist throughout the more populated areas as ornamental plantings.

Communities

The residential portion of the assessment area is primarily WI. Some narrow stretches of the assessment area along Hwy 62 are urban in character, however these areas are small and surrounded by WI or pure wildland. The assessment area has been divided into nine "Communities" for the purposes of this report which comprise the most densely populated portions of the WI. These Communities are not based on political or traditional neighborhood boundaries, but rather on factors relating to wildfire propagation and impacts including, but not limited to, density, structural flammability, fuels, topography and suppression resources. The nine Communities (Pioneertown, Morongo Valley, Rimrock, Yucca Valley, Joshua Tree, Homestead Valley, Twentynine Palms, Wonder Valley and Sunfair/Surprise Valley) contain over 59,000 private (non-government) parcels. These areas are the focus of this document.

Areas of Special Interest

The assessment area has two Areas of Special Interest (ASI); the Yucca Valley Airport and the Burns Canyon Community.

The Yucca Valley Airport is a private airport operated by volunteers. The airport has been an important resource for firefighters during past wildfire events. It has been included in this CWPP due to its position and importance to suppression response.

During the course of this analysis it became apparent that Burns Canyon, although outside the area of the hazard analysis, is in need of in-depth analysis for fire hazards and mitigations. This area has an active homeowners' group that should be supported in their concerns and actions; therefore, it has been added to this CWPP as an Area of Special Interest.

PROBABILITY SITUATION

For the purposes of this report Probability is the likelihood of a significant fire occurrence (fires greater than 100 acres). This is primarily determined by the fire history of the area and the No-HARM Frequency model.

While the west and south sides of the assessment area have an active fire history, the low-lying desert terrain to the east has no history of significant fires in this century. Major fires (greater than 500 acres) that burned within five miles of the assessment area from 2000 to 2022 include the Sawtooth Complex (2006), Acoma (2008), Paradise (2005), Pushwalla (2006), and Elk (2022). Several smaller fires have also occurred, mainly to the west and south.

The *2023 Yucca Valley Hazard Mitigation Plan* notes in its Wildfire Hazard section several historical wildland fires have impacted the town of Yucca Valley. According to the General Plan – Safety Element the 85,700-acre Sawtooth Complex destroyed 50 homes, 171 outbuildings and 194 vehicles in the Yucca Valley area, and the Acoma Fire burned 368 acres destroying one outbuilding in the Town of Yucca Valley.⁴ Seventeen individuals were injured and one civilian died as a result of the Sawtooth Complex.⁵

During the preparation of this report the Geology Fire started in neighboring Joshua Tree National Park and grew to over 1,000 acres in less than 24 hours, highlighting the potential desert grass/shrub fuels have for rapid fire development.

Although 65 miles away, the 2023 York Fire burned over 93,000 acres from San Bernardino County into Nevada. Most of this fire was located in the Mojave National Preserve where fuels are similar to the desert shrub and Joshua Tree communities found in the south and west sides of the assessment area.

To predict the likelihood of a significant wildfire event No-HARM inputs 300,000 points of ignition. These simulated fires are run across three weather scenarios. Areas where fires stack (modeling shows repeated fires in the same area) indicate an increased likelihood of a significant fire occurrence. No-HARM assigns a value between one and 50 to each FireShed based on an aggregation of all the pixels in that FireShed. A value of one indicates the lowest probability of significant wildfire and 50 the highest. Adjective ratings for Frequency in No-HARM are as follows: 0-9 = Low, 10-23 = Moderate, 24-35 = High and >35 = Very High.

Figure 1 shows the boundaries of the Communities of the assessment area. The No-HARM Frequency analysis rates FireSheds inside these boundaries from 1.6 to 22.1 indicating a low to moderate probability of the likelihood of a significant fire occurrence. Only Morongo Valley and Pioneertown are rated at the upper end of the moderate bracket at 22.1 and 19.8 respectively.

Based on the No-HARM Frequency assessment, most of the assessment area should be considered at low to moderate risk for significant fires. The Communities on the west and south sides, however, should be considered higher risk based on fire history. It is also important to note the potential for rapid fire development does exist in fuels found in and around the assessment area.

COMMUNITY IGNITABILITY ANALYSIS

Purpose

The purpose of dividing residential areas into Communities is to group the most heavily populated WUI/WI residential areas into hazard categories for prioritization of recommendations. This is accomplished with the Interface/Intermix Community Hazard Rating (ICHR) tool, which is intended to analyze Home Ignition Zone (HIZ) hazards, suppression and mitigation factors within WUI/WI developments. For this study, fire behavior and other factors analyzed by No-HARM have been incorporated into the ICHR ratings.

Description

There are nine Communities in the assessment area. The ICHR analysis incorporates fire behavior modeling and GIS data sets generated by No-HARM to calculate a score of 0 to 100 points. That score sorts these zones into one of five adjective rating categories: low, moderate, high, very high and extreme. The Community boundaries and ratings are shown in **Figure 1** and **Table 1**. In **Figure 1** the assessment area boundary is shown in blue, and the Community boundaries are shown in the color corresponding to their hazard rating. For an overview of the methodology used to generate the hazard rating scores please see *Appendix C: Methodology*.

Of these nine Communities (Pioneertown, Morongo Valley, Rimrock, Yucca Valley, Joshua Tree, Homestead Valley, Twentynine Palms, Wonder Valley and Sunfair/Surprise Valley), none rated as Extreme or Very High. Pioneertown, Rimrock and Morongo Valley rated as High hazard. While most of Yucca Valley rated as Moderate hazard, there are significant areas where hazards are higher, causing a split rating of High/Moderate for this community. This rating and the reasons behind it are discussed in *Appendix A: Communities*. Joshua Tree, Homestead Valley and Twentynine Palms rated as Moderate hazard. Wonder Valley and Sunfair/Surprise Valley rated as Low hazard primarily due to low structure density, light and discontinuous fuels and flat topography.

The Community descriptions in *Appendix A: Communities* are an overview of the general characteristics of the area. They focus on structural ignitability and HIZ hazards (both natural and man-made) based on field observations. This overview is not intended to describe every home or street but rather what is typical or dominant for that Community.

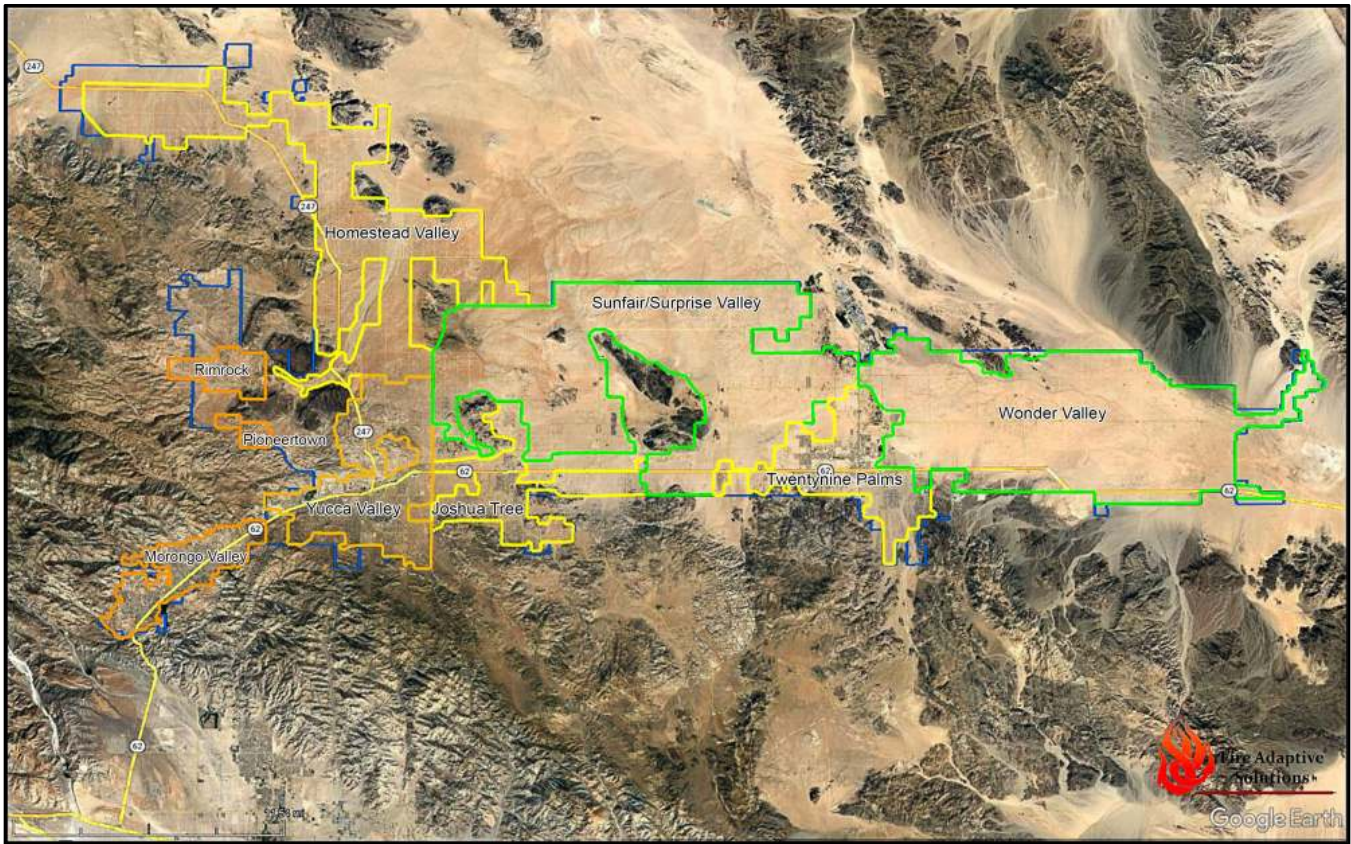


Figure 1, Morongo Basin Interface/Intermix Community Hazard Zones

Table 1 - WUI/WI Community Hazard Ratings

Morongo Basin 2023 CWPP Interface/Intermix Community Hazard Ratings		
Community Name	Score	Adjective Rating
Pioneerstown	63	High
Morongo Valley	53	High
Rimrock	52	High
Yucca Valley	50	High/Moderate
Joshua Tree	47	Moderate
Homestead Valley	37	Moderate
Twentynine Palms	36	Moderate
Wonder Valley	30	Low
Sunfair/Surprise Valley	29	Low

Rating Categories: Low 0-30; Moderate 31-50; High 51-70; Very High 71-90; Extreme > 90.

FIREFIGHTING CAPABILITIES AND LOCAL PREPAREDNESS

Within the area encompassed by this CWPP there are State, Local, and Federal Responsibility Areas. A “Responsibility Area” defines jurisdictional responsibility for wildland fire suppression. However, all fire agencies operate under the closest resource concept. Within the CWPP area, the following agencies may respond to a wildland fire, depending on which resources are available:

San Bernardino County Fire District (SBCFD)
CAL FIRE San Bernardino Unit (BDU)
Morongo Valley Fire Department (MVFD)
Bureau of Land Management/National Park Service (BLM/NPS)
CAL FIRE Riverside Unit (RRU)

Figure 2 is a Responsibility Area map showing the State Responsibility Area/Local Responsibility Area (SRA/LRA) boundaries as well as the areas of federal agency responsibility as they exist in 2023. These boundaries are reviewed and updated as needed every five years.

Figure 3 shows a screen shot of the CAL FIRE Fire Hazard Severity Zone (FHSZ) viewer from September of 2023. Only the portions of the assessment area rated from Moderate to Very High are shown. Please note CAL FIRE currently only shows Very High fire hazard severity zones in LRAs. Moderate and High ratings are not extended into LRAs. The most current boundaries and FHSZ ratings can be seen on the CAL FIRE FHSZ Viewer at <https://egis.fire.ca.gov/FHSZ/>.⁶ Please note FHSZ polygon ratings are not the same as the ICHR Community hazard ratings developed for this report, which rely on independent proprietary modeling. Please see *Appendix C – Methodology* for more detail regarding the hazard methodology used to rate the Communities in this CWPP. A discussion of the methodology employed in the development of CAL FIRE FHSZs is beyond the scope of this CWPP. For more information regarding FHSZs please contact DRFS or your local CAL FIRE office.

SBCFD provides primary fire suppression and all-risk emergency response to all LRA and Federal Response Areas (FRA) lands in the assessment area. SBCFD maintains four fire stations in the assessment area: Stations #41 and #42 in Yucca Valley, Station #36 in Joshua Tree and Station #44 in Twentynine Palms. Division 4 headquarters is also located in Yucca Valley. SBCFD Air and Wildland Division includes two Type 1 hand crews (Old Cajon and Harrison Canyon), two bulldozers, and one helicopter operated in cooperation with San Bernardino County Sheriff’s Office (SBCSO) available for year-round response.

SBCFD also has six inactive stations in Pioneertown (Station #38). Stations #19 (Homestead Valley/Landers), #35 (Panorama Heights, Joshua Tree), #43 (Twentynine Palms), #45 (80526 Amboy, Wonder Valley) and #47 (87670 Amboy, Wonder Valley) are all inactive.

MVFD has one active station (#461) located at 11207 Ocotillo Street. According to their website this station has one Type 1 engine, one Type 6 brush truck, two water tenders and one command vehicle. MVFD also has an inactive fire station at 9492 Twentynine Palms Hwy (Station #462, Morongo Valley East Fire Station). There are no staff or apparatus at this station due to a lack of funding, however, this station is still owned by MVFD and functional if needed. The department has a fire prevention unit that provides public education and fire code enforcement. MVFD maintains a mutual aid agreement with CAL FIRE for fire response, likewise CAL FIRE dispatches for MVFD.

CAL FIRE provides primary wildland fire suppression to all SRAs. They maintain one station in the assessment area that is closed part of the year. The Yucca Valley Fire Station is located at 7105 Airway Avenue.

The California Desert Interagency Fire Program includes BLM and NPS, incorporating wildfire management and fuels reduction programs throughout southern California. The Blackrock Interagency Fire Center is located in JTP at the Blackrock campground. Stationed at Blackrock are NPS Engine 7374 and BLM Engine 7372.

MCAGCC, north of the assessment area, maintains the Combat Center Fire Department (MCCFD). MCCFD have mutual aid and community response contribution agreements with Fire Districts in the Morongo Basin.

In high severity periods agreements with the California Military Department allow for California National Guard and California State Guard resources to provide aid in wildfire response including their Modular Airborne Fire Fighting System (MAFFS), helicopters, support personnel, communications equipment, and other resources.⁷

There is one active Fire Safe Council in the assessment area. Desert Region Fire Safe (DRFS) began operations in June 2022. DRFS is headquartered in Yucca Valley and is a partner of the Inland Empire Fire Safe Alliance (IEFSA).

The High Desert Emergency Action Alliance (HDEAA), also headquartered in Yucca Valley, has been instrumental in the creation of DRFS and this CWPP. HDEAA provides public education and sponsors disaster prevention and mitigation programs in the assessment area. HDEAA is also a partner of IEFSA.⁸ Currently both DRFS and HDEAA are entirely volunteer operated.

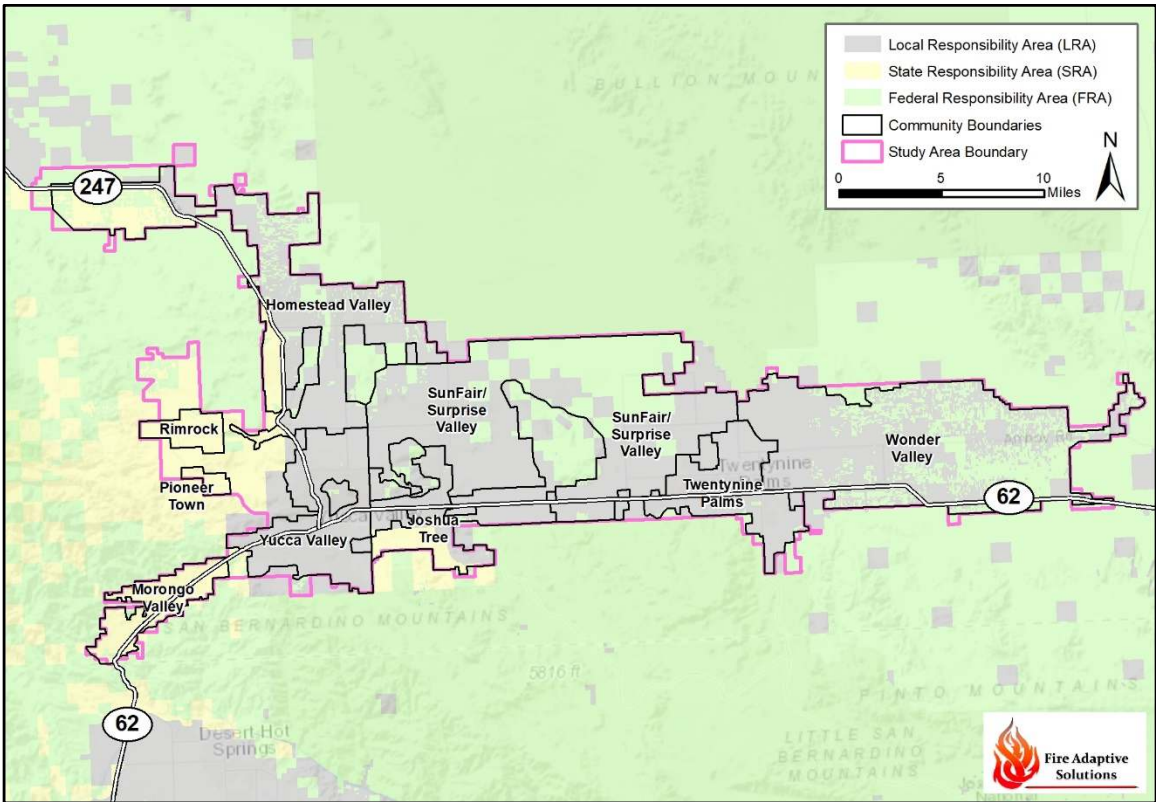


Figure 2, SRAs and LRAs with Federal Responsibility Areas

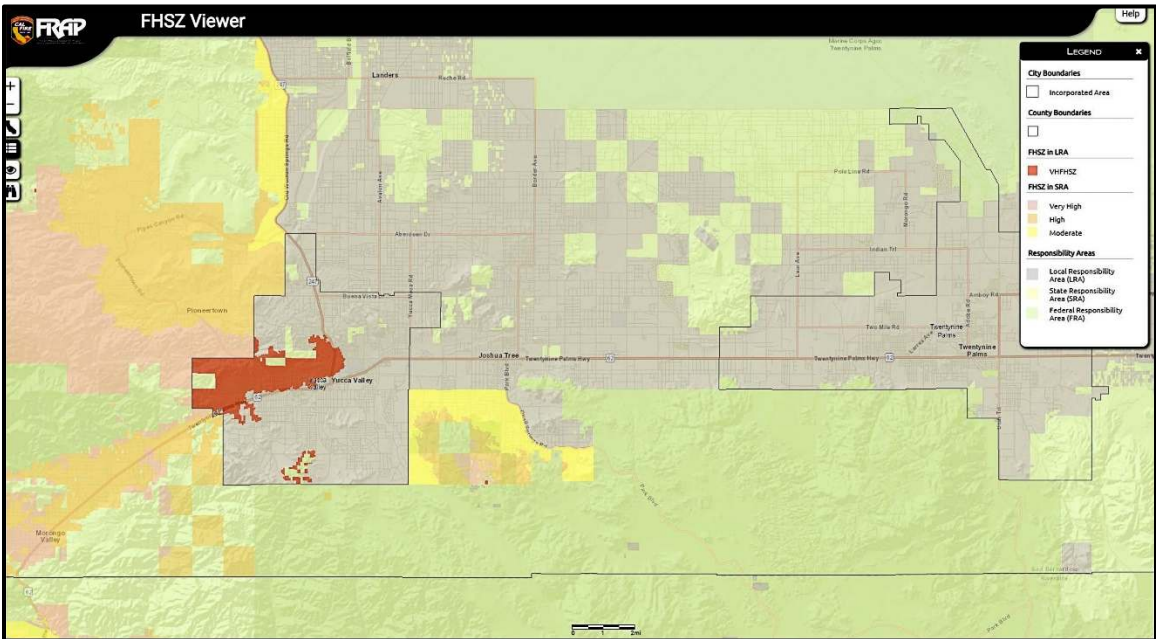


Figure 3, CAL FIRE FHSZs (Fire Hazard Severity Zones)

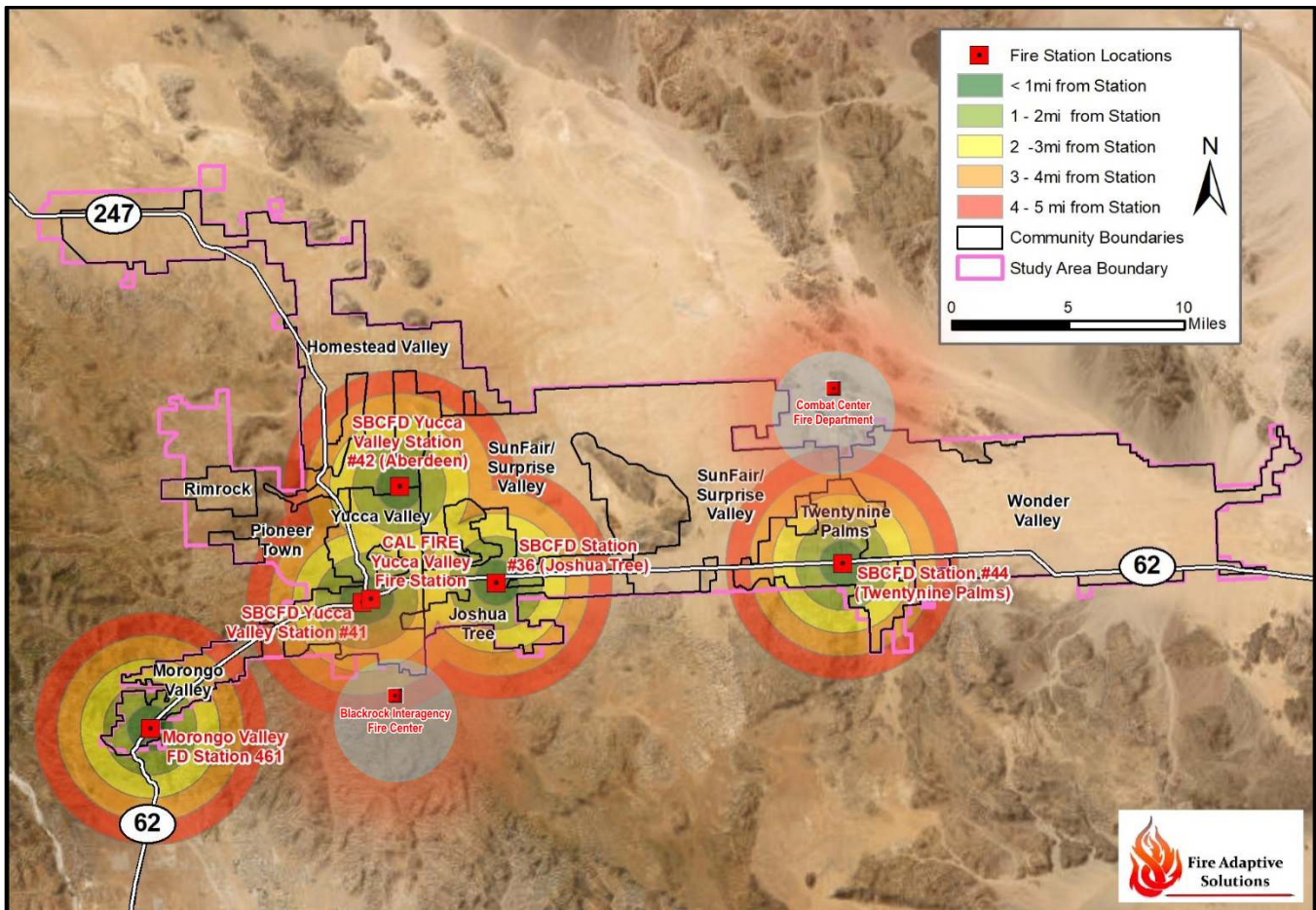


Figure 4, Fire Station Locations Within Assessment Area Boundaries

Considerations

- Investigate grant funding to provide paid staff for DRFS and HDEAA. Paid staff members are essential to maintaining a successful Fire Safe Council.
- Fire Districts in cooperation with community groups should work with DRFS and IEFSA to establish new Fire Safe Councils, Firewise Communities and local disaster preparedness groups. Many residents are unaware of the fire danger in the assessment area. Public education and engagement will be key to establishing successful and enduring mitigation programs.
- DRFS should work with Fire Districts to provide their Defensible Space Advisory programs, which provides a one-on-one consultation with a trained Advisor to residents and property owners.
- DRFS should work with MVFD to offer a wood chipper program to aid residents of Morongo Valley with the removal of slash.
- Pioneertown is working to create the Pioneertown Emergency Preparedness Network (PEPN). DRFS and IEFSA should work with PEPN to create Firewise Communities for Pioneertown operating as part of PEPN.
- The Burns Canyon ASI (see the *Areas of Special Interest* section of this report) has an active road association that should be supported by DRFS and IEFSA in their efforts to decrease fire hazards and improve suppression resources to the residents of the Burns Canyon Road area.

WATER SUPPLY FOR FIRE SUPPRESSION

There are at least four water utility providers in the assessment area, Hi-Desert Water District (HDWD), Big Horn Desert View Water Agency (BDVWA), Joshua Basin Water District (JBWD) and Golden State Water Company (GSWC). The coverage map shown in **Figure 5** is from the San Bernardino County website.⁹ San Bernardino County has created special districts for water in some areas. Some of these are shown in **Figure 5**.

All the Communities in the assessment area have hydrants except for the Johnson Valley portion of Homestead Valley, Wonder Valley and Surprise Valley, but only HDWD has a publicly available hydrant map. SBCFD does have information on this hydrant system. See the hydrant map provided by SBCFD, (**Figure 6**)

According to their website JBWD has 17 above ground reservoirs with a capacity of 1,233,000 gallons and 1,305 fire hydrants.¹⁰ There is, however, no other publicly available information regarding their hydrant network. SBCFD does have information on this hydrant system. See the hydrant map provided by SBCFD, (**Figure 6**)

Although third parties with pumping permits pump and haul water from the BDVWA station in Johnson Valley for residential use, there is no water storage for fire suppression in Johnson Valley. BDVWA maintains the pumping station which has a FDC, the capabilities of the station are 90 gallon per minute and the station holds approx. 10,000 gallons of well water. Water for Landers is supplied by BDVWA, however, many of the homes in Landers have wells as their only water source. There is no publicly available information on the web regarding hydrant locations or water supply for fire suppression in Landers. SBCFD does have information on this hydrant system. See the hydrant map provided by SBCFD, (**Figure 6**)

GSWC is the water provider for the Morongo Valley Community. Their website reports serving 1,000 customers in Morongo Valley; however, we were unable to locate a coverage map or hydrant location map for GSWC in Morongo Valley. SBCFD does have information on this hydrant system. See the hydrant map provided by SBCFD, (**Figure 6**)

Water for Pioneertown is supplied by a special district (County Service Area CSA 70 W4), however, many of the homes in Pioneertown have wells as their only water source. There is no publicly available information on the web regarding hydrant locations or water supply for fire suppression in Pioneertown. SBCFD does have information on this hydrant system. See the hydrant map provided by SBCFD, (**Figure 6**)

Although the county has created special districts for water in some areas, the maintenance of hydrants is the responsibility of the water district. HDWD does keep maintenance records for their hydrants, but we do not have any information regarding maintenance records for hydrants owned by other water districts in the assessment area. Throughout the assessment area there are hydrants in poor condition and hydrants covered by vegetation making access difficult (see **Figure 7**). Most hydrants do not have reflective markings for nighttime visibility.

The assessment area is a high desert environment. Although there are no rivers or large open bodies of water for dip/draft operations, HDWD owns and operates percolation basins within the CWPP area. These have the ability to be filled and used as temporary dip/draft sites. HDWD also has the ability to dig other temporary dip sites. SBCFD has a map of the complete hydrant network (See **Figure 6**), however, we were unable to locate a comprehensive map of alternative water sources, such as cisterns and tanks with fire department connections, covering the assessment area for this CWPP.

The Burns Canyon homeowners' group (see *Areas of Special Interest*) has initiated a project to map water resources for fire suppression accessed from Burns Canyon Road and to install fire department connections on tanks and cisterns. Once this work is completed it will provide a water resource for the Communities of this CWPP as well as the Burns Canyon area.

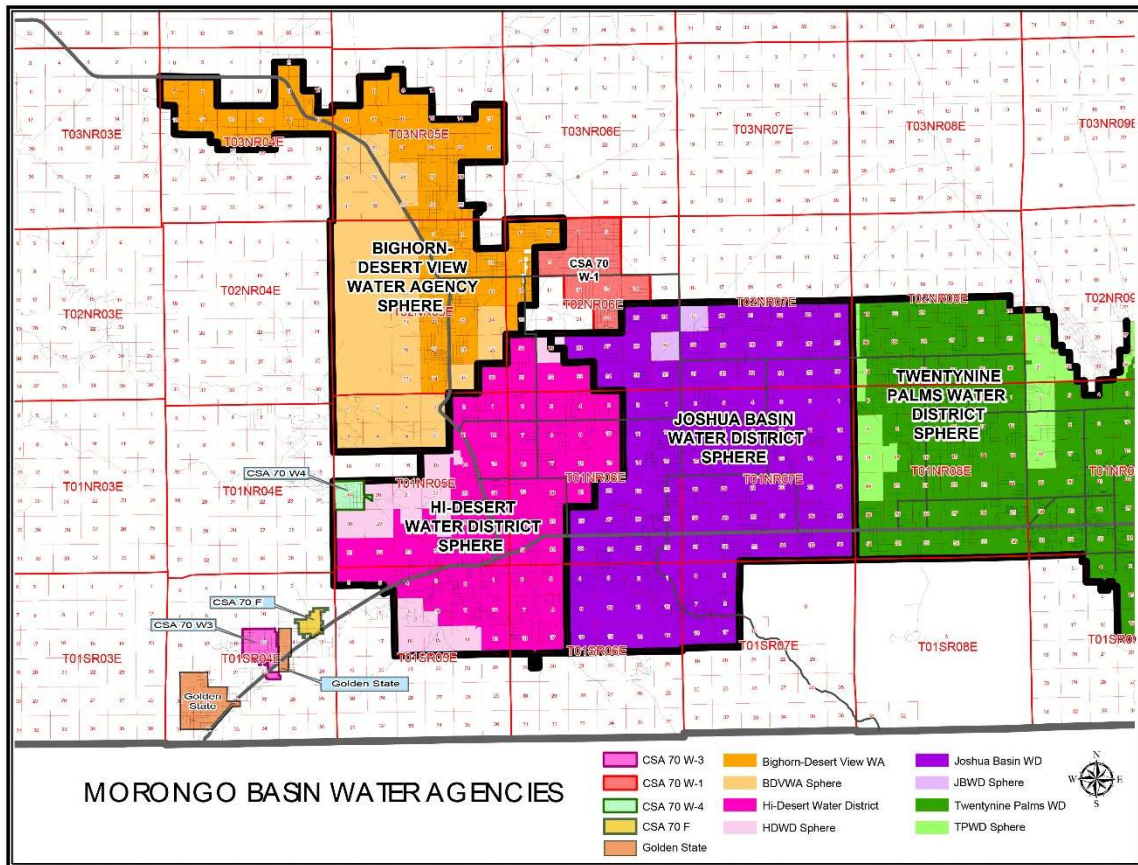


Figure 5, Morongo Basin Water Providers Coverage Areas

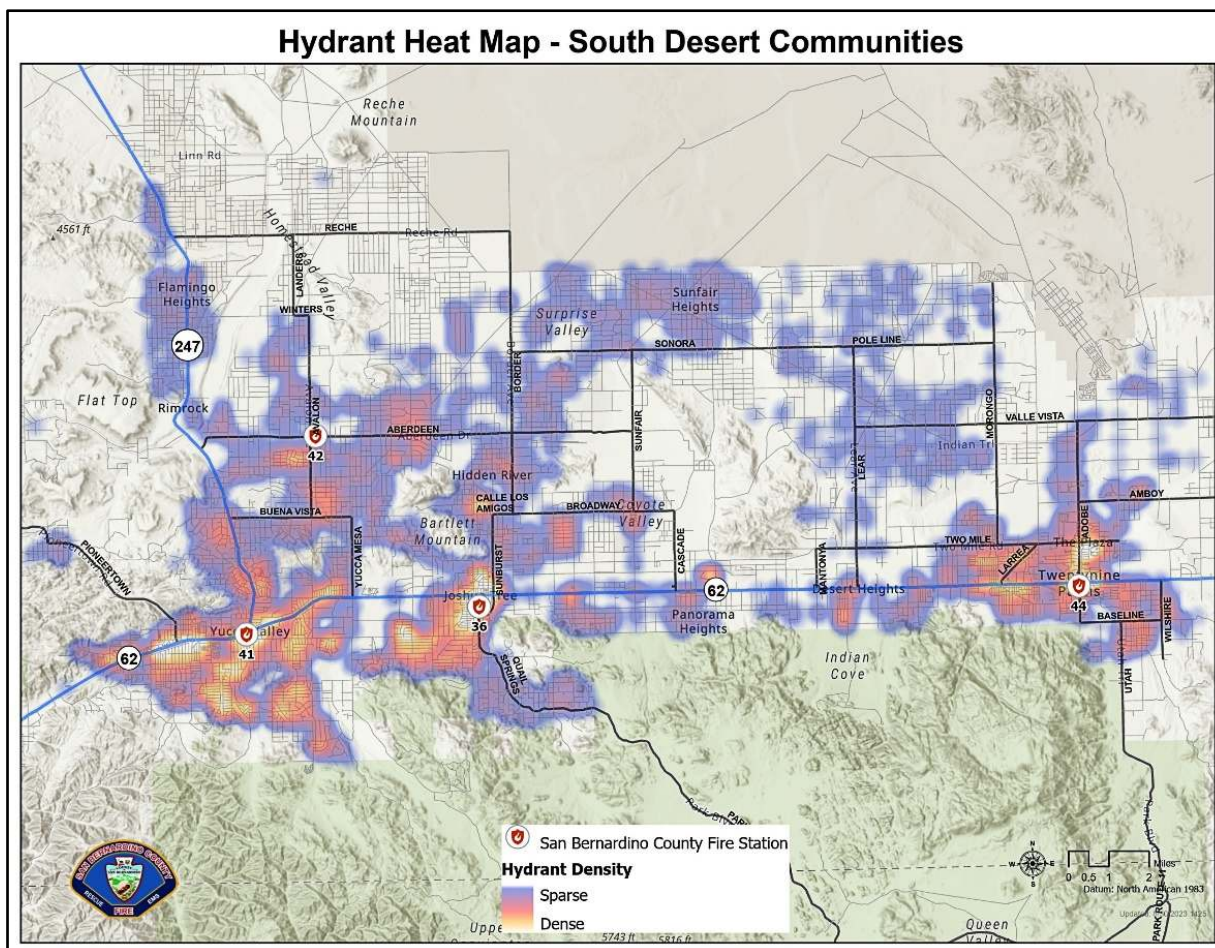


Figure 6, SBCFD Hydrant Map



Figure 7, Hydrant Overgrown by Vegetation in Yucca Valley

Considerations

- A collaborative effort should be made by all the water districts to create a comprehensive map showing all working hydrants and any alternative water sources, such as water tanks and cisterns, available for fire suppression. The creation and maintenance of this map along with the annual hydrant testing mentioned below are high priority recommendations to establish an accurate reference of available water for fire response.
- All hydrants in the assessment area should be tested annually. Any found to need maintenance should be marked and reported to the appropriate water district. Hydrant maintenance is the responsibility of the water districts and in addition to flow and pressure testing should include replacement of missing caps, vegetation removal, painting and reflective marking.
- A visual inspection of any cisterns or water tanks available for fire suppression should be conducted on an annual basis. This inspection should include any exposed plumbing and connections.
- The Town of Yucca Valley has undergone a switch to septic systems in most areas causing trees that were watered by leach fields to become drought stressed, adding to dead fuel loads near homes. A public education campaign should be conducted to stress the need to water any remaining trees in these areas to keep them as fire resistive as possible.

FUTURE CONSIDERATIONS

The quality of the Home Ignition Zone (HIZ) is the primary factor in determining a home's ability to survive wildfire. The HIZ includes the ignitibility of the structure itself and the quality of the defensible space surrounding it. **The two most important recommendations in this report are:**

1) to incorporate defensible space techniques and ignition resistant construction in future development plans, and 2) for existing structures to be fire hardened to the greatest extent practical. Detailed information on achieving these goals is available in *Appendix B: Home Ignition Zone Recommendations*.

The following general measures listed below should be practiced throughout the assessment area.

1. Always be aware of the current and expected fire danger in your area. In times of high fire danger consider packing go-bags and a creating a household plan to speed your exit should evacuation become necessary.
2. Clean roofs and gutters to remove pine needles and other flammable litter from the roof year-round. (Required by California PRC 4291(a)(5).
3. Don't store firewood or other combustibles under decks, stairs, or wooden projections. (Also a requirement of California PRC 4291).
4. Develop and maintain defensible space as described in *Appendix B: Home Ignition Zone Recommendations* and California law. Debris and cuttings should be removed entirely from the area and never dumped into adjacent wildlands or vacant lots.
5. Maintain and clean spark arresters on any chimneys.
6. Connect and have available a minimum of 50 feet of garden hose near all buildings to extinguish small fires before they spread. For large buildings, two or more hoses may be required to provide adequate coverage.
7. See the *Access/Egress Routes & Evacuation Recommendations* section below for recommendations regarding maintaining driveways and turn-arounds at your home to provide a safe evacuation route for your family and access for firefighters.
8. There has been an increase in OHV misuse in some Communities, such as Johnson Valley and the Burns Canyon ASI. Misuse contributes to an increase in probability of ignition, general fire hazard, and can cause obstruction to access and egress of both responders and residents. It is recommended OHV access be reevaluated for its impact on probability of ignition and fire hazards. Existing rules regarding OHV use should be vigorously enforced.

It is essential to remember that fire mitigation is not a one-time job. Defensible space should be maintained year-round, and reducing structural ignitibility is an ongoing process. For more information, please see *Appendix B: Home Ignition Zone Recommendations*.

LANDSCAPE SCALE CONSIDERATIONS

When most people think of a fuelbreak they envision a line, usually 10 to 30 feet wide, where all vegetation has been removed to mineral soil; however, the concept of a fuelbreak can describe any area where fuels have been strategically manipulated to reduce the spread and intensity of wildfire. Since the concept of a fuelbreak is more nebulous than the specific definitions of “fireline” and “firebreak” as used by wildland firefighters, the effectiveness of fuelbreaks has been the subject of debate among fire scientists and forest managers for many years. While the concept of a “shaded fuelbreak” is most applicable to forested areas, fuels treatments designed to slow the spread and intensity of fire may be applied to all flammable vegetation. The majority of wildland fuels in the assessment area are shrub fuels. Treatment of shrub fuels is most effective within 100 feet of structures; however, it is important to understand that in extreme weather conditions shrub fuels can cast burning embers over one mile. This is one reason the HIZ treatments described in Appendix B are critical to homes surviving wildland fires.

In general shrub fuels should be reduced to clusters no larger than twice the height of the tallest shrubs in any direction with a spacing between groupings of at least 2 ½ times the height of the tallest shrubs. In areas where short grasses are the dominant fuel, prescribed fire should be considered as a treatment method. Fuels reduction in open space will be most effective when combined with defensible space treatments. We recommend cooperating agencies collaborate with individual property owners and managers wherever possible to create effective cross-boundary treatment plans.

In this report, when distances are given, they are intended as minimums. Depending on fuels and topography, more extensive treatment areas may be necessary. The recommendations in this report are general. The specific design of any fuel treatment should be referred to qualified experts familiar with both the vegetation and fire behavior of the area. Standards and guidance provided by CAL FIRE and the San Bernardino County Fire Prevention Standards should be primary sources for this information.

Considerations

There are some areas, especially in the Yucca Valley Community, where trees are growing through powerlines and in some cases the lines are being stressed. This creates a dangerous condition where powerlines could become detached and spark, potentially igniting the vegetation, especially during windy conditions. Where lines are within vegetation, branches should be cut back to allow a clearance of 15 feet to either side of the center of the powerline. Joshua Trees are a protected species in California, however some of these are also impinging power lines. If Joshua Tree branches stressing the lines cannot be cut back the existing power lines should be disconnected and replacement lines buried or otherwise rerouted. This recommendation differs from California CPUC General Order 95, Section III, however we consider it a high priority recommendation due to the threat stressed powerlines represent.¹¹ This type of work is the sole responsibility of the utility provider. DRFS may create an inventory of problem areas and request the utility conduct the mitigations recommended here in the interests of public safety and limiting liability.

Wherever practical all power lines, especially high-tension lines, should have the following vegetation management implemented and maintained for 15 feet to either side of the centerline of the powerline. At ground level flammable materials including not only live vegetation, but also ground litter, duff and dead vegetation that will propagate fire should be removed. From ground level to eight feet, brush and grasses higher than four inches should be cut, and any live trees should be limbed to a height of eight feet. From eight feet to the horizontal plane of the highest conductor attachment any dead or diseased limbs should be removed from live

trees and any diseased, dying or dead trees or shrubs removed in their entirety. These recommendations may go beyond the minimum standards provided in California PRC 4292 and 4293, however these are proven practices and are recommended by the authors of this CWPP.

Wildfires can happen at any time and can spread rapidly. Communities should familiarize themselves with the Ready, Set, Go program and should be prepared to respond to direction as provided by local law enforcement. Evacuation is generally regarded as the principal tactic to save lives during a wildfire event. In areas where flammable native vegetation and ornamental plantings encroach the driving surface fuels modification should be considered. The following distances and tactics for roadside fuels modifications given here are general in nature. The assessment area contains concentrations of Joshua Trees. Any fuels reduction plan must prioritize the preservation of Joshua Trees.

- For primary roads and driveways accessing residential developments thinning should be considered in any section where fuels are continuous near the driving surface. Within 10 feet of the road hazardous trees and shrubs (stressed or dying and flammable species like creosote and rabbit brush) should be removed and any grasses mowed to a height no greater than four inches. Within 30 feet of the road tree limbs should be removed to a height of eight feet above the ground, or 1/3 of the tree height for trees less than 25 feet high. Dead trees for wildlife should be limited to no more than one or two per acre. Within 100 feet of the road, clusters of shrubs should be reduced to a diameter of no more than twice the mature height and a spacing of 2 ½ times the mature height be maintained between clusters.
- Trees, large shrubs, and other vegetation along driveways should be pruned as necessary to maintain a minimum of 13.5 feet of vertical clearance for emergency vehicle access.

In 2006 the Sawtooth Complex burned through Pipes Canyon nearly to Hwy 247 (Old Woman Springs Road). Hwy 247 is the principal corridor connecting most of Homestead Valley with fire suppression resources. Fires burning through Pipes Canyon could compromise this important access route. Considering the importance of Hwy 247 and the fire history of Pipes Canyon **the following recommendation is a high priority landscape scale fuels modification project.**

Pipes Canyon is narrow in spots with steep slopes on either side of the road, however, wherever it is possible, the roadside thinning recommendations given above should be implemented within 30 feet of Pipes Canyon Road from where the road enters Pipes Canyon east of the Rimrock Community to its junction with Hwy 247 (shown in **green** in **Figure 8**). Also, along Hwy 247 from its intersection with Aberdeen Drive in the south to its intersection with La Brisa Drive in the north, the roadside thinning recommendations given above should be implemented and maintained within 30 feet of the road (shown in **yellow** in **Figure 8**).



Figure 8, Pipes Canyon Fuels Management Project

ACCESS/EGRESS ROUTES & EVACUATION CONSIDERATIONS

Access

The paved roads in and out of the assessment area, such as Hwy 62 (Twentynine Palms Highway) and Hwy 247 (Old Woman Springs Road), are generally of adequate width and in good condition. In all the Communities, however there are rough dirt roads and driveways. Some of these are steep and some are narrow with vegetation encroaching the driving surface, especially where homes are located on steeper slopes. There are many dead-end streets and driveways that are the only way in and out for many residents (see **Figure 9**). For these properties it is important to maintain a good, all-weather driving surface as well as adequate clearing for emergency vehicles and roadside vegetative maintenance.

Street signage is variable in the assessment area with markers missing at some streets and common driveways. In Pioneertown all the street markers are on combustible wooden posts with no reflective street names (see **Figure 10**). Missing or inadequate address markers are also an issue. Many homes do not have an address marker visible from the street and those that do are of all types with no particular system for size or position. Although mapping applications have made it easier for responders to locate specific structures, reflective addressing visible from the street is still desirable. There is limited (or no) cellular data in some parts of the assessment area for mapping applications. All applications relying on GPS technology have some difficulty pinpointing addresses from time to time and it is important to remember that technology does fail.

While some residents may consider reflective address signage to be unattractive, it is essential for quick and effective response. The value to responders, especially at night under difficult conditions, is not to be underestimated. This is especially true during large wildland fires where poor marking will create challenges for outside responders who do not have training and experience regarding local access. Address marking standards are required by California PRC 4290, San Bernardino County and may also be addressed in local codes.¹²



Figure 10, Wooden Street Marker in Pioneertown



Figure 9, Typical Dirt Road in Yucca Valley

Evacuation

During a wildfire event evacuation will be a critical consideration. The San Bernardino County Sheriff's Department (SBSO) has jurisdiction over emergency evacuation in the assessment area. SBSO covers an area of approximately 20,000 square miles. The Morongo Basin Station is responsible for over 2,500 square miles. Due to the size of the coverage area, it is impossible to have a pre-planned citizen evacuation plan for every scenario.

In coordination with SBCFD, the Sheriff's Department has developed an in-house emergency plan. It is available on the Sheriff's Intra-Web (STARLINK) and not for public release. The Emergency Operations Division of SBSO is responsible for maintaining this emergency plan, which is reviewed annually.

The entire county is broken down into smaller areas of responsibility, which can be assigned to a deputy, or a team of deputies, during an emergency. Depending on the threat and the projected pathway, deputies receive direction from Incident Command during their shift regarding evacuation routes, evacuation centers, etc. Each situation is different and may change depending on the circumstances involved. The plan has been designed so that deputies in the field can quickly react to a threatened area, and if needed, assess and act on very short notice.

During any emergency, including wildfire incidents, the Sheriff's Department utilizes several methods to inform the public about the incident. These methods include:

- Social media
- Press releases (Print, Television, Radio)
- Nixle Releases
- Reverse 911
- Highway (CAL-TRANS electronic signage)
- Public address announcements by deputies in an affected area (Car P/A System)
- Public address announcements by helicopter
- Door knocks during evacuations

Morongo Basin SBSO has over 200 volunteer members including search and rescue groups, Explorer Scouts and citizen patrol units.

Considerations

- We recommend DRFS, county city and town governments, and homeowners work together to create and implement a consistent system of reflective address markers and pursue funding to help people conform to existing State, County, or local codes.
- Access road vegetation management is recommended for all roads and driveways accessing occupied residential properties. See the *Landscape Fuels Recommendations* section above for details.
- For driveways and dead-end access roads longer than 150 feet, a cleared turnaround for fire apparatus shall be provided. Turnarounds may consist of a "cul-de-sac" with a minimum 45-foot radius (in some high density developments in San Bernardino County a 38-foot radius is allowed), a 60-foot "Y", or a 120-foot "Hammerhead" with a road width of at least 20 feet for dead end roads and driveways 151 feet to 500 feet and a minimum road width of 26 feet for dead-end roads and driveways longer than 500 feet as described in California Fire Code, Title 24, Part 9.¹³ This standard is already required by the cited state fire code for new construction. This recommendation is for pre-existing, non-conforming roads to be updated.
- Where required by fire officials, roadway turnouts shall be at least 12 feet wide and 30 feet long with a minimum 25-foot taper on each end. Roadways should be at least 20 feet wide, however access points to individual parcels can be a minimum of 16 feet wide as per California Fire Code, Title 24, Part 9.¹⁴ Please note that even though San Bernardino County Fire Prevention Standards allow a residential driveway serving not more than two (2) single family residences to be a minimum of 12 feet in width¹⁵ that does not allow for large apparatus to pass each other (Type 1 fire engines may be up to 102 inches, or 8.5 feet, in width exclusive of mirrors, fixed steps or suppressant devices).¹⁶ This standard is already required by the cited county fire code for new construction. This recommendation is for pre-existing, non-conforming roads to be updated.
- To increase fire awareness of residents and visitors the high traffic primary entrances into Morongo Basin should have signs indicating the current level of fire danger located in highly visible places. **Figure 11** shows an example of one such sign. One sign should be located facing traffic coming into the assessment area on Hwy 62 from the east, one facing traffic coming into the assessment area from the west and one facing traffic coming into the assessment area on Hwy 247. Signs on Hwy 62 should be placed at entrances to both Morongo Valley and Wonder Valley.
- For Communities in or near CAL FIRE Very High and High Fire Hazard Zones, signs similar to the example shown in **Figure 12** should be erected in visible locations for all the main access roads. This recommendation includes the communities of Rimrock, Pioneertown, Morongo Valley, Yucca Valley and Joshua Tree, as well as the Burns Canyon ASI. Signs like this are commercially available from commercial outlets.



Figure 11, Fire Danger Sign Example



Figure 12, High Fire Danger Area Sign Example¹⁷

AREAS OF SPECIAL INTEREST

There are two Areas of Special Interest (ASI) in, or adjacent to, the assessment area; The Yucca Valley Airport and Burns Canyon.

The Yucca Valley Airport (see **Figure 13**, where the airport is marked by the green balloon) is operated entirely by volunteers. There is no paid staff. Operations are currently funded through the Airport District. All properties within the Airport District pay a three cents per square foot tax. There are some rental houses on the airport, but all are owned by private residents. Most of the land that the airport sits on is owned by the Yucca Valley Airport Corporation which has a long-term lease with the Airport District. The Airport District pays \$500/month rent to the Yucca Valley Airport Corporation. No money from the corporation is used towards maintenance or upkeep of the airport. The Airport District is entirely responsible for maintenance and upkeep of the airport, including improvements. There are some additional funds, in the form of \$10,000 per year that comes from the Caltrans aeronautical division.

The Airport is an essential link in the transportation chain serving local needs during an emergency. The 35-acre airport facility includes a 200-acre radius around the Airport. It is Privately owned and open to the Public. Aircraft that fly into the Airport are often single-propeller, twin-propeller, turbo-propeller, and small jet aircraft. Still, it has received jets, military planes, helicopters, and the County Sheriff's Department Emergency Aircraft. The San Bernardino Sheriffs' Department utilizes the runway for their helicopters for law enforcement and search and rescue efforts in the Joshua Tree National Park or for major off-road events. Air Ambulances land and take off from the Airport in life-saving missions to the larger hospitals.

The Airport had not been repaved since 1986 and needed improvement. The District voted to bring the Airport into FAA standards with a complete repaving that ensured the runway for 20 years. The Town of Yucca Valley offered the district \$95,000 through Measure Y. Then they received a loan from Cal Trans, and the remaining amount came from taxes collected through airport fees and residents' taxes. The total amount is around \$830,000. The project was completed in Summer of 2023.

In the past the airport has served as a staging area and incident command center for large disasters like the Landers earthquake and the Sawtooth Complex. During the Landers earthquake many of the roads were too damaged to drive on, so supplies were airlifted into the airport to be distributed around the community.

The Sawtooth Complex closed the airport to the public for two weeks. During this time, emergency flight operations were conducted out of the airport. There is no onsite aviation fuel at the airport. CAL FIRE had to bring in their own fuel trucks. Immediately after the Sawtooth Complex another fire started in Joshua Tree and kept the airport closed for another two weeks. Again, flight operations and fueling from fuel trucks were conducted out of the airport. CAL FIRE established a temporary control tower for that incident.

The airport remains available for aerial firefighting operations. The airport is also used by medical helicopters to airlift critical patients to hospitals and for line workers replacing worn and damaged electrical lines to reduce the hazard of electrical fires. There is still no onsite aviation fuel or Fixed Base Operator (FBO) at the airport. Fuel trucks must be brought in to fuel planes and helicopters.

The Burns Canyon ASI is located west of Pioneertown and consists of a group of widely scattered residential properties accessed from Burns Canyon Road. The Burns Canyon ASI is indicated by the black polygon in **Figure 14**, which shows Burns Canyon in relation to the west side of the assessment area. Elevations in this area vary from 5,000 feet to 5,800 feet and there are large unbroken wildland fuel beds surrounding both sides of Burns Canyon Road. All the homes in this ASI are located in WI. There is no WUI or urban/suburban core.

Homeowners in the Burns Canyon ASI area are part of an active road association which is working to mitigate fire hazards to homes and along the access roads. Their primary concern is an alarming increase in OHV misuse that increases the probably of ignition and complicates access and egress for residents and responders (see Recommendation 8 in the *General Recommendations* section of this report. This group is currently working on mapping water resources for fire suppression in their area.



Figure 13, Yucca Valley Airport

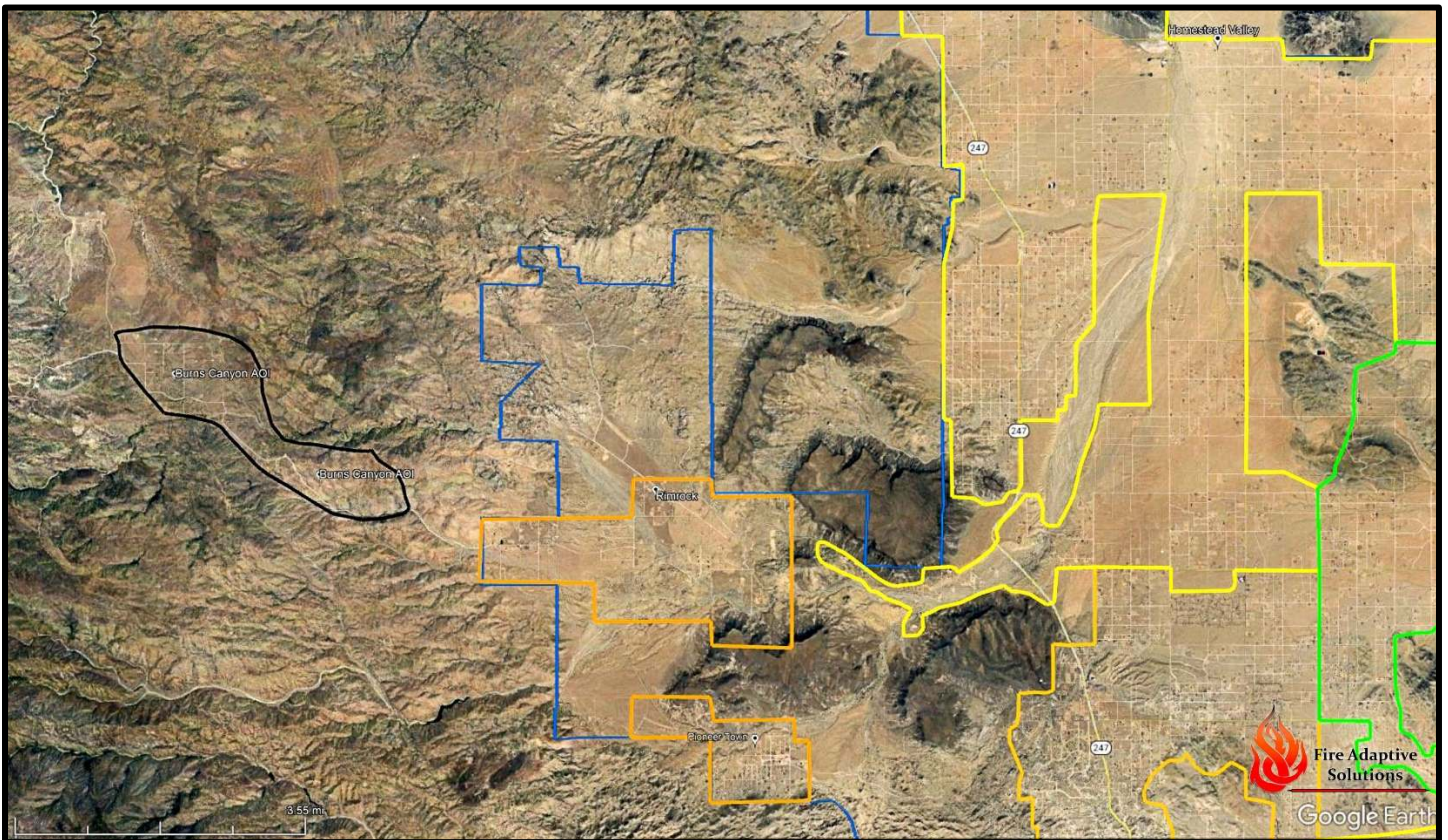


Figure 14, Burns Canyon ASI

Considerations

The airport is a critical piece of infrastructure for wildland intermix and interface suppression due to the large distances many homes are from fire stations. As such, grants and other funding sources should be pursued to ensure adequate funds for its continued operation.

- Paid staff and an FBO would increase the chances of the airport remaining a viable resource for fire suppression in the future. Although the airport does not qualify for FAA funding, other sources should be pursued to achieve this goal. Considering the importance of the airport for fire and medical operations, local fire agencies should also be engaged to promote this effort.
- Grants should be pursued to provide permanently located infrastructure for firefighting efforts at the airport including, but not limited to, aviation fuel tanks, fire retardant mixing capabilities and water tanks with fire department connections or pumpkin tanks if permanently installed water tanks are impractical.
- The Burns Canyon Road ASI should be studied in depth for fire hazards to residential property and access roads and potential mitigation recommendations assessed.
- The Burns Canyon Road homeowners should be supported by DRFS and IEFSA in their efforts to mitigate the increase in fire hazards caused by increasing OHV use. See Recommendation 8 in the *General Recommendations* section of this CWPP.
- When completed, the water resource map under development by the Burns Canyon Road homeowners should be included as an addition to the water resources described in this CWPP and shared with local firefighting agencies.

CONCLUSION

The analysis performed during the preparation of this report shows portions of the assessment area, particularly the Communities with a High ICHR hazard severity rating, to have a moderate likelihood for continued wildfires with a high potential for loss of life and damage to property. The following summary is a distillation of the highest priority actions to preserve life and property:

- Individual property owners must realize the survival of their homes will rely heavily on their ability and willingness to create defensible space and harden their structures to the greatest extent practical against ignitability from embers and firebrands. Support from DRFS, IEFSA HDEAA and other local fire safe councils is key to community awareness and support of these efforts.
- The agency having jurisdiction should support mitigation efforts of residents by advising and assisting those efforts wherever possible and by ensuring the existing statutes regarding fire hazard abatement are enforced, even if the property is vacant and/or owners are not residents of the area. This should include periodic code inspections to ensure compliance with California Public Resources Code 4291 and other applicable fire codes and ordinances.
- A complete map of the water supply for fire suppression should be maintained. Hydrants should be tested on an annual basis and serviced whenever necessary.
- Ensure roads and driveways are maintained to provide sustainable access for emergency response apparatus.
- Efforts to evaluate and reduce fuels along primary access and evacuation routes should be a priority. Maintenance evaluation and cutting must continue to be ongoing for these treatments to be effective.
- Efforts to improve and assure continued operation of the Yucca Valley Airport for aerial firefighting operations should be pursued.
- Further study to quantify fire hazards and recommend mitigations for the Burns Canyon ASI will be needed to improve the safety of residents and property.

GRANT RESOURCES

One of the biggest obstacles to overcome when trying to implement CWPP recommendations and wildfire mitigation projects is funding. A certified CWPP opens a multitude of funding sources to complete work outlined in the plan. For many mitigation projects, federal, state and county funds are available to begin treatments. The list below is not inclusive, but rather serves as a starting point for the most commonly available sources of funding and outreach for agencies and organizations.

Federal Emergency Management Agency (FEMA) Grants

- **Assistance to Firefighters Grant Program**
 - Purpose: to improve firefighting operations, purchase firefighting vehicles, equipment and personal protective equipment; fund fire prevention programs; and establish wellness and fitness programs.
 - Necessary information includes a DUNS number, Tax ID number and Central Contractor Registration
 - <https://www.fema.gov/welcome-assistance-firefighters-grant-program>
- **SAFER: Staffing for Adequate Fire and Emergency Response**
 - Purpose: to provide funding directly to fire departments and volunteer firefighter interest organizations in order to help them increase the number of trained, “front line” firefighters available in their communities. The goal of SAFER is to enhance the ability of local fire departments to comply with staffing, response and operational standards established by NFPA and OSHA.
 - <https://www.fema.gov/staffing-adequate-fire-emergency-response-grants>
- **Fire Prevention and Safety Grants (FP&S)**
 - Purpose: FP&S Grants are part of the Assistance to Firefighters Grants and are under the purview of the Grant Programs Directorate in FEMA. Their purpose is to support projects that enhance the safety of the public and firefighters from fire and related hazards.
 - <https://www.fema.gov/fire-prevention-safety-grants>
- **Hazard Mitigation Assistance Grant Program (HMGP)**
 - Purpose: to provide grants to state and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of HMA is to reduce the loss of life and property due to natural disasters and enable mitigation measures to be implemented during the immediate recovery from a disaster.
 - <https://www.fema.gov/grants/mitigation/hazard-mitigation>
- **Pre-Disaster Mitigation Grant Program (PDM)**
 - Purpose: to provide funds to states, territories, Tribal governments, communities, and universities for hazard-mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces the overall risks to the population and structures.
 - <https://www.fema.gov/pre-disaster-mitigation-grant-program>

CAL FIRE Grants

- **California Climate Investment (CCI) Fire Prevention Grant**

Purpose: provides funding for projects related to fuel (vegetation) hazard reduction, fire prevention education and training, and fire prevention planning. Projects funded by the grant will reduce the risk of fire ignition and spread in and adjacent to communities, educate owners of habitable structures about wildfire risks, or allow for strategic, long-term planning to reduce the risk of wildfire to communities in the SRA throughout the State.

- <https://www.caclimateinvestments.ca.gov/fire-prevention>

- **California Grants Portal**

This portal allows searches for any California state grant opportunity.

- <https://www.grants.ca.gov>

Natural Resources Conservation Service (NRCS)

- **Environmental Quality Improvement Program (EQIP)**

Purpose: provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland. EQIP may also help producers meet Federal, State, Tribal, and local environmental regulations.

- <https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives>

- **NRCS Conservation Stewardship Program (CSP)**

Purpose: To help identify natural resource problems and provide technical and financial assistance.

- <https://www.nrcs.usda.gov/programs-initiatives/csp-conservation-stewardship-program>

OTHER ORGANIZATIONS AND SERVICES

Firewise Communities

- Purpose: a multi-agency organization designed to increase education of homeowners, community leaders, developers, and others regarding the Wildland-Urban Interface and the actions they can take to reduce fire risk to protect lives, property and ecosystems.
- <http://www.firewise.org>

National Volunteer Fire Council

- Purpose: to support volunteer fire protection districts. Includes both federal and non-federal funding options and grant writing help.
- <http://www.nvfc.org/>

National Resources Conservation Service Emergency Watershed Protection Program

- Purpose: to undertake emergency measures including the purchase of flood plain easements for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed.
- https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/landscape/ewpp/?&cid=nrcs143_008258

REFERENCES/CITATIONS

- ¹ National Institute of Standards and Technology Technical Note 2205, March 2022, page 3 (footnote 1)
- ² <https://www.nwcg.gov/term/glossary/home-ignition-zone-hiz>
- ³ <https://www.census.gov/quickfacts/>
- ⁴ <https://www.yucca-valley.org/home/showdocument?id=7498&t=638302787509800302> , Page 57.
- ⁵ ibid
- ⁶ <https://egis.fire.ca.gov/FHSZ/>
- ⁷ http://calfire.ca.gov/communications/downloads/fact_sheets/CoopResponse.pdf
- ⁸ <https://hdeaa.org/about>
- ⁹ http://www.sbcounty.gov/lafco/items/201201/item_8_1d.pdf
- ¹⁰ <https://www.jbwd.com/index.asp?SEC=A41CABB2-1DF7-440C-9F1E-C6205F40EC92>
- ¹¹ https://ia.cpuc.ca.gov/gos/go95/go_95_rule_35.html
- ¹² <https://www.rsf-fire.org/wp-content/uploads/2016/10/SRAFireSafeRegulations.pdf>
- ¹³ <https://codes.iccsafe.org/content/CFC2019P4/appendix-d-fire-apparatus-access-roads>
- ¹⁴ <https://codes.iccsafe.org/content/CFC2019P4/appendix-d-fire-apparatus-access-roads>
- ¹⁵ <https://sbcfire.org/wp-content/uploads/sites/46/2021/09/A-1-Fire-Apparatus-Access-Road-Design-Construction-and-Maintenance-final-version.pdf>
- ¹⁶ <https://www.fama.org/wp-content/uploads/2018/01/TC009-Em-Veh-Weight-Reg-FAMA-IAFC-111122.pdf>
- ¹⁷ <https://smokeyzone.com/products/high-fire-danger-area-sign>

Morongo Basin
Community Wildfire Protection Plan
2023
Appendix A
Community Ignitability Analysis



**Fire Adaptive
Solutions**

4445 COMANCHE DRIVE
BOULDER, CO 80303
www.FireAdaptiveSolutions.com

COMMUNITY IGNITABILITY ANALYSIS

Purpose

The purpose of dividing residential areas into hazard zones (Communities) is to group the most heavily populated WUI/WI residential areas into hazard categories for prioritization of recommendations. This is accomplished through the use of the Interface/Intermix Community Hazard Rating (ICHR) tool, which is designed to analyze Home Ignition Zone (HIZ) hazard and mitigation factors within WUI/WI developments.

Methodology

The ICHR analysis incorporates data gathered in the field regarding structural ignitability, conditions in the home ignition zone, manmade fuel hazards and suppression factors with the fire behavior modeling and GIS analysis provided by No-HARM to generate a hazard score of 0 to 100 points where a 0 represents the lowest possible hazard and 100 the greatest. Adjective ratings for ICHR numeric scores are as follows: 30 or less = Low, 31-50 = Moderate, 51-70 = High, 71-90 = Very High and >90 = Extreme. For a more detailed discussion of the methodology behind these ratings please see *Appendix C: Methodology*.

Description

There are nine residential hazard zones in the study area. The ICHR score has been used to sort these zones into one of five adjective rating categories: low, moderate, high, very high and extreme. The Community boundaries and ratings are shown in **Figure 1** and **Table 1**. In **Figure 1** the study area boundary is shown in blue, and the Community boundaries are shown in the color corresponding to their hazard rating.

Of these nine Communities (Pioneertown, Morongo Valley, Rimrock, Yucca Valley, Joshua Tree, Homestead Valley, Twentynine Palms, Wonder Valley and Sunfair/Surprise Valley), none rated as extreme or very high. Pioneertown, Rimrock and Morongo Valley rated as high hazard. While most of Yucca Valley rated as moderate hazard, there are significant areas where hazards are higher, causing a split rating of high/moderate. Joshua Tree, Homestead Valley and Twentynine Palms rated as moderate hazard. Wonder Valley and Sunfair/Surprise Valley rated as low hazard primarily due to low structure density, light and discontinuous fuels and flat topography.

The split high/moderate rating of the Yucca Valley Community is due to some factors worth discussing. The entire south side of this Community abuts Joshua Tree National Park, which represents a large, unbroken fuelbed of shrubs, cacti and Joshua Trees. Topography is flat along the valley bottom but rises steeply to both the north and south and is complicated by ravines and washes causing elevations to range from 3,000' to over 4,300'. Although the mean slope in this community is only 7.3% there are slopes of up to 83% on the west and south sides. NoHARM predicted fire behavior is moderate for most of Yucca Valley, however it is high to very high for the southwest side where slopes are steeper and wildland fuels are heavier and more continuous to the west of the study area. The small urban corridor centered around Hwy 62, is surrounded by wildland fuels and could be subject to damage from ember cast depending on fire conditions. Although the majority of Yucca Valley should be considered at moderate hazard, additional hazards are high enough and exist in large enough parts of the south and west portions of this community to warrant the split rating.

The following Community descriptions are an overview of the general characteristics of the area. They focus on structural ignitability and HIZ hazards (both natural and man-made) based on field observations. This overview is not intended to describe every home or street but rather what is average or typical for that Community.

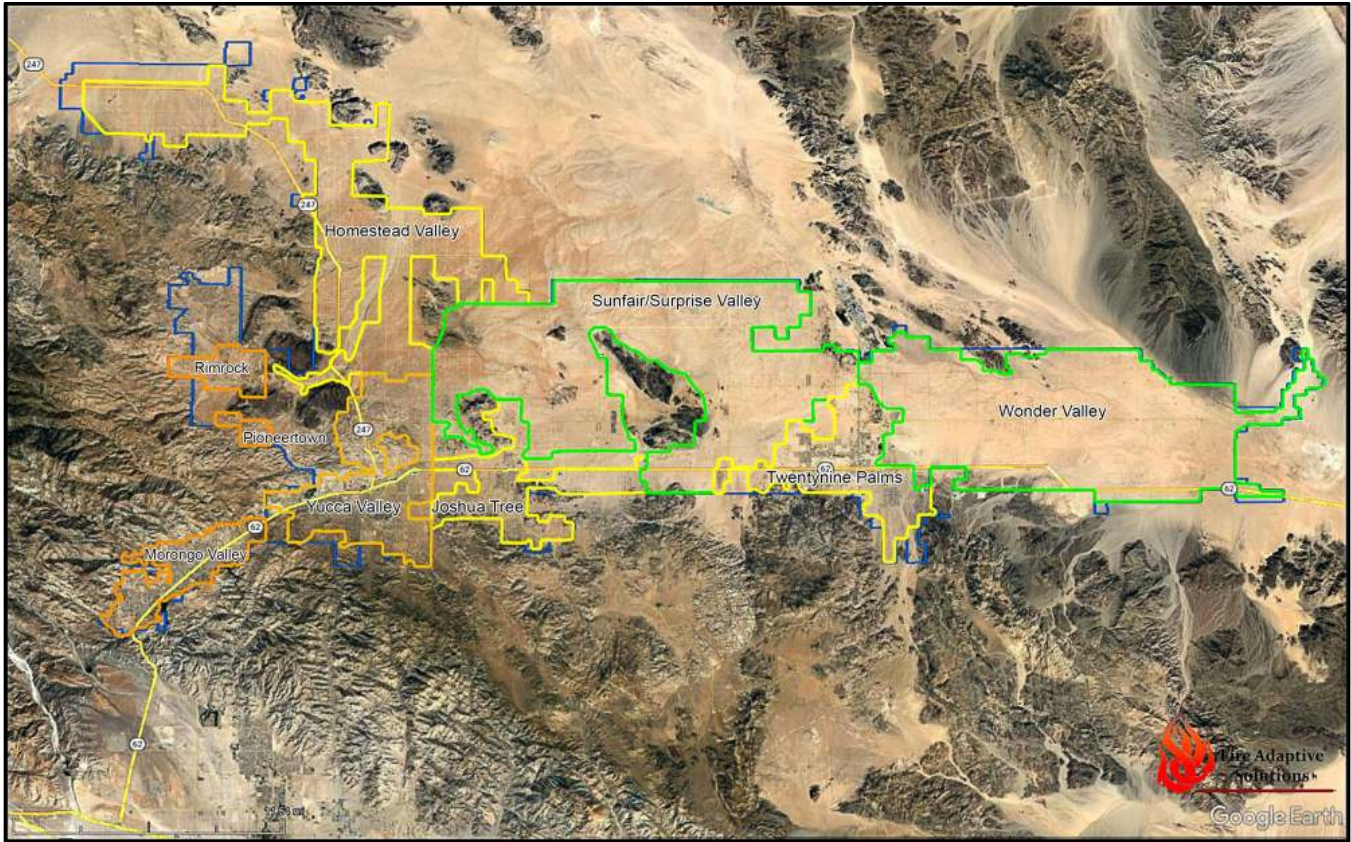


Figure 1 – Morongo Basin Community Boundaries

Table 1 - WUI/WI Community Hazard Ratings

Morongo Basin 2023 CWPP Interface/Intermix Community Hazard Ratings		
Community Name	Score	Adjective Rating
Pioneertown	63	High
Morongo Valley	53	High
Rimrock	52	High
Yucca Valley	50	High/Moderate
Joshua Tree	47	Moderate
Homestead Valley	37	Moderate
Twentynine Palms	36	Moderate
Wonder Valley	30	Low
Sunfair/Surprise Valley	29	Low

Rating Categories: Low 0-30; Moderate 31-50; High 51-70; Very High 71-90; Extreme > 90.

Structural Ignitability Discussion – Pioneertown



Figure 2 – Pioneertown

Hazard Rating:	High
Utilities Above or Below Ground:	Overhead power and propane tanks
General Construction:	Primarily wood siding with ignition resistant (IR) roof
Average Lot Size:	2.74 acres
Dual Access Roads:	One road in and out, but escape is possible North or South
Road Widths, Slope and Surface:	Steep, narrow dirt roads and driveways, some rough
Water Supply:	Hydrants, but see text
Proximity to Fire Station:	8 – 9.7 miles, mean distance 8.94 miles
Zone Characteristics and Hazards	

Most homes in this Community are moderate size single-family structures on moderate to large size lots and density is low. Although there are newer structures with IR siding and roofs mixed in, the dominant construction is older wood or partial wood siding structures with an asphalt roof. Most homes have flammable decks, fences and/or outbuildings. Open wooden decks and porches above fuels are common. Ornamental plantings as well as native vegetation exist too close to many structures and most homes have none, or inadequate defensible space. Fuels are primarily light to moderate loads of shrubs, grasses, Joshua trees and yucca. Fuel beds are broken, primarily by dirt clearings, throughout the center of this Community but are heavier and more continuous on both the north and south sides. Grasses and shrubs provide ladder fuels for larger shrubs, trees and structures. This Community is located in a mountainous area with steep, complex terrain. Elevations vary from 3,947' to 4,505' and slope grades of up to 75% exist. Although flatter lots exist in the valley along the east/west portion of Pioneertown Road, steep slopes and ravines exist on all sides of this Community. Utilities are supplied by overhead powerlines with wooden poles and propane tanks. The only way in and out of this Community is on Pioneertown Road. This paved road connects to other roads to both the north and south of Pioneertown but runs through continuous fuels and steep terrain in both directions. Most properties are accessed by rough dirt roads, many of which are one way in and out and some are also steep. There is a preserved "old town" area used for events that consists of almost entirely wood structures with shake roofs. Although the immediate area around the structures has been cleared of fuels, this area is still surrounded by native fuels and vulnerable to ember cast and spot fires. There are hydrants, but some are very old and in poor condition. Most street markers are non-reflective wooden poles that would be difficult to read at night or under fire conditions. Address markers are inconsistent in type and placement. Most homes do not have any visible address marker. Homes in this Community are all more than five miles from the nearest fire station.

Structural Ignitability Discussion – Morongo Valley



Figure 3 – Morongo Valley

Hazard Rating:	High
Utilities Above or Below Ground:	Above ground power lines and propane tanks
General Construction:	Wood siding with IR roof
Average Lot Size:	2.59 acres
Dual Access Roads:	One road in and out, but escape is possible East or West
Road Widths, Slope and Surface:	Rough dirt roads, some steep and narrow
Water Supply:	Hydrants
Proximity to Fire Station:	0 – 5.75 miles, mean distance 1.93 miles
Zone Characteristics and Hazards	

This Community is located in a hanging valley between the rest of the study area and the Palm Springs desert. Most homes in this Community are small to moderate size single-family structures, however, there are trailer parks and some larger homes are also horse properties. While there are some newer homes with IR siding and roofs (usually stucco and asphalt shingle), wood siding or mixed wood/stucco siding is dominant. Homes are small to moderate size near Hwy 62 with larger homes on larger lots scattered on the hills above. Most homes have flammable decks, fences and/or outbuildings. Open wooden decks and porches above fuels are common. Ornamental plantings as well as native vegetation exists too close to many structures and most homes have none, or inadequate defensible space. Fuels are primarily light to moderate loads of shrubs, cactus and yucca. Grasses and shrubs provide ladder fuels for larger shrubs, trees and structures. Elevations in Morongo Valley are lower than Yucca Valley, Rimrock, Pioneertown and western Homestead Valley, ranging between 2,385' and 3,773'. Slopes up to 79% exist. Homes at the higher elevations are primarily located on larger lots and density is lower. Most of these homes are located mid-slope or at the top of ridges and summits. The homes in the flattest part of the valley near Hwy 62 are generally located on low to moderate slopes. Utilities are supplied by overhead powerlines with wooden poles and propane tanks. The only way in and out of this Community is on Hwy 62. This paved highway runs east/west through this Community and connects to Palm Springs and Yucca Valley. The highway has steep grades in both directions. Most properties are accessed by rough dirt roads, many of which are one way in and out, and some are steep. There are hydrants, but some are very old and in poor condition. Street signage is generally good; however, most homes do not have a visible address marker. Address markers that do exist are inconsistent in type and placement. Morongo Valley has its own fire department (MVFD), but there are still some homes in Morongo Valley that are more than five miles from a fire station. Response to many of these will be slowed by the rough condition of most roads and driveways. MVFD has a mutual aid agreement with CAL FIRE, but not SBCFD.

Structural Ignitability Discussion – Rimrock



Figure 4 - Rimrock

Hazard Rating:	High
Utilities Above or Below Ground:	Above ground power lines and propane tanks
General Construction:	Primarily combustible siding with IR roof
Average Lot Size:	6 acres
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Rough dirt roads, some steep and narrow
Water Supply:	Hydrants
Proximity to Fire Station:	6.3 – 11.3 miles, mean distance 8.8 miles
Zone Characteristics and Hazards	

Most homes are small to moderate size and located on moderate to large size lots. Some are also horse properties. Most homes are older construction with wood siding and an asphalt shingle roof. Flammable fences, decks, projections and outbuildings are common. There are several properties with piles of flammable debris in the yard. Natural fuels consist of primarily shrubs and grasses. Fuel loads are generally moderate and discontinuous where the homes exist but become heavier and more continuous in the surrounding hills. This is another Community with complex topography. The west side of Rimrock is mountainous. Ridges and summits surround this Community and there are many steep ravines and drainages. Elevations range from 3,904' to 4,879' and slope grades of up to 79% exist. While there are homes located mid-slope and on ridges, most are located on flatter terrain. This community can be accessed by either Pioneertown Road from the south or Pipes Canyon Road to the east. These primary roads are paved and of adequate width, but Pipes Canyon is narrow and runs through continuous fuels that encroach the road. The 2006 Sawtooth Complex burned through Pipes Canyon nearly to Hwy 247. Most homes in Rimrock are only accessible by very rough dirt roads and driveways. These are usually narrow with native vegetation encroaching on the driving surface. Many are dead ends that may not have adequate turnarounds for apparatus. Utilities are supplied by overhead powerlines and propane tanks. There are hydrants, but some are very old and in poor condition. Street signs are generally good, but address markers are non-reflective or missing for most properties. Address markers that do exist are inconsistent in type and placement. Homes in this Community are all more than five miles from the nearest fire station.

Structural Ignitability Discussion – Yucca Valley



Figure 5 – Yucca Valley

Hazard Rating:	High/Moderate
Utilities Above or Below Ground:	Overhead power, mixed gas
General Construction:	Primarily combustible siding with IR roof
Average Lot Size:	1.29 acres
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Rough dirt access roads, some steep and narrow
Water Supply:	Hydrants
Proximity to Fire Station:	0 – 5.29 miles. Mean distance 2.28 miles
Zone Characteristics and Hazards	

This community abuts Joshua Tree National Park. Small to moderate size single-family homes on small lots (less than ½ acre) are dominant, although the Western Hills neighborhood in the northern end of this community has larger homes. In general lots are larger in the northern and southern edges of this community and density is lower. Construction types are a mix of wood siding (or partial wood siding with some stone or stucco) and stucco with an asphalt shingle roof. A few of these have metal roofs. There are several abandoned buildings including 20-30 homes south of Yucca Trail. Many homes have flammable fences, decks or other architectural features. Several yards are cluttered with flammable materials such as tires, wood piles and construction materials. Some residences have flammable outbuildings too close to fuels. Few (if any) homes have adequate defensible space. Flammable ornamental plantings and native vegetation are too close to most structures. Fuels are heavy to moderate loads of shrubs (including Creosote and creosote) and Joshua trees. Bunch grasses occur in patches in some areas. Native fuels are heaviest on the south end of this community, lighter along the valley floor where development becomes more urban and then heavier again on the slopes and ridge tops to the north. The topography is flat along the valley bottom but rises steeply to both the north and south and is complicated by ravines and washes. There are homes located mid-slope and on ridgetops with steep slopes below. Although both Hwy 62 and Hwy 247 access this community there are many dead-end streets and cul-de-sacs. The paved roads are generally of adequate width, but there are many rough dirt roads and driveways. Almost all these dirt roads are rough enough to compromise response times. Apparatus turnarounds are inadequate or non-existent on many residential streets. Street signage is generally adequate; however, most homes do not have visible address markers and those that do are inconsistent in type and placement. Some homes are serviced by SoCal Gas, but there are also many with propane tanks and most of these have vegetation or other flammable materials too close to tanks or lines. Powerlines are above ground on wooden poles. Flammable vegetation is growing too close to lines and poles in some areas. There are tree limbs growing around powerlines and in some cases stressing the lines. This Community has a hydrant system; however, some hydrants are surrounded by vegetation that hinders access. Although there are two SBCFD stations in this Community response time to some areas will be long due to distance and poor roads.

Structural Ignitability Discussion – Joshua Tree



Figure 6 – Joshua Tree

Hazard Rating:	Moderate
Utilities Above or Below Ground:	Above ground power, mixed gas
General Construction:	Mix of combustible and IR siding with IR roof
Average Lot Size:	1.9 acres
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Some rough dirt roads and driveways
Water Supply:	Hydrants
Proximity to Fire Station:	0 – 6.72 miles. Mean distance 2.45 miles
Zone Characteristics and Hazards	

Single-family homes and mobile home parks are dominant. Homes are generally small on small to medium size lots (less than 1 acre). There are some newer homes with IR siding (usually stucco), but most homes are older with a mix of stucco and wood siding or stucco with wood attachments and architectural details. Roof types are mixed, but most are IR. There are some abandoned buildings and poorly maintained homes. Some yards are cluttered with flammable materials such as tires, wood piles and construction materials and/or have flammable outbuildings too close to fuels. Few (if any) homes have adequate defensible space. Flammable ornamental plantings and native vegetation are too close to many structures. This area has several mobile home parks which are the most serious concern for house-to-house transmission of fire as some of these are old and not well maintained. Fuels are primarily light to moderate loads of native shrubs, cacti and yucca. Flammable ornamental plantings in this community include Italian cedars, pines, palms (many not trimmed of dead fronds) and Palo Verde. Topography is flat along the valley bottom near Hwy 62 but rises steeply on both the north and south sides where it is complicated by ravines and washes. Elevation ranges from 2,220' to 4,143' and slope grades up to 85% exist. Although most homes are in flatter terrain there are some located mid-slope on moderate to steep slopes. Primary roads are paved and of adequate width, but several homes are located on rough dirt roads or driveways. Most homes do not have visible address markers and those that do are inconsistent. Power is provided by overhead lines on wooden poles. Some parts of this community are serviced by SoCal Gas, but other homes are on propane tanks. This community has a hydrant network maintained by Joshua Basin Water District; however, no hydrant map or maintenance information is publicly available. Although there is a SBCFD station in this Community, there are still homes more than five miles away from the nearest fire station. This Community is a primary gateway to Joshua Tree National Park. The West entrance (at Park Blvd./Quail Springs Road) sees many visitors during the busy season (October to May). This influx of visitors sometimes creates traffic jams that could complicate firefighter access and evacuation during an incident. The increased outdoor activity associated with this level of visitation also increases the probability of human-caused fire starts.

Structural Ignitability Discussion – Homestead Valley



Figure 7 – Homestead Valley

Hazard Rating:	Moderate
Utilities Above or Below Ground:	Above ground power lines and propane tanks
General Construction:	Primarily combustible siding with IR roof
Average Lot Size:	4.22 acres
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Rough dirt roads and driveways, some narrow
Water Supply:	Hydrants in some, but not all, areas
Proximity to Fire Station:	0 – 19.2 miles. Mean distance 7.54 miles
Zone Characteristics and Hazards	

Small to moderate size single-family homes on moderate to large lots are dominant. Most lots are 2-20 acres. The dominant construction type is wood siding or partial wood siding with an asphalt shingle roof, however there are newer homes with IR siding (usually stucco) mixed in. There are also some abandoned buildings. There are many homes with flammable fences, decks, and/or outbuildings. Many yards are cluttered with flammable materials. Few homes have adequate defensible space. Flammable ornamental plantings and native vegetation are too close to most structures. Fuels are moderate to light loads of shrubs and bunch grasses. Joshua trees and cacti occur occasionally. Native fuel loads are generally lighter than Yucca Valley and are broken in the rockier areas. They are still; however, heavy in spots and the relatively low structure density leads to large, unbroken fuel beds. Topography is flat to low angle where most homes are located, but there are some homes located mid-slope on steeper terrain. This Community has several steep rock intrusions, and the topography is complicated by ravines and washes. Elevations range from 2,569' to 4,177'. Pipes Canyon runs through this area and floods frequently, often closing the main access road (Hwy 247). There are other ways in and out of this community, but there are also dead-end streets and cul-de-sacs. The paved roads are of adequate width, but there are many rough dirt roads and driveways. Street signage is generally adequate; however, most homes do not have visible address markers and those that do are inconsistent in type and placement. Utilities are supplied by propane tanks and overhead powerlines on wooden poles. Flammable vegetation is growing too close to lines and poles in some areas and several homes have vegetation or other flammable materials too close to tanks or lines. There are hydrants in some parts of this community; however, the Johnson Valley portion does not have any water for fire suppression and all domestic water is either hauled in or from wells. SBCFD's Aberdeen station (Station 42) is in Yucca Mesa; however, distance and rough access make for long response times to most of Homestead Valley. There is a large BLM OHV area in Johnson Valley that could be an ignition source. The Landers area is like the rest of Homestead Valley except there is domestic water supplied by Big Horn Water and some hydrants. Some of the hydrants are in poor condition and there is no other water for fire suppression. Yucca Mesa is a more developed area within the Homestead Valley Community and also has hydrants.



Figure 8 – Twentynine Palms

Hazard Rating:	Moderate
Utilities Above or Below Ground:	Above ground power, mixed gas and propane tanks
General Construction:	Mix of wood and stucco siding with IR roof
Average Lot Size:	1.3 acre
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Some rough dirt roads and driveways
Water Supply:	Hydrants
Proximity to Fire Station:	0 – 7.2 miles. Mean distance 2.39 miles
Zone Characteristics and Hazards	

Twentynine Palms is one of two main gateways to Joshua Tree National Park (JTNP) in the study area and there is a dense cluster of homes between Hwy 62 and the park boundary. Properties consist of trailer parks (some very old) and older single-family homes. Most of these are small structures on small lots. IR siding (stucco) with an asphalt roof is the dominant construction type, however, there are also many older wood siding homes mixed in. Most homes have flammable decks and projections, fences, debris piles and/or outbuildings. Many of the older homes are in poor condition, including some abandoned and unfinished structures. There is a large, relatively unbroken fuelbed between Twentynine Palms and the park consisting of native shrubs, yucca, and cacti. Fuel loads vary from light to moderate. Many homes have flammable vegetation, both native and ornamental, too close to structures. These include palm trees, most of which are untrimmed or standing dead, Palo Verde, and various ornamental tree species. In town the native vegetation becomes sparse consisting of primarily Creosote shrubs. Except between the park and the south edge of this Community, fuels are lighter than in Yucca Valley. There are two city owned parks and two schools with irrigated sports fields. Topography is flat to low slope, except on the south side where the terrain becomes mountainous between this community and JTNP. The mean slope is 4.25%, but slopes of up to 65% exist on the south side. Elevations vary from 1,761' to 2,813' and even the flatter terrain is complicated by washes and ravines. Addressing is inconsistent and many homes do not have any visible address marker. Utilities are supplied by overhead powerlines on wooden poles and propane tanks, but some of the newer homes may be on SoCal Gas. Twentynine Palms has a water district, but during the preparation of this CWPP we could not locate any public information regarding their hydrant system. The system appears to be old and many of the hydrants need work, however local sources say the water district does update their system. There is an SBCFD station (Station 44) on Adobe Road near Hwy 62, but there are still several homes more than five miles from the nearest fire station. The JTNP North entrance (on Utah Trail) sees many visitors during the busy season (October to May). This influx of visitors sometimes creates traffic jams that could complicate firefighter access and evacuation during an incident. The increased outdoor activity associated with this level of visitation also increases the probability of human-caused fire starts.

Structural Ignitability Discussion – Wonder Valley



Figure 9 - Wonder Valley

Hazard Rating:	Low
Utilities Above or Below Ground:	Above ground power lines and propane tanks
General Construction:	Primarily wood siding with mixed roof types
Average Lot Size:	6.8 acres
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Many rough dirt roads and driveways
Water Supply:	None
Proximity to Fire Station:	1.20 – 23.56 miles. Mean distance 8.92 miles

Zone Characteristics and Hazards

This Community is in a relatively flat valley surrounded by low mountain ridges. There are pockets of homes, but there's a lot of empty space and structure density is low. Homes are mostly small structures on large to medium size lots. Construction is older and typically wood siding with an asphalt shingle or tar paper roof. There are a few newer homes with IR siding and metal roofs, however these are in the minority. There are many abandoned, dilapidated shacks and cabins. Boarded up "Jackrabbit" homestead cabins are common. Many lots have flammable debris piles in the yard including old cars and abandoned trailers. There are ornamental plantings too close to some structures. Vegetation is similar to Twentynine Palms, but the ground is even more sandy with lighter ground cover. Dominant vegetation is still shrubs, but most are small. Vegetative fuel loads are light to almost non-existent. Elevations here are lower than the rest of the study area averaging between 1,191' and 2,152'. While this Community is mostly flat to low slope there are some steeper slopes (up to 54%). While there are a few paved roads (such as Godwin Road, Amboy Road and Hwy 62) most roads are dirt, and a number are quite rough. Utilities are provided by overhead powerlines on wooden poles and propane tanks. There is no hydrant network or other reliable water source for fire suppression. Domestic water is supplied by wells or hauled in. Address markers are inconsistent at best and missing from most lots. Twentynine Palms private airport is in this Community. The closest fire response is from Station 44 in Twentynine Palms. This is a large Community, and most homes are more than five miles from a fire station. Some are over 20 miles from the nearest fire station. The poor condition of the roads will make response times to the outlying areas very long.



Figure 10 – Sunfair/Surprise Valley

Hazard Rating:	Low
Utilities Above or Below Ground:	Above ground power lines and propane tanks
General Construction:	Primarily combustible siding with IR roofs but see text
Average Lot Size:	5.1 acre
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Many rough dirt roads and driveways
Water Supply:	Mixed, see text
Proximity to Fire Station:	1 – 12.2 miles. Mean distance 5.55 miles

Zone Characteristics and Hazards

This Community is mostly flat to gently sloping desert terrain with a few notable uplifts. Most of this Community is similar to Wonder Valley with older, small homes on moderate to large size lots. The Sunfair area, however, has newer homes and an Airstream glamping park. In Sunfair, homes are small single-family structures on small lots and trailer parks. While newer homes with IR siding and roofs (usually stucco siding with asphalt shingle roofs) are dominant in Sunfair, this is a small area and in the rest of Surprise Valley homes and lots are similar to Wonder Valley. As in Wonder Valley, there are boarded up cabins and many lots have piles of flammable debris in the yard including old cars and abandoned trailers. There are ornamental plantings too close to some structures, however fuel loads are generally light to non-existent. Dominant vegetation is native shrubs, but most are small. Although most of the homes are in flat to gently sloping terrain there are some significant uplifts with some homes are located mid-slope. There's a large uplift in the middle of this Community that is mostly BLM property. Fuel loads are heavier at the higher elevations of this property, but there are no residential structures here. Slope grades up to 82% exist in this Community and elevations vary from 1,762' to 3,481'. Elevations generally trend from higher in the west to lower in the east. While there are some paved roads, most roads are dirt, and a number are quite rough. Utilities are provided by overhead powerlines on wooden poles and propane tanks. The western part of this Community, including the Sunfair area, has hydrants, but in most of Surprise Valley there is no hydrant network or other reliable water source for fire suppression. Domestic water is supplied by wells or hauled in. Address markers are inconsistent at best and missing from many lots. This is a large Community, and many homes are more than five miles from a fire station. Some are over 10 miles from the nearest fire station. The poor condition of the roads will make response times to the outlying areas very long.

Morongo Basin

Community Wildfire Protection Plan 2023

Appendix B

Home Ignition Zone Recommendations



**Fire Adaptive
Solutions**

4445 COMANCHE DRIVE
BOULDER, CO 80303
www.FireAdaptiveSolutions.com

INTRODUCTION AND HOME IGNITION ZONE DEFINITIONS

Introduction

The two most important recommendations in this CWPP are.

- 1) for existing structures to implement defensible space techniques and be fire hardened to the greatest extent practical.**
- 2) for ignition resistant construction and defensible landscaping to be incorporated into future development.**

Most homes in all the Communities of the study area will benefit from fuels management in the Home Ignition Zone (HIZ) and structure hardening. Even vacant residential properties should implement the practices in this appendix. Proper HIZ maintenance and structure hardening will help prevent fires that could spread to surrounding structures or wildland fuels and reduce the potential for structure loss through ember cast in the event a fire does involve the structure.

Structure hardening and ignition resistant plantings will be discussed later in this appendix, but first, we'll cover the basic practices involved in fuels management in the HIZ. The defensible space concepts presented below can be applied to closely built groups of homes as well as individual homes built on larger lots with greater spacing. In fact, in high density neighborhoods where structure separation distance is small (often as little as six feet for properties on lots of 0.15 acres or less) cooperative participation in fuels removal and modification is imperative as the ignition of a single structure has a disproportionate effect on surrounding structures compared to neighborhoods where structure spacing is greater. The authors and stakeholders of this report recognize the difficulty involved in coordinating large groups of homeowners and organizations such as HOAs; however, the creation of defensible space and structure hardening will produce the greatest benefits for the protection of life and the conservation of property from the effects of wildfire. For more information on broader community protection, please visit <https://fireadaptednetwork.org/>.

What is The Home Ignition Zone?

There are primarily two factors that determine a home's ability to survive wildfire: the ignitability of the structure, and the quality of the defensible space surrounding it. These two factors are combined in the HIZ (See **Figure 1**), which considers both the structure itself and the space surrounding it when designing actions to mitigate the effects of wildfire.

One of the greatest challenges to limiting the potential damage from wildland fires in the study area is the lack of adequate defensible space. In neighborhoods where homes are too close to create adequate individual defensible spaces, cross-boundary cooperation will be necessary to execute effective treatments. Throughout the study area, land adjacent to homes is of varied ownership, and any fuels modifications extending beyond lot boundaries will require collaboration and perhaps special permission to implement. Homeowners need to be aware they cannot cut and dump behind their property to create defensible space.

Under extreme conditions, wildland ignitions could quickly involve homes located on the edge of natural fuels and spread through neighborhoods by house-to-house transmission. This type of fire spread was observed in the 2021 Marshall Fire near Boulder Colorado that destroyed nearly 1,100 homes and claimed at least one life. It is not possible to develop effective individual defensible space where structures are spaced close together on small lots; however, it is possible to create linked defensible space by building defensible perimeters around clusters of dwellings and replacing flammable vegetation and manmade materials near and between structures with ignition resistant plantings and noncombustible materials (See **Figure 2**).

Much of the following general information regarding creating defensible space has been adapted from information available on the CAL FIRE defensible space website, <https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/>.

The specific distances quoted below are guidelines, and depending on circumstances of fuels, topography, and ownership, these distances may need to be modified. The full text of Public Resource Code (PRC) 4291 is available at https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=4291.&lawCode=PRC

Defensible space is defined as an area around a structure that has been modified to reduce fire hazards. Natural and manufactured fuels are treated, cleared, consolidated, or substituted with ignition-resistant landscaping to slow the spread and intensity of fire. The development of defensible space involves zones in which different techniques are deployed. These zones should be developed for every structure on the property larger than 120 square feet, including detached garages, storage sheds, barns, etc., as well as the home. The specific design depends on many factors, including, but not limited to, the size and shape of buildings, construction materials, topography, and vegetative type. Although California CCR 1299.02 defensible space standards exempt buildings less than 120 square feet that are not used for habitation, research published in NIST Technical Note 2205, *WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology* demonstrates small auxiliary fuels including outbuildings, fences and even vehicles can act as fuel jackpots reducing structure separation distance and potentially creating a high exposure to residences. Tight spacing of fences, sheds and other auxiliary fuels also negatively affect the safe operation of responders as well as the survivability of structures.¹ Their conclusion was that small auxiliary fuels (including structures) should be removed or relocated if they are within 25 feet of the target (residence or other asset to be protected).²

It is very important to ensure where relocation of flammable materials, such as wood piles, away from the home is recommended, that relocation does not place those materials too close to other flammable structures or linear features, such as fences, that could create a pathway for fire to adjacent properties. The location of cars, boats and recreational vehicles is often not considered in defensible space plans, but these are combustible and can provide pathways for fire spread. Relocation of fuels can be difficult to accomplish on small lots in high density neighborhoods and is a tactic best suited for larger lots where combustibles can be more adequately separated. On very small lots (< 0.15 acres) with little structure separation removing hazardous fuels and replacing combustible features with non-combustible alternatives is likely to be the only way to create defensible space. When planning defensible space, the location of flammable structures and other fuels should always consider not only the distance to structures on that individual property, but distances to structures and flammable features on adjacent properties.

The zone definitions below conform to CAL FIRE designations. CAL FIRE defines Zone 0 as the “Ember Resistant Zone”, Zone 1 as the “Lean, Clean and Green Zone” and Zone 2 as the “Reduce Fuel Zone”. It is important to note California law requires defensible space within a 100-foot perimeter of the house or to the property line and considers Zone 2 to extend from 30 feet to 100 feet (or to the property line if it is less than 100 feet) from structures and decks.

Homeowners looking to sell properties located in a “High” or “Very High” fire hazard severity zone as defined by CAL FIRE are required to provide proof of defensible space compliance by requesting an AB 38 Defensible Space Inspection. “Very High” fire hazard severity zones exist in the study area. See the Fire Hazard Severity Zone Viewer at <https://egis.fire.ca.gov/FHSZ/> for detailed locations.

Some local governments have ordinances more stringent than California law. For example, San Diego County requires 50 feet of clearance in CAL FIRE Zone 1. The fire hazard abatement ordinances covering the mountain and desert areas of San Bernardino County (where the study area is located) can be viewed or downloaded from the San Bernardino County Land Use Services website here, <https://lus.sbcounty.gov/fire-hazard-abatement-home/resources-county-code/>. Other useful resources, including a list of fire-resistant plants can also be found on this website. The distances given below are from the CAL FIRE standard and should be considered guidelines. Local fire authorities should always be consulted when planning defensible space treatments.

Zone 0 (the Ember Resistant Zone) extends from zero to five feet from the structure. Zone 0 distance is measured from the outside edge of the eaves, decks, or other attached projections.

- In general, nothing should be planted in the first five feet from the structure, and ground cover should be non-flammable such as gravel, cement, or flagstones. No combustible bark or mulch should be used for landscaping in this zone.
- Any cuttings or vegetative debris such as dead or dying vegetation, leaves, needles, cones and bark should be removed.
- Combustible items on decks such as outdoor furniture, planters and flammable ornaments should be limited.
- Pine needles and any other flammable debris should be removed from any decks or projections and raked to five feet away. Raking this material more than five feet has not been shown to significantly reduce the likelihood of ignition and is not recommended.
- Remove any branches that overhang the roof or are within 10 feet of a chimney or stovepipe.
- Firewood and any lumber piles should be relocated to Zone 2.
- Garbage and recycling bins, boats, RVs, and other combustible items should be located outside this zone.

Zone 1 (the Lean Clean and Green Zone) extends from five to 30 feet from the structure and is managed to reduce the intensity of approaching fire. Fuels management in this Zone consists of the following:

- Remove any stressed, diseased, dead, or dying trees or shrubs.
- Create at least 10 feet of crown spacing between individual, or small groups of, trees. Groups of two or three trees may be left in some areas, but a spacing of 30 feet is recommended between such groupings.
- Remove ladder fuels and prune branches from tree trunks up to a height of at least six feet for trees 12 feet or more in height or 1/3 of the tree height for smaller trees. The remaining branches should be no less than 10 feet from other trees. Limbs should be cut no less than ¼ inch from the trunk to preserve tree health.
- Leave a minimum distance of 2 ½ times the mature height between groups of shrubs.
- Groups of shrubs should be no larger horizontally than twice the mature height.
- There should be a vertical gap of at least three times the height of any shrubs to the lowest branches of trees.
- Mow grasses to a maximum height of four inches. This is especially important in fall when grasses have cured.
- Woodpiles should be moved to Zone 2, but regardless of location there should be a 10-foot clearance down to mineral soil around any woodpile. Do not make woodpiles any larger than necessary.
- Propane tanks should also have 10 feet of clearance to mineral soil in all directions and no flammable vegetation for at least 20 feet from the tank's exterior.
- Remove dead or dry vegetation such as piles of leaves and needles.
- Avoid heavy accumulations (known as jackpots) of fuels on the ground, including logs, slash, or mulch piles.

The distances given here are minimums and should be increased for slopes and dangerous terrain features. While the CAL FIRE defensible space website (<https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/>) gives general guidance regarding additional spacing on slopes, we strongly recommend a fire or forestry professional be consulted when planning defensible space in steep or complicated topography.

Zone 2 (the Reduce Fuel Zone) is designed to provide a gradual transition between Zone 1 and the natural vegetation condition of the surrounding lands. CAL FIRE defines this zone as extending from 30-100 feet, or to the property line if it is less than 100 feet, from structures and is managed to promote vegetative health and limit fire behavior. Healthy forests usually contain various ages, heights, and species; however, reducing ladder fuels and maintaining or creating crown spacing should be primary concerns. Clearances recommended for Zone 1 apply here as well. Mitigation requirements are specified in the County fire hazard abatement codes found on the department of Land Use Services website. Additional requirements may exist depending on situational factors. Contacting the San Bernardino County Fire Department or local CAL FIRE office for management guidance for properties extending beyond 100 feet from structures (into Zone 3, the native fuel bed) is highly recommended.

Existing structures can be difficult to fire harden. Removal, reduction and/or relocation of fuels should always be implemented as the primary defensive measure. Creating defensible space is not a one-time job. To be effective defensible space must be maintained on an on-going basis.



Figure 1 - The Home Ignition Zone



Figure 2: Linked defensible space example

IGNITION RESISTANT LANDSCAPING AND STRUCTURE HARDENING

Ignition-Resistant Landscaping

Ignition-resistant landscaping generally includes widely spaced trees, low-fuel volume shrubs, and herbaceous groundcover. Ignition-resistant, native re-vegetation should be considered at least as far as the 30-foot perimeter of Zone 1. In areas where it is practical and desirable, replanting with fire-wise species and implementing proper planting practices will provide the following benefits:

- Reduce fire risk by limiting the ability of invasive and flammable species to return.
- Protect bare soils from erosion.
- Promote natural beauty and ecological stability without sacrificing adequate wildland fire protection.

Examples of fire-wise planting practices would be to space trees widely to interrupt the continuity of aerial fuels, plant low-fuel volume shrubs (usually no greater than 18 inches in height) and integrate decorative rocks and non-combustible natural features into the landscape design. Deep watering trees through the summer, fall and during dry winters will keep trees alive and deter insects. Healthy, well-irrigated plants are less flammable, and irrigation systems can reduce the intensity and spread of surface fires.

Drought-resistant plants and irrigation systems should be utilized in newly planted areas. Existing plants that are fire resistant do not have to be replaced to reduce the fire risk; however, flammable varieties such as tamarisk, Italian cypress, junipers and palms should be avoided. San Bernardino County Land Use Services maintains a list of low fire hazard plants on their website which is available here, <https://lus.sbcounty.gov/fire-hazard-abatement-home/resources-county-code/>. Emphasis should be placed on the use of these species. Any retained natural vegetation needs to be maintained at a conservative fuel level and arrangement. Decorative rocks should be integrated into the design. Stone will help anchor and stabilize soil, break fuel continuity, and provide a natural look to the landscape. For more information on fire-resistant landscaping see the California Native Plant Society website at <https://www.cnps.org/flora-magazine/fire-resistant-landscaping-23654>.

Careful planting of a firewise landscape can provide open space and common areas with natural beauty and ecological stability without sacrificing adequate wildfire protection.

To retain the health and vigor required to be fire-resistive, plants require maintenance. Vegetative maintenance is a critical factor in safeguarding these species' ignition-resistant qualities and continuing resistance to undesirable fire effects. Ongoing maintenance should include adequate watering, removing of dead material, weed control, cutting grasses to four inches or less, pruning trees and shrubs to prevent the buildup of ladder fuels, and removing surface fuel jackpots. Ladder fuels and fuel jackpots contribute to crown fire development and ember cast during fires.

It is important to remember fire mitigation is not a one-time job. Defensible space should be maintained year-round, and reducing structural ignitability is an ongoing process.

The Importance of Reducing Structural Ignitability and Individual Parcel Assessments

In their 2013 publication *How Risk Management Can Prevent Future Wildfire Disasters in the Wildland-Urban Interface*, David E. Calkin, Jack D. Cohen, Mark A. Finney, and Matthew P. Thompson come to the following conclusion:

“The demonstrated inability to suppress wildfires under extreme weather conditions and the fact that many homes are not destroyed when exposed to these wildfires indicates that reducing home ignition potential is key to effectively reducing home destruction. Because home ignitions are primarily determined by conditions on private property, the principal authority, and thus, primary responsibility for preventing WUI home destruction lies with homeowners rather than public land managers.”³

As mentioned earlier, the HIZ is comprised of the structure itself and the area within the first 100 feet (or in some cases as much as 200 feet). Individual home hazard assessments can provide a road map for homeowners to reduce the ignition potential of the HIZ; however individual assessments rely heavily on the evaluation of conditions existing from the structure up to at least 200 feet out or the property line. As such, they are most effective when lot sizes are one acre or greater.

Homes in some of the Communities identified in this report, especially isolated homes on large lots adjacent to native fuelbeds, could receive the most benefit from parcel-level hazard assessments; however, in some neighborhoods of the study area, homes are too close together and lots too small for individual parcel assessments to yield much actionable information. For that reason, we recommend individual parcel assessments focus on areas where the average lot size is one acre or larger. For neighborhoods where homes are located closer together, we recommend focusing on reducing HIZ ignition potential through linked defensible space and structure hardening tactics discussed below. In neighborhoods where lots are large enough to benefit from parcel-level assessments, the data gathered should be integrated with the Community-level structural ignitability analysis presented in *Appendix A: Communities* to establish a framework for cooperative future mitigation efforts.

Structural Hardening Recommendations

NEW DEVELOPMENT

The best time to reduce the ignitability of a home is before it's built. Therefore, we recommend during the planning stage questions such as these be addressed:

- Are there multiple access points, and would access be safe for responders and evacuees during fire conditions?
- Can the adjacent fuels be modified to create adequate defensible space for homes considering the fuel type and topography?
- What is the potential fire behavior and ember cast from fires approaching the development during both typical and extreme fire weather conditions?
- Will complex forms or flammable materials in the architectural design trap heat and embers?
- Does the design of homes and neighborhoods include adequate turnarounds and access for apparatus and sufficient water for fire suppression?
- Are streets and home addresses visibly marked with consistent, reflective signage?

Compliance with SRA Fire Safe Regulations and Chapter 7 of the California Building Code is intended to help address some of these issues.

EXISTING COMMUNITIES

Although some of the factors impacting the survivability of structures are best addressed before the home is built, there are important steps that should be taken to improve the chances of survival for existing homes.

The role of embers in structure loss cannot be overstated. Embers are generated by burning materials and lofted by wind and convective heat ahead of the main fire front. Structures are vulnerable to ember penetration in numerous ways. Some of the more common areas are outlined below.

Roof: Fortunately, few homes and outbuildings in the study area have flammable roofs. The roof of a structure has a significant impact on its ignitability and the likelihood of house-to-house fire spread. Class A roofing materials such as asphalt shingle, metal, and tile roofs are all considered ignition resistant. We recommend future use of any functional or decorative wood shingle, tar paper or other flammable roofing material for repair or replacement be prohibited.

Decks: There are quite a few homes with wooden decks, stairs and/or projections. According to some fire authorities, wooden decks are so combustible that when a wildfire approaches, the deck often ignites before the fire reaches the house.⁴ The shape of decks and outdoor stairs makes them excellent traps for heat and embers. Nothing flammable should ever be stored under decks or projections because of this.

We recommend that as wooden decks and projections found throughout the study area become in need of repair or replacement, non-flammable materials, such as plastic composites or aluminum decking should be strongly encouraged. The quality and number of choices for wood substitute building materials have grown exponentially in the last decade, and homeowners are no longer limited to materials with an inferior look and finish. In addition to reducing fire hazards, these materials usually require much less maintenance than wood. In areas where fire behavior predictions call for low to moderate intensities, it is helpful to isolate existing wooden decks from the energy of fires by building a non-combustible patio and wall below the deck to limit the heat trap effect. The best design is to enclose the deck completely to create a solid form.

Windows quickly fail when exposed to the radiant heat of a wildfire. Once windows have failed, they provide a direct path for embers and heat to enter the home and ignite the inside. Although some of the newer homes in the study area have more heat resistive windows, such as low E Thermopane (double glazed) and tempered glass patio doors, most older homes are likely to have conventional single-pane window glass. This is especially true of homes that were built originally as homestead cabins or seasonal residences.

We recommend replacing single-pane windows with modern double-pane windows that will improve the resistance to breakage from heat exposure by up to double the exposure time.⁵ Homes near heavy fuels should consider installing heavy, non-flammable window coverings that will afford the home some additional protection from embers in the event windows break. Homes in these areas should also consider replacing large windows (2 feet or more wide or tall) with smaller panes that are more likely to stay in place even if fractured by heat.

Vents are another location where embers can enter the structure. Vents, especially vents on the downhill side of the home, should have flammable vegetation removed as per Zone 0 defensible space standards and be protected by non-flammable landscaping features such as stone or brick that will block the heat path of the fire. Vents in eaves and soffits should be covered with a non-combustible mesh with openings 1/8" or smaller to slow the ingress of embers. Any open eaves should be enclosed to prevent them from becoming a trap for heat and embers. When enclosing an open eave, a flat soffit is preferred over a sloping soffit to limit the heat trap effect.

Propane Tanks: Above-ground propane tanks should be installed at least 30 feet from homes (outside Zone 1). This recommendation is for new installations, not existing tanks. California law requires a 10-foot buffer down to mineral soil in all directions surrounding propane tanks. All flammable vegetation must be removed from within 20 feet of tanks, lines, and meters.⁶

Historic fire events have proven that poor construction techniques and materials are linked directly to structure loss, reinforcing the message of the research quoted earlier in this appendix. The Insurance Institute for Business and Home Safety (IBHS) wildfire research center has developed a video demonstrating how various home construction materials burn during an ember storm (<https://www.youtube.com/watch?v=IvbNOPSYyss>).

For more detailed information regarding structure hardening and vulnerabilities of various construction methods and materials, please see the following links:

- <https://chico.ca.us/sites/main/files/file-attachments/firewise-construction.pdf?1577086183> (Fire Resistant Materials for Home Repair and Construction)

- <https://www.ready.gov/sites/default/files/2020-03/home-builder-guide-construction-defensible-space.pdf> (FEMA *Home Builder's Guide to Construction in Wildfire Zones*)
- <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1141> National Fire Protection Association (NFPA) 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*.
- https://www.youtube.com/watch?v=vL_syp1ZScM *Your Home Can Survive a Wildfire* NFPA video presentation.
- https://ibhs.org/wp-content/uploads/member_docs/Lessons-Learned-from-Waldo-Canyon-Fire_IBHS.pdf (Lessons learned from the Waldo Canyon Fire)

REFERENCES/CITATIONS

¹ <https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf> (Pages 19, 20 and 34).

² Ibid (Page 32).

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3896199/>

⁴ https://static.colostate.edu/client-files/csfs/pdfs/FIRE2012_1_DspaceQuickGuide.pdf, Page 4.

⁵ <https://static.colostate.edu/client-files/csfs/pdfs/firewise-construction2012.pdf>, Page 30.

⁶ <https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/>

Morongo Basin

Community Wildfire Protection Plan 2023

Appendix C Methodology



**Fire Adaptive
Solutions**

4445 COMANCHE DRIVE
BOULDER, CO 80303
www.FireAdaptiveSolutions.com

COMMUNITY HAZARD RATING METHODOLOGY

Purpose

The purpose of this appendix is to provide an overview of the methodology used to determine Community (AKA Residential Hazard Zones) hazard ratings for this CWPP. Two tools are principally involved: Interface/Intermix Community Hazard Rating (ICHR) which generates a score used to determine the adjective hazard rating class for each of the Communities of the study area and NoHARM, which produces the fire behavior predictions and one of the components of Probability, which is the likelihood of a significant wildfire start, incorporated into the ICHR scores. NoHARM is a decision support tool for wildfire hazard assessment and is a proprietary product of Precisely.

Introduction

The primary outcome of the hazard study performed for this CWPP is to identify and quantify wildland fire hazards in the most heavily populated Wildland-Urban Interface (WUI) and Wildland Intermix (WI) residential areas. WUI/WI portions of the study area are grouped into Communities for the hazard analysis and prioritization of mitigation recommendations. The WUI is also known as the Urban Edge Ember Zone. It is the area where encroaching wildland fuels could create a fire hazard to what would be an urban development in a different setting. The WI consists of communities where wildland fuels surround homes. Several authorities including the US Fire Administration, the International Wildland-Urban Interface Code (IWUIC) and the National Fire Protection Association (NFPA) also recognize an “Occluded” category of interface communities that includes developed areas surrounding wildland fuel islands of less than 1,000 acres.¹ In terms of hazard analysis and mitigation these Communities are treated and defined as similar to WUI Communities, therefore it is unnecessary and confusing for the purposes of this study to create a separate class for them. The Interface/Intermix Community Hazard Rating system (ICHR) used in this analysis considers significant fuel islands inside WUI Communities as an additional hazard source.

ICHR Methodology

ICHR was developed specifically to evaluate communities within the WUI/WI for their relative wildfire hazard using the field experience and knowledge of ignition management and wildfire hazard mitigation professionals. ICHR combines physical infrastructure such as structure density, road access and water supply with the fire behavior Severity modeling of NoHARM. Elements of NFPA 1144 have been integrated into this methodology to ensure compatibility with national standards. Aspects of NFPA 1142 regarding water supply for rural and suburban firefighting are included in the assessment by evaluating proximity and capacity of water for fire suppression. Recently this methodology was reviewed and revised using information from NIST Technical Note 2205 (WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology, March, 2022).

ICHR is an enhancement of the system commonly used by wildland firefighters to perform structural triage on a threatened community in the path of an advancing wildfire using NoHARM predicted fire behavior for average conditions on a fire season day. The ICHR survey and fuel model ground-truthing are accomplished by field surveyors with WUI/WI fire experience. ICHR data collected in the field is analyzed by a Wildland Fire Mitigation Specialist who verifies and integrates it with NoHARM data and adjusts the final ratings if

necessary. ICHR ratings are related to what is customary for the area. For example, a High hazard Community in the tall grass prairies of Kansas will not look like a High hazard Community in the Sierra Nevada. The system creates a relative ranking of Community hazards in relation to other Communities in the study area. ICHR generates a total hazard score of 0 to 100 points where a 0 represents the lowest possible hazard and 100 the greatest. This numeric score is used to sort Communities into one of five adjective hazard classes: Low, Moderate, High, Very High or Extreme. Not all categories are found in every study. The ICHR range of hazard factors is so broad it is common for Extreme and Low hazard communities to not simultaneously exist in any one study. Adjective ratings for ICHR numeric scores in this study are as follows: 30 or less = Low, 31-50 = Moderate, 51-70 = High, 71-90 = Very High and >90 = Extreme.

The ICHR ratings, as described above, have been included in the description of the Communities discussed in *Appendix A: Communities*.

NoHARM

The NoHARM Risk 50 rating is a mathematical model combining Severity with Frequency. The model takes into account both the likelihood of a significant fire developing within the rated FireShed and the severity of damaging fire effects to create a composite rating of fire risk in that FireShed. Although the majority of the weighting in the model is in these two elements, other factors are included in the Risk 50 rating and vary depending on whether FireSheds are located in the WUI, WI or wildland.

NoHARM Severity ratings attempt to quantify the severity of fire effects on values at risk and the ecosystem by combining flame length and crown fire development into a single rating. Like other numeric ratings generated by NoHARM, Severity assigns a value between one and 50 to each FireShed based on an aggregation of all the pixels in that FireShed. A value of one indicates the lowest severity of damaging fire effects and 50 the highest. It is important to understand the Severity model may under-predict the effects of ember cast, especially under extreme weather conditions.

Probability

Probability is determined by the fire history of the area and the Frequency simulation derived from NoHARM. To predict the likelihood of a significant wildfire event No-HARM inputs 300,000 points of ignition. These simulated fires are run across three weather scenarios. Areas where fires stack (modeling shows repeated fires in the same area) indicate an increased likelihood of a significant fire occurrence. No-Harm assigns a value between one and 50 to each FireShed based on an aggregation of all the pixels in that FireShed. A value of one indicates the lowest probability of significant wildfire and 50 the highest. Adjective ratings for Frequency in No-HARM are as follows: 0-9 = Low, 10-23 = Moderate, 24-35 = High and >35 = Very High.

Fire Behavior

NoHARM incorporates the predicted Severity and Frequency of wildfire simulations within “FireSheds” to give a comprehensive view of the wildfire threat context homes and other structures are exposed to. NoHARM FireSheds are based on the topography of the landscape and correlate to vegetative growth and directions wildfires tend to burn in the absence of wind. NoHARM uses three modules, one for Wildland, one for Intermix (WI) and one for Interface (WUI) to predict fire behavior using FireSheds to aggregate the landscape. NoHARM also accounts for the fact that FireSheds experience additional ignition points and alterations in severity from outside their boundaries. For example, a structure may be built in a clearing of short grass within a conifer forest, but the wildfire threat isn’t limited to grass fuels the home is located in. It is also subject to

threats from the timber fuels in the surrounding FireSheds. NoHARM acknowledges this by incorporating the threat from the surrounding FireSheds into the threat profile from every adjacent FireShed.

Fuel models represented within the FireSheds, prevailing weather patterns and historical fire frequency data are included in the model outputs. These outputs are used to break up FireSheds into one of four descriptive categories: Low (**green**), Moderate (**yellow**), High (**orange**) and Very High (**red**). See **Figure 1**. It is important to note that due to great variability in flammability of structures and other manmade development, NoHARM considers areas of concentrated development as non-burnable. These areas are shown in white in the fire behavior map image below (**Figure 1**). The Intermix module of NoHARM accounts for this as well as the added complexity of the built environment by including additional appropriate data sets.

When wildland fuels border an area that would, in a different context, be considered a traditional urban or suburban development, these areas are assigned to the Interface module of NoHARM. Unlike the Wildland and Intermix areas, the primary threat to structures in the Interface is from flame impingement (on one or two sides) and ember cast. Vegetative fuels no longer surround the structures and, as mentioned above, NoHARM does not assess individual structures directly for flammability.

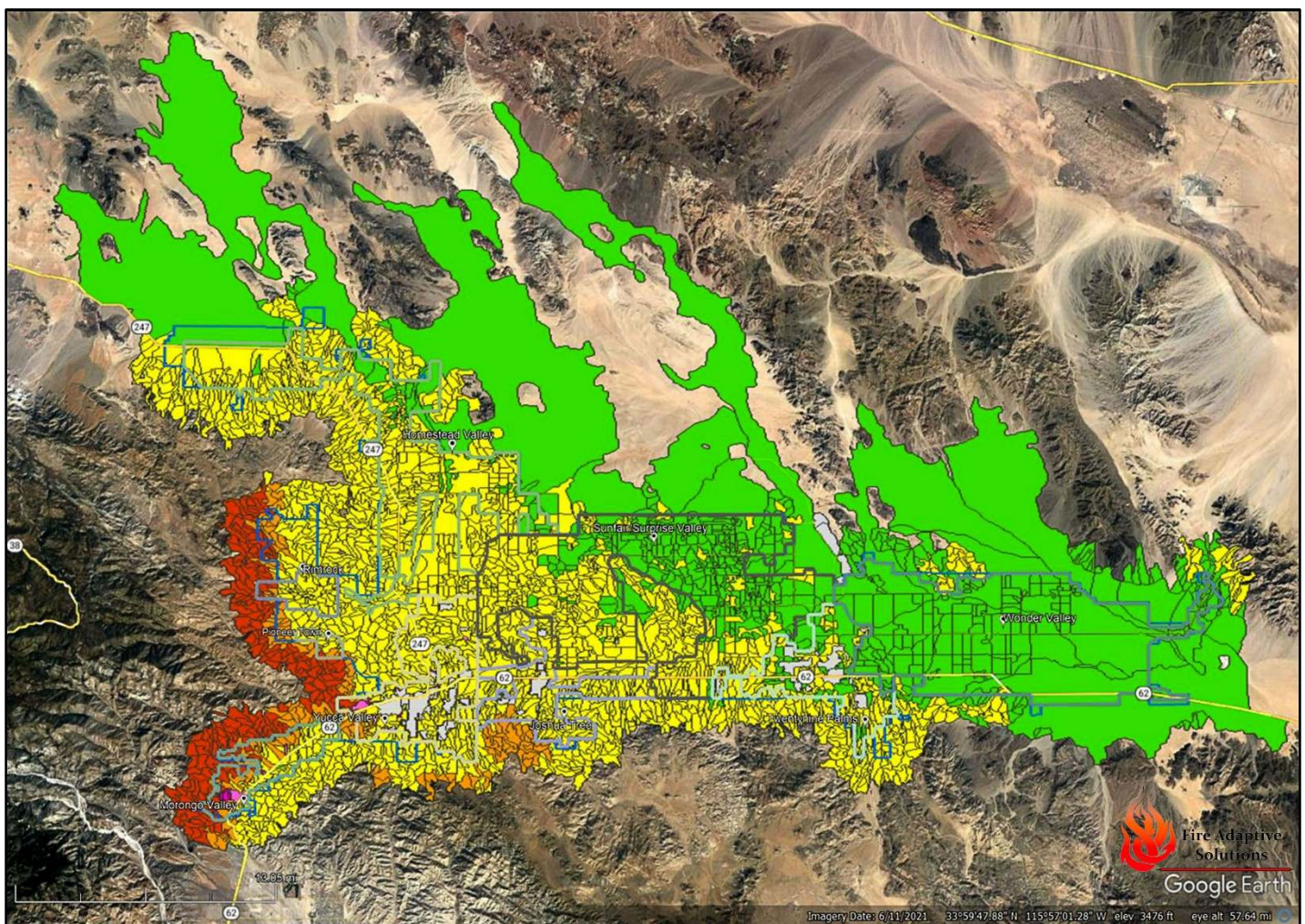


Figure 1 – Morongo Basin NoHARM Predicted Fire Behavior (four color hazard classes)

Table 1 - ICHR Community Hazard Ratings

Morongo Basin 2023 CWPP Interface/Intermix Community Hazard Ratings		
Community Name	Score	Adjective Rating
Pioneertown	63	High
Morongo Valley	53	High
Rimrock	52	High
Yucca Valley	50	High/Moderate
Joshua Tree	47	Moderate
Homestead Valley	37	Moderate
Twentynine Palms	36	Moderate
Wonder Valley	30	Low
Sunfair/Surprise Valley	29	Low

Rating Categories: Low 0-30; Moderate 31-50; High 51-70; Very High 71-90; Extreme > 90.

References

¹ National Institute of Standards and Technology Technical Note 2205, March 2022, page 3 (footnote 1)












Morongo Basin CWPP

Final Audit Report

2024-02-29

Created:	2024-02-05
By:	Justin Merino (merino@kulturspace.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAA2dbrUve4yIQCBInvWTctQtqUU1t_lxnd

"Morongo Basin CWPP" History

-  Document created by Justin Merino (merino@kulturspace.com)
2024-02-05 - 4:27:41 PM GMT
-  Document emailed to s.primack@morongovalleyfire.org for signature
2024-02-05 - 4:36:12 PM GMT
-  Document emailed to Dyberg Laura (dyberg4fsc@gmail.com) for signature
2024-02-05 - 4:36:12 PM GMT
-  Document emailed to Shane Littlefield (shane.littlefield@fire.ca.gov) for signature
2024-02-05 - 4:36:13 PM GMT
-  Document emailed to dmunsey@sbcfire.org for signature
2024-02-05 - 4:36:13 PM GMT
-  Document emailed to Justin Merino (merino@kulturspace.com) for signature
2024-02-05 - 4:36:13 PM GMT
-  Document e-signed by Justin Merino (merino@kulturspace.com)
Signature Date: 2024-02-05 - 4:36:43 PM GMT - Time Source: server
-  Email viewed by s.primack@morongovalleyfire.org
2024-02-05 - 4:53:27 PM GMT
-  Signer s.primack@morongovalleyfire.org entered name at signing as Stuart A. Primack
2024-02-05 - 4:56:25 PM GMT
-  Document e-signed by Stuart A. Primack (s.primack@morongovalleyfire.org)
Signature Date: 2024-02-05 - 4:56:27 PM GMT - Time Source: server
-  Email viewed by Dyberg Laura (dyberg4fsc@gmail.com)
2024-02-05 - 5:26:07 PM GMT

 Document e-signed by Dyberg Laura (dyberg4fsc@gmail.com)


Signature Date: 2024-02-05 - 5:26:36 PM GMT - Time Source: server

 Email viewed by Shane Littlefield (shane.littlefield@fire.ca.gov)


2024-02-05 - 9:22:00 PM GMT

 Document e-signed by Shane Littlefield (shane.littlefield@fire.ca.gov)

Signature Date: 2024-02-05 - 9:22:26 PM GMT - Time Source: server

 New document URL requested by Shane Littlefield (shane.littlefield@fire.ca.gov)

2024-02-20 - 10:21:22 PM GMT

 Email viewed by dmunsey@sbcfire.org

2024-02-29 - 7:05:50 PM GMT

 Signer dmunsey@sbcfire.org entered name at signing as Daniel R Munsey

2024-02-29 - 7:07:19 PM GMT

 Document e-signed by Daniel R Munsey (dmunsey@sbcfire.org)

Signature Date: 2024-02-29 - 7:07:21 PM GMT - Time Source: server

 Agreement completed.

2024-02-29 - 7:07:21 PM GMT