

JUNE 2022

BERNALILLO COUNTY



# COMMUNITY WILDFIRE PROTECTION PLAN

Working together to build  
fire adapted communities,  
resilient to wildfire



**SWCA**<sup>®</sup>  
ENVIRONMENTAL CONSULTANTS

The entities listed below participated in the development of and/or reviewed and are in support of the Bernalillo County Community Wildfire Protection Plan:

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*We would like to formally thank the Core Team and all stakeholders for contributing their time and expertise throughout the planning process. Your participation has contributed to creating resilient landscapes, implementing public education, reducing structural ignitability, and ensuring safe and effective wildfire response.*

For additional information, questions, or concerns regarding this project, please contact Project Manager Cody Stropki [cstropki@swca.com](mailto:cstropki@swca.com).



For all your planning and implementation needs, please visit [www.swca.com](http://www.swca.com).



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## EXECUTIVE SUMMARY

# WHAT IS THE PURPOSE OF THIS COMMUNITY WILDFIRE PROTECTION PLAN?

The purpose of the 2022 Bernalillo County Community Wildfire Protection Plan (CWPP) update is to:

1. provide a countywide scale of wildfire risk and protection needs,
2. bring together all responsible wildfire management and suppression entities in the planning area to address identified needs, and
3. provide a framework for future planning and implementation of necessary mitigation measures.

This CWPP aims to assist in protecting human life and reducing property loss due to wildfire throughout the County. This 2022 plan was compiled from reports, documents, data, and Core Team and public input. The plan was developed in response to the federal Healthy Forests Restoration Act (HFRA) of 2003.

The CWPP meets the requirements of the federal HFRA of 2003 by addressing the following:

1. Having been developed collaboratively by multiple agencies at the state and local levels in consultation with federal agencies and other interested parties.
2. Prioritizing and identifying fuel reduction treatments and recommending the types and methods of treatments to protect at-risk communities and pertinent infrastructure.
3. Suggesting multi-party mitigation, monitoring, and outreach.
4. Recommending measures and action items that residents and communities can take to reduce the ignitability of structures.
5. 5. Soliciting input from the public on the draft.

# WHAT ARE THE KEY ISSUES ADDRESSED?

Issues addressed in this CWPP include:

- Fuel treatment recommendations for land management agencies and homeowners to mitigate hazard and risk
- Prioritizing hazardous fuels reduction in the wildland urban interface (WUI)
- Raising awareness about the natural role that fire plays in the ecosystem and maintaining resilient landscapes
- Public education and outreach to homeowners to enable individuals to reduce the risk of fire to their properties, particularly regarding the time required for fire response to remote communities
- Constant and consistent messaging for residents and visitors concerning wildfire risks and mitigation strategies
- Increasing public access to information through the use online materials, including the story map created for this CWPP

- Investing and supporting fire response at all levels, including resources for local fire departments to increase capacity to serve the community
- Increasing public understanding of the fire response process
- Continuing to address wildfire issues at the landscape level, across multiple jurisdictions
- Managing fire to protect values and accomplish resource management goals, including protection and enhancement of wildfire habitat, water supply and quality, and forest health
- Recent climate patterns and associated changes to the wildland fire environment
- Disease and insect outbreaks associated with tree mortality

## HOW IS THE PLAN ORGANIZED?

The CWPP provides a Composite Risk-Hazard Assessment, action items, project recommendations, and background information about Bernalillo County's wildland fire environment, as well as land management plans and agencies. Most of the background information is housed in several appendices.

**Chapter 1** provides a general overview of CWPPs, the Core Team, planning area, land ownership, and public involvement.

**Chapter 2** presents an overview of the WUI, fire environment, and specific information about vegetation and fire history, as well as fire management and response.

**Chapter 3** describes the Composite Risk-Hazard Assessment, results of the assessment, and community values at risk (VARs).

**Chapter 4** provides mitigation strategies in accordance with the National Cohesive Wildfire Strategy as well as post-fire protocols and rehabilitation strategies.

**Chapter 5** presents monitoring strategies to assist in tracking project progress and in evaluating work accomplished.

**Appendix A** contains background information on the County, including fire policy, past planning efforts, challenges to forest health, public education programs, and federal, state, and tribal land management agencies.

**Appendix B** presents additional mapping.

**Appendix C** lists the Core Team members.

**Appendix D** provides summary information on hazard and risk for each WUI community.

**Appendix E** presents a sample form of the National Fire Protection Association (NFPA) Wildfire Fire Risk and Hazard Severity Form 1144.

**Appendix F** details funding opportunities.

**Appendix G** contains additional resources for community members, including a homeowner wildfire mitigation guide and a list of outside resources covering a variety of topics.

**Appendix H** presents information on public outreach and engagement with regard to this CWPP.

**Appendix I** houses project recommendations.

**Appendix J** outlines modeling and geographic information system (GIS) backgrounds and explanations.

## WHAT IS THE GOAL OF A CWPP?

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness. Another goal of the CWPP is to enhance public awareness by helping residents better understand the natural- and human-caused risks of wildland fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the HFRA, are (Society of American Foresters [SAF] 2004):

- **Collaboration:** Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP.
- **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment that will protect one or more communities at risk (CARs) and their essential infrastructures.
- **Treatments of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

## HOW WAS THE BERNALILLO COUNTY CWPP UPDATE DEVELOPED?

A group of multijurisdictional agencies (federal, state, and local) and organizations joined together as a Core Team to update previous plans and develop this countywide CWPP. Previous CWPPs include the Middle Rio Grande Bosque CWPP (2008) and the East Mountain CWPP (2008 and 2015), but this is the first countywide plan. Several Core Team members have many years of experience working on previous CWPPs, as well as a depth knowledge of fire management in the community and surrounding areas, and have contributed their expertise to this CWPP.

The CWPP planning process served multiple purposes. One was to model and map wildfire risk. Another was to identify and map the many physical hazards throughout the planning area that could increase the threat of wildfire to communities. This mapping process allowed the planning team to prioritize treatments tailored specifically for the community to reduce fire risk. The development of the 2022 CWPP also provided opportunities for public engagement. Public outreach events, including Zoom webinars and individual meetings with homeowner associations, were completed to increase awareness and collect local input, and social media and online forums have allowed for further engagement. The CWPP planning process also brings together wildfire responders and land managers into a Core Team, providing opportunities to build lasting working relationships and encourage collaboration. By incorporating public and Core Team input into the recommendations, treatments are tailored specifically for the planning area. Overall, the Bernalillo County CWPP emphasizes the importance of collaboration among multijurisdictional agencies and the public in developing fuels mitigation treatment programs to address wildfire hazards.



## WHY CREATE A STORY MAP FOR THE PROJECT?

The County opted to develop a story map (online web content) to disseminate information to the public and provide an opportunity for the public to provide input into the plan content. The story map presents the CWPP in a web layout with accompanying web maps and includes a project tracker. In addition to facilitating information sharing, the story map also provides the County with a platform that can be readily revised to keep the CWPP document current. The story map can be accessed through the Bernalillo County website.

## WHO PARTICIPATED IN DEVELOPING THE PLAN?

Land managers across Bernalillo County, New Mexico, participated in this CWPP. Agencies such as the Bernalillo County Fire & Rescue (BCFR), Albuquerque Fire and Rescue, City of Albuquerque Open Space, Bernalillo County Open Space, U.S. Fish and Wildlife Service, EMNRD Forestry Division, and U.S. Forest Service, along with other additional community or organization representatives, served as the Core Team for this CWPP and drove the decision-making process. Several Core Team members were involved in previous CWPPs in and around the county and have contributed their expertise to this CWPP.

## WHERE IS THE PLANNING AREA?

The planning area includes all the Bernalillo County as delineated by its geographic and political boundaries.

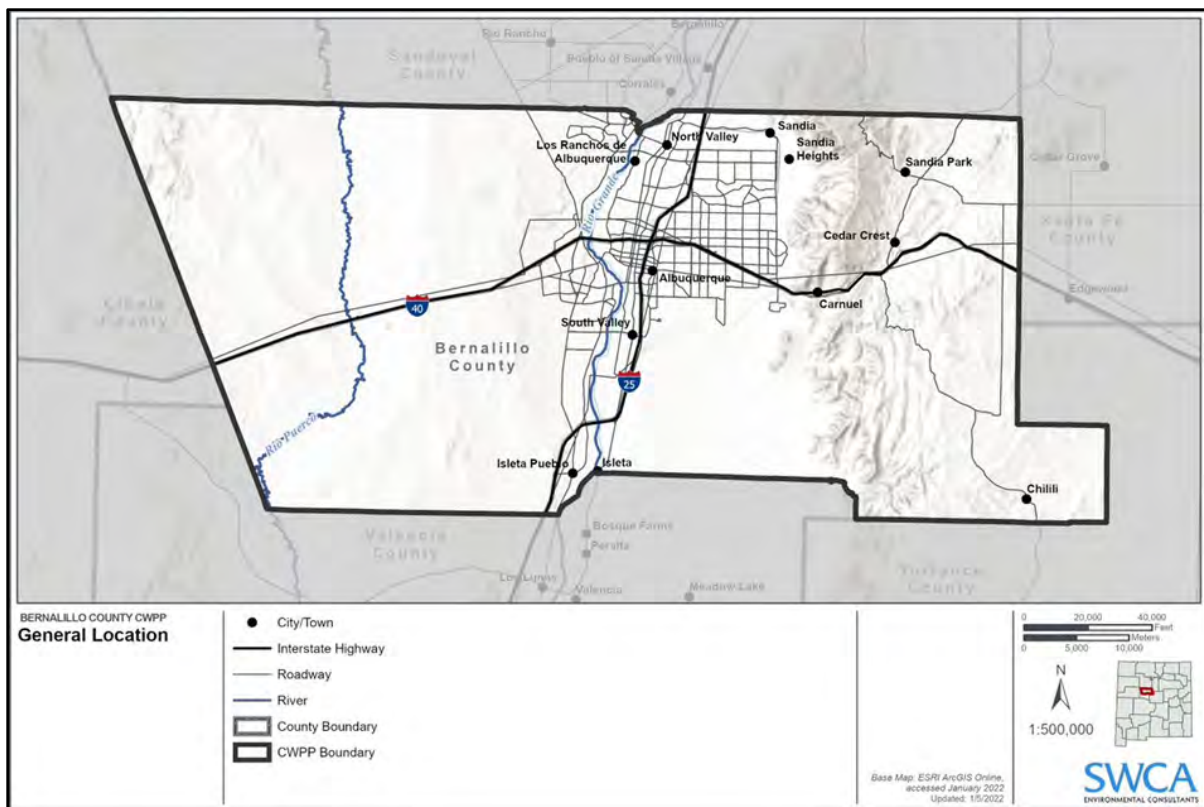


Figure ES 1. Bernalillo County CWPP planning area.

## WHAT WAS THE PUBLIC INVOLVEMENT?

The Core Team engaged in public outreach using a multimedia approach, using the story map created for the project, social media posts, community surveys, webinars, community interviews, and information distributed through mass emails. The Core Team hosted numerous virtual and in person public meetings from November 22, 2021, through May 2022. By incorporating public and Core Team input into the recommendations, treatments are tailored specifically for Bernalillo County.

## WHAT IS THE CURRENT WILDFIRE SITUATION?

Bernalillo County contains a considerable portion of wildfire-prone land. Vegetation types across the county consist of desert and semi-desert grass and shrublands, which transition to piñon-juniper woodlands and coniferous forests at higher elevations. Fires are a natural part of the disturbance cycle for most of the vegetation types, but recent fires have been more likely to occur in piñon-juniper woodlands and ponderosa pine forests, particularly within the Cibola National Forest. Additionally, with the compounding effects of invasive plant species and increased human use, the Rio Grande bosque corridor has also experienced a substantial increase in wildfire occurrence in a historically non-fire-prone region. Many of the county's forested areas comprise abundant fuels; for that reason, most historic and current fire incidents have occurred in these areas, including the largest fire in recent memory, the Doghead Fire, which burned nearly 18,000 acres across private land and the Cibola National Forest. In addition, multiple factors have combined to increase forest susceptibility to wildfire, including frequent drought, fire suppression-based forest management tactics, and climate change. Removing natural fire from a fire-dependent ecosystem, drought, insects, and diseases have resulted in increased fuel build-up and alterations to vegetation composition (Goodwin et al. 2021). These forest changes have been shown to increase the risk of uncharacteristically large high-severity fires (Goodwin et al. 2021; Schoennagel 2017). In recent years across the western United States, including New Mexico, fires have grown to record sizes and are burning earlier, longer, hotter, and more intensely than they have in the past (Westerling et al. 2006; Westerling 2016).

## WHAT RECENT FIRES OCCURRED HERE?

Bernalillo County and the surrounding environment consist of diverse landscapes that produce a complex wildfire setting due to variable topography, tree mortality, and an assortment of vegetation types. Recent large, severe wildfires include the Doghead Fire and Big Spring Fire. The Doghead Fire, which was caused by equipment, occurred on June 14, 2016, and ultimately consumed nearly 18,000 acres. On the other hand, the Big Spring Fire, a lightning-caused fire, started on June 25, 2008, and scorched 5,478 acres. Although the Big Spring Fire of 2008 occurred in the neighboring county of Tarrant, it is referenced here due to its proximity and the shared similarity of the wildland fire environment. There have been 14 wildfires in New Mexico by June 2022, with two breaking records for the largest wildfire to occur on State land. The Black Fire has burned over 325,136 acres by late June 2022, and the Calf Canyon-Hermits Peak Fire has burned over 341,735 acres by late June 2022<sup>1</sup> (National Wildfire Coordinating Group [NWCG] 2022). Each of these two fires broke the previously held record of 297,845 acres burned from the 2012 Whitewater-Baldy Fire.

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<sup>1</sup> These two incidents were still active during report development.

## WHAT IS THE PURPOSE OF THE COMPOSITE RISK-HAZARD ASSESSMENT?

The purpose of the risk assessment is to evaluate and provide information pertaining to the risk of wildland fires within the WUI of the Bernalillo County. The Composite Risk-Hazard Assessment is twofold and combines a GIS model of hazard based on fire behavior and fuels modeling technology (Composite Risk-Hazard Assessment) and a Core Team-generated assessment of on-the-ground community hazards and VARs.

The risk assessment considers:

- Fire behavior modeling, which includes
  - fire history
  - probability of fire occurring
  - intensity of a fire if one occurs
- Exposure and susceptibility of the WUI and VARs to wildfire based on their locations

The purpose of the Composite Risk-Hazard Assessment is to provide information about wildfire hazard and risk to highly valued resources and assets (HVRAs).

Some of the highest risk areas identified in the planning area are communities located on or near the East Mountains in the Cibola National Forest and communities situated along the Rio Grande Corridor.

## HOW IS MY COMMUNITY RATED?

Community field evaluations, summarizing information on hazard and risk for each WUI community within Bernalillo County are provided in this plan. A team from SWCA Environmental Consultants conducted on-the-ground community risk assessment surveys (field evaluations) throughout the county between February 15 and March 18, 2022, using the NFPA 1144 standard for assessing structure ignitability in the WUI. Using this standard provided a consistent process for evaluating wildland fire hazards around existing structures to determine the potential for structure ignition from wildland fire ignitions.

Community evaluations provide a total score of risk and hazard based on various parameters observed during the surveys, and a corresponding descriptive rating of low, moderate, or high are available in Appendix D.

## WHAT ARE THE STRATEGIES TO ADDRESS WILDFIRE HAZARDS?

**Goal 1** of the Cohesive Strategy and the Western Regional Action Plan is to **Restore and Maintain Landscapes**: Landscapes across all jurisdictions are resilient to fire and other disturbances in accordance with management objectives.

Recommendations for hazardous fuels treatments include:

- Road and vegetation maintenance



- WUI mitigation actions and maintenance
- Special species and wildlife management
- Capacity to address projects

**Goal 2** of the Cohesive Strategy and the Western Regional Action Plan is **Fire-Adapted Communities:** Human populations and infrastructure can withstand a wildfire without loss of life and property.

Recommendations for public outreach/education and structural ignitability include:

- Developing and promoting wildfire education
- Interagency collaboration
- Defensible space and structural hardening improvements
- Hosting community awareness events

**Goal 3** of the Cohesive Strategy and the Western Regional Action Plan is **Wildfire Response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions:

Recommendations for improving fire response capabilities include:

- Water supply improvements
- Emergency notification improvements
- Evacuation route identification
- Interagency collaboration

## WHAT DOES POST-FIRE RESPONSE AND RECOVERY INVOLVE?

There are many aspects to post-fire response recovery, including but not limited to:

- Returning home and checking for hazards.
- Coordinating and mobilizing a group of teams in the community to respond to emergencies.
- Rebuilding communities and assessing economic needs—securing the financial resources necessary for communities to rebuild homes, business, and infrastructure.
- Restoring the damaged landscape—restoration of watersheds, soil stabilization, and tree planting.
- Prioritizing the needs of vulnerable and disadvantaged communities during response and disaster recovery efforts.
- Evaluating and updating disaster recovery plans every 5 years to respond to changing needs and characteristics of the community.
- Coordinating with planning, housing, health, and human services, and other local, regional, or state agencies to develop contingency plans for meeting short-term, temporary housing needs of those displaced during a catastrophic wildfire event.

## HOW WILL THE PLAN BE IMPLEMENTED?

The CWPP does not require implementation of any of the recommendations, but the message throughout this document is that the greatest fire mitigation could be achieved through the joint actions of individual homeowners, tribes, and local, state, and federal governments.

The recommendations for fuels reduction projects are general in nature; site-specific planning that addresses location, access, land ownership, topography, soils, and fuels would need to be employed upon implementation. Also, it is important to note that the recommendations are specific to wildland urban interface (WUI) areas and are expected to reduce the loss of life and property.

In addition, implementation of fuels reduction projects need to be tailored to the specific project and will be unique to the location depending on available resources and regulations. In an effort to streamline project implementation, this CWPP has identified the pertinent land management/ownership agencies associated with each recommendation. On-the-ground implementation of the recommendations in the CWPP planning area will require development of an action plan and assessment strategy for completing each project.

## WHEN DOES THE CWPP NEED TO BE UPDATED?

The CWPP should be treated as a living document to be updated annually or immediately following a significant fire event. The plan should continue to be revised to reflect changes, modification, or new information. These elements are essential to the success of mitigating wildfire risk throughout the county and will be critical in maintaining the ideas and priorities of the plan and the communities in the future.



# CHAPTER 1 – INTRODUCTION

The United States is facing urgent forest and watershed health concerns. While the number of annual wildfires throughout the United States has been slightly decreasing (67,700 fires in 2016 vs. 59,000 fires in 2020), the number of acres burned has been on the rise (Congressional Research Service [CRS] 2021). An average of 7 million acres is burned every year due to wildfire, more than doubling the annual average of acres burned in the 1990s (CRS 2021). Communities are seeing the most destructive wildfire seasons in history. The 2015 fire season had the most acreage impacted in a single year since 1960 at 10.13 million acres. 2020 was the second most extensive year for wildfire with 10.12 million acres burned (CRS 2021). These statistics demonstrate that wildfires are becoming larger and harder to control.

New Mexico's 2020 Forest Action Plan states that New Mexico, like other western states, faces urgent issues concerning extreme wildfire events, insect epidemics, and shifting climate conditions that are unprecedented and threaten the sustainability of ecosystems and increase risk to communities, firefighters, and water resources. These issues were exemplified in the 2011 Las Conchas Fire, which burned an excess of 150,000 acres in the Jemez Mountains, destroyed 112 structures, and deteriorated wildlife habitat and key watersheds (New Mexico Energy, Minerals, and Natural Resources Department [EMNRD] Forestry Division 2020a).

As wildfire severity increases, communities need a plan to help prepare for, reduce the risk of, and adapt to wildland fire events. Community Wildfire Protection Plans (CWPPs) help accomplish these goals. A CWPP provides recommendations that are intended to reduce, **but not eliminate**, the extreme severity or risk of wildland fire.

The development of the CWPP is rooted in meaningful collaboration among many stakeholders, including local, state, and federal officials. The planning process involves looking at past fires and treatment accomplishments using the knowledge and expertise of the professional fire managers who work for the various agencies and governing entities in Bernalillo County. From there, the CWPP ultimately identifies the current local wildfire risks and needs that occur in the county, which is further supported with relevant science and literature from the southwestern region of the United States.

In addition, this document, the 2022 Bernalillo County CWPP, reviews, verifies, and/or identifies potential new priority areas where mitigation measures are needed to protect from wildfire the irreplaceable life, property, and critical infrastructure in the county. However, this CWPP does not attempt to mandate the

type and priority for treatment projects that will be carried out by the land management agencies and private landowners. The responsibility for implementing wildfire mitigation treatments lies at the discretion of the landowner; the 2022 Bernalillo County CWPP will only identify potential treatments and a suggested priority for these projects.

## GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness. Another goal of the CWPP is to enhance public awareness by helping residents better understand the natural-and human-caused risk of wildland fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the HFRA, are:

**Collaboration:** Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (Society of American Foresters [SAF] 2004).

**Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment that will protect one or more communities at risk (CARs) and their essential infrastructures (SAF 2004).

**Treatments of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan (SAF 2004).

It is the intent of this 2022 CWPP to provide a countywide scale of wildfire risk and protection needs and then bring together all of the responsible wildfire management and suppression entities in the county to address the identified needs and to support these entities in planning and implementing the necessary mitigation measures. Additional information on the planning process is available in Appendix A.

## NAVIGATION

The plan provides background information, a Composite Risk-Hazard Assessment, and recommendations to reduce or mitigate wildfire risk to communities. The CWPP is designed to be used by the residents of Bernalillo County, as well as stakeholders tasked with forest, fire, and emergency management. Some information is therefore highly technical in order to provide sufficient detail to aid in project implementation.

During this CWPP planning process, the plan has been supplemented with online content compiled into a project story map. The story map serves as a synopsis to the larger plan and is designed to make the information in this plan more accessible to the reader as it allows the public and stakeholders to interface with the various map products that have been developed through this planning process. The story map and CWPP will be readily updated as conditions change throughout the county. The story map can be accessed via the Bernalillo County website.

This CWPP is organized into several chapters with more detailed information compiled into appendixes. Chapter 1 provides an overview of CWPPs and describes the need for a plan; Chapter 2 gives an overview of the fire environment and introduces the reader to fire history information and well as fire

response; Chapter 3 describes field evaluations, road and evacuation analysis, and the Composite Risk-Hazard Assessment; Chapter 4 includes detailed mitigation strategies that could be implemented to reduce wildfire risk under the umbrella of the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy), including action plans that outline priorities and recommendations for reducing fuels, initiating public education and outreach, reducing structural ignitability, and improving fire response capabilities; and Chapter 5 provides suggested approaches to monitoring actions.

The CWPP does not require implementation of any of the recommendations; however, these recommendations may be used as guidelines for the implementation process if funding opportunities become available. The recommendations for fuels reduction projects are general in nature; site-specific planning that addresses location, access, land ownership, topography, soils, and fuels would need to be employed upon implementation. Also, it is important to note that the recommendations are specific to WUI areas and are expected to reduce the loss of life and property.

In developing the CWPP, a large amount of background information on the County was compiled and analyzed, including location and land use data, climate and weather data, baseline vegetation data, historic conditions, population, demographics, CWPP planning process, fire regime and baseline conditions, fire policy, and other supporting background information. This information is presented in Appendix A, Community and CWPP Background Information.

Additional appendices to this CWPP include maps in Appendix B; the Core Team contact list in Appendix C; community descriptions and hazard ratings in Appendix D; NFPA 1144 form in Appendix E; funding sources in Appendix F, homeowner resources in Appendix G, community outreach in Appendix H, project recommendations in Appendix I, and modeling/GIS background and methodology in Appendix J.

## ALIGNMENT WITH THE NATIONAL COHESIVE STRATEGY

The 2022 CWPP is aligned with the Cohesive Strategy and its Phase III Western Regional Action Plan by adhering to the nationwide goal “To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.” (Forests and Rangelands 2014:3).

The primary, national goals identified as necessary to achieving the vision are:

- **Restore and maintain landscapes:** Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- **Fire-adapted communities:** Human populations and infrastructure can withstand a wildfire without loss of life and property.
- **Wildfire response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

For more information on the Cohesive Strategy, please visit: <https://www.forestsandrangelands.gov/strategy/documents/strategy/CSPhaseIIINationalStrategyApr2014.pdf>

Alignment with these Cohesive Strategy goals is described in more detail in Chapter 4, Mitigation Strategies.



In addition to aligning with the Cohesive Strategy, the CWPP also incorporates information on post-fire recovery, the significant hazards of a post-fire environment, and the risk that post-fire effects pose to communities (Figure 1.1).



**Figure 1.1. CWPP incorporating the three primary goals of the Cohesive Strategy and post-fire recovery and serving as holistic plan for fire prevention and resilience.**

## ALIGNMENT WITH PLANS AND AGREEMENTS

This CWPP is aligned with multiple local, state, and federal planning documents. These documents or agreements are summarized in Appendix A. In addition, fire policy and legislative direction is also summarized in Appendix A.



# CORE TEAM

The BCFR invited engagement from adjacent government agencies in the development of this 2022 Bernalillo County CWPP. Stakeholder involvement is critical in producing a meaningful document that includes all collaborators' diverse perspectives. Representatives from adjacent counties were included in the Core Team to ensure the CWPP is aligned with the goals and planning objectives of those counties as well. The Core Team drives the planning process in its decision making, data sharing, experience, and communication with community members. The project was kicked off and the Core Team met for the first time on November 18, 2021, and met again on March 24, 2022.

The Core Team List is provided in Appendix C.

# PLANNING AREA

The planning area includes all of Bernalillo County as delineated by its political boundary (Figure 1.2).

Details on location and geography can be found in Appendix A.

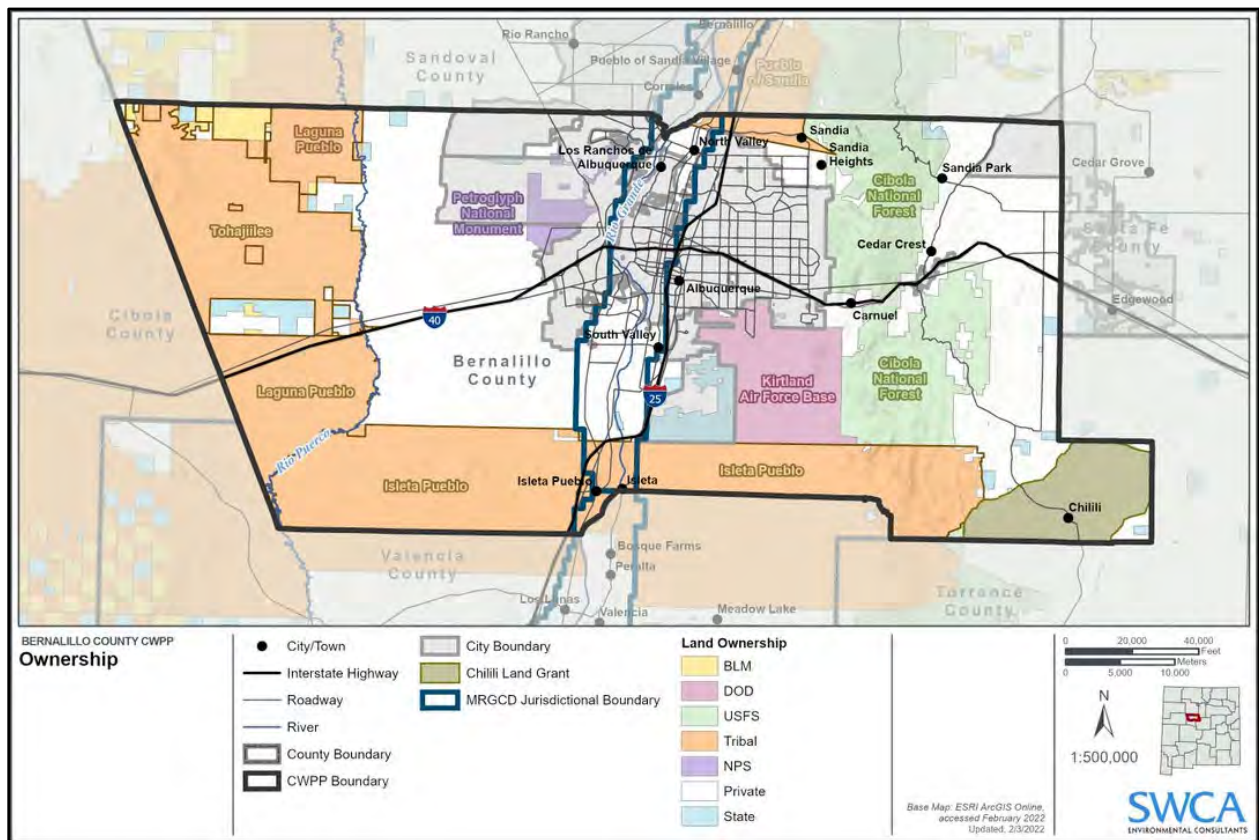


Figure 1.2. Land ownership within Bernalillo County.

## LAND OWNERSHIP

Bernalillo County has various land ownership jurisdictions, including municipal, county, tribal, state, and federal agencies (see Figure 1.2). The U.S. Forest Service (USFS) owns the Cibola National Forest (Cibola NF); Pueblos and tribal groups own blocks of land in the western and southern portions of the county; the National Park Service (NPS), the city, and the state jointly own the Petroglyph National Monument; and the Department of Defense owns the Kirtland Airforce Base, south of Albuquerque. In addition, many privately owned tracts of land are distributed throughout the county.

Additional detail regarding the planning area, such as topography, weather, and vegetation is summarized in Appendix A.

## PUBLIC INVOLVEMENT

A key element in the CWPP process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (Society for American Foresters [SAF] 2004). The draft CWPP was made available for public review from May 23<sup>rd</sup> through June 5<sup>th</sup>, 2022. In addition to the CWPP report, the County developed a CWPP story map (online content) to provide opportunities for information sharing and gathering. The public were invited to view the story map and provide feedback in the spring of 2022. The story map and draft were announced through several different media outlets for review (Appendix H).

Throughout the planning process several sites, such as the County's social media accounts and official website, published information about the CWPP story map and draft plan, including announcements in multiple weekly newsletters, a community survey, press release, and informational flyer.

Several events were held during this planning process, including multiple internal, stakeholder, and client meetings; several presentations to local community organizations and homeowners associations (HOAs), and a public outreach/educational event.

More information regarding the details of these online resources (including URLs) can be found in Appendix H, Community Outreach. Appendix H also includes a brief summary of the story map, including representative photographs of the information available to the public.

During subsequent updates to this plan, the County will employ more traditional methods of engagement to ensure community members are able to continue to provide substantive input into the document. Recommendations for future community engagement and outreach are provided in Table 4.4 in Chapter 4.



## WILDLAND URBAN INTERFACE

The wildland urban interface (WUI) is composed of both interface and intermix communities and is defined as areas where human habitation and development meet or intermix with wildland fuels (U.S. Department of the Interior [DOI] and U.S. Department of Agriculture [USDA] 2001:752–753). Interface areas include housing developments that meet or are in the vicinity of continuous vegetation. Intermix areas are those areas where structures are scattered throughout a wildland area where the cover of continuous vegetation and fuels is often greater than cover by human habitation.

In addition, the WUI has an area of influence, or influence zone. This area is described with respect to wildland and urban fire; it is an area with a set of conditions that facilitate the opportunity for fire to burn from wildland fuels to the home and or structure ignition zone (NWCG 2021a).

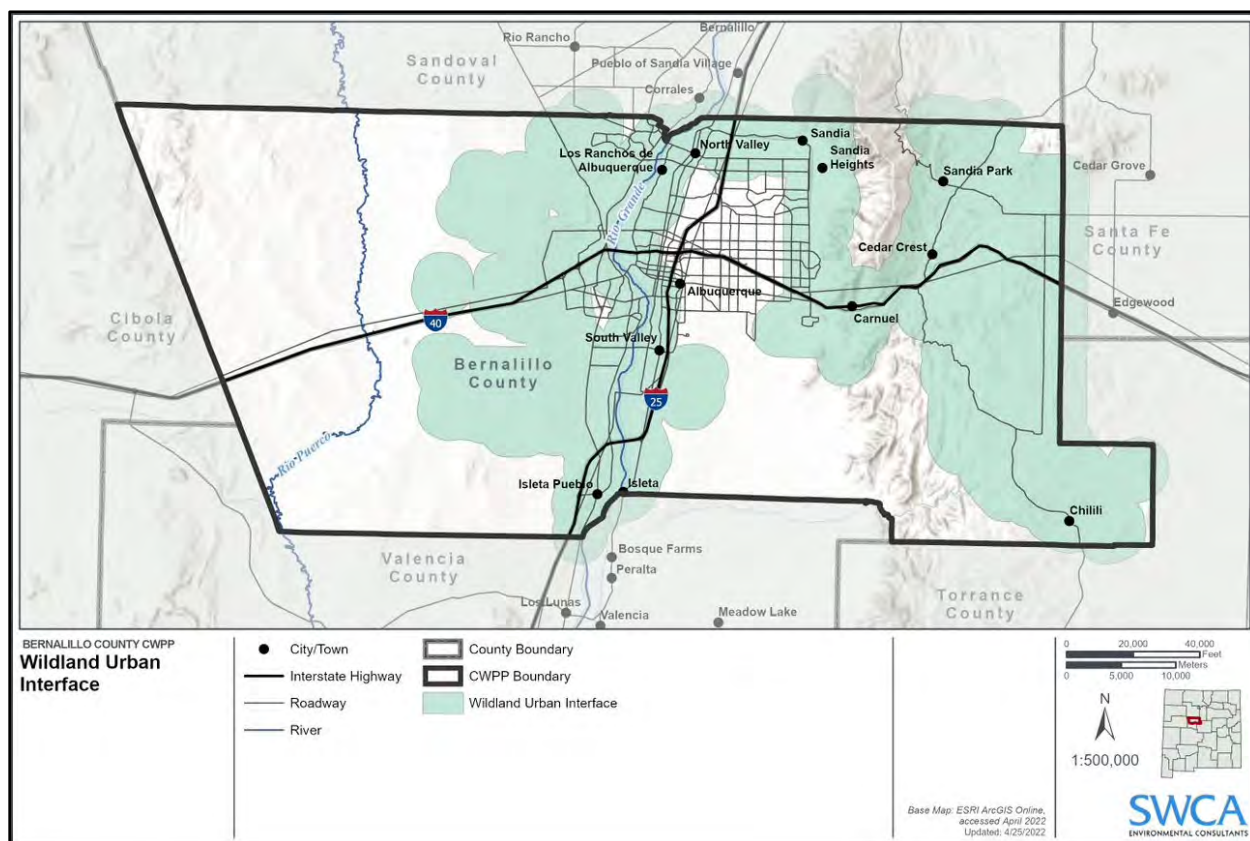
A CWPP offers the opportunity for collaboration of land managers to establish a definition and a boundary for the local WUI; to better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area; and to prioritize and plan fuels treatments to mitigate for fire risks. At least 50% of all funds appropriated for projects under the Healthy Forests Restoration Act (HFRA) must be used within the WUI.

According to the HFRA, the WUI can be defined by a CWPP. In this CWPP, the WUI (Figure 2.1) is defined as:

- An area extending 1.5 miles from the boundary of an at-risk community.
  - In the event a strategic fuel project enhances community protection, the WUI boundary may extend beyond the traditional 1.5-mile buffer to include areas where the strategic project would be completed. For example, sustained slopes and ridgelines may continue beyond the 1.5-mile buffer. However, it is still important that project work is completed in those high-risk areas. Therefore, the entire strategic planning area would be considered as WUI, not just the sections within the 1.5-mile buffer.



At-risk communities were delineated prior to the on-the-ground community hazard assessments and were based on the presence of homes and structures surrounded by wildland fuels. Buffers representing the 1.5-mile area for WUI as defined above are presented in Appendix D for each community.



**Figure 2.1. Bernalillo County WUI.**

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property. Human encroachment upon wildland ecosystems within recent decades is increasing the extent of the WUI throughout the county (Figures 2.2 and 2.3), which is having a significant influence on wildland fire management practices. Combined with the collective effects of aggressive suppression policies, resource management practices, land use patterns, climate change, and insect and disease infestations, the expansion of the WUI into areas with high fire risk has created an urgent need to modify fire management practices and policies and to understand and manage fire risk effectively in the WUI (Pyne 2001; Stephens et al. 2005). Mitigation techniques for fuels and fire management can be strategically planned and implemented in WUI areas; for example, with the development of defensible space around homes and structures.

During the 20-year period between 1990 and 2010, the WUI expanded rapidly with regard to the number of new houses built (41%) and land area (%33), making it the fastest-growing land use category in the lower 48 states. The highest proliferation of houses and population in the WUI occurred in the southwestern United States, and it's expected that these trends will continue and amplify (Radeloff et al. 2018). Today, more than 46 million residences in 70,000 communities are at risk for WUI fires (U.S. Fire Administration [USFA] 2021a). When it comes to wildfire, this trend is of special concern since WUI

conditions are linked with an increased risk of loss of human life, property, natural resources, and economic assets.

Fire and WUI Code information is described in Appendix A.



**Figure 2.2. Example of the WUI in Bernalillo County.**



**Figure 2.3. Example of the WUI in Bernalillo County.**

## FIRE REGIMES

Fires are characterized by their intensity, the frequency at which they occur, the season in which they occur, their spatial pattern or extent, and their type. Combined, these attributes describe the fire regime.

In order to classify, prioritize, and plan for fuels treatments across a fire management region, methods have been developed to stratify the landscape based on physiographic and ecological characteristics.

Fire regimes in the western United States have changed dramatically within the past several decades. Historically, fire regimes within the wildlands in Bernalillo County were largely a function of the dominant vegetation, where grasslands, open shrub-steppe communities, and ponderosa pine forests had relatively frequent, low-intensity surface fires. Piñon-juniper woodlands and sub-alpine forests, however, typically experienced infrequent high-severity fires. These historical regimes would typically create a mosaic of different stages of vegetative structure across the landscape. For the most part, these fires have helped to preserve an open vegetative community structure by consuming fuels on the ground surface, which has maintained open meadows and cleared the forest understory of encroaching vegetation. However, the forested portions of the county, e.g., the Cibola NF, have departed from historical fire regimes (USFS 2021a). As a result, some areas, especially in the Sandia and Manzano Mountains, have not burned in over 100 years (Arid Land Innovation, LLC 2015). This departure from historical fire regimes has caused recent wildland fires to burn much more intensely and unpredictably in many areas of New Mexico (EMNRD Forestry Division 2020).

It is important to address here the common misconception that all southwestern forests have historically exhibited low-intensity frequent surface fire regimes. This is not always the case, as many of the higher-elevation (8,500 feet and above) spruce-fir and mid-elevation mixed-conifer forests would have naturally experienced infrequent stand replacing fires as part of their natural regeneration cycle (Touchan et al. 1996; Fulé et al. 2003), so for these forest types, restoration to more open stands is not always appropriate. At lower elevations, plants and animals are adapted to historical frequent, low-severity fire regimes and are therefore not resilient to the high-severity, extensive wildfires burning today (Keane et al. 2002). Human influences regarding fire regimes have therefore been greatest at these low-elevation sites. An additional factor contributing to the natural disturbance regime in southwestern forests are outbreaks of bark beetle (*Ips*, *Dendroctonus*, and *Scolytus* spp.), which have locally killed significant numbers of spruce (*Picea* sp.), fir (*Abies* sp.), Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), and piñon pine (*Pinus edulis*) trees throughout the planning area (EMNRD Forestry Division 2022a). The effect of bark beetle infestation is particularly evident within the Cibola NF (EMNRD Forestry Division 2022a). Currently, many needles have dropped to the ground and have left only skeletons of trees where fire is less likely to be carried through the canopy due to the absence of light and flashy aerial fuels. In areas where the canopy is still maintaining dead needles, the risk of fire being carried through the canopy is much greater and should be mitigated as appropriate.

## FUELS AND TOPOGRAPHY WITHIN THE WUI IN BERNALILLO COUNTY

The western half of the county is predominantly composed of grassland fuels, transitioning into shrub-steppe- or shrubland-dominated fuels with increasing elevation. Grassland communities are primarily characterized by semidesert grasslands, which are relatively sparse and usually occur on flat to rolling topography at lower elevations. Grasslands may occur as pure herbaceous stands, a shrub-steppe community, or a juniper savanna.



Forested communities exist primarily in the higher elevations of the Sandia and Manzanita Mountains in the eastern portions of the county. Typically, forested communities are dominated by piñon-juniper woodlands at the lower elevations, which transition to ponderosa pine forests, then to mixed-conifer forests, and finally to spruce-fir forests as elevation increases.

Map 1 in Appendix B shows fuels within Bernalillo County.

## Grasslands and Shrub-Steppe

As the elevation rises from the Rio Grande bosque ecosystem, the land cover transitions into a grassland-dominated ecosystem, which primarily occurs on dry plains, mesas, and alluvial flats. This vegetation type covers an elevational range from approximately 4,700 up to 7,600 feet in the surrounding foothills. Grassland fires can move quickly under dry, windy, and steep conditions, often reaching speeds of over 300 feet per minute. Previous work has suggested that the historical fire return intervals (FRIs) for grasslands throughout the seventeenth to early nineteenth centuries were every 5 to 10 years (Leopold 1924; Swetnam et al. 1992). Recent fire-suppression policies may have contributed to declining fire frequency in this cover type, but other interacting factors may have contributed as well. Beginning in the latter half of the nineteenth century, intensive livestock grazing is thought to have been responsible for a decline in grassland fires (Touchan et al. 1996; West 1984). Heavy grazing reduced the fuels available to propagate fire spread and also reduced competition with herbaceous plants, tipping the balance in favor of the woody species. Woodland encroachment, increased tree density, and altered fire behavior characterize many former grasslands of the Southwest. Once woody plants become dominant, their long lifespans and their ability to extract both shallow and deep soil moisture can maintain a woodland condition indefinitely (Burgess 1995). Frequent fire plays a significant role in grassland nutrient cycling and successional processes, and long-term exclusion may produce irreversible changes in ecosystem structure and function (McPherson 1995).

The shrub-steppe ecosystem is similar to the semi-desert grassland ecosystem in its vegetative composition, and it typically occurs on alluvial fans and flats within lower elevations. The shrub-steppe ecosystem is usually dominated by grasses (>25% cover) but has an open shrub layer. Typically, the shrub-steppe portion of the grasslands has a longer FRI than grassland communities due to the decreased presence of herbaceous fuels. However, in some regions, grazing and fire exclusion is favoring increased coverage of sagebrush in addition to woody encroachment (Innes 2019).

## Piñon-Juniper Woodlands

One of most common vegetative communities in Bernalillo County is piñon-juniper woodland. The fire ecology of these woodlands is not well understood, but generally it is believed that fire disturbance was relatively infrequent, while fire played more of a role as piñon-juniper woodland transitioned to savannah and ponderosa pine ecotones. In a review of piñon-juniper disturbance regimes, Romme et al. (2007) has subdivided the piñon-juniper cover type into three subtypes: areas of potential woodland expansion and contraction, piñon-juniper savannas, and persistent woodlands. These categories are helpful in separating the broad piñon-juniper cover type into distinct communities, which are subject to different climatic, topographic, and disturbance conditions.

Areas of potential expansion and contraction are those zones wherein the boundaries of the piñon-juniper ecotones have shifted. As mentioned previously, many grasslands in the Southwest have been colonized by trees as a result of a complex interplay of environmental factors. The issue of woodland encroachment into grasslands goes hand in hand with the assessment of historical conditions of the woodlands. These shifting boundaries have been widely documented (e.g., Gottfried 2004) but the historical condition of the

ecosystem may be relative to the time scale of evaluation. Betancourt (1987) has suggested that the changing distribution patterns seen in the last century may be part of larger trends that have occurred over millennia and not the result of land use changes. Overall, it is believed that greater landscape heterogeneity existed previously in many of these areas that are now uniformly covered with relatively young trees (Romme et al. 2007).

Piñon-juniper savannas are found on lower-elevation sites with deep soils where most precipitation occurs during the summer monsoon season. Juniper savanna, the most common savanna in New Mexico, consists of widely scattered trees in a grass matrix (Dick-Peddie 1993). Similar to grasslands, the range of savannas has decreased as tree density has increased, but the mechanisms for tree expansion are complex as is the subject of current research. Significant scientific debate currently exists over the natural FRI for savannas. Generally, it is agreed that fire was more frequent in savannas than in persistent woodlands due to the higher density of ground fuels in the savannah zones.

Persistent woodlands, characteristic of rugged upland sites with shallow, coarse soils, tend to have older and denser trees. Herbaceous understory vegetation is typically sparse, even in the absence of heavy livestock grazing. Research from persistent woodlands provides strong evidence to support the theory that the natural fire regime of piñon-juniper woodlands was dominated by infrequent but high-severity fires and that FRIs may have been on the order of 400 years (Baker and Shinneman 2004; Romme et al. 2007). These findings are in stark contrast to previous estimates of piñon-juniper FRIs of 30 to 40 years (Schmidt et al. 2002). The short FRI estimates are mostly inferred from FRIs of adjacent ponderosa pine ecosystems due to the scarcity of fire-scarred trees in these ecosystems.

In contrast to ponderosa pine, piñon pines and junipers produce relatively small volumes of litter. Understory fuels, either living or dead, must be sufficiently contiguous to carry a low-intensity surface fire. In the absence of fine surface fuels, fires that spread beyond individual trees are most likely wind-driven and spread from crown to crown (Romme et al. 2007). Fire extent is greatest in higher-density woodlands and is limited by both fuels and topography in sparse, low-productivity stands on rocky terrain. It is likely that fire has been more common in savannas and areas of expansion and contraction than in persistent woodlands, but debate remains regarding the exact range of fire frequency. Overall, frequent, low-intensity surface fires are not the predominant fire regime in piñon-juniper woodlands. Therefore, fire exclusion has likely not significantly impacted this forest type. However, the degree of departure from historical conditions and the causes of any observed changes remain uncertain; therefore, restoration treatments in woodlands should be approached with caution (Romme et al. 2007).

## Ponderosa Pine Forests

In general, studies have found that pre-1900 mean fire intervals—the arithmetic average of all fire frequencies for a specific study site—ranged from 4 to 36 years across southwestern ponderosa pine forests and that fire frequencies and areas burned were the greatest in mid-elevation ponderosa pine forests (Fulé et al. 2003; Grissino-Mayer et al. 2004; Swetnam and Dieterich 1985; Veblen et al. 2000). Ponderosa pine stands, which exist in higher elevation and steeper portions within the county, are fire-adapted ecosystems that were historically maintained by frequent, low-intensity fires. Throughout the Southwest, extensive fire history studies have documented historic fire frequencies in ponderosa pine forests using tree-ring data (Allen et al. 2002). Large variation in the spatial and temporal scales of fires in ponderosa pine forest was common and was usually based on forcing factors, such as seasonality, regional climate, elevation, aspect, and other site conditions. The effects of fire exclusion on forest structure are thought to be more profound in forests that previously sustained frequent, low-intensity surface fires (Westerling et al. 2006), and it is likely that fire exclusion was a primary cause of departure from historical conditions in ponderosa pine forests. Historically, frequent fire would have consumed fuels

on the ground surface and culled young trees to maintain an uneven age distribution and mosaic pattern throughout the forest (Allen et al. 2002). Frequent fire disturbance maintained an open, park-like forest structure with canopy openings and an abundant herbaceous and shrubby understory (Cooper 1960; Covington and Moore 1994; Weaver 1947). In contrast to this historic structure, modern ponderosa stands are often overly dense with an understory of younger trees, increasing the likelihood for a fire to be lifted into the canopy. In areas where canopy spacing is less than 20 feet, there is increased crown fire hazard and potential for long-range spotting, especially in the presence of wind and steep slopes.

## Mixed-Conifer/Spruce-Fir Forests

Often forest patches affected by low- and high-severity fire are closely juxtaposed in a transition zone made up of a forest type known as mixed conifer (Fulé et al. 2003). Fire histories in mixed-conifer forests vary with forest composition, landscape characteristics, and human intervention, but tend to exhibit mixed severity fire regimes with both low-intensity surface fires and patchy crown fires (Touchan et al. 1996). Mixed-severity fire regimes are the most complex fire regimes in the western United States because of their extreme variability (Agee 1998, 2005).

A mixed-severity fire regime exists where the typical fire, or combination of fires over time, results in a complex mixture of patches of different severity, including unburned, low-severity, moderate-severity, and high-severity patches (Agee 2005). Ponderosa pine was once co-dominant in many mixed-conifer forests with relatively open stand structures, but fire suppression has allowed the development of dense sapling understories, with regeneration dominated by the more fire-sensitive Douglas-fir, white fir (*Abies concolor*), and Engelmann spruce (*Picea engelmannii*). Forest stand inventory data from Arizona and New Mexico show an 81% increase in the area of mixed-conifer forests between 1962 and 1986. Herbaceous understories have been reduced by denser canopies and needle litter, and nutrient cycles have been disrupted. Heavy surface fuels and a vertically continuous ladder of dead branches have developed, resulting in increased risks of crown fires (Touchan et al. 1996). Thus, across New Mexico there has been an increase in both mixed-conifer forests and the likelihood of these forests experiencing high-severity fire.

Spruce-fir forests that occur at higher elevations across the southwestern United States typically exhibit high densities (782–1,382 trees/acre), high basal areas (28–39 square meters per hectare [ $m^2/ha$ ]), continuous canopy cover (52%–61%), and increased woody debris (28–39  $m^2/ha$ ). These forest characteristics naturally support high-intensity and severe stand-replacing fires (Fulé et al. 2003) and an infrequent fire regime. Approximately 80% or more of the aboveground vegetation is either consumed or dies as a result of such fire.

## Riparian Woodland Communities

Native riparian vegetation in the bosque is not adapted to fire, and fires did not typically occur within this ecological zone. As a result, fire can actually influence the composition and structure of riparian ecosystems. The ecology of this habitat type has changed significantly over time, as fire-adapted invasive species such as saltcedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*) have invaded many areas. Once saltcedar has been established at a location, it increases the likelihood that the riparian area will burn and, as a result, alter the natural disturbance regime. This is of particular concern along the WUI that borders the Rio Grande riparian areas. Saltcedar and Russian olive both sprout readily after fire, and although cottonwood (*Populus* sp.) will also regenerate after fire, it typically has limited survival of resprouting individuals. Studies have found that the density of saltcedar foliage is higher at burned sites than unburned sites within riparian areas (Smith et al. 2006).

## IMPACTS FROM CHEATGRASS

Invasive annual plants, such as cheatgrass (*Bromus tectorum*) and, to a lesser extent, burningbush (*Kochia scoparia*) and Russian thistle (*Kali tragus*), have had significant impact on the natural fire regimes of Bernalillo County. Cheatgrass, specifically, can function as both an early seral stage invader of disturbed sites and as potential climax dominant, especially on sites that would normally support native perennial forb and grass communities (Zouhar 2003). In invaded ecosystems, cheatgrass will frequently dominate the post-fire landscape. Furthermore, as its presence and abundance on the landscape increases, the potential and recurrence of future wildfire also increases (Zouhar 2003). In areas dominated by cheatgrass, the average FRI is typically less than 10 years (Paysen et al. 2000). These traits have resulted in cheatgrass likely altering the fire severity and frequency of many fire regimes within Bernalillo County. Cheatgrass can affect most of the vegetative communities across Bernalillo County; however, the most impacted are usually grasslands, shrub-steppe, and piñon-juniper woodlands.

**Cheatgrass Impacts to Grasslands and Shrub-Steppe.** Within these systems, cheatgrass has had dramatic impacts on local fire ecology. The success of cheatgrass on post-fire landscapes is typically dependent on the pre-fire vegetative communities (Zouhar 2003). Grasslands and shrublands that have been heavily disturbed (i.e., areas where there has been a substantial reduction of native perennial grass and forbs) are more likely to experience post-wildfire cheatgrass invasion (Peters and Bunting 1994; Zouhar 2003;). Usually, within 2 to 3 years after a fire, cheatgrass may dominate the canopy and exclude the establishment of native perennials. Due to cheatgrass' tendency to form dense ground cover, the likelihood of fire also increases. Typically, 3 to 6 years after a fire, cheatgrass fuels are sufficient for a second fire to occur (Peters and Bunting 1994). Many perennial grasslands and shrub-steppe ecosystems typically experience moderate frequency (20–50-year FRIs) and low-severity wildfire. However, the highly flammable and highly competitive cheatgrass has reduced the FRI to less than 10 years and has resulted in the likelihood of higher severity and more intense wildfire in these ecosystems (Peters and Bunting 1994; Zouhar 2003).

**Cheatgrass Impacts to Piñon-Juniper Woodlands.** Cheatgrass has been described as being ubiquitous to many piñon-juniper woodlands in the western United States (Zouhar 2003). Its post-fire wildfire success will typically depend on the seral stage of the piñon-juniper woodland. Mature piñon-juniper woodlands with a sparse understory of native perennials that experience stand replacement events are most likely to experience cheatgrass invasion during the early post-wildfire successional stages (Goodrich 1999; Zouhar 2003). During these early stages, cheatgrass can achieve 60% to 80% ground cover within 5 to 10 years. This high-density state will persist until either one of two scenarios happen. The less likely scenario is that recruitment of juniper and piñon succeeds and they return as canopy-dominant species, which usually requires more than 20 years. The more likely scenario is that the cheatgrass state is perpetuated by recurring FRIs of less than 20 years, where any potential early seral stage native species do not survive a fire (Zouhar 2003).

## FIRE HISTORY

Fire is a natural part of New Mexico's varied landscapes and is essential to many ecosystems across the state. Fire controls the density and composition of young trees, recycles nutrients, clears debris and litter from the ground, and creates wildlife habitat at different scales. Many of New Mexico's ecosystems, such as forest, grassland, and savanna ecosystems, are fire-dependent or fire-adapted (Forest Stewards Guild [FSG] 2017)). Native plant species and wildlife are adapted to a specific set of fire regimes (fire frequency, severity, and spatial extent), which are typically of moderate-frequency, low-severity fires

(FSG 2017; Schoennagel et al. 2017). Historically, many New Mexico Native American tribes recognized this interdependence between fire and the ecosystem and were actively engaged in fire management to maintain and restore ecosystem health, among other objectives (Raish 2005). However, more than a century of suppression efforts have resulted in dense stand conditions, pest outbreaks, and increased susceptibility to fire (FSG 2017; Schoennagel et al. 2017; Young et al. 2019). Wildland fire suppression practices, in conjunction with other management actions such as human expansion into the wildlands and warming temperatures, have resulted in an imbalance between wildfire and ecosystem interactions (Schoennagel et al. 2017).

## PAST FIRE MANAGEMENT POLICIES AND LAND MANAGEMENT ACTIONS

Beginning in the early 1900s, the policy for handling wildland fire leaned heavily toward suppression. Over the years, other agencies, such as the Bureau of Land Management (BLM), the Bureau of Indian Affairs (BIA), and the NPS, have followed the lead of the USFS and adopted fire suppression as the proper means for protecting the nation from wildfire. As a result, many areas now have excessive fuel buildups, dense and continuous vegetative cover, and tree and shrub encroachment into open grasslands.

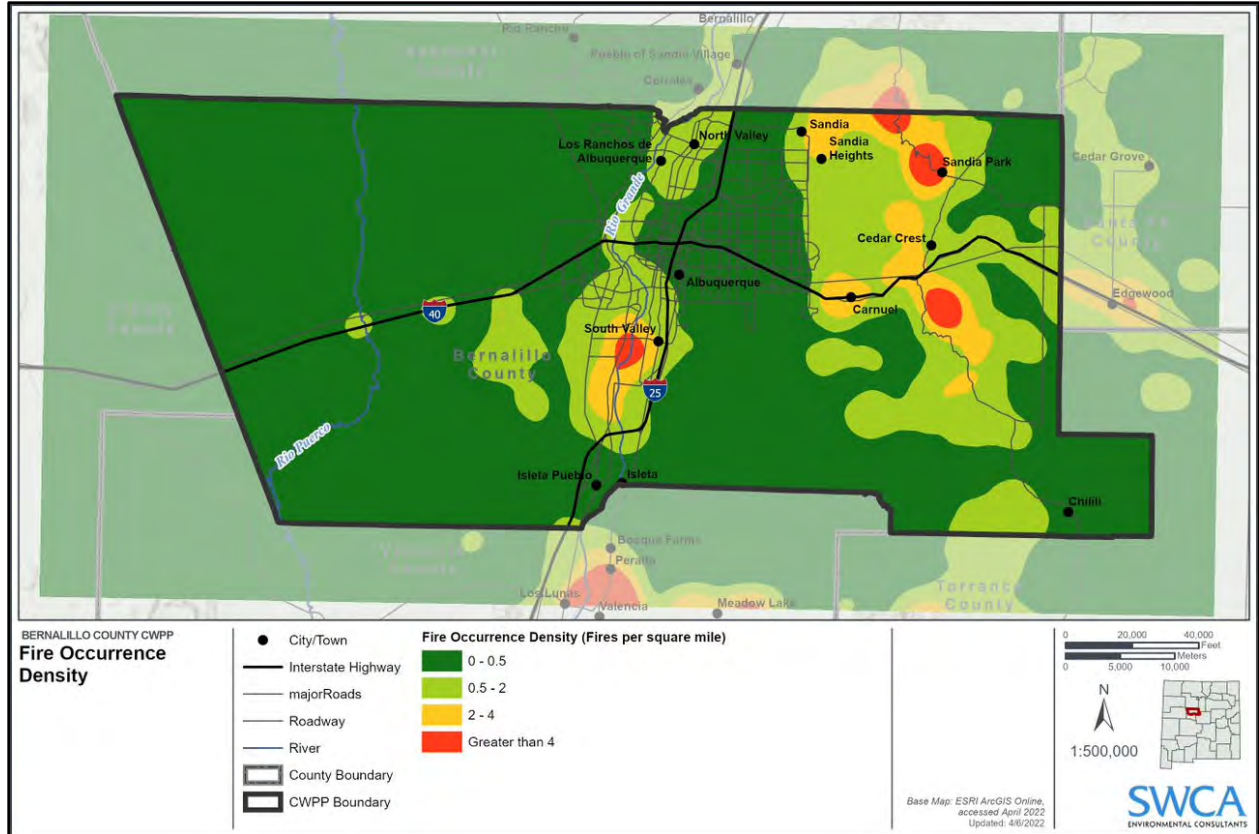
## RECENT FIRE OCCURRENCE

An analysis of the fire history of Bernalillo County and its surrounding area (2000–2022) shows that fires have predominantly occurred within the Manzanita Mountains in the eastern portion of the county. There has also been a high concentration of fires along the Rio Grande Corridor, predominantly within the bosque zone (Figures 2.4 and 2.5). There was a high frequency of fires from 2000 to 2008, a lull in fire frequency from 2009 to 2019, and a substantial increase in fire frequency in 2020 and 2021 (Figure 2.6). Over the last 23 years, there have been 1,753 fires, with 93% of these fires (1,632 fires) being less than 10 acres in size (Figure 2.7). Since 2000, a total of 54,211 acres in and around Bernalillo County have experienced wildfire. In this timespan, five fires have been greater than 1,000 acres but less than 5,000 acres, and three fires have been greater than 5,000 acres. The largest fire since 2000 was the Dog Head Fire, which burned 17,912 acres in 2016 in southeastern Bernalillo County and northeastern Tarrant County. There have been 14 wildfires in New Mexico by June 2022, with two breaking records for the largest wildfire to occur on State land. The Black Fire has burned over 325,136 acres by late June 2022, and the Calf Canyon-Hermits Peak Fire has burned over 341,735 acres by late June 2022<sup>2</sup> (NWCG 2022). Each of these two fires broke the previously held record of 297,845 acres burned from the 2012 Whitewater-Baldy Fire.

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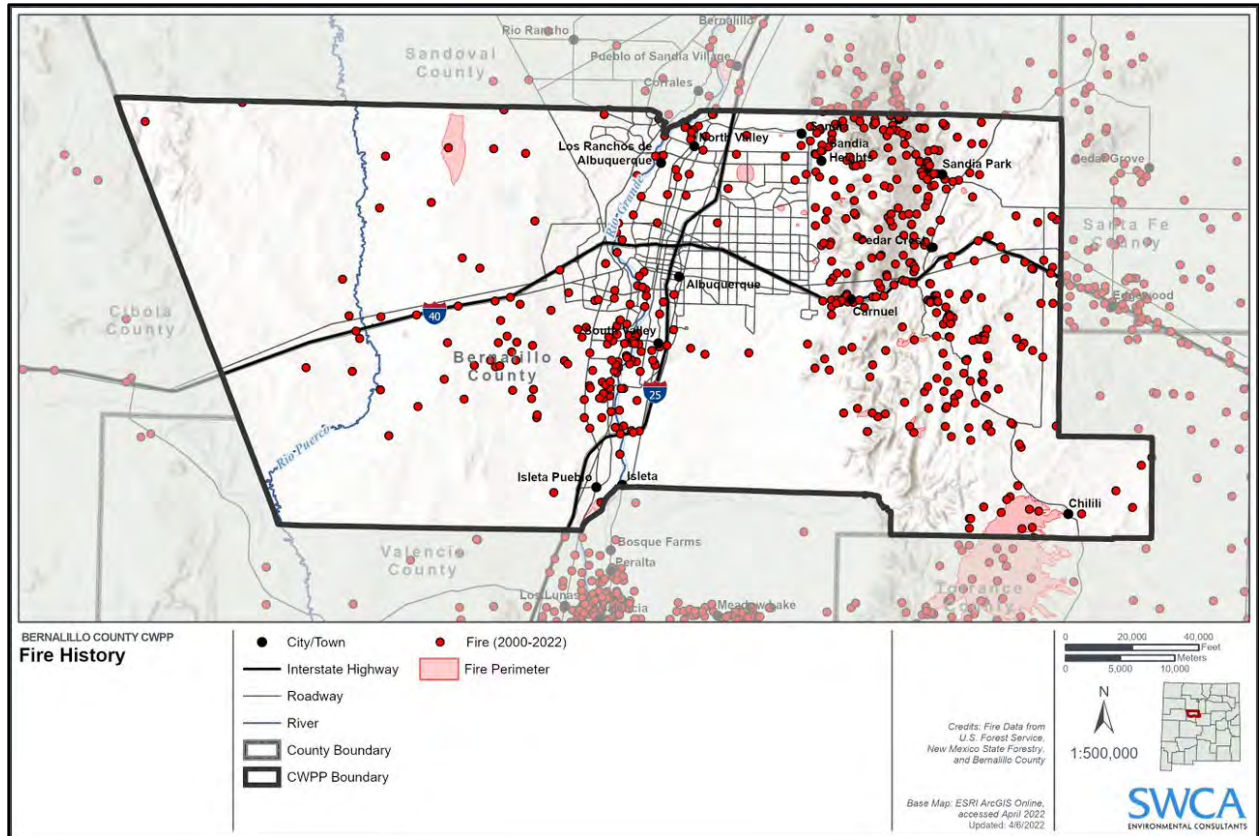
<sup>2</sup> These two incidents were still active during report development.





**Figure 2.4. Fire occurrence density for Bernalillo County from 2000 through 2022.**

Note: Fire occurrence density has been determined by performing a density analysis on fire start locations with ArcGIS Desktop Spatial Analyst.



**Figure 2.5. Historic fire events for Bernalillo County from 2000 through 2022.**

Humans have been the source of 77.3% (1,355 ignitions) of the wildfire ignitions in Bernalillo County from 2000 through 2022. Approximately 73% of these human ignitions are unknown, but among known human-caused ignitions, campfires are most common source (Figure 2.8). Residents within the WUI, particularly along the Rio Grande bosque and communities within or bordering the Manzanita Mountains, are concerned with the number of human-caused fires (City of Albuquerque and Bernalillo County 2017). Although most fires take place during the summer months, human-caused ignitions increase the potential for wildfires throughout the entire year (City of Albuquerque and Bernalillo County 2017).



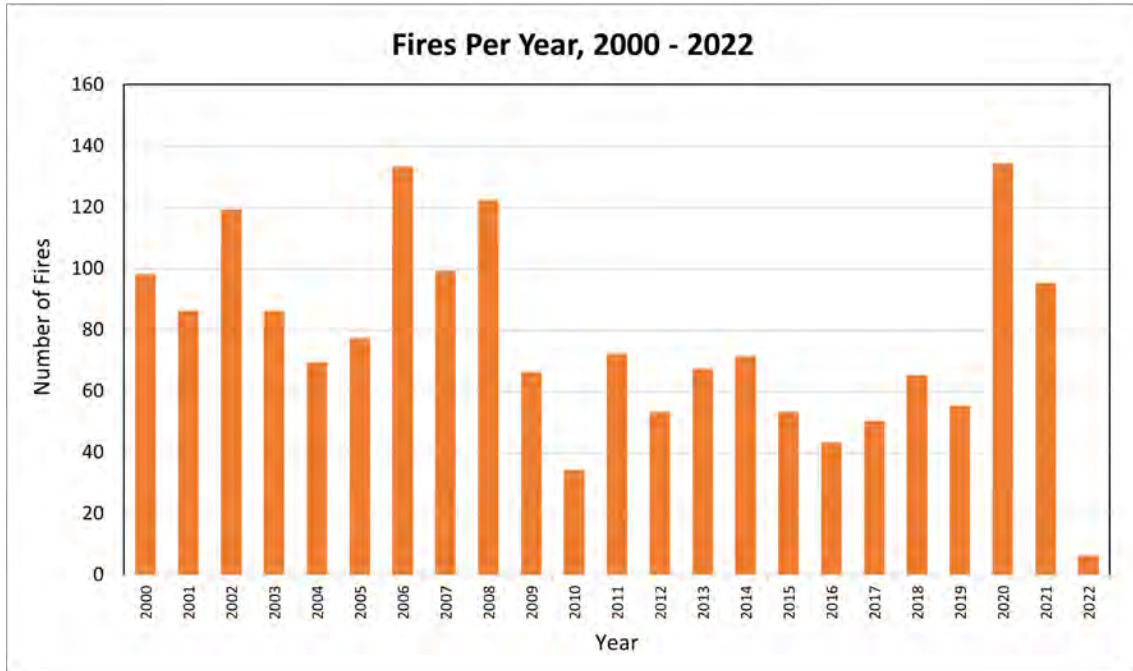


Figure 2.6. Annual wildfire frequency for Bernalillo County from 2000 through 2022, based on available data.



Figure 2.7. Fire size statistics for Bernalillo County from 2000 through 2022.

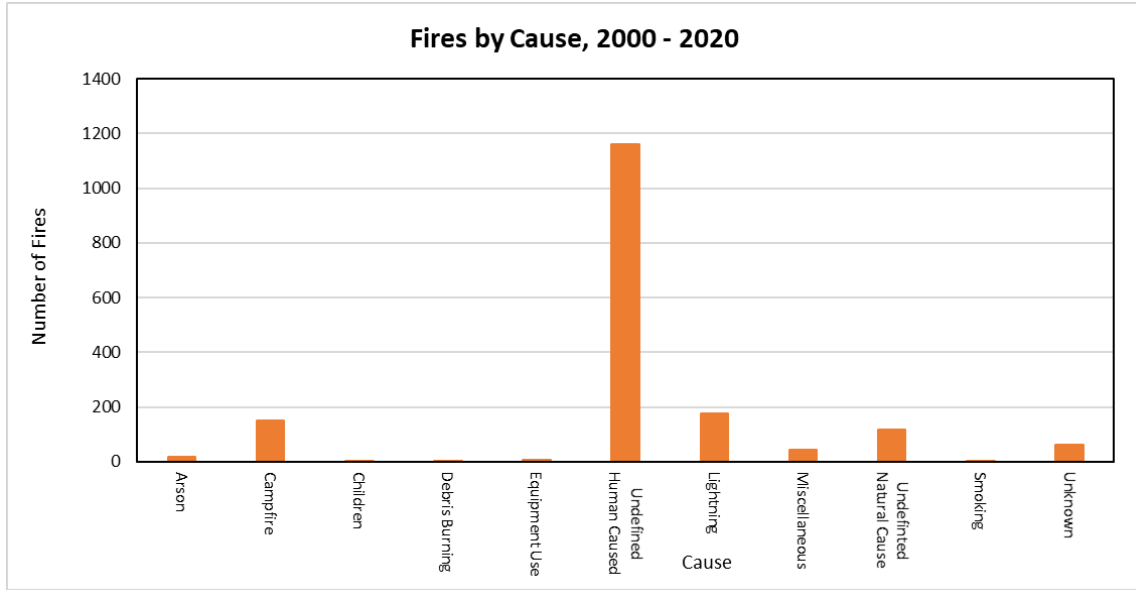


Figure 2.8. Fire causes for Bernalillo County from 2000 through 2022.

## FUTURE CHALLENGES

### IMPACT OF CLIMATE CHANGE

Frequent drought, fire suppression-based forest management tactics, and climate change have all worked together to increase forest vulnerability. Removing natural fire from a fire-dependent ecosystem, drought, insects, and diseases have resulted in increased fuel build-up and alterations to vegetation composition (Goodwin et al. 2021). These forest changes can increase the risk of uncharacteristically large high-severity fires (Goodwin et al. 2021; Schoennagel 2017). In the past few years, fires have grown to record sizes and are burning earlier, longer, hotter, and more intensely than they have in the past (Westerling et al. 2006; Westerling 2016).

According to the National Interagency Fire Center (NIFC), occurrence of catastrophic wildfires has greatly increased over the last 20 years. Westerling et al., (2006) claim that a study of large (>1,000 acres) wildfires throughout the western United States for the period of 1970 to 2003 saw a pronounced increase in fire frequency since the mid-1980s (1987–2003 fires were four times more frequent than the 1970–1986 average).

An update to Westerling et al.'s 2006 work found that the frequency of large wildfires has continued to increase with each decade since 1970 (Westerling 2016). Within just the last 10 years, a record number of acres have burned, and numbers are continually increasing (NIFC 2021a). In 2020, 58,950 fires were reported nationwide, burning 10.1 million acres (NIFC 2021a). In New Mexico, 123,792 acres were burned by wildfire in 2021 (NIFC 2021b). With increased fires comes increased suppression costs; 2018 beat all previous records, with federal firefighting costs hitting \$3,143,256,000 (NIFC 2021c).

The shifting climate, particularly rising temperatures, frequent drought, and the extension of the fire season, are considerably escalating wildfire risk across the state. The length of the fire season in the southwestern United States has increased significantly since 1979; and since the 1970s, the frequency of large fires has increased dramatically. Specifically, the occurrence of large fires has increased by **462%** in

southwestern U.S. forests (Schoennagel 2017). When accounting for climate change, this pattern is expected to amplify in the future and promote wildfire potential across western U.S. forests (Abatzoglou and Williams 2016). However, it should be noted that the impact of climate change to a particular fire regime will be contingent upon year-to-year climate variability and ecosystem type. For instance, synchronous fires across spruce-fir forests in New Mexico coincide with drought conditions or, in the case of open ponderosa pine forests, a wet year followed by a dry year (NPS 2017).

New Mexico has already begun to experience the impacts of increased fire occurrence and severity. In fact, two of the largest wildfires in New Mexico's recorded history occurred in the last decade, the 2011 Las Conchas Fire and the 2012 Whitewater-Baldy Complex Fire. The Las Conchas Fire scorched over 156,000 acres, and the Whitewater-Baldy Complex Fire burned over 289,000 acres (Union of Concerned Scientists 2016). It is evident that large and severe fire events continue to pose a significant threat to New Mexico's communities.

In addition to direct damage (e.g., structure and property damage) caused by wildfires, abnormally large and severe wildfires also cause indirect impacts to the environment and ecosystem. Uncharacteristically large and severe wildfires may deteriorate local and regional air quality, pollute waterways, displace native species (animal and plant), and increase carbon dioxide emissions. The increased carbon dioxide emissions are of special concern since carbon dioxide is a greenhouse gas. Greenhouse gases are implicated in climate change, and climate change is a critical factor exacerbating frequency and severity of wildfires (NPS 2017).

## TREE MORTALITY

Rising temperatures, drought, and insect outbreaks have contributed to increased tree mortality in and around the Cibola NF. Tree mortality due to the aforementioned factors is a natural process in forest ecosystems. However, if due to compound disturbances or other factors a significant number of trees die in a brief time period over large regions, forest health may be negatively affected. In addition to disrupting ecosystem processes, widespread tree mortality near developed or recreational areas present hazards as trees can fall and potentially endanger the public and infrastructure. Moreover, dead trees function as a fuel that will readily burn as they contain lower moisture and, in conjunction with the fuel aridity of the surrounding environment, may result in larger and more intense fires (Goodwin et al. 2021).

In New Mexico, in the early 2000s, severe heat, drought, and subsequent bark beetle outbreaks caused significant tree mortality. Specifically, mortality among mature piñon pines in the middle Rio Grande Basin was more than 90% (Union of Concerned Scientists 2016). Rising temperatures and reduced water availability have stressed trees, thereby increasing their susceptibility to insect and pathogen infestations, particularly bark beetles (EMNRD Forestry Division 2020b). Over 500,000 acres of New Mexico forests had tree mortality between 2015 and 2020 (EMNRD Forestry Division 2022a). In 2020, over 10,000 acres with ponderosa pine mortality were detected, with the Cibola NF ranking as the second highest national forest by tree mortality. Most of the 2020 surveyed tree mortality in Bernalillo County occurred in the northern portion of the Cibola NF (EMNRD Forestry Division 2022a).

Additional information on forest health considerations and wildlife are summarized in Appendix A.

# FIRE RESPONSE CAPABILITIES

## PLANNING DECISION AND SUPPORT

Wildfires have continued to grow in size and severity over the last decade, requiring fire managers to institute more robust pre-fire planning as well as adapt and improve decision-making tools in order to reduce risk to fire responders and the public and assess impacts on ecological processes.

A primary decision tool utilized by fire managers across all agencies is the [Wildland Fire Decision Support System](#) (WFDSS), a system that assists fire managers and analysts in making strategic and tactical decisions for fire incidents (WFDSS 2021). WFDSS combines desktop applications for fire modeling into one web-based system. It provides a risk-informed decision process and documentation system for all wildland fires, and it also introduces economic principles into the fire decision process in order to improve efficiencies while also ensuring safe and effective wildfire response.

One intent of the WFDSS is to ensure that when fire response decisions are made, they fall in line with agency land and resource management plans. Agencies have recently been moving away from the traditional written fire management plans and instead are developing spatial fire management plans that can be housed within WFDSS (WFDSS 2015). The Cibola NF for example will have all management requirements and strategic objectives for fire management, contained within WFDSS, so that in the event of a fire, incident managers are considering this information when making decisions and developing strategic direction for the wildfire incident (WFDSS 2015).

## FIRE RESOURCES

Bernalillo County contains several local, tribal, state, and federal fire protection organizations that are well integrated through mutual aid and fire protection agreements such as the Joint Powers Agreement. In general, most of the agencies serving the County are well staffed and have plentiful resources throughout the wildfire season (April–July). However, during the regular season (i.e., August–March), resources, especially state, federal, and County resources, may be shifted to other regions. During this period, the time to obtain resources may be extended, especially for areas that are under federal and state jurisdiction.

### Local Response

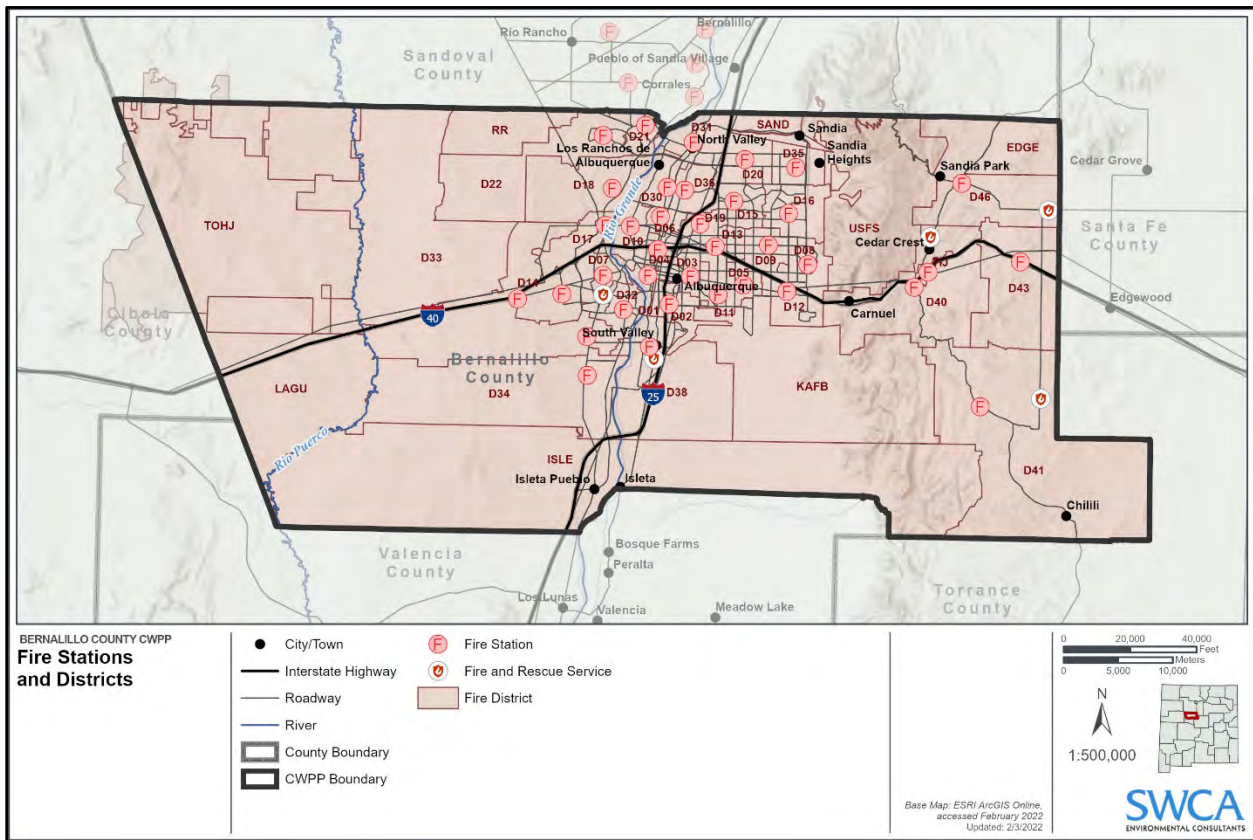
#### Albuquerque Fire Rescue

Albuquerque Fire Rescue (AFR) was established on June 1, 1900, and currently serves a jurisdiction comprising more than 190 square miles and an estimated population over 500,000. The AFR is an “all hazard” fire department and is responsible for responding to fires, as well as other emergencies such as medical emergencies, hazardous materials incidents, and heavy technical rescue within the city of Albuquerque. There are 22 fire stations distributed throughout the city of Albuquerque, with a combined total of 729 full-time firefighters (City of Albuquerque 2022a). Each station is assigned to a district for which it is responsible for fire and rescue response. The AFR may respond to fires outside of its jurisdiction through mutual aid agreements with BCFR and Kirtland Air Force Base (City of Albuquerque 2022b).

The AFR also has a wildland fire task force, which ensures over 700 Albuquerque firefighters have wildland fire qualifications. This task force works in collaboration with other agencies and helps provide wildfire protection for Albuquerque’s open spaces, a large portion of the Rio Grande Valley State Park, the Sandia foothills, and the Petroglyph National Monument on Albuquerque’s Westside. AFR operates its own dispatch center (City of Albuquerque 2022c).

## Bernalillo County Fire & Rescue

BCFR was established on September 15, 1958, as a volunteer department with one station. It has expanded from a single volunteer station to a fully paid department spanning 12 districts (Figure 2.9) with each district employing five to six paid personnel around the clock. BCFR’s mission is to “preserve and protect lives and property from the adverse effects of fires or exposure to dangerous conditions, to provide a high level of quality care of medical emergencies, and to protect our citizens through proactive education prevention, and response” (BCFR 2016). BCFR has responsibility for responding to emergencies, including fire suppression, in the unincorporated areas of the county, which comprise 890 square miles and a population of 118,000 (BCFR 2016).



**Figure 2.9. Fire station locations and districts within Bernalillo County.**

BCFR also provides wildland firefighting services and response, with all 12 districts containing wildland terrain. BCFR fights fire on multiple types of wildland fire areas, including the Sandia Mountains and the Rio Grande bosque. BCFR consists of 12 districts spread throughout three regions. The North Valley (Battalion North) region contains Districts 30, 31, 35, and 36. The South Valley (Battalion West) region contains Districts 32, 33, 34, and 38. The East Mountains of Bernalillo County (Battalion East) region contains Districts 40, 41, 43, and 46. BCFR headquarters, also known as the Atrium, is located in the



North Valley. The Office of Emergency Communications operates a dispatch service for BCFR (Bernalillo County 2022a).

## State Response

### New Mexico Energy, Minerals, and Natural Resources Department Forestry Division

The EMNRD Forestry Division, established in 1957, focuses on wildfire response, fuels treatments, monitoring insect outbreaks and invasive insects that lead to tree mortality, conservation of rare plants, and promoting healthy watersheds. The EMNRD Forestry Division is headquartered in Santa Fe, with 78 full-time personnel working at nine locations throughout the state. In addition, the EMNRD Forestry Division trains and staffs about 300 emergency wildland firefighters and is responsible for fire suppression on 43 million acres of non-municipal, non-tribal, and non-federal land in the state (EMNRD Forestry Division 2022b).

Dispatch, coordination, and logistical support is provided via the Southwest Coordination Center (SWCC) (DOI et al. 2015). Resource distribution for all-risk incidents, such as aircraft and equipment requests, is handled by the SWCC. The SWCC is a cooperative effort amongst various agencies, including the USFS, U.S. Fish and Wildlife Service (USFWS), NPS, BLM New Mexico State Office, BIA, and EMNRD Forestry Division (SWCC 2022).

The Bernalillo District of the EMNRD Forestry Division has primary responsibility for non-federal, non-municipal, non-tribal, and non-pueblo lands within the Bernalillo County CWPP planning area. In the event of a wildfire on state land, local fire departments or other resources may be used for initial attack under the [New Mexico Joint Powers Agreements](#).

## Federal Response

### Bureau of Indian Affairs

The BIA's Wildland Fire Management Branch mission is to "execute our fiduciary trust responsibility by protecting lives, property, and resources while restoring and maintaining healthy ecosystems through cost-effective and creative fire-management programs, collaboration, and promoting Indian self-determination" (DOI 2019). The BIA has trust responsibility to protect 55 million acres of Native American Lands. To fulfill its responsibility, the BIA provides direct services or funds self-governance for fire management programs throughout tribal lands (DOI 2019). The BIA maintains a wildland fire engine fleet with over 280 engines, sponsors seven interagency hotshot crews, and provides 21 aviation resources. In addition, the BIA sponsors, on average, more than 3,000 on-call firefighters each year (DOI 2022a).

The BIA Southwest Region operates in New Mexico, Colorado, and Texas. Tribal land in these states comprise a total of 4,869,744 acres. In New Mexico, the BIA Southwest Region, through the Southern Pueblos Agency, serves the Pueblos of Isleta, Laguna, and Sandia (DOI 2022b). The Southern Pueblos Agency has initial attack responsibility for the Pueblos of Isleta, Laguna, and Sandia, as well as the To'Hajiilee Indian Reservation. However, the EMNRD Forestry Division may also engage in initial attack activities for the Pueblos of Isleta and Sandia (EMNRD Forestry Division 2018).



## Bureau of Land Management

In New Mexico, the BLM is responsible for fire management on 13.5 million acres of public land in four BLM districts, including the Albuquerque District. The BLM operates a fleet of 14 fire crews and engines across the state of New Mexico and holds mutual aid agreements with other agencies (BLM 2021d). Bernalillo County falls under the Albuquerque District Office; however, due to the minimal presence of BLM land in the county, the BLM does not have initial attack responsibility. The BLM may respond to fires in the county through mutual aid agreements (DOI et al. 2015).

## Department of Defense

### *Kirtland Air Force Base*

The Kirtland Air Force Base (KAFB) has its own fire department and is responsible for initial attack within its jurisdictional boundaries. The KAFB also has a Wildfire Fuel Management Program, which is primarily directed at preventing wildfire on its property and surrounding areas. In 2019, the KAFB initiated a 16,000-acre wildfire prevention project. The project focused on creating fuel breaks, which would assist in containing wildfires within the borders of the military installation (KAFB 2019).

## U.S. Forest Service

Overall, the USFS provides wildfire response and management for over 193 million acres of National Forest System lands within the United States (CRS 2021). National Forest lands are considered federal responsibility areas, which are regions where the federal government is responsible for fire response. On USFS land, the USFS has the responsibility for initial attack (initial response).

### *Cibola National Forest*

Fire response for the Cibola NF is coordinated through the SWCC in partnership with the National Interagency Coordination Center. Dispatch, coordination, and logistical support is provided via the SWCC. Resource distribution for all-risk incidents, such as aircraft and equipment requests, is handled by the SWCC (SWCC 2022).

The Cibola NF is broken down into four ranger districts; a large portion of the Sandia Ranger District and a minor portion of the Mountainair Ranger District are located in Bernalillo County (USFS 2021a).

## National Park Service

### *Petroglyph National Monument*

The Petroglyph National Monument is jointly owned and managed by the NPS, the City of Albuquerque, and the State of New Mexico (NPS 2018). The NPS is responsible for managing wildland fire on 5,250 acres of the 7,235-acre monument. The remaining 1,985 acres are managed by the City of Albuquerque (NPS 2022). However, the City of Albuquerque is responsible for initial response. Namely, AFR Districts 17, 18, and 22 provide initial attack and fire protection services for the monument (City of Albuquerque 2022b).

## Tribal Response

### Pueblo of Sandia

Pueblo of Sandia does not have an active fire response crew. However, they operate an Emergency Operations Center (EOC) where emergency response actions are planned and coordinated by emergency personnel. Additional capabilities of the EOC are currently being developed (Pueblo of Sandia 2022).

### Pueblo of Isleta

The Pueblo of Isleta fire department is a volunteer department with 10 firefighters and one paid Fire Chief. All members have received appropriate wildland firefighting training (*Isleta Pueblo News* 2021).

### Pueblo of Laguna

Servicing land in both Cibola and Bernalillo Counties, the Laguna Fire Rescue consists of three fire stations and employs 27 career firefighters operating with a mission to “protect and preserve lives, property and the environment through fire suppression, emergency medical and rescue services, disaster preparedness, community involvement, and hazardous material mitigation” (Pueblo of Laguna 2022). The goals of the Laguna Fire Rescue are accomplished by providing rapid response to all emergencies and through community involvement. The Laguna Fire Rescue responds to a wide range of emergency and non-emergency calls such as medical, hazardous materials, motor vehicle accidents, structural fires, and wildland fires in the Pueblo of Laguna as well as surrounding areas (Pueblo of Laguna 2022).

### Navajo Nation

The To'Hajiilee Cañoncito Band of Navajos is a noncontiguous section of the Navajo Nation located in parts of western Bernalillo County. The To'Hajiilee Field Office operates a limited BIA volunteer fire department and shares a mutual aid agreement with BCFR, the Albuquerque Fire Department, and Pueblo of Laguna Fire & Rescue (Navajo Nation 2022). Additionally, the Navajo Nation has its own Department of Fire & Rescue Services, which seeks to “safeguard the public welfare by protecting life, health and property from fire, hazardous materials and other perils.” Through “non-traditional” means, the Navajo Nation Department of Fire & Rescue Service’s goals are to protect people and resources from harm and future harm of fire, educate to reduce fire threats, develop and train members in fire knowledge and skills, garner respect by being kind and compassionate, and, finally, conserve and protect the sovereignty of the Navajo Nation and Navajo culture. The Navajo Nation fire program actively trains personnel, collaborates with neighboring communities and agencies, generates awareness of Navajo culture and values, and updates its procedures and policies as needed (Navajo Nation 2005).

### Mutual Aid

The wildland fire community is well known for its development of mutual aid agreements at the federal, state, and local levels. Such automatic aid agreements allow for closest forces to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted; state resources responding to wildfires on federal land may have their associated costs reimbursed by the responsible federal agency, and the reverse is true for federal resources suppressing a wildfire on state land.

## Bernalillo County Mutual Aid Agreements

The BCFR holds mutual aid agreements with AFR, Pueblo of Laguna, Pueblo of Isleta, and the Department of Emergency Medical Services, To'Hajiilee Field Office, Navajo Division of Public Safety (Core Team, Personal Communication, 2022).

### New Mexico Wildland Fire Management Joint Powers Master Agreement

Under the New Mexico Wildland Fire Management Joint Powers Master Agreement personnel, equipment, supplies, services, and funds regarding wildland fire are coordinated and exchanged through participating agencies.

Participating agencies include the New Mexico Energy, Minerals and Natural Resources Department, Forestry Division; United States Department of Agriculture Forest Service, Southwest Region 3; United States Department of the Interior, National Park Service, Intermountain Region; United States Department of the Interior, Fish and Wildlife Service, Southwest Region; United States Department of the Interior, Bureau of Indian Affairs, Southwest Regional Office and Navajo Regional Office; United States Department of the Interior, Bureau of Land Management, New Mexico State Office; and the United States Department of Energy, National Nuclear Security Administration, Los Alamos Site Office.

You can find more information on the agreement here: [https://gacc.nifc.gov/swcc/dc/nmadc/management\\_admin/incident\\_business/documents/New%20Mexico%20JPA.pdf](https://gacc.nifc.gov/swcc/dc/nmadc/management_admin/incident_business/documents/New%20Mexico%20JPA.pdf).

### New Mexico Master Cooperative Wildland Fire Management Response Agreement

The New Mexico Master Cooperative Wildland Fire Management Response Agreement facilitates the coordination and exchange of resources needed for wildfire management, such as equipment/supplies, personnel, services, and funds. The EMNRD Forestry Division; USFS Southwest Region 3; NPS Intermountain Region; USFWS Southwest Region; BIA Southwest Regional Office and Navajo Regional Office, BLM New Mexico State Office, and National Nuclear Security Administration Los Alamos Field Office (NA-LA) are all parties to the agreement.

In addition, for federal agencies, the agreement goes beyond wildland fire. Additional information regarding the agreement is provided here: <https://www.emnrd.nm.gov/sfd/master-cooperative-agreement-and-interstate-mutual-aid-agreement/>.

### Interstate Mutual Aid Agreement for Wildland Fire Management Assistance

The EMNRD Forestry Division and Oregon Department of Forestry have come together to provide mutual assistance in wildland fire management. The exchange of equipment/supplies, personnel, and services is facilitated by the agreement.

Additional information about the agreement is provided here: [https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/NMStateForestry\\_OregonDepartmentofForestry\\_MutualAidAgreementforWildlandFire.pdf](https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/NMStateForestry_OregonDepartmentofForestry_MutualAidAgreementforWildlandFire.pdf).

### Intrastate Mutual Aid System (IMAS)

Through the Interstate Mutual Aid System (IMAS), Bernalillo County holds mutual aid agreements with all local jurisdictions within New Mexico (Bernalillo County 2010).

## Southern Pueblos Agency Fire Management Program

Under the Southern Pueblos Agency Fire Management Program, initial attack and suppression responsibilities on federal trust lands are coordinated through the Albuquerque Dispatch Center. In addition, the Joint Powers Agreement mandates that initial attack responsibilities on private, state, and federal lands are shared by the Agency Fire Management program (Pueblo of Isleta 2021). The Albuquerque Dispatch Center is made of participating state and federal agencies within New Mexico, including New Mexico State Forestry, USFS, BIA, NPS, BLM, and USFWS. The Southern Pueblos Agency Fire Management Program is a contributing member of the dispatch center under the BIA. Participating agencies share resources that may be needed for fire suppression (Pueblo of Isleta 2021).

## EVACUATION RESOURCES

Bernalillo County Office of Emergency Management is in charge of administering evacuation orders for the County. The County is currently developing evacuation plans for its emergency operations plan (Bernalillo County 2010).

The City of Albuquerque Office of Emergency Management is responsible for evacuation planning, including administering and revoking evacuation orders, as well as the distribution of resources to all emergency events that occur within the jurisdiction of the City. With respect to fire emergencies, the AFR will provide on-site coordination and counsel of evacuation activities, as well as assist in public notification (City of Albuquerque 2005). The City of Albuquerque's Emergency Operations Center (EOC) is the primary communications link regarding notification, activation, distribution, and incident management of all responding agencies within the city's metropolitan area. The EOC functions to improve both organization and communication of personnel and resources during a major incident or emergency. The EOC operates under the National Incident Management System. During an emergency, the EOC will be staffed by various department and agency representatives related to the incident being managed to guarantee coordination between all levels of government (City of Albuquerque 2005).

In addition, the City of Albuquerque has created a City Evacuation Plan (maps) to direct residents, city labor force, and visitors, in both planning and the event of an actual emergency. However, it should be emphasized that there are no specific evacuation routes for each type of hazard due to the variability of hazards, e.g., the high variability of fire movement (spread) due to weather. Therefore, it is important to listen to the latest emergency alerts to know the course of action. The evacuation maps can be accessed here: <https://www.cabq.gov/office-of-emergency-management/how-the-city-is-preparing/evacuation-planning>.

Please note that the public should follow the latest guidance from trusted sources, such as official government agencies, in regard to evacuation orders, especially as emergency response plans change rapidly.

Sign up for Bernalillo County emergency notifications here: <https://www.bernco.gov/health-and-public-safety/sign-up-for-emergency-notifications/>.

Learn more about Albuquerque's emergency notifications here: <https://www.cabq.gov/office-of-emergency-management/how-the-city-is-preparing/evacuation-notifications>.

## ROAD SYSTEMS

Much of Bernalillo County is accessible via surfaced roads and highways; however, some communities, mainly those within the WUI, are accessed only via unsurfaced roads, which are often narrow and winding. In addition, some communities adjacent to the WUI are limited to one major road in and out, have dead ends or locked access gates (Figure 2.10), or are located on steep slopes. These access roads are particularly hazardous during emergency evacuation, especially where they are lined by thick, dense, and/or overhanging vegetation (Figure 2.11). Fuel treatment may be needed along some roads with encroaching vegetation that could prevent safe evacuation of residents or safe access by emergency responders.



**Figure 2.10. Example of a locked gate prohibiting access on an unsurfaced road.**





**Figure 2.11. Example of an unsurfaced road with overhanging vegetation.**

Information on specific road systems can be found in Appendix A.

## PEOPLE

The safe and efficient evacuation of people from wildfire requires several factors, including:

- **Emergency notification methods:** The County uses the Integrated Public Alert & Warning System (IPAWS) to notify county residents of emergencies. There is no sign-up required to receive emergency alerts through IPAWS. In addition, residents of Albuquerque and unincorporated Bernalillo County can sign up for Everbridge, a no-cost emergency notification system that uses landlines or mobile phones to relay fire danger, severe weather, road closures, and other immediate threats to the community (Bernalillo County 2022b). It should be noted that the County previously used Nixle for emergency alerts, thus all residents, including previous subscribers, are encouraged to sign up for Everbridge. Furthermore, the City of Albuquerque uses the Emergency Action System to relay evacuation notifications through television broadcasts. The City also uses radio emergency alerts (City of Albuquerque 2022d).
  - Sign up for Bernalillo County emergency notifications here:  
<https://www.bernco.gov/health-and-public-safety/sign-up-for-emergency-notifications/>
- **Preplanning by the public about how to evacuate and where to go:** Locked gates, poor or missing signage, and conflicts with emergency vehicles driving into the community versus the public trying to leave complicate evacuation. Uncertainty about where to find temporary refuge can cause families to become separated and delay reunions. Some individuals without transportation or with limited mobility may be accidentally left behind.



- **Public awareness:** These two items will fail to occur throughout communities at risk (CARs) if the residents are unaware of notification methods: 1) the need for preplanning and 2) the elements that should be included in preplanning. Therefore, public education and outreach on these topics should be part of all efforts conducted by agencies such as fire departments in a wide variety of venues.

## COMMUNITY EMERGENCY RESPONSE TEAM

Developed by the Federal Emergency Management Agency (FEMA), the Community Emergency Response Team (CERT) training is a program that educates community members about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical. Supplemental training modules are available to better assist professional responders in a variety of emergency situations. Advance training includes such topics as animal response, emergency communications, traffic and crowd management, and flood response. The City of Albuquerque Office of Emergency Management CERT program prepares individuals for increased self-reliance, which can supplement City of Albuquerque resources in the event of a disaster or other major emergency.

For more information, visit the City's CERT webpage: <https://www.cabq.gov/office-of-emergency-management/citizen-preparedness/community-emergency-response-team>.

You can also see the East Mountain Citizen Corp CERT program here: <https://www.eastmtncitizenscorp.org/>.

## ANIMALS AND LIVESTOCK

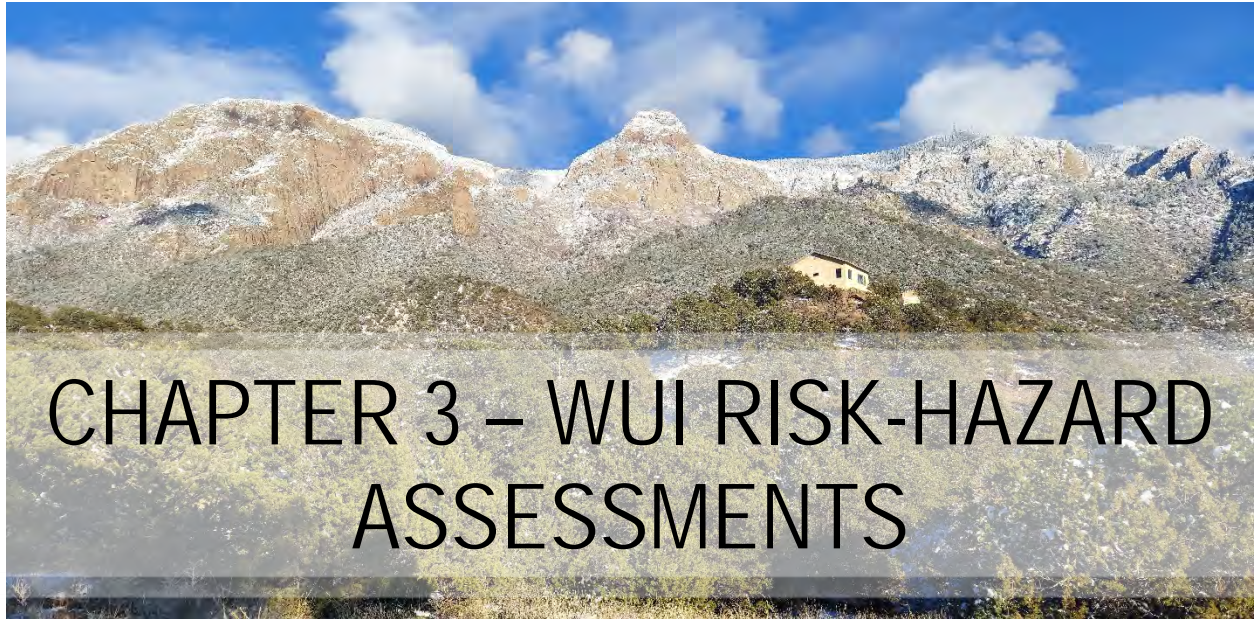
In the event of a wildfire, it is important that residents, fire responders, and the Bernalillo County Department of Emergency Management have a plan for evacuation of pets and livestock. Evacuation planning often neglects to describe how animals will be evacuated and where they will be taken. The loading of horses, for example, during a fire and smoke situation, and transport of stock vehicles down narrow roads under stressful situations, can be very difficult. Public education could emphasize the need for individuals to have a plan for the evacuation of pets in addition to their family, ensuring a lack of planning doesn't slow or prevent evacuation.

There is also a need to identify where animals can be taken, such as county fairgrounds, for large animal shelter. Similarly, locations where small animals such as dogs and cats picked up in the fire area should also be identified, as well as the lead agencies, such as humane societies, coordinating this work.

The Bernalillo County Animal Care and Rescue Center may be of assistance in an emergency. For more information, view their webpage here: <https://www.bernco.gov/animal-care-services/>.

## WATER AVAILABILITY AND SUPPLY

Water supply is consistent throughout the city of Albuquerque and is provided by hydrants. However, some communities located in the East Mountains have inconsistent, limited, or no permanent water supplies. Moreover, many communities located along State Highway 337 have an especially difficult time procuring water resources. Waterbodies include the Rio Grande River, ponds within golf courses, and isolated lakes. Universal fittings would be beneficial for Bernalillo County to ensure water access when needed.



## PURPOSE

The purpose of completing the assessments listed below is to create unique tools for evaluating the risk of wildland fires to communities within the WUI areas of Bernalillo County. Although many definitions exist for hazard and risk, for the purpose of this document these definitions follow those used by the firefighting community:

**Hazard** is a fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.

**Risk** is defined as the chance of a fire starting as determined by the presence and activity of causative agents (NWCG 1998).

From these assessments, land use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire, as well as work with community members to educate them about methods for reducing the damaging consequences of fire. Moreover, by using the final Composite Risk-Hazard Assessment, fuels reduction treatments can be implemented on both private and public land. Through these treatments, community members have the opportunity to actively participate, as well as recommend treatments on the public land they use or care about.

The Albuquerque & Bernalillo County Comprehensive Plan (City of Albuquerque and Bernalillo County 2017) states that the likelihood of catastrophic wildfire in the county is high.

## COMMUNITY FIELD EVALUATIONS

Community field evaluations were conducted using the NFPA Wildland Fire Risk and Hazard Severity 1144 Form (see Appendix E). This form is based on the NFPA Standard for Reducing Structure Ignition Hazards from Wildland Fire 2013 Edition. The NFPA standard focuses on individual structure hazards and requires a spatial approach to evaluating and mitigating wildfire hazards around existing structures. It also includes ignition-resistant requirements for new construction and is used by planners and

developers in areas that are threatened by wildfire and is commonly applied in the development of Firewise Communities (for more information, see [www.firewise.org](http://www.firewise.org)). Fox Hills and Paa-Ko communities in Sandia Park, Bernalillo County are current Firewise communities. You can view active Firewise sites here: <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA>.

The purpose of the field evaluation and subsequent ratings is to identify fire hazards and risks and prioritize areas requiring mitigation and more detailed planning. These evaluations should not be seen as tactical pre-suppression or triage plans. The evaluations help to drive the recommendations for mitigation of structural ignitability, community preparedness, and public education. The evaluation also helps to prioritize areas for fuels treatment based on the hazard rating. Each area was rated based on conditions within the community and immediately surrounding structures, including access, adjacent vegetation (fuels), defensible space, adjacent topography, roof and building characteristics, available fire protection, and placement of utilities. Where a range of conditions was less easily parsed out, a range of values was assigned on a single evaluation form. Each score was given a corresponding adjective rating of low, moderate, or high.

Community field evaluations for Bernalillo County were conducted in spring 2022 (Figures 3.1–3.4). The community at risk (CAR) hazard ratings from the evaluations are provided in Table 3.1. This table also includes a summary of the positive and negative attributes of a community as they relate to wildfire risk. **Full CAR descriptions are provided in Appendix D.**



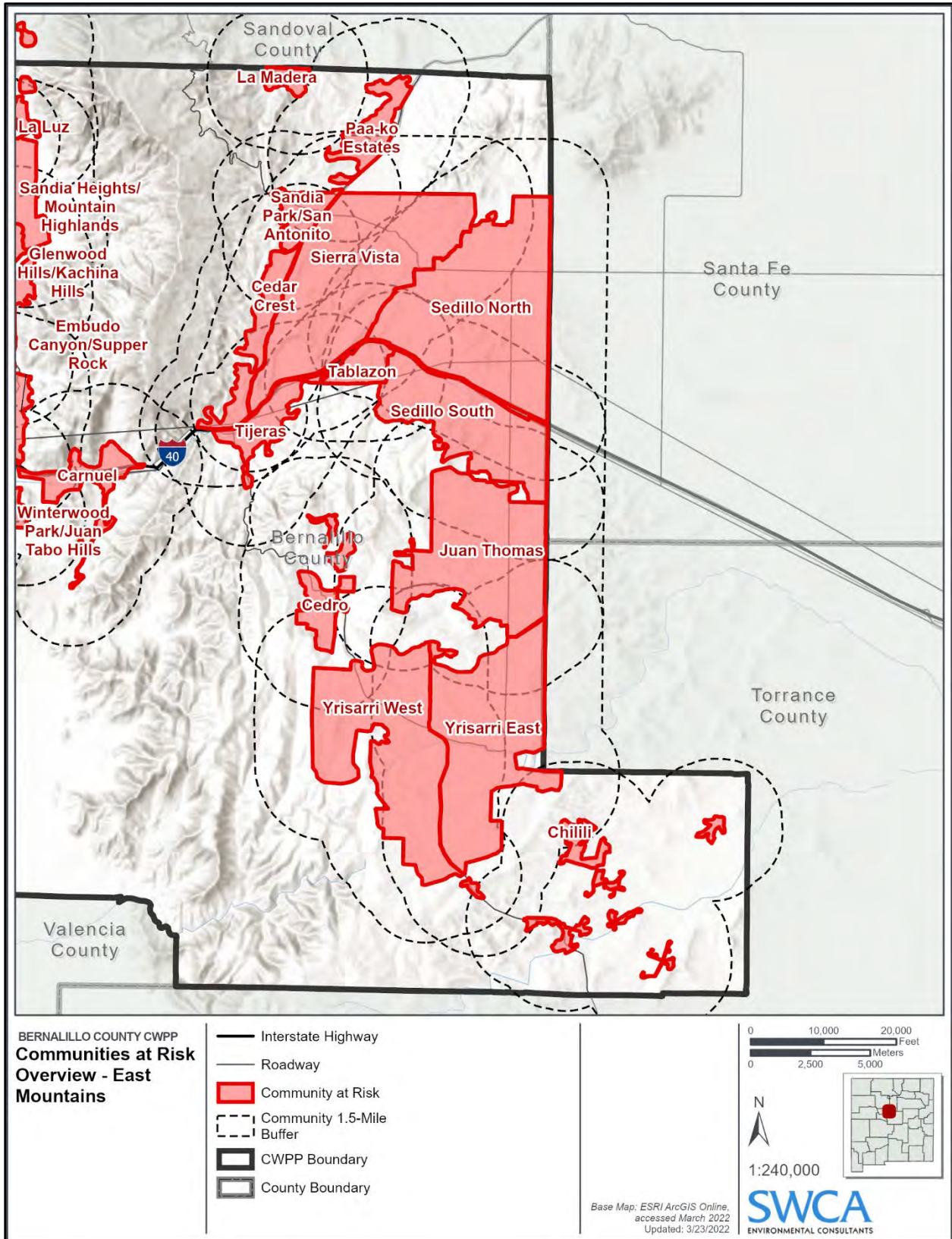


Figure 3.1. East Mountain communities at risk.



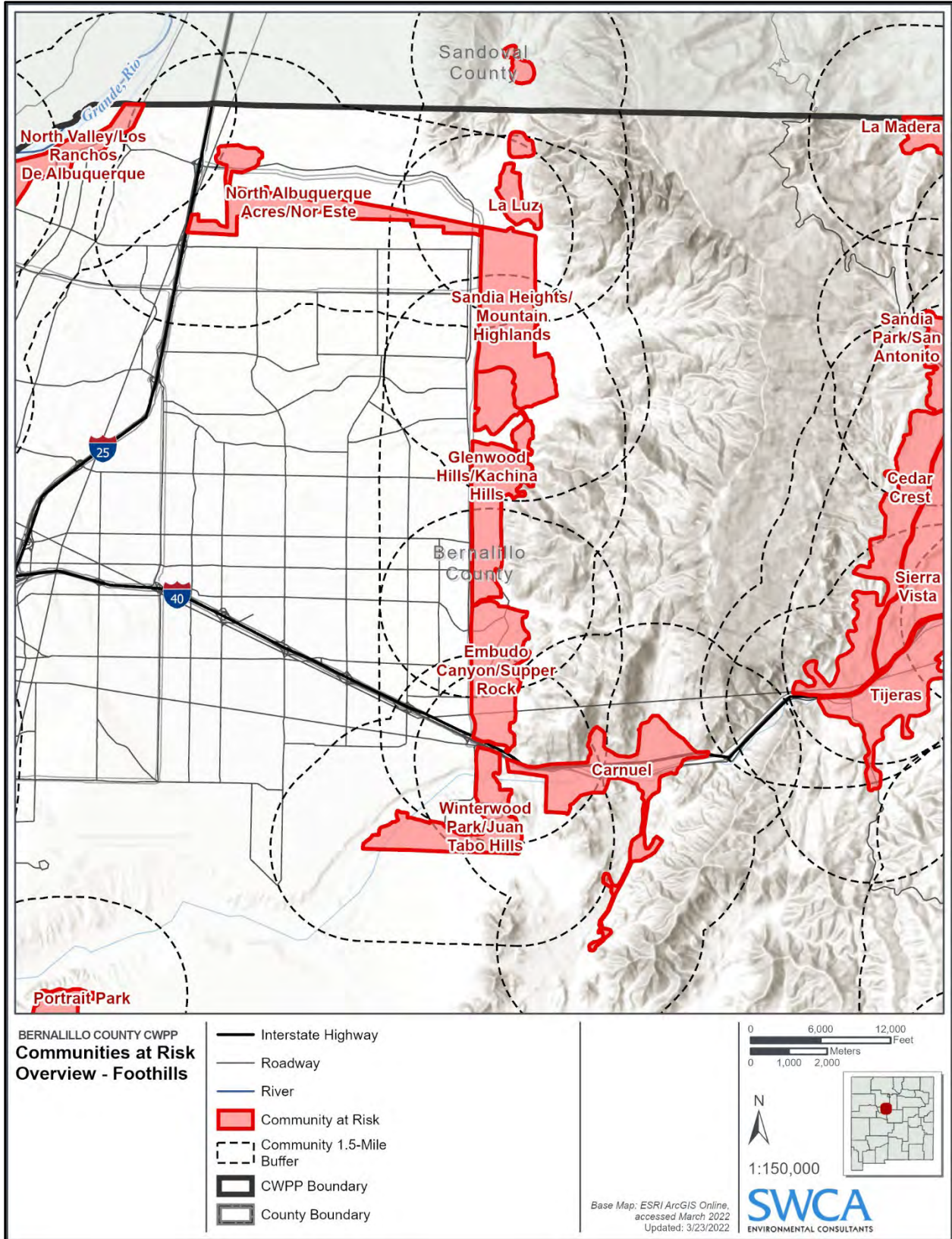


Figure 3.2. Foothill communities at risk.



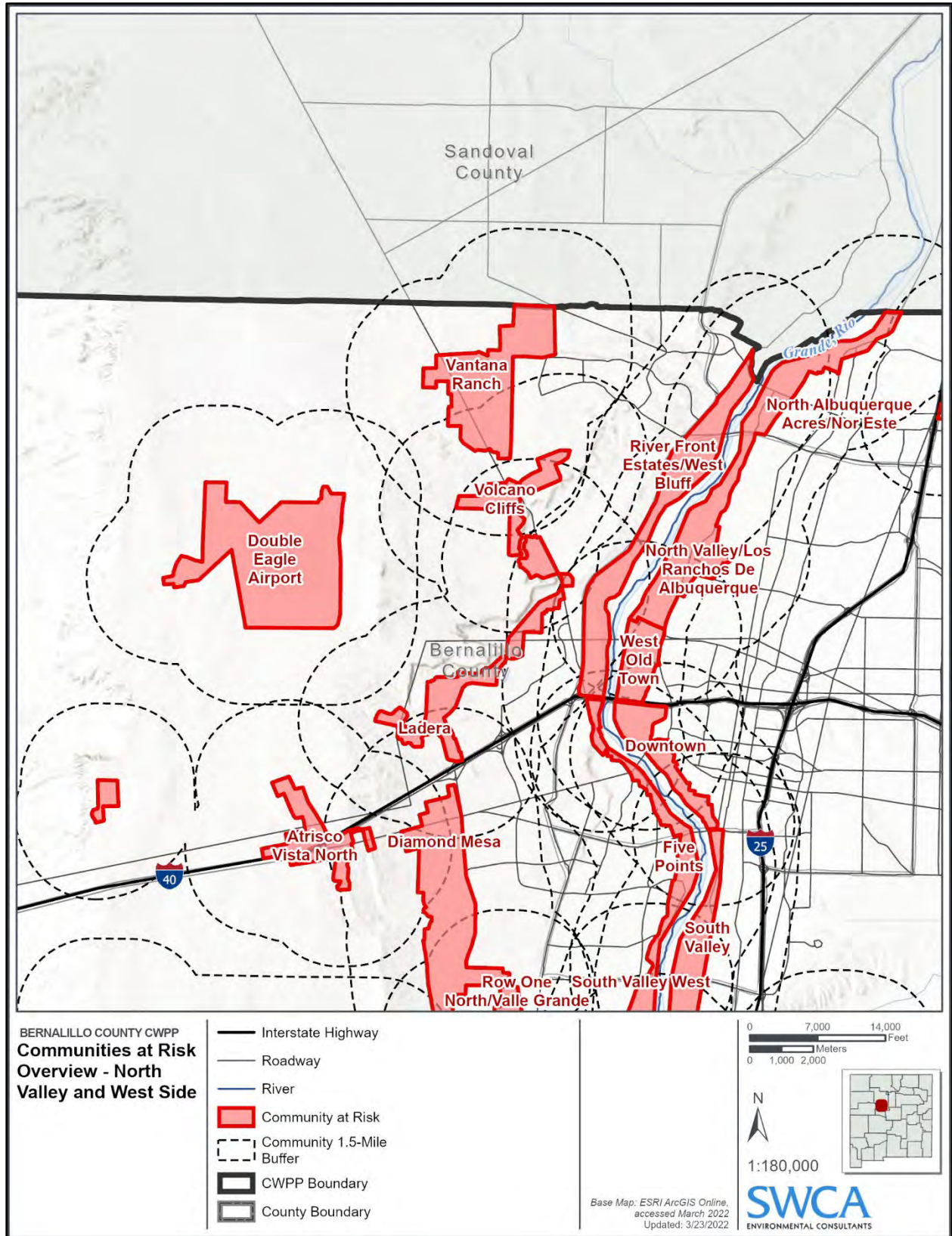


Figure 3.3. North Valley and West Side communities at risk.



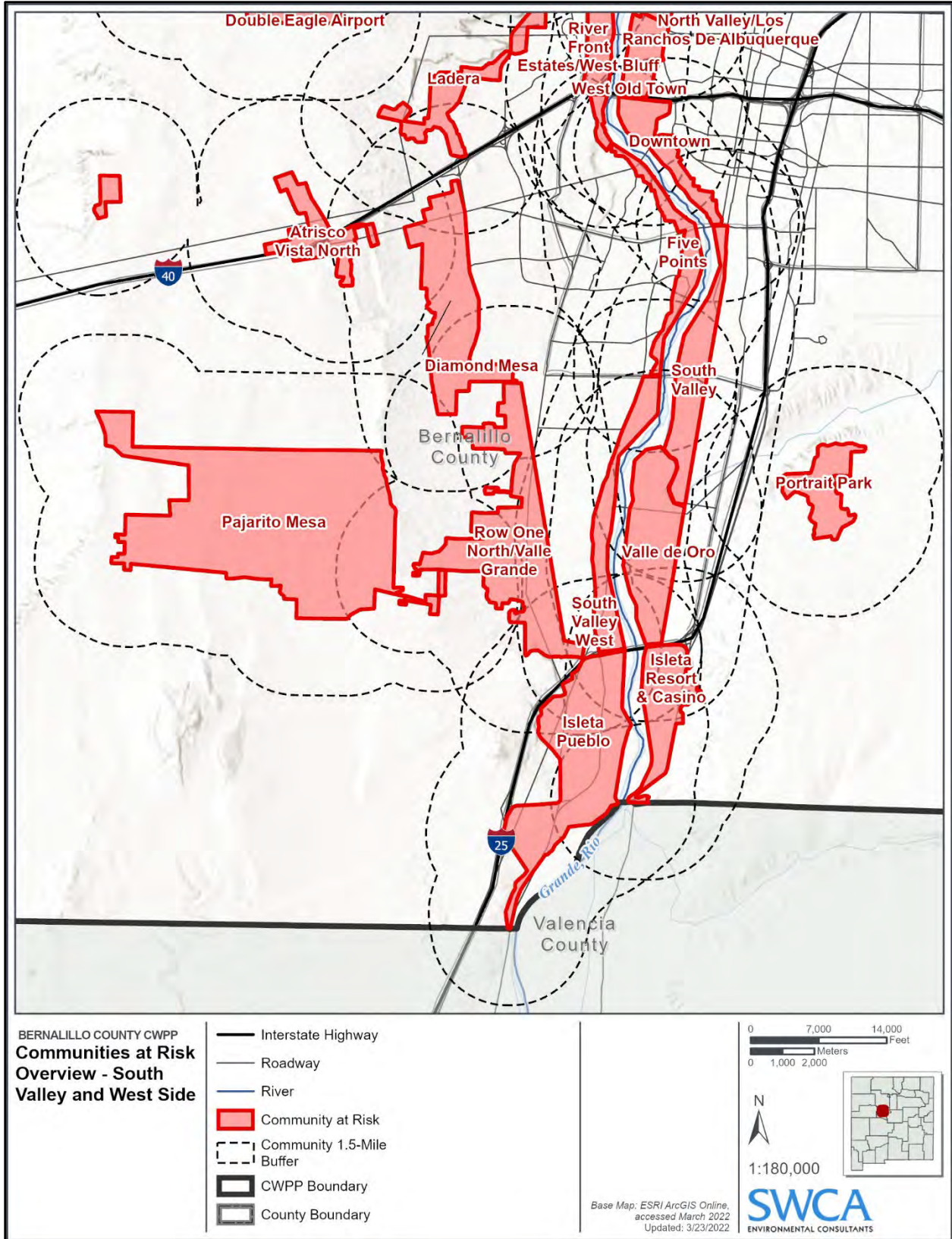


Figure 3.4. South Valley and West Side communities at risk.

**Table 3.1. Communities at Risk Ratings with Community Field Evaluation Summary**

Community	Risk Rating	Fire Station	Positives	Negatives
Atrisco Vista North	Low	City of Albuquerque Fire Station 14	<ul style="list-style-type: none"> <li>• Buildings made from modern materials</li> <li>• Sparce low grasses</li> <li>• Multiple ingress/egress</li> <li>• Ample fire hydrant access</li> </ul>	<ul style="list-style-type: none"> <li>• Single wide trailers are made from a mix of materials</li> <li>• Some construction yards have exposed combustible materials</li> </ul>
Carnuel	High	Bernalillo County Fire Station 40 / City of Albuquerque Fire Station 12	<ul style="list-style-type: none"> <li>• Access to Interstate Highway 40 and Route 66</li> <li>• Fire Station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Overall poor combustible materials used for building materials</li> <li>• Dirt roads with narrow turnarounds</li> <li>• Continuous fuel buildup around residences located south of I-40</li> <li>• Continuous fuels within the area.</li> </ul>
Cedar Crest	High	Bernalillo County Fire Station 40 / Village of Tijeras Fire Department	<ul style="list-style-type: none"> <li>• Modern materials used for building construction</li> <li>• Fuels treatments to the west of the community on USFS lands</li> </ul>	<ul style="list-style-type: none"> <li>• Narrow roads with limited turnarounds</li> <li>• Continuous high-load fuels around houses</li> <li>• Intermittent road signs</li> <li>• One-way ingress/egress</li> <li>• Defensible space is limited</li> </ul>
Cedro	High	Bernalillo County Fire Station 40 / Village of Tijeras Fire Department	<ul style="list-style-type: none"> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous fuels with ground to canopy connectivity</li> <li>• Limited water sources</li> <li>• Variety of building materials</li> <li>• Area has a variety of topographical features</li> <li>• One-way ingress/egress</li> </ul>
Chilili	High	Bernalillo County Fire Station 40 / Village of Tijeras Fire Department	<ul style="list-style-type: none"> <li>• Street signs are present</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Continuous fuels with ground to canopy connectivity</li> <li>• Limited water sources</li> <li>• Variety of building materials</li> <li>• Defensible space is limited</li> <li>• Fire station &gt;5 miles</li> </ul>

Community	Risk Rating	Fire Station	Positives	Negatives
Diamon Mesa	High	City of Albuquerque Fire Station 14	<ul style="list-style-type: none"> <li>Multiple ingress/egress</li> <li>Xeriscape landscaping</li> <li>Mostly new construction</li> <li>Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>Defensible space is limited</li> <li>Wooden fences noted</li> </ul>
Double Eagle Airport	Low	City of Albuquerque Fire Station 14	<ul style="list-style-type: none"> <li>Multiple ingress/egress</li> <li>Low scarce fuels</li> <li>New construction</li> <li>Hydrants throughout the area</li> </ul>	<ul style="list-style-type: none"> <li>Fire station &gt;5 miles</li> </ul>
Downtown	High	City of Albuquerque Fire Station 1	<ul style="list-style-type: none"> <li>Multiple ingress/egress</li> <li>Hydrants throughout the unit</li> <li>Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>Connectivity to the Bosque area</li> <li>Mature old growth trees</li> <li>Limited defensible space</li> <li>Variable building materials</li> </ul>
Embudo Canyon/ Supper	High	City of Albuquerque Fire Station 8	<ul style="list-style-type: none"> <li>Multiple ingress/egress</li> <li>Xeriscape landscaping</li> <li>Hydrants throughout the unit</li> <li>Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>Varying types of roofing material</li> <li>Limited defensible space</li> <li>Wooden fences noted</li> </ul>
Five Points	High	Bernalillo County Fire Station 32	<ul style="list-style-type: none"> <li>Mostly Class B building materials</li> <li>Hydrants throughout the unit</li> <li>Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>One-way ingress/egress</li> <li>Connectivity to Bosque with mature old growth vegetation</li> <li>Variety of roofing materials</li> </ul>
Glenwood Hills/ Kachina	High	City of Albuquerque Fire Station 8 / City of Albuquerque Fire Station 16	<ul style="list-style-type: none"> <li>Multiple ingress/egress</li> <li>Xeriscape landscaping</li> <li>Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>Older building materials</li> <li>Wooden fences</li> <li>Limited defensible space</li> </ul>
Isleta Pueblo	High	Bernalillo County Fire Station 34	<ul style="list-style-type: none"> <li>Multiple ingress/egress</li> <li>Good defensible space</li> </ul>	<ul style="list-style-type: none"> <li>Shingled roofs</li> <li>Mixed building materials</li> <li>No fire hydrants</li> <li>Nearest fire station is &gt;5 miles</li> </ul>

Community	Risk Rating	Fire Station	Positives	Negatives
Isleta Pueblo Resort & Casino	Medium	Bernalillo County Fire Station 34	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Paved</li> <li>• Manicured lawns and golf courses</li> </ul>	<ul style="list-style-type: none"> <li>• New building construction</li> <li>• Modern building materials</li> </ul>
Juan Thomas	High	Bernalillo County Fire Substation 51	<ul style="list-style-type: none"> <li>• Present and reflective road signs</li> <li>• Class A roofing material</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Mostly dirt roads</li> <li>• Pockets of dense continuous vegetation</li> <li>• Multiple classes of building materials</li> </ul>
La Luz	High	Bernalillo County Fire Station 35	<ul style="list-style-type: none"> <li>• Some hydrants</li> <li>• Class B building materials</li> <li>• Reflective road signs</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Continuous vegetation around houses</li> <li>• Multiple road surface conditions</li> <li>• Houses places &lt;30 feet from slope setback</li> <li>• Terrain would negatively influence fire behavior</li> </ul>
La Madera	High	Bernalillo County Fire Station 46	<ul style="list-style-type: none"> <li>• Present and reflective road signs</li> <li>• Active community</li> <li>• Defensible space</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely isolated community</li> <li>• Many locked gates</li> <li>• An assortment of building materials</li> <li>• Fire station is &gt;5 miles away</li> <li>• No hydrants or other water bodies</li> </ul>
Ladera	High	City of Albuquerque Fire Station 17	<ul style="list-style-type: none"> <li>• Low and sparce vegetation component</li> <li>• Mostly brick construction</li> <li>• Xeriscape landscaping</li> <li>• Multiple ingress/egress points</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple and prevalent wooden fences present</li> <li>• Limited defensible space</li> </ul>
North Albuquerque Acres/Nor Este	Medium	City of Albuquerque Fire Station 20	<ul style="list-style-type: none"> <li>• New building construction</li> <li>• Hydrants throughout the unit</li> <li>• Defensible space</li> <li>• Low sparse fuel</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation becomes continuous and thick in the east</li> </ul>



Community	Risk Rating	Fire Station	Positives	Negatives
North Valley/ Los Ranchos De Albuquerque	High	Bernalillo County Fire Station 30/31	<ul style="list-style-type: none"> <li>• New building construction</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Large cottonwood trees connecting to Bosque</li> </ul>
Paa-ko Estates	High	Bernalillo County Fire Station 46	<ul style="list-style-type: none"> <li>• Large turnarounds ever ¼ mile</li> <li>• New construction materials</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous vegetation throughout the area</li> <li>• Some houses are built on ridgelines and gullies</li> </ul>
Pajarito Mesa	Medium	Bernalillo County Fire Station 34	<ul style="list-style-type: none"> <li>• Low history of wildfires</li> <li>• Limited and sparse fuels</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple dirt roads</li> <li>• No hydrants or water sources</li> </ul>
Portrait Park	Medium	Bernalillo County Fire Station 38	<ul style="list-style-type: none"> <li>• Sparse fuels throughout the area</li> <li>• New building and roofing materials</li> </ul>	<ul style="list-style-type: none"> <li>• Limited defensible space</li> </ul>
River Front Estates/ West Bluff	High	City of Albuquerque Fire Station 17 - 20	<ul style="list-style-type: none"> <li>• New and modern building materials</li> <li>• Flat topography</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous fuels extending from the Bosque</li> <li>• One-way ingress/egress</li> <li>• Limited defensible space</li> </ul>
Row One North/Valle Grande	Medium	Bernalillo County Fire Station 34	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Class B roofing materials</li> <li>• Class B building materials</li> <li>• Defensible space</li> <li>• Low fire potential</li> </ul>	<ul style="list-style-type: none"> <li>• Dispersed hydrants</li> </ul>
Sandia Heights/ Mountain Highlands	Medium	Bernalillo County Fire Station 35	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• Xeriscape landscaping</li> <li>• Class B roofing and building materials</li> <li>• Present and reflective street signage</li> </ul>	<ul style="list-style-type: none"> <li>• Wooden fences</li> <li>• Buildings placed on undulating terrain</li> <li>• Narrow roadways with limited turnarounds</li> <li>• Overgrown arroyos near roadways</li> </ul>

Community	Risk Rating	Fire Station	Positives	Negatives
Sandia Park/ San Antonito	High	Bernalillo County Fire Station 46	<ul style="list-style-type: none"> <li>• Some dispersed hydrants</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Narrow roadways</li> <li>• Vegetation is growing into electrical utilities</li> <li>• Winding, poorly signed roads</li> <li>• Houses are not mitigated for vegetation</li> <li>• Some homes are situated in chimneys and canyons.</li> </ul>
Sedillo North	High	Bernalillo County Fire Station 43 / Bernalillo County Fire Substation 56	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Defensive space</li> <li>• Low, sparse fuels</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Some communities built within mature piñon-juniper woodlands</li> <li>• Wooden fences noted</li> <li>• Some buildings are built in narrow canyons</li> </ul>
Sedillo South	High	Bernalillo County Fire Station 43	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Defensive space</li> <li>• Low, sparse fuels</li> <li>• Fire station &lt;5 miles</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Some communities built within mature piñon-juniper woodlands</li> <li>• Wooden fences noted</li> <li>• Some buildings are built in narrow canyons</li> </ul>
Sierra Vista	High	Bernalillo County Fire Station 46 / Bernalillo County Fire substation 50	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• Class B building and roofing materials</li> </ul>	<ul style="list-style-type: none"> <li>• Some communities have limited defensible space</li> <li>• Varied topographic terrain</li> <li>• Continuous vegetation from ground to canopy in some areas</li> </ul>
South Valley	High	Bernalillo County Fire substation 50	<ul style="list-style-type: none"> <li>• Multiple ingress/egress points</li> <li>• Flat topographical features</li> <li>• Low grasses and shrubs</li> </ul>	<ul style="list-style-type: none"> <li>• Limited defensible space</li> <li>• Unmaintained agricultural fields</li> <li>• Connectivity to unmanaged bosque area</li> <li>• Industrial complex with exposed, combustible materials</li> </ul>

Community	Risk Rating	Fire Station	Positives	Negatives
South Valley West	High	Bernalillo County Fire Station 38	<ul style="list-style-type: none"> <li>• Present and reflective street signs</li> <li>• Paved roads</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Class C building materials</li> <li>• One-way ingress/egress</li> <li>• Agriculture fields connecting to bosque</li> <li>• Aboveground utilities</li> </ul>
Tablazon	High	Bernalillo County Fire Station 43	<ul style="list-style-type: none"> <li>• Fire station &lt;5 miles</li> <li>• Modern building materials</li> </ul>	<ul style="list-style-type: none"> <li>• Winding, confusing roads</li> <li>• Situated in rolling hills and canyons</li> <li>• Home built within piñon-juniper woodlands</li> <li>• One-way ingress/egress</li> </ul>
Tijeras	High	Bernalillo County Fire Station 40 / Village of Tijeras Fire Department	<ul style="list-style-type: none"> <li>• Class A roofing</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Large piñon-juniper woodland is connective and continuous within the area</li> <li>• Houses are located in depressions and in chimneys</li> <li>• One-way ingress/egress</li> </ul>
Valle de Oro	High	Bernalillo County Fire Station 38	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Defensible space</li> </ul>	<ul style="list-style-type: none"> <li>• Mix of building materials</li> <li>• Connectivity with bosque</li> <li>• Area of historic fires</li> </ul>
Vantana Ranch	High	City of Albuquerque Fire Station 22	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Xeriscape landscaping</li> <li>• Hydrants throughout unit</li> <li>• Wide streets with turnarounds</li> </ul>	<ul style="list-style-type: none"> <li>• Limited defensible space</li> </ul>
Volcano Cliffs	Medium	City of Albuquerque Fire Station 17 - 18	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• New roofing and building construction</li> </ul>	<ul style="list-style-type: none"> <li>• Limited defensible space</li> </ul>
West Old Town	High	City of Albuquerque Fire Station 10	<ul style="list-style-type: none"> <li>• Xeriscape landscaping</li> <li>• Flat topography</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Limited defensible space</li> <li>• Mix of building materials</li> <li>• Dead end roads</li> </ul>

Community	Risk Rating	Fire Station	Positives	Negatives
Winterwood Park/Juan Tabo Hills	High	City of Albuquerque Fire Station 12	<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Xeriscape landscaping</li> <li>• Modern building materials</li> </ul>	<ul style="list-style-type: none"> <li>• Proximity to KAFB and potential munitions fires</li> </ul>
Yrisarri East	High	Bernalillo County Fire Substation 51	<ul style="list-style-type: none"> <li>• Class A roofs</li> <li>• Multiple ingress/egress</li> </ul>	<ul style="list-style-type: none"> <li>• Thick vegetation</li> <li>• No hydrants or waterbodies</li> <li>• An assortment of building materials</li> </ul>
Yrisarri West	High	Bernalillo County Fire Station 41	<ul style="list-style-type: none"> <li>• Class B roofs</li> </ul>	<ul style="list-style-type: none"> <li>• Complicated road network</li> <li>• One-way ingress/egress</li> <li>• Heavily vegetated</li> <li>• Varied topography</li> <li>• Wood and vinyl building construction</li> </ul>

## EVACUATION ROUTE RISK ANALYSIS

Several road features may compromise evacuation efforts in the event of a fire emergency. These features include road grade, curvature (sinuosity), length, surface material (e.g., paved vs. unpaved), connectivity (e.g., local access road vs. main transportation corridor), stability (e.g., bridged vs. unbridged), and adjacent structure density. Figure 3.5 shows an overview of the level of risk in the roads in the planning area. Overall, the main transportation corridors (i.e., highways and interstates) received a low-risk rating, whereas smaller residential roads (i.e., local access roads and rural roads) received a higher risk rating. Detailed, community-level maps with risk ratings ranging from low to extreme are provided in Appendix D.

Several road features were used as inputs to determine road risk: road sinuosity (degree of curvature), grade/slope, connectivity (number of connections to other roads), surface material (i.e., paved or unpaved), length, stability (i.e., bridged or unbridged), degree of overhanging tree cover, and surrounding building density. The inputs are illustrated in Figure 3.6. Data for these features were gathered from roads and buildings footprints from Open Street Map and satellite imagery from the USGS. The inputs were processed in ArcGIS Pro (geospatial software). All inputs were adjusted to a common scale to facilitate comparison and evaluation, i.e., a risk score on a scale from 0 to 1 was assigned to all input features, with lower values representing lower risk and higher values representing higher risk. For features that have a range of values (e.g., degree of slope), a decimal value was assigned. For example, a moderately steep road would receive a score of 0.6, whereas a road with a gentle slope would receive a score of 0.1. For features that were evaluated by presence or absence, either a 0 or a 1 was assigned. For example, an unsurfaced road would receive a score of 1, whereas a paved road would receive a score of 0. All inputs were combined to produce a final risk score; each feature was assigned a weight, i.e., a value based on how much influence that feature has on risk. The final weights are shown in Table 3.2.

**Table 3.2. Final Weights Assigned to Each Feature**

Input	Weight
Sinuosity	0.2
Grade	0.15
Bridge	0.05
Surface Material	0.1
Connectivity	0.15
Length	0.1
Tree Cover	0.1
Building Density	0.15

The final map (see Figure 3.5) is the end result of the analysis; it accounts for all features in Table 3.1 and their respective weights. Dark red segments represent portions of the roads that are rated as extreme risk, and orange segments represent portions of the roads that are rated as high risk.



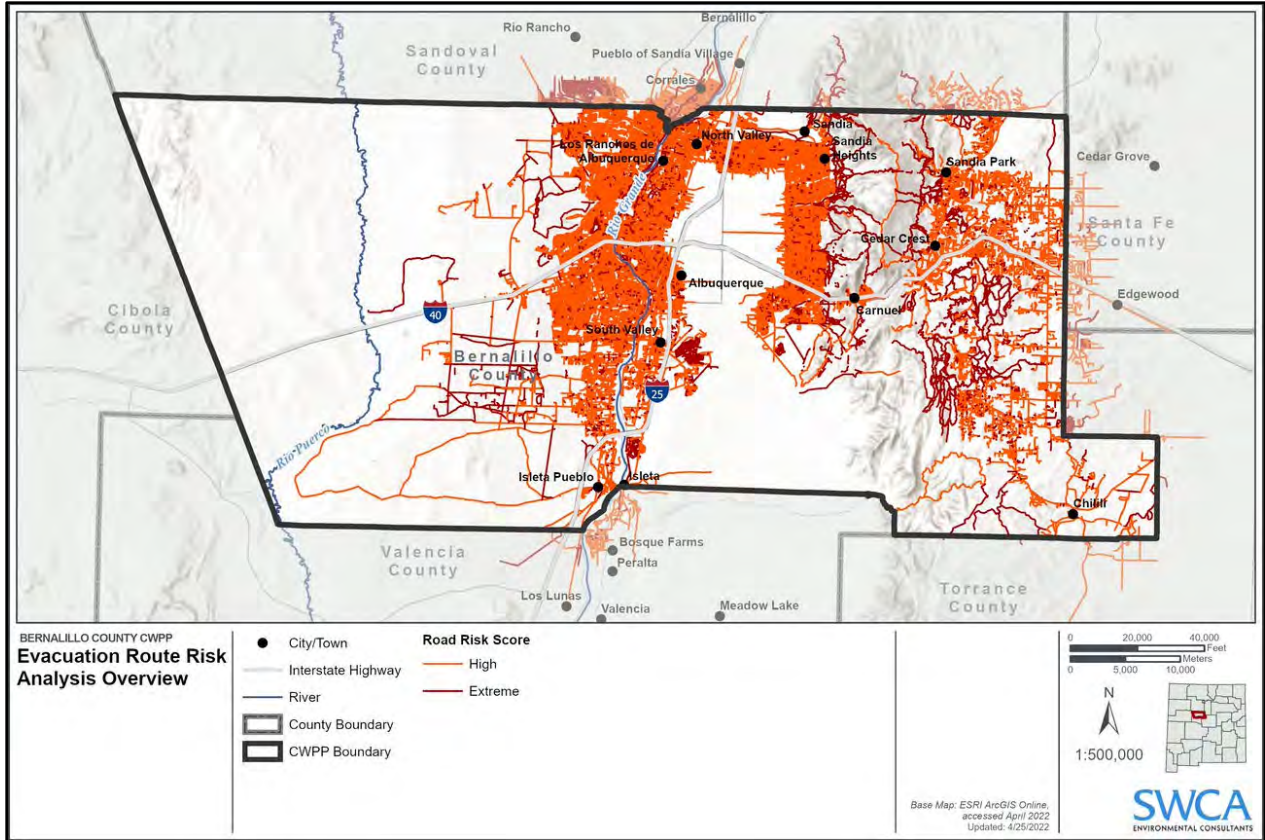


Figure 3.5. Evacuation route risk analysis overview.

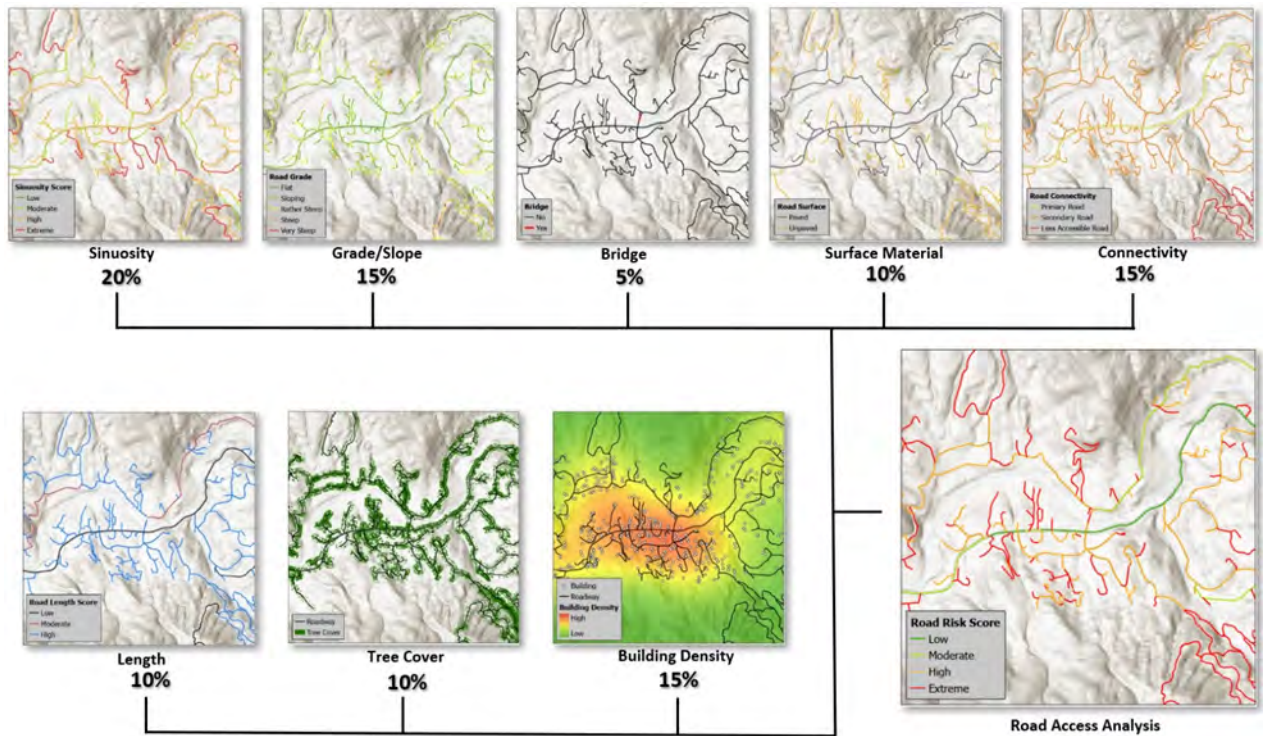


Figure 3.6. Evacuation route risk analysis inputs.

# COMPOSITE RISK-HAZARD ASSESSMENT INPUTS

The Composite Risk-Hazard Assessment is created by layering several risk-hazard inputs, including fire behavior model outputs generated in the desktop analysis (flame length, fireline intensity, rate of spread, and crown fire potential), VARs (discussed in Appendix A), and the WUI, fire history, and fire response, which are described in Chapter 2.

## DESKTOP ANALYSIS

A desktop analysis of risks and hazards uses fuels properties, topography, and weather to generate fire behavior modeling outputs (flame length [Map 2 in Appendix B], fireline intensity [Map 3 in Appendix B], rate of spread [Map 4 in Appendix B], and crown fire potential [Map 5 in Appendix B]), which were used as inputs (along with fire history, fire response, and the WUI) in the Composite Risk-Hazard Assessment.

Information regarding fuels, fire history, and response is provided in Chapter 2.

## Fire Behavior Modeling

### Overview

The wildland fire environment consists of three factors that influence the spread of wildfire: fuels, topography, and weather. Understanding how these factors interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the WUI. In the wildland environment, vegetation is synonymous with fuels. When sufficient fuels for continued combustion are present, the level of risk for those residing in the WUI is heightened. Fire spreads in three ways: 1) surface fire spread, in which the flaming front remains on the ground surface (in grasses, shrubs, small trees, etc.) and resistance to control is comparatively low; 2) crown fire, in which the surface fire “ladders” up into the upper levels of the forest canopy and spreads through the tops (or crowns) independent of or along with the surface fire, and when sustained is often beyond the capabilities of suppression resources; and 3) spotting, in which embers are lifted and carried with the wind ahead of the main fire and ignite in receptive fuels; if embers are plentiful and/or long range (>0.5 mile), resistance to control can be very high. Crown fire and spotting activity have been a concern for fire managers, particularly under extreme weather conditions. In areas where homes are situated close to timber fuels and/or denser shrubs and trees, potential spotting from woody fuels to adjacent fuels should always be acknowledged.

Treating fuels in the WUI can lessen the risk of intense or extreme fire behavior (Martinson and Omi 2013; Safford et al. 2009). Studies and observations of fires burning in areas where fuel treatments have occurred have shown that the fire either remains on or drops to the surface, thus avoiding destructive crown fire, as long as activity fuels are treated or removed (Graham et al 2004; Pollet and Omi 2002; Prichard et al. 2010; Safford et al. 2012; Waltz et al. 2014). Fuel mitigation efforts therefore should be focused specifically where these critical conditions could develop in or near CARs.

For this plan, an analysis of fire behavior was carried out using well-established fire behavior models: FARSITE, FlamMap, BehavePlus, and FireFamily Plus housed within the Interagency Fuel Treatment Decision Support System (IFTDSS), as well as ArcGIS Desktop Spatial Analyst tools. Data used in the Composite Risk-Hazard Assessment were largely obtained from LANDFIRE.

Detailed information regarding fire behavior models can be found in Appendix J.

## COMPOSITE RISK-HAZARD ASSESSMENT RESULTS

The Composite Risk-Hazard Assessment modeling approach uses a weighted sum model, which “stacks” geographically aligned data sets and evaluates an output value derived from each cell value of the overlaid data set in combination with the weighted assessment. In a weighted sum model, the weighted values of each pixel from each parameter data set are added together so that the resulting data set contains pixels with summed values of all the parameters. This method ensures that the model resolution is maintained in the results and thus provides finer detail and range of values for denoting fire risk. Figure 3.7 illustrates the individual data sets and the relative weights assigned within the modeling framework. These include fire behavior parameters, fire occurrence density, HVRAs, WUI, and distance from fire stations. Figure 3.8 is the Composite Risk-Hazard Assessment for the planning area and classifies the planning area into low-, moderate-, and high-risk categories. Figure 3.9 shows the Composite Risk-Hazard Assessment and the WUI together.

Additional information can be found in Appendix J.



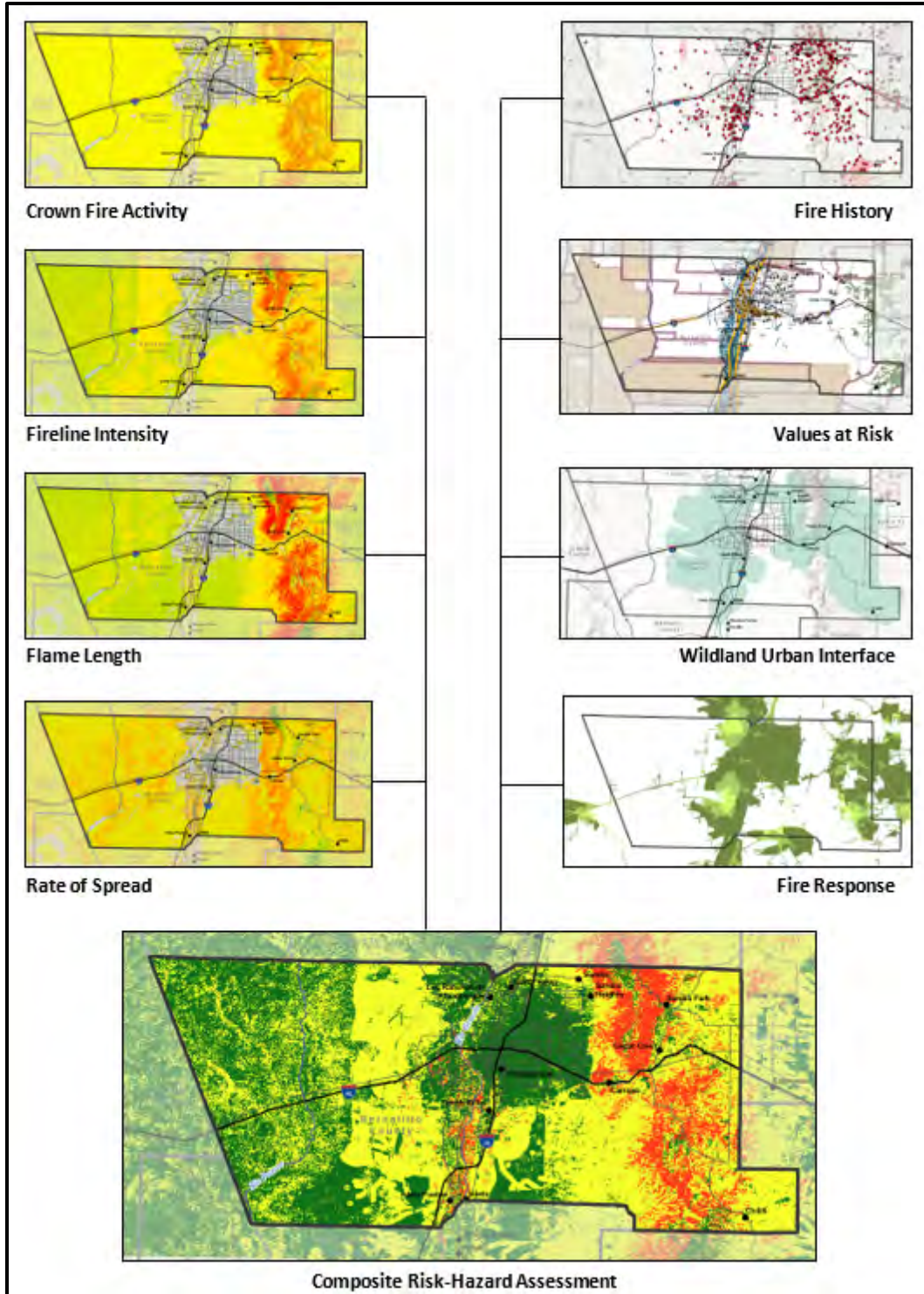


Figure 3.7. Composite Risk-Hazard Assessment overlay process.

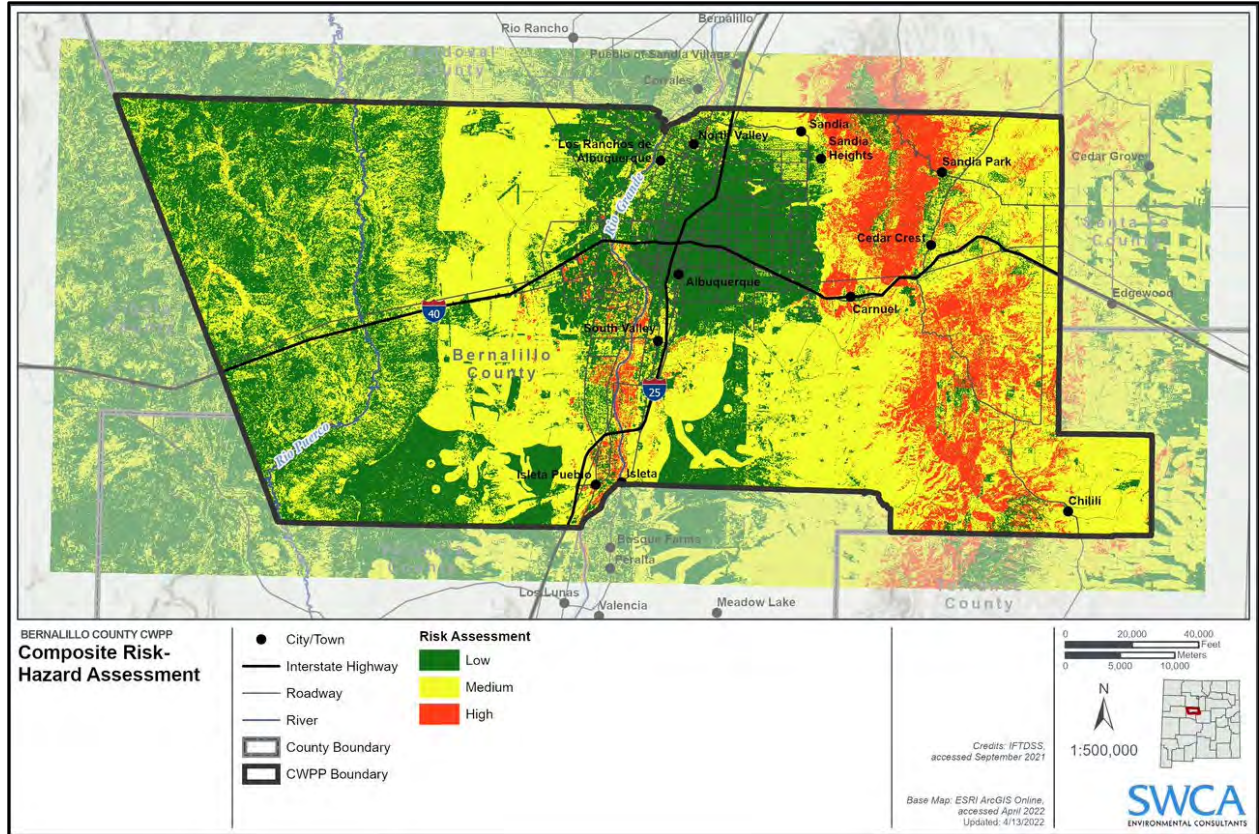


Figure 3.8. Composite Risk-Hazard Assessment.



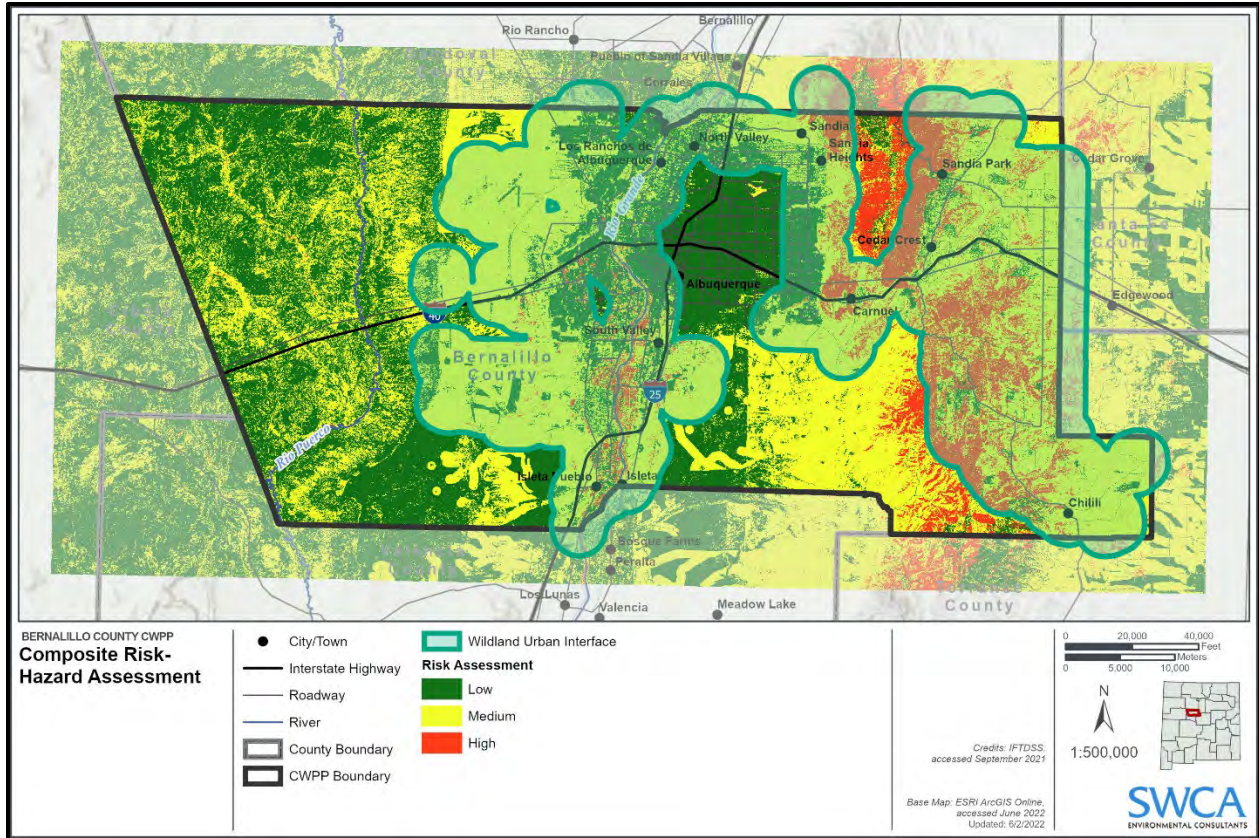


Figure 3.9. Composite Risk-Hazard Assessment and WUI boundary.



This chapter provides project recommendations and implementation guidance. However, mitigation does not stop there. In addition to the recommendations, recognizing wildfire mitigation, preparedness, and resilience, means being prepared both pre- and post-fire. Postfire response and rehabilitation information can be found at the end of this chapter.

This plan has been aligned with the Cohesive Strategy and its Phase III Western Regional Action Plan by adhering to the nation-wide goal:

*“To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.” (Forests and Rangelands 2014:3).*

Thus, CWPP recommendations have been structured around the three main goals of the Cohesive Strategy: restoring and maintaining landscapes, fire-adapted communities, and wildfire response. In addition, counties adjacent to Bernalillo County were included in the Core Team, and project recommendation development to ensure the recommendations have been aligned with cross-boundary goals. Many of the recommendations listed can be implemented at the homeowner or community level. Projects requiring large-scale support can be prioritized based on the Composite Risk-Hazard Assessment.

Recommendation matrixes are used throughout this chapter to serve as an action plan for implementation. Recommendations have been aligned with the strategies in the 2020 New Mexico Forest Action Plan (EMNRD Forestry Division 2020a) wherever possible.

## COHESIVE STRATEGY GOAL 1: RESTORE AND MAINTAIN LANDSCAPES

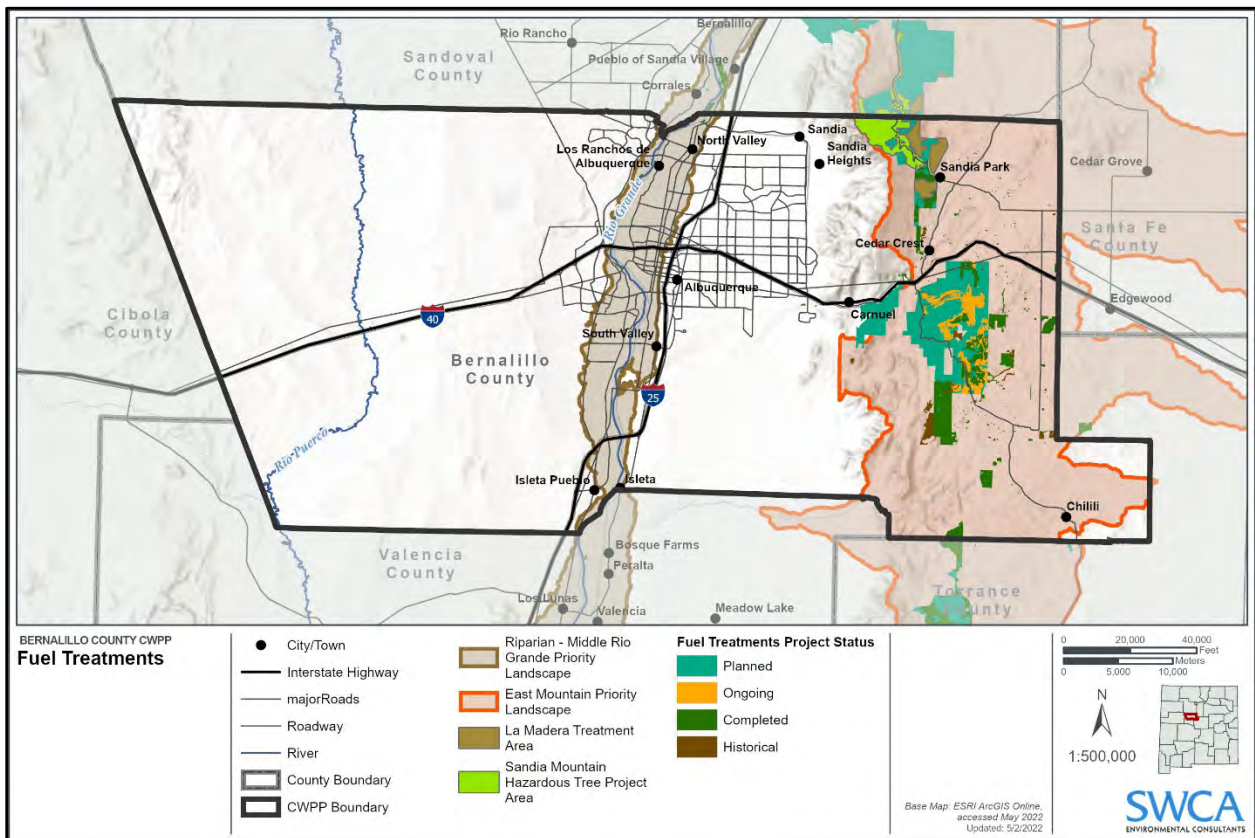
Goal 1 of the Cohesive Strategy and the Western Regional Action Plan is Restore and Maintain Landscapes: Landscapes across all jurisdictions are resilient to fire and other disturbances in accordance with management objectives.



*“Sustaining landscape resiliency and the role of wildland fire as a critical ecological process requires a mix of actions that are consistent with management objectives. The West will use all available methods and tools for active management of the landscape to consider and conserve a diversity of ecological, social, and economic values. The West will coordinate with all partners and seek continued stakeholder engagement in developing market-based, flexible, and proactive solutions that can take advantage of economies of scale. All aspects of wildland fire will be used to restore and maintain resilient landscapes. Emphasis will be placed on protecting the middle lands near communities.”* (Western Regional Strategy Committee [WRSC] 2013:14).

**In this CWPP, recommendations to restore and maintain landscapes focus on vegetation management and hazardous fuel reduction.**

This region has been home to an active and committed fuel treatment program led by land managers for many years. Figures 4.1 and 4.2 show existing fuel treatments that have been completed or planned in and around the planning area. This information is derived from the [New Mexico Forest and Watershed Restoration Institute](#) and [ArcGIS New Mexico Vegetation Treatments database](#). The reader is referred to agency websites and the [Federal Register](#) for the latest information on planned or ongoing actions on adjacent public land. The treatment momentum already observed surrounding the planning area should be built upon in order to increase fuel treatment effectiveness across the landscape.



**Figure 4.1. Existing fuel treatments across all jurisdictions.**

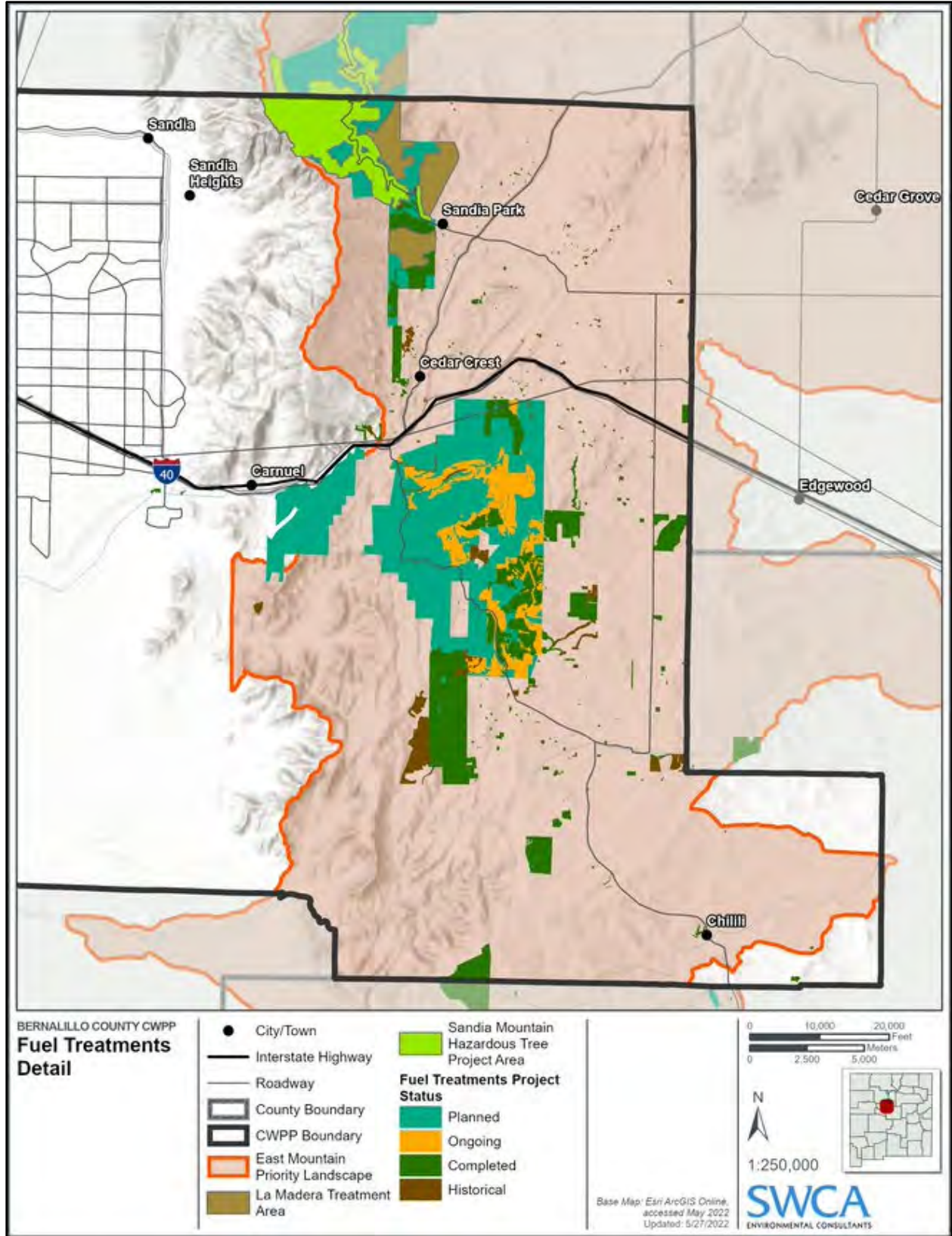


Figure 4.2. Existing fuel treatments detail (zoomed in).

## RECOMMENDATIONS FOR HAZARDOUS FUEL REDUCTION

Fuels management of public and private land in the WUI is key to the survival of homes during a wildfire event, as well as the means to meet the criteria of Goal 1. Research has shown how fuel treatments in the WUI can change fire behavior to support suppression activities and protect homes (Evans et al. 2015). The importance of fuels management is reflected in policy at the federal level, with the HFRA requiring that federal land management agencies spend at least 50% of their fuels reduction funds on projects in the WUI.

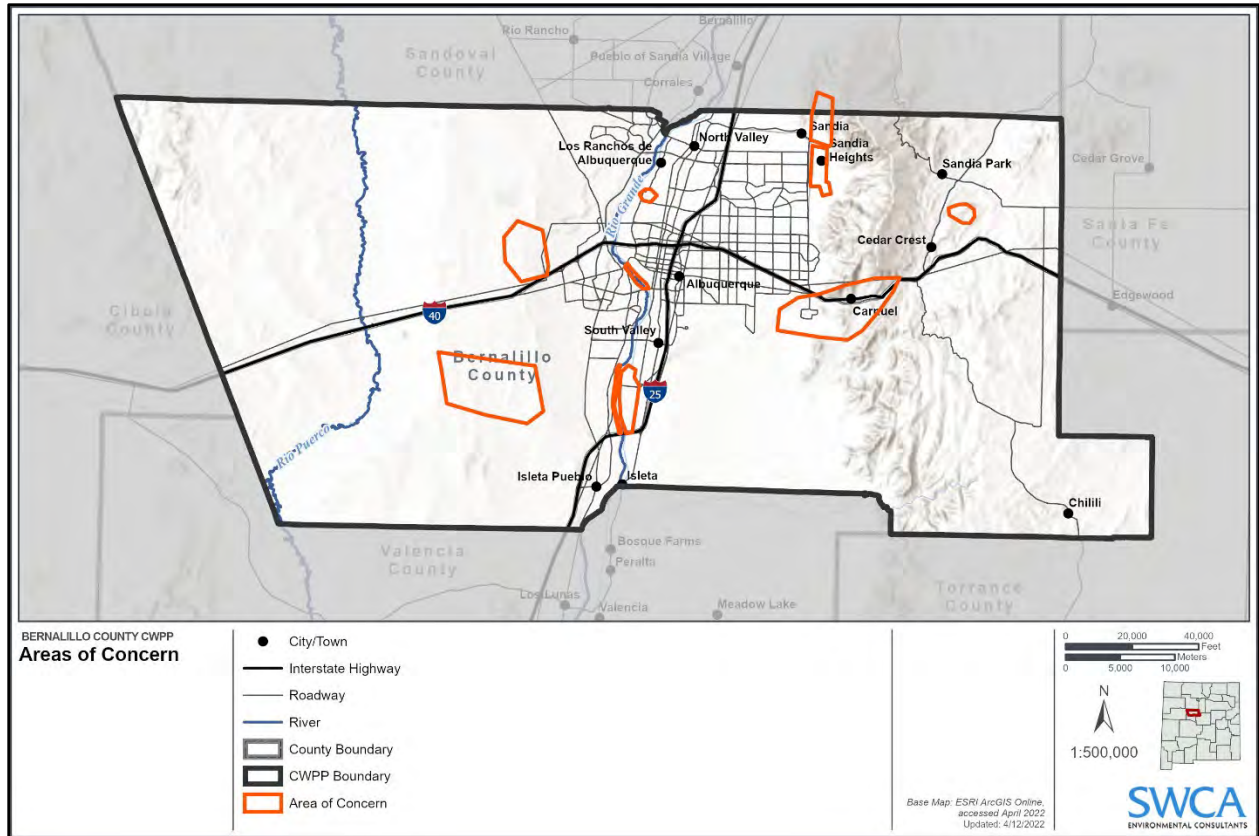
Fuels should be modified with a strategic approach to reduce the threat that high-intensity wildfires pose to lives, property, and other values. This section provides information on fuel treatment methodologies that can be applied to first protect structures (defensible space), then near community boundaries (fuel breaks, cleanup of adjacent open spaces), and finally in the wildlands beyond community boundaries (larger-scale forest health and restoration treatments).

While not necessarily at odds with one another, the emphasis of each of these treatment types is different. Proximate to structures, the recommendations focus on reducing fire intensity consistent with Firewise and International Fire Code standards. Further into open space areas, treatments tend to emphasize forest health and increasing resiliency to catastrophic wildfire and other disturbances. Cooperators in fuels management should include federal, state, and local agencies as well as interested members of the public. Federal land management plans focus on these more landscape-level treatments, so the CWPP incorporates most federal land management by reference to those land management planning documents. The CWPP focuses primarily on projects within or adjacent to WUI areas.

Table 4.1 summarizes the types of treatments recommended throughout the planning area. The majority of the treatments are focused on higher risk areas, as defined by the Composite Risk-Hazard Assessment and Core Team input. Many of these treatment recommendations are general across the communities because similar conditions and concerns were raised by fire responders for all communities that border wildland areas. Tables 4.1, 4.4, and 4.5 also address the requirement for an action plan and assessment strategy by providing monitoring guidelines and a timeline for implementation. This timeline is obviously dependent on available funding and resources, as well as National Environmental Policy Act (NEPA) protocols for any treatments pursued on public land.

In addition, areas of concern (Figure 4.3) have been delineated based on the Composite Risk-Hazard Assessment (see Figure 3.9) and Core Team input. Areas of concern include regions of high concentrations of HVRAs that coincide with high potential exposure to wildfire and/or areas where land management agencies have ongoing vegetation management treatments that could be enhanced by adjacent projects. These are areas where land managers should consider employing mitigation measures to protect life, property, and other values. It is recommended that treatment plans be developed to execute mitigation measures in these areas. Treatment types will be site specific but should address a need to slow fire spread or mitigate potential extreme fire behavior parameters, such as high flame lengths or fireline intensity.





**Figure 4.3. Areas of concern for Bernalillo County.**

When applying fuel treatments, every effort should be made to align treatments with 2020 New Mexico Forest Action Plan (EMNRD Forestry Division 2020) with consideration of all appropriate best management practices and sound science. In addition, treatments should be strategically located in areas to maximize effectiveness of other existing and ongoing projects (see Figures 4.1 and 4.2).

When possible, simultaneously planning for the management of multiple resources while reducing fuels will ensure that the land remains viable for multiple uses in the long term. The effectiveness of any fuel reduction treatment depends on the degree of maintenance and monitoring that is employed. Monitoring will also ensure that objectives are being met in a cost-effective manner.

The treatment list is by no means exhaustive and should be considered purely a sample of required projects for the future management of the planning area. Many projects may be eligible for grant funds available from federal and/or state sources. For a list of funding sources, please refer to Appendix F.

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**Table 4.1 Recommendations to Create Resilient Landscapes (Fuel Treatments)**

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
1		H	Spring 2023	Identify needed road maintenance and strategic road buffers	Highest risk roadways as identified in the risk assessment Pajarita Mesa Recreation areas	County, State, Interstate	<p><u>Roadway improvements:</u></p> <ul style="list-style-type: none"> <li>While increasing roadway width may not be feasible in many locations, creation of passing areas where possible should be prioritized</li> <li>Utilize roadway improvements as recreationalist ingress/egress in case of emergency (aligns with 2020 New Mexico Forest Action Plan)</li> <li>Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing)</li> <li>Install proper signage and turn around points where appropriate.</li> </ul> <p><u>Road and Utility right-of-way vegetation improvements:</u></p> <ul style="list-style-type: none"> <li>Frequent maintenance of right-of-way/hazardous fuels reduction (aligns with 2020 New Mexico Forest Action Plan)                             <ul style="list-style-type: none"> <li>Treat surface fuels for a minimum of 10-foot buffer and up to 30 feet where possible</li> <li>Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles</li> <li>Control for invasive species that may contribute to rapid fire spread (i.e., weeds and grasses).</li> </ul> </li> <li>Establish partnership between utilities and NMFD to assist with collaborative efforts for vegetation management and other risk reduction measures along utility right-of-way (goal from 2020 New Mexico Forest Action Plan).</li> <li>Develop and implement vegetation management plans along rights-of-way (goal of 2020 New Mexico Forest Action Plan).</li> </ul>	Provides for safe and effective wildfire response capabilities. Creates a strategic fuel break along roadways to create potential fire break.	Regular maintenance needed to ensure the roads are drivable for emergency response vehicles.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Building Resilient Infrastructure and Communities (BRIC)</li> <li>Firewise Grants</li> <li>National Fire Plan (NFP) Grants</li> <li>2022 Infrastructure Investments and Jobs Act</li> </ul>
2		H	Spring 2023	Protect rare species habitats (aligns with 2020 New Mexico Forest Action Plan) and reduce invasives	County and adjacent state and federal lands (public and private)	County, State, Federal	<ul style="list-style-type: none"> <li>Work with land management agencies to ensure all fuels treatments are aligned with environmental regulations relating to protection of sensitive species.                             <ul style="list-style-type: none"> <li>When treating in the bosque, follow BMPs for preservation of SWFL and YBCC habitat including preservation of dense riparian buffer and focusing treatments on removal of ladder fuels that comprise non-native species.</li> </ul> </li> <li>Incorporate prescribed burns and/or cultural burns where appropriate to restore habitat and defend against invasives.</li> <li>Be mindful of treatment types as some (such as mowing) may increase invasive presence</li> </ul>	Balance the reduction of hazardous fuels with the protection of highly sensitive resources.	Monitor accomplishments in addressing species protections while reducing wildfire risk.	<ul style="list-style-type: none"> <li>The Forest and Watershed Restoration Act (FAWRA)</li> <li>2022 Infrastructure Investments and Jobs Act</li> <li>Environmental Quality Incentives Program (EQIP)</li> <li>Leonardo DiCaprio Foundation Grants</li> </ul>
3		H	Spring 2023	Integrate wildfire management with meeting other resource management objectives	State and Public Lands	County, Federal Agencies	<ul style="list-style-type: none"> <li>Leverage the information from the development of the CWPP and the HMP to combine fuel reduction and habitat restoration projects.</li> <li>Maximize funding sources through integrating fuel projects with other land management goals, including ecological restoration, habitat improvements and recreation. This includes water quality and erosion maintenance, in addition to maintaining wildlife corridors.</li> <li>Utilize the Good Neighbor Authority, as appropriate, to facilitate cross-boundary actions.</li> </ul>	Restore degraded landscapes to build a more resilient fire environment.	Periodically review accomplishments in reducing hazardous fuels and success at meeting other resource management objectives.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>FAWRA</li> <li>EQIP</li> <li>Leonardo DiCaprio Foundation Grants</li> </ul>
4		H	Spring 2023	Collaborate with local HOAs or community associations (aligns with New Mexico Forest Action Plan) to develop fuel break measures and associated access improvements for increased community protection	Bernalillo County (all lands) Four Hills Prioritize highest risk areas as identified in the risk assessment.	Private, County	<ul style="list-style-type: none"> <li>To ensure defensible space in WUI will be maintained, require property owners and HOAs to establish sufficient structure clearance around all structures.</li> <li>Work with HOAs to identify needed access improvements.</li> </ul>	Create resilient landscapes and address potential for extreme wildfire behavior in and around communities. Create and maintain accountability with local landowners.	Carry out a 2-year review of accomplishments in improving defensible space. Repeat NFPA1144 assessments every 2-3 years to document improvements in defensible space.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> <li>Firewise grants</li> <li>State Farm Good Neighbor Citizenship (GNC) Grants</li> <li>NFP</li> <li>Fire Management Assistance Grant (FMAG)</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
5		H	Winter 2022/ Spring 2023	Consider use of prescribed burning and/or cultural burning where appropriate	Bernalillo County Grasslands	Fire Department, Federal Agencies	<ul style="list-style-type: none"> <li>Utilize prescribed burn planning that follows agency and regulator protocols.</li> <li>Closely follow plan prescriptions.</li> <li>Utilize prescribed burn program to provide training for local fire department personnel and volunteers.</li> <li>Implement prescribed fire within the WUI where possible</li> <li>Use findings to identify priority areas to facilitate ecologically appropriate fire reintroduction (goal from 2020 New Mexico Forest Action Plan).</li> </ul>	Protect communities and infrastructure by reducing fuel loads. Increase capacity and training for fire departments. Restore/maintain habitat.	Carry out inventory each year of number and acreage of prescribed fire completed. Collaboratively set goals for upcoming year. Establish training needs and funding.	<ul style="list-style-type: none"> <li>FAWRA</li> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Access to Ancestral Lands Grant (AALG)</li> <li>RCP</li> </ul>
6		H	Fall/ Winter 2022	Identify mitigation projects within areas of high exposure potential	Bernalillo County (all lands) Prioritize highest risk areas as identified in the risk assessment and priority landscapes	County, State	<ul style="list-style-type: none"> <li>Encourage the development and implementation of long-term, cost-effective, and environmentally sound mitigation projects (Goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan)</li> <li>Utilize the fire behavior modeling to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire fighters could more safely suppress future wildfire.</li> </ul> Focus on the following treatments: <ul style="list-style-type: none"> <li>Remove ladder fuels to reduce the potential for surface to canopy continuity and extreme fire behavior.</li> <li>Carry out understory vegetation management to minimize horizontal continuity.</li> <li>Treat small patches of land tucked into residential areas.</li> <li>Create mosaics of vegetation types and stand ages to reduce horizontal and vertical continuity of vegetation to limit fire spread.</li> <li>Prepare to treat fine fuels that establish in fuel treatment areas.</li> <li>Preferentially treat hazardous fuel types first- e.g., cheatgrass, Russian olive, salt cedar.</li> </ul>	Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential (aligns with 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan). Consider a full tool kit of mitigation measures.	Carry out a 2-year review of accomplishments in reducing hazardous fuels. Calibrate fuel model based on treatment effectiveness at altering fuel loading. Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>HMGP</li> <li>FMAG</li> <li>Regional Catastrophic Preparedness Grants (RCP)</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> </ul>
7		H	Summer/ Fall 2022	Implement fuel reduction projects within/around the WUI and high-risk communities (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan)	Bernalillo County (all lands)	All agencies	<ul style="list-style-type: none"> <li>Utilize multi-agency coordination to develop a long-term fuel reduction/vegetation management strategic plan, including monitoring and maintenance (aligns with 2020 New Mexico Forest Action Plan)</li> <li>Break down plans into focus areas/high-risk communities</li> <li>Utilize thinning and prescribed burns (where appropriate) to reduce fuel load in high-risk areas</li> <li>Implement and maintain shaded fuel breaks and reduce ladder fuels</li> <li>Aim for 300-foot shaded fuel breaks around communities</li> <li>Remove brush piles prior to fire season</li> <li>Target vacant lots with accumulating vegetation</li> <li>Reduce fuel continuity where appropriate, focusing on high-risk areas and the WUI</li> <li>Utilize the Good Neighbor Authority, as appropriate, to facilitate cross-boundary actions.</li> <li>Reduce fuel loads in riparian areas (goal from 2020 New Mexico Forest Action Plan)</li> </ul>	Reduce the risk of wildfire within the built environment. Reduce the risk of home and structure ignitions. Reduce the potential for crown fires.	Long-term multi-agency coordination and planning. Regular vegetation maintenance.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> <li>Firewise grants</li> <li>U.S. Endowment for Forestry and Communities</li> <li>NFP</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
8		M	Winter 2022/ Spring 2023	Improve and maintain existing fuel breaks and potential fire containment features	Bernalillo County (all lands) Highest risk areas as identified in the risk assessment	County, State, Federal	<p>Strategic placement of fuel breaks will help to limit the spread of wildland fire and increase access to difficult areas. Fuel break prescriptions should be site specific depending on the fuel type, topography, soils, adjacent land management practices and environmental regulations (NEPA). The prescriptions will incorporate the use of best management practices for habitat protection (i.e., protection of vulnerable species and habitat and prevention of invasive species).</p> <ul style="list-style-type: none"> <li>Look for opportunities to develop and/or increase fire breaks to double as access within the WUI or difficult to access areas and look for opportunities to widen some public trails, especially those running along ridgelines, to better serve as fuel breaks/fire access roads on lands adjacent to WUI.                             <ul style="list-style-type: none"> <li>Work with Open Space to ensure road/trail widening in recreation areas have proper signage or ropes to prevent users from misusing the safety zones.</li> </ul> </li> <li>Bury all power lines in Bernalillo County to reduce the incident of a downed tree hitting a power line or ice affecting lines. New development in the City is required to bury power lines (except high-voltage lines) (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).                             <ul style="list-style-type: none"> <li>Maintain fuel breaks under high tension power lines not buried. Work must only be carried out in full coordination and conjunction with utility providers and must be within parameters established under agency right-of-way agreements.</li> <li>Trim trees along roadways to prevent interference with power lines during high winds and winter storms (The Public Service Company of New Mexico [PNM] does this through a contract) (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> </ul> </li> <li>Encourage clearance of an additional width when possible.</li> <li>Create additional buffer zones between existing development and the forest, ensuring fire suppression access. Maintain existing fire breaks and buffers (<i>Figure 4.1, map of existing and planned fuel treatments</i>).</li> <li>Work with adjacent landowners to develop internal capacity to help enhance fire access-through road and trail improvements on those lands.</li> </ul>	<p>Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures.</p> <p>Create a fuel arrangement unlikely to support crown fire.</p> <p>Ensure the protection of vulnerable ecosystems and values at risk.</p>	<p>Regular maintenance needed to ensure the fuel break remains clear of vegetation.</p> <p>Monitor for invasive species.</p> <p>Continued management of fire breaks maintained by grazing, brush breaking, controlled burns.</p>	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>National Forest Foundation (NFF); Innovative Finance for National Forests Grant Program</li> <li>BRIC</li> <li>Firewise Grants</li> <li>NFP</li> </ul>
9		M	Winter 2023	Increase capacity to complete and maintain needed hazardous fuels projects across multiple jurisdictions	County and adjacent state and federal lands (public and private)	County, State, Federal, Soil and Water Conservation Districts such as Sandia Collaborative, Estancia Basin Watershed Health, and Restoration Monitoring Group	<ul style="list-style-type: none"> <li>Collaboratively identify vegetation and fuels management needs based on the risk/hazard assessment (aligns with 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan)</li> <li>Develop equipment needs to accomplish work (including maintenance) and seek funding for purchase.</li> <li>Create an educational tool/resource for land /property owners re: various methods, techniques, and cost for various fuel treatments. Utilize Appendix G, homeowner resources (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Cultivate and support partnerships with NGOs and volunteer groups to support implementation of projects (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Collaborate with federal agencies to create long-term implementation and monitoring plans (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Utilize the Good Neighbor Authority, as appropriate, to facilitate cross-boundary actions.</li> </ul>	<p>Create resilient landscapes and address potential for extreme wildfire behavior in and around the WUI.</p> <p>Create and maintain accountability with local landowners.</p>	<p>Set up a standing multi-agency meeting every fall to review accomplishments and address future needs.</p>	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>GSA Federal Excess Personal Property (FEPP)</li> <li>Firewise Grants</li> <li>BRIC</li> <li>RCP</li> </ul>



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## Fuels Treatment Types

### Defensible Space

Defensible space is perhaps the fastest, most cost-effective, and most efficacious means of reducing the risk of loss of life and property. Although fire agencies can be valuable in providing guidance and assistance, creating defensible space is the responsibility of the individual homeowner (Figure 4.4).



**Figure 4.4. Defensible space zones providing clearance between a structure and adjacent woodland or forest fuels.**

Source: EMNRD 2017 [https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/FINAL-new-mexico-RSG-guide-2017\\_000.pdf](https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/FINAL-new-mexico-RSG-guide-2017_000.pdf).

Effective defensible space consists of creating an essentially fire-free zone adjacent to the home (Zone 1), a treated secondary zone that is thinned and cleaned of surface fuels (Zone 2), and (if the parcel is large enough) a transitional third zone that is basically a managed forest area (Zone 3). These components work together in a proven and predictable manner. Zone 1 keeps fire from burning directly to the home; Zone 2 reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember

production; and Zone 3 does the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition (see Figure 4.4).

Three zones for defensible space actions are described. These include:

**Zone 1 – Keeps fire from burning directly to the home:** This zone, which consists of an area of 0 to 30 feet around the structure, features the most intense modification and treatment. This distance is measured from the outside edge of the home's eaves and any attached structures, such as decks. While Zone 1 extends to 30 feet from your structures, the first 5 feet surrounding your structure is the most important. Do not plant directly beneath windows or next to foundation vents. Frequently prune and maintain plants in this zone to ensure vigorous growth and a low growth habit. Remove dead branches, stems, and leaves. Do not store firewood or other combustible materials in this area. Enclose or screen decks with metal screening. Extend gravel coverage under the decks. Do not use areas under decks for storage. Prune low-lying branches (ladder fuels that would allow a surface fire to climb into the tree) and any branches that interfere with the roof or are within 10 feet of the chimney. In all other areas, prune all branches of shrubs or trees up to a height of 10 feet above ground (or 1/3 the height, whichever is the least).

Recommendations for treating Zone 1 include (CAL FIRE 2022):

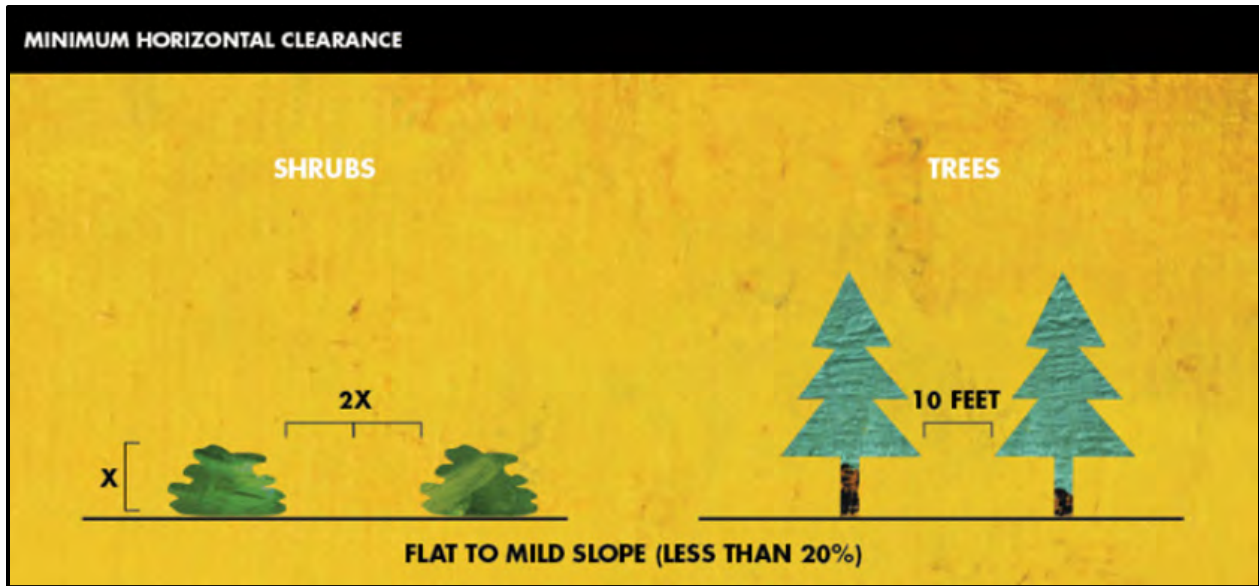
- Use non-combustible landscaping materials, such as gravel, in place of mulch. Clear all dead and dying debris from around a structure, including branches, dead leaves, pinecones, pine needles, grasses, and shrubs. Remember to check areas where the debris can accumulate, such as gutters, stairways, porches, and roofs.
- Clear all branches or vegetation within 10 feet of any chimney or stovepipe outlet.
- To keep vegetation within the 5-foot buffer around all structures, make sure plants are thoroughly watered, and keep non-woody, low-growing plant species if possible. However, it is best to keep no vegetation within 5 feet of any structures.
  - If keeping shrubs or trees within this zone, please see information below on recommended spacing.
- Maintain trees by trimming them regularly and keeping a minimum 10-foot buffer between tree canopies.
- Trim or remove any flammable vegetation near windows.
- Remove any items or vegetation that could catch fire and ignite other property structures, such as vegetation under decks or stairs.
- Separate any items that could ignite, such as trees, shrubs, swing sets, patio furniture, etc.
- Limit the use of combustible materials, such as outdoor furniture, on decks or patios.
- Relocate firewood or lumber to Zone 2.
- Replace structures attached to a home, such as fencing or gates, with non-combustible materials.
- If possible, keep garbage receptacles outside of Zone 1.
- If possible, keep all vehicles, boats, all-terrain vehicles (ATVs), and any other machines outside of Zone 1.

**Zone 2 – Reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember production:** This zone features fuel reduction efforts and serves as a transitional area between Zones 1 and 3. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend at least 100 feet from the structure. Remove stressed, diseased, dead, or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. These actions help eliminate the continuous fuel surrounding a structure while enhancing home site safety and the aesthetics of the property. Keep grass and wildflowers under 8 inches in height. Regularly remove leaf and needle debris from the yard.

Recommendations for treating Zone 2 include but are not limited to (CAL FIRE 2022):

- Maintain all grasses to reach a maximum height of 4 inches.
- For shrubs or trees, maintain a distance between plants of at least two times a plant's size. Additional space between vegetation is needed for properties on slopes (Figure 4.5).
  - Flat to mild slope (less than 20 percent): Minimum distance of 10 feet between trees and two times the size of other plants. Example: For shrubs 2 feet in diameter, at least 4 feet is needed between shrubs.
  - Mild to moderate slope (20–40 percent): Minimum distance of 20 feet between trees and four times the size of other plants. Example: For shrubs 2 feet in diameter, at least 8 feet is needed between shrubs.
  - Moderate to steep slope (greater than 40 percent): Minimum distance of 30 feet between trees and six times the size of other plants. Example: For shrubs 2 feet in diameter, at least 12 feet is needed between shrubs.
- Create vertical space between vegetation by clearing all branches at least 6 feet from the ground for isolated trees, or for trees with nearby shrubs, clear at least three times the shrub height (Figure 4.6).
  - Example: A 4-foot shrub is growing near a tree; a clearance of 12 feet (3 × 4) is needed between the top of the shrub and the lowest tree branch.
- Vegetation debris such as dead leaves, branches, twigs, pinecones, etc., may be allowed (depending on your local requirements) up to 3 inches in depth. However, it is best to remove vegetation debris.
- All wood or lumber piles must have a 10-foot buffer of bare mineral soil in all directions; no vegetation should be kept within this buffer.





**Figure 4.5. Minimum horizontal clearance.**

Source: CAL FIRE (2022)



**Figure 4.6. Minimum vertical clearance.**

Source: CAL FIRE (2022)

**Zone 3 – Provides the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition:** This area extends from the edge of your defensible space to your property boundaries (Figure 4.7). The healthiest forest is one that has multiple ages, sizes, and species of trees where adequate growing room is maintained over time, so maintain a distance of at least 10 feet between the tops of trees. Remove ladder fuels, creating a separation between low-level

vegetation and tree branches to keep fire from climbing up trees. A greater number of wildlife trees can remain in Zone 3, but regularly remove dead trees and shrubs. Ensure trees in this area do not pose a threat to power lines or access roads.



**Figure 4.7. Defensible space zones.**  
Source: FSN 2016

Specific recommendations should be based on the hazards adjacent to a structure such as slope steepness and fuel type. Firewise guidelines and the Homeowner's Guide (see Appendix G) are excellent resources but creating defensible space does not have to be an overwhelming process. The NFPA offers a free [Community Wildfire Risk Assessment Tutorial](#) and an online learning module: [Understanding the Wildfire Threat to Homes](#). Both tools are great resources for learning about, and implementing, defensible space.

Assisting neighbors may be essential in many cases. Homeowners should consider assisting the elderly, sharing ladders for gutter cleaning, and assisting neighbors with large thinning needs. Homeowner actions have been found to also motivate neighbors to act, increasing the scope of the wildfire mitigation across a community (Evans et al. 2015). Adopting a phased approach can make the process more manageable and encourage maintenance (Table 4.2).

**Table 4.2. Example of a Phased Approach to Mitigating Home Ignitability**

Year	Project	Actions
1	Basic yard cleanup (annual)	<ul style="list-style-type: none"> <li>Dispose of clutter in the yard and under porches.</li> <li>Remove dead branches from yard.</li> <li>Mow and rake.</li> <li>Clean off roofs and gutters.</li> <li>Remove combustible vegetation near structures.</li> <li>Coordinate disposal as a neighborhood or community.</li> <li>Post 6-inch reflective address numbers visible from road.</li> </ul>
2	Understory thinning near structures	<ul style="list-style-type: none"> <li>Repeat basic yard cleanup.</li> <li>Limb trees up to 6–10 feet.</li> <li>Trim branches back 15 feet from chimneys.</li> <li>Trim or cut down brush.</li> <li>Remove young trees that can carry fire into forest canopy.</li> <li>Coordinate disposal as a neighborhood or community.</li> </ul>

Year	Project	Actions
3	Understory thinning on private property along roads and drainages	Limb trees up to 6–10 feet. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
4	Overstory treatments on private property	Evaluate the need to thin mature or diseased trees. Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness.
5	Restart defensible space treatment cycle	Continue the annual basic yard cleanup. Evaluate need to revisit past efforts or catch those that were bypassed.

## Fuel Breaks and Open Space Cleanup

The next location priority for fuels treatments should be where the community meets wildland. This may be the outer margins of a town or an area adjacent to occluded open spaces such as a park. Fuel breaks (also known as shaded fuel breaks) are strips of land where fuel (for example, living trees and brush, dead branches, leaves or downed logs) has been modified or reduced to limit the fire’s ability to spread rapidly. Fuel breaks should not be confused with firebreaks, which are areas where vegetation and organic matter are removed down to mineral soil. Shaded fuel breaks may be created to provide options for suppression resources or to provide opportunities to introduce prescribed fire. In many cases, shaded fuel breaks may be created by thinning along roads. This provides access for mitigation resources and firefighters, as well as enhancing the safety of evacuation routes.

## Larger Scale Treatments

Farther away from WUI communities, the emphasis of treatments often becomes broader. While reducing the buildup of hazardous fuels remains important, other objectives are often included, such as forest health and resiliency to catastrophic wildfire and climate change considerations. Wildfires frequently burn across jurisdictional boundaries, sometimes on landscape scales. As such, these larger treatments need to be coordinated on a strategic level. This requires coordination between projects and jurisdictions, as is currently occurring in the County.

Land managers have carried out numerous forest restoration projects across the Cibola NF, and have ongoing projects planned on public land that are designed to reduce hazardous fuels to protect communities and resources, while restoring fire-adapted communities (Figures 4.8 and 4.9).





**Figure 4.8. Photograph of a prescribed burn in progress within Bernalillo County.**



**Figure 4.9. Photograph of a completed prescribed burn within Bernalillo County.**



## Fuel Treatment Methods

Since specifics of the treatments are not provided in detail in Table 4.1, different fuels reduction methods are outlined in the following narrative.

Several treatment methods are commonly used for hazardous fuels reduction, including manual treatments, mechanized treatments, prescribed fire, and grazing (Table 4.3). This brief synopsis of treatment options is provided for general knowledge; specific projects will require further planning. The appropriate treatment method and cost will vary depending on factors such as the following:

- Diameter of materials
- Proximity to structures
- Acreage of project
- Fuel costs
- Steepness of slope
- Area accessibility
- Density of fuels
- Project objectives

It is imperative that long-term monitoring and maintenance of all treatments is implemented. Post-treatment rehabilitation such as seeding with native plants and erosion control may be necessary. In addition, post-treatment fuel clean-up is a must, as neglected piles of vegetation may result in increased fire risk.

**Table 4.3. Summary of Fuels Treatment Methods**

Treatment	Comments
Machine mowing	Appropriate for large, flat, grassy areas on relatively flat terrain.
Manual treatment with chipping or pile burning	Requires chipping, hauling, and pile burning of slash in cases where lop and scatter is inappropriate. Pile burning must comply with smoke management policy.
Brush mastication	Brush species tend to re-sprout vigorously after mechanical treatment. Frequent maintenance of treatments is typically necessary. Mastication tends to be less expensive than manual (chainsaw) treatment and eliminates disposal issues.
Timber mastication	Materials up to 10 inches in diameter and slopes up to 30 percent can be treated. Eliminates disposal issues. Environmental impact of residue being left on-site is still being studied.
Prescribed fire	Can be very cost effective for public land but not close to the city. Ecologically beneficial. Can be used as training opportunities for firefighters. May require manual or mechanical pretreatment. Carries risk of escape. Unreliable scheduling due to weather and smoke management constraints.

Treatment	Comments
Feller buncher	Mechanical treatment on slopes more than 30 percent or of materials more than 10 inches in diameter may require a feller buncher rather than a masticator. Costs tend to be considerably higher than masticator.
Grazing (goats)	Can be cost effective. Ecologically beneficial. Can be applied on steep slopes and shrubby and flashy fuels. Requires close management.

## Manual Treatment

Manual treatment refers to crew-implemented cutting with chainsaws. Although it can be more expensive than mechanized treatment, crews can access many areas that are too steep or otherwise inaccessible with machines. Treatments can often be implemented with more precision than prescribed fire or mechanized methods allow. Merchantable materials and firewood can be removed while non-merchantable materials are often lopped and scattered, chipped, or piled and burned on-site. Care should be exercised to not increase the fire hazard by failing to remove or treat discarded material in a site-appropriate manner.

Strategic timing and placement of fuels treatments is critical for effective fuels management practices and should be prescribed based on the conditions of each treatment area. Some examples of this would be to place fuel breaks in areas where the fuels are heavier and in the path of prevailing winds and to mow grasses just before they cure and become flammable. Also, fuel reductions on slopes/ridgelines extending from the WUI to enhance community protection. In areas where the vegetation is sparse and not continuous, fuels treatments may not be necessary to create a defensible area where firefighters can work. In this situation, where the amount of fuel to carry a fire is minimal, it is best to leave the site in its current condition to avoid the introduction of exotic species.

## Mechanized Treatments

Mechanized treatments include mowing, mastication (ground-up timber), and whole tree felling. These treatments allow for more precision than prescribed fire and are often more cost-effective than manual treatment.

Mowing, including ATV and tractor-pulled mower decks, can effectively reduce grass fuels adjacent to structures and along highway rights-of-way and fence lines. For heavier fuels, several different masticating machines can be used, including drum- or blade-type masticating heads mounted on machines and ranging in size from a small skid-steer to large front-end loaders. Some masticators can grind standing timber up to 10 inches in diameter. Other masticators are more effective for use in brush or surface fuels. Mowing and mastication do not actually reduce the amount of on-site biomass but alter the fuel arrangement to a less combustible profile.

In existing fuel break areas maintenance is crucial especially in areas of encroaching shrubs or trees. In extreme risk areas more intensive fuels treatments may be necessary to keep the fire on the ground surface and reduce flame lengths. Within the fuel break, shrubs should be removed, and the branches of trees should be pruned from the ground surface to a height of 4 to 8 feet, depending on the height of the fuel below the canopy, and thinned with a spacing of at least two to three times the height of the trees to avoid movement of an active fire into the canopy.

Mechanical shears mounted on feller bunchers are used for whole tree removal. The stems are typically hauled off-site for utilization while the limbs are discarded. The discarded material may be masticated, chipped, or burned in order to reduce the wildfire hazard and to speed the recycling of nutrients.

## Grazing

Fuel modifications targeted toward decreasing both vertical and horizontal continuity in fuels is critical as a prevention method against fire proliferation. The primary objectives for these modifications are treating surface fuels and producing low-density and vertically disconnected stands. Goat grazing is an effective, nontoxic, nonpolluting, and practically carbon-neutral vegetation treatment method. A goat grazing system typically consists of a high density of goats enclosed by a metallic or electrified fence guided by herders. Goats feed on a variety of foliage and twigs from herbaceous vegetation and woody plants (Lovreglio et al. 2014).

## Prescribed Burning

Prescribed burning is also a useful tool to reduce the threat of extreme fire behavior by removing excessive standing plant material, litter, and woody debris while limiting the encroachment of shrubby vegetation (see Figures 4.8 and 4.9). Where possible, prescribed fire could occur on public land since fire is ecologically beneficial to this fire-adapted vegetation community and wildlife habitat. The New Mexico Prescribed Fire Council offers informational resources on implementing prescribed fire on both public and private land (Appendix G). The USFS and local departments are already implementing prescribed burning in Bernalillo County (Figure 4.10).

All prescribed fire operations will be conducted in accordance with federal and state laws and regulations. Public safety would be the primary consideration in the design of any prescribed burn plan so as to not negatively impact the WUI. Agency use of prescribed fire on public land would be carried out within the confines of the agency's fire management planning documents and would require individual prescribed burn plans that are developed for specific burn units and consider smoke management concerns and sensitive receptors within the WUI. Smoke monitors could be placed in areas where smoke concerns have been raised in the past.

Following any type of fuels reduction treatment, post-treatment monitoring should continue to ensure that management actions continue to be effective throughout the fire season. The vegetation within this ecosystem can change rapidly in response to drought or moisture from year to year and during the course of the season, so fuels treatments should be adjusted accordingly. To learn more about firing techniques, visit the EFIRE Fire Techniques webpage: <https://efire.cnr.ncsu.edu/efire/fire-techniques/>.

Several burns may be needed to meet full resource management objectives, so a solid maintenance plan is needed to ensure success.

## Cultural Burning

Within the Southwest, fire has historically been a means forest management and restoration by Indigenous communities for thousands of years (Raish et al. 2005). Although cultural burning is included under the umbrella of prescribed burns, it holds a different meaning and has more purposes than a typical prescribed burn (Fire Adapted Communities New Mexico [FACNM] 2021). Cultural burns are "pertinent and substantial to the cultural livelihood" with over 70 identified purposes (FACNM 2021).

Rather than focusing solely on fuel reduction, or as a means of wildfire mitigation, cultural burning is done with a more holistic view, under the philosophy of "reciprocal restoration," meaning, as stewardship

responsibilities to the land are fulfilled, those actions will in turn benefit the peoples who depend on those ecosystems (Long et al. 2021). Cultural burning is typically performed with a variety of objectives, such as landscape management, ecosystem and species biodiversity and health, transmission of environmental and cultural knowledge, ceremonies and spiritual wellbeing, a sense of place, and material services (i.e., food, medicine, plant materials, etc.). Extensive site preparation is typically done before a burn, and post-burn monitoring and additional cultural practices are a common factor of the land stewardship tradition (Long et al. 2021).

*“Cultural burning by Native Americans interconnected them not only to the land but to their animal, reptile, bird and plant spiritual relatives. Therefore, conducting a cultural burn relates to what they burned, how they burned it, and why they burned it.” - Ron W. Goode, Tribal Chair, North Fork Mono Tribe*

### *Impacts of Prescribed Fire on Communities*

Prescribed fires can have impacts on air quality that may impact local communities. Impacts on a regional scale are typically only acute when many acres are burned on the same day, which is rare in this region. Local problems are occasionally acute due to the large quantities of smoke that can be produced in a given area during a short period of time. Residents with respiratory problems may be impacted during these burning periods since smoke consists of small particles of ash, partly consumed fuel, and liquid droplets that are considered air pollutants. Other combustion products include invisible gases such as carbon monoxide, carbon dioxide, hydrocarbons, and small quantities of nitrogen oxides. Oxides of nitrogen are usually produced at temperatures only reached in piled or windrowed slash or in very intense wildfires that are uncommon in the region. In general, prescribed fires produce inconsequential amounts of these gases. Inappropriate management of prescribed fires can be bothersome to residents, and it can negatively affect community health.

Managing smoke from prescribed fires is an important part of planning for prescribed burning. Smoke from burning vegetation produces air pollutants that are regulated by both the U.S. Environmental Protection Agency (EPA) and the State of New Mexico. Therefore, effective smoke management is a vital component of planning and conducting prescribed fires. The New Mexico Environment Department, Air Quality Bureau has outlined smoke management guidelines within the New Mexico Smoke Management Program Guidance Document to protect the health and welfare of New Mexicans from the impacts of smoke (New Mexico Environment Department, Air Quality Bureau 2005). In addition, the New Mexico Environment Department offers a webpage specifically for wildfire and prescribed fire smoke resources: <https://www.env.nm.gov/air-quality/fire-smoke-links/>.

Furthermore, the NWCG released the NWCG Smoke Management Guide for Prescribed Fire in 2020 (NWCG 2020). This plan is designed to act as a guide to all those who use prescribed fire. Smoke management techniques, air quality regulations, public perception of prescribed fire, foundational science behind prescribed fire, modeling, smoke tools, air quality impacts, and more are all discussed in this plan. The document is meant to pair with NWCG’s Interagency Prescribed Fire Planning and Implementation Procedures Guide for planning and addressing smoke when prescribed fire is used (NWCG 2020). To view the plan, please visit: <https://www.nwcg.gov/sites/default/files/publications/pms420-3.pdf>.

Fire managers must obtain a permit from the Air Quality Bureau to start a prescribed burn and can only do so during optimal conditions for smoke management. During a burn, lighting patterns can be altered to change how smoke is generated. Generally, the impacts of smoke from prescribed burning are far less than those from wildfire events. Prescribed burns aid in reducing the potential smoke impacts of high-intensity, extensive wildfires (Greater Santa Fe Fireshed Coalition 2022).



Effects of smoke can be managed by burning on days when smoke will blow away from smoke-sensitive areas. Precautions are taken when burning near populated areas, highways, airports, and other smoke sensitive areas. Any smoke impact downwind is considered before lighting a fire. Smoke management is a significant component of all prescribed burn plans. Other mitigating actions include alerting the public of upcoming burning activities, including the purpose, best conditions for ensuring good smoke dispersal, duration, size, and location of projects. Local radio, newspapers, social media, and TV can provide broad coverage for alerts. Land management agencies in the planning area consistently work with concerned citizens regarding smoke management and attempt to provide solutions such as the placement of smoke monitors at sensitive sites.



**Figure 4.10. Photograph showing a prescribed burn in the East Mountains being conducted by the Cibola National Forest.**

Photo source: East Mountain Interagency Fire Protection Association (EMIFPA)

### *Thinning and Prescribed Fire Combined*

Combining thinning and prescribed fire can be the most effective treatment (Graham et al. 2004). In forests where fire exclusion or disease has created a buildup of hazardous fuels, prescribed fire cannot be safely applied, and pre-burn thinning is required. The subsequent use of fire can further reduce residual fuels and reintroduce this ecologically imperative process.

## COHESIVE STRATEGY GOAL 2: FIRE-ADAPTED COMMUNITIES

### **Goal 2 of the Cohesive Strategy/Western Regional Action Plan is: Fire-Adapted Communities:**

Human populations and infrastructure can withstand a wildfire without loss of life and property. The basic premise of this goal is:

*“Preventing or minimizing the loss of life and property due to wildfire requires a combination of thorough pre-fire planning and action, followed by prudent and immediate response during a wildfire event. Post-fire activities can also speed community recovery efforts and help limit the long-term effects and costs of wildfire. CWPPs should identify high-risk areas and actions residents can take to reduce their risk. Fuels treatments in and near communities can provide buffer zones to protect structures, important community values and evacuation routes. Collaboration, self-sufficiency, acceptance of the risks and consequences of actions (or non-action), assisting those who need assistance (such as the elderly), and encouraging cultural and behavioral changes regarding fire and fire protection are important concepts. Attention will be paid to values to be protected in the middle ground (lands between the community and the forest) including watersheds, viewsheds, utility and transportation corridors, cultural and historic values, etc.” (WRSC 2013:15).*

***In this CWPP, recommendations for fire-adapted communities include public education and outreach actions and actions to reduce structural ignitability.***

## RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Just as environmental hazards need to be mitigated to reduce the risk of fire loss, so do the human hazards. Lack of knowledge, lack of positive actions (e.g., failing to create adequate defensible space), and negative actions (e.g., keeping leaf litter and exposed propane tanks close to structures) all contribute to increased risk of loss in the WUI.

Most residents in the WUI understand the risk that wildfire poses to their communities. However, it is important to continually engage the community as a partner in order to expand wildfire mitigation options across land ownership (McCaffrey 2004, 2020; McCaffrey and Olsen 2012; Winter and Fried 2000).

Methods to improve public education could include increasing awareness about fire department response and resource needs; providing workshops at demonstration sites showing Firewise landscaping techniques or fuels treatment projects; organizing community cleanups to remove green waste; publicizing availability of government funds for treatments on private land; and, most importantly, improving communication between homeowners and local land management agencies to improve and build trust, particularly since the implementation of fuel treatments and better maintenance of existing treatments needs to occur in the interface between public and private land.

The BCFR already carries out many public education activities throughout the county, such as educating neighborhoods on wildland fire danger and fire prevention (Bernalillo County 2022c). The fire department is a great resource for information and contacts regarding wildfire mitigation and wildfire prevention. In addition, the Ciudad Soil and Water Conservation District provides homeowners with assessments and funds to complete defensible space treatments.

Please see Appendix G for a list of educational resources.

Table 4.4 lists public education recommendations to be implemented in the County.

## RECOMMENDATIONS FOR REDUCING STRUCTURAL IGNITABILITY

Table 4.4 provides a list of community-based recommendations to reduce structural ignitability that should be implemented throughout the Bernalillo County CWPP planning area. Reduction of structural ignitability depends largely on public education which provides homeowners the information they need to take responsibility for protecting their own properties. A list of action items that individual homeowners can follow can be found below. Carrying out fuels reduction treatments on public land may only be effective in reducing fire risk to some communities; if homeowners have failed to provide mitigation efforts on their own land, the risk of home ignition remains high, and firefighter lives are put at risk when they carry out structural defense.

Preparing for wildland fire by creating defensible space around the home is an effective strategy for reducing structural ignitability as discussed under Cohesive Strategy Goal 1: Resilient Landscapes. Studies have shown that burning vegetation beyond 120 feet of a structure is unlikely to ignite that property through radiant heat (Butler and Cohen 1996), but fire bands that travel independently of the flaming front have been known to destroy houses that had not been impacted by direct flame impingement. Hardening the home to ignition from embers, including maintaining vent coverings and other openings, is also strongly advised to protect a home from structural ignitability. Managing the landscape around a structure by removing weeds and debris within a 30-foot radius and keeping the roof and gutters of a home clean are two maintenance measures proven to limit combustible materials that could provide an ember bed and ignite the structure. In essence, reducing structural ignitability and creating defensible space are key for protecting from the potential loss and damage.

Below you will find pertinent information regarding recent legislation related to Goal 2 of the Cohesive Strategy.

**House Bill 266:** The Forest and Watershed Restoration Act emphasized the need for restoration throughout the state, and allocates funds through EMNRD for the purpose of restoring forests and watersheds (see Appendix F for more information).

**Table 4.4. Recommendations for Creating Fire-Adapted Communities (Public Education and Reducing Structural Ignitability)**

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
1		H	Fall/winter 2022	Identify vulnerable populations located in the WUI	Bernalillo County (all lands) Prioritize high-risk areas: East mountains in general, specifically: Chilili, High Desert, Pajarita Mesa, Four Hills	Fire Department, HOA's, community leaders	<ul style="list-style-type: none"> <li>The County needs to identify vulnerable populations (elderly, disabled, low income) who may need additional help to mitigate home hazards and to evacuate during a wildfire.</li> <li>Seek grant opportunities to support assistance for vulnerable populations.</li> </ul>	Protect life and property of the most vulnerable members of the community.	Annual review of number of actions taken to address vulnerable populations	<ul style="list-style-type: none"> <li>BRIC</li> <li>Firewise grants</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> </ul>
2		H	Fall/winter 2022	Educate the public on how to mitigate risk and damage from wildfire and other natural hazards (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan)	Bernalillo County (all lands) Prioritize highest threat areas as identified in the risk assessment	Fire Department, HOA, Los Rancheros Citizen Corps Program, Private Landowners	<ul style="list-style-type: none"> <li>Increase education through community training classes as well as YouTube videos on defensible space, fire safe landscaping, structural hardening components, and WUI building construction requirements.</li> <li>Create/distribute wildfire and natural hazard education documents, including topics such as home hardening, defensible space, how wildfire spreads, impacts of disaster, mitigation opportunities, preparation needs, etc.</li> <li>Distribute a list of mitigation actions broken down by cost.</li> <li>Utilize Appendix G of the CWPP: Homeowner Resources</li> <li>Create/distribute education material on evacuations. Promote the BCFR wildfire preparedness webpage.</li> <li>Implement youth fire prevention programs (can work with camps, schools, clubs, etc.)</li> <li>Use existing signage                             <ul style="list-style-type: none"> <li>Spread seasonally adjusted fire prevention messages along highways and in public open space areas to reduce human ignitions and promote defensible space.</li> <li>Promote the use of existing electronic signs at firehouses and other locales to display fire prevention information, safety messages, and fire danger ratings linked to safety actions.</li> <li>Add signage in bosque areas that have frequent ignitions.</li> </ul> </li> <li>Increase Firewise/Ready, Set, GO! Workshops                             <ul style="list-style-type: none"> <li>Offer hands-on workshops to highlight individual home vulnerabilities and how-to techniques to reduce ignitability of common structural elements.</li> <li>Home assessments conducted in a neighborhood often include groups of neighbors participating with the assessor to learn from each other's homes. Homeowners get a better understanding by viewing a home other than their own and feel more comfortable asking questions as a group.</li> <li>Assessments and workshops can be requested by an HOA.</li> <li>Utilize a train-the-trainer model. Develop a team of trained citizens that could perform hazard assessments within their community. Seek funding to pay volunteer fire departments to assist.</li> <li>Provide educational resources during assessments.</li> </ul> </li> </ul>	Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.  Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fires.	Yearly updates to materials. Annual review of number of events implemented. Set goals for the following year.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>The Fire Prevention and Safety Grants (FP&amp;S)</li> <li>Environmental Protection Agency (EPA) - Environmental Education Grants</li> </ul>



Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
3	Ongoing	H	Fall/winter 2022	Implement community events and foster a positive fire culture (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan)	Bernalillo County (all lands) Focus on highest threat areas as identified in the risk assessment and populations at risk	Fire Department, Community Service Groups.	<ul style="list-style-type: none"> <li>Host County chipper program or chipper days, community cleanup days, community awareness and preparation events, etc.</li> <li>A community-led day of yard cleanup with fire mitigation in mind may encourage large numbers within the community to carry out mitigation measures and implement defensible space.</li> <li>Residents should assist elderly, disabled, or vulnerable residents.</li> <li>Hold a community gardening event with volunteers – construct a firesafe demonstration garden or home landscaping for the public to view.</li> <li>Aim to draw all populations, especially those at risk. Ensure that all interactions result in follow up engagement by collecting contact information for residents interested in action.</li> </ul>	Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.	Annual review of number of events implemented. Set goals for next year.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>FP&amp;S</li> </ul>
4		H	Spring 2022	Improve/increase enforcement of Defensible Space Standards	Bernalillo County (all lands) Prioritize high-risk areas identified in the risk assessment	Fire Department, County, HOAs, Private landowners	<ul style="list-style-type: none"> <li>Defensible Space                             <ul style="list-style-type: none"> <li>A professional assessment would help identify the most critical actions that an individual could take.</li> <li>Assessments could also include marking trees and shrubs suggested for removal.</li> <li>Implement annual vegetation and defensible space inspections</li> <li>Host inspections to twice a year. Include pre-determined inspection schedule.</li> <li>Develop staffing plan to support enforcement and seek funding to implement the plan.</li> <li>Provide tax incentives for defensible space actions.</li> <li>Work with insurance companies to determine the potential to provide incentives for defensible space associated with reduced insurance premiums.</li> <li>Increase green waste pickup/disposal options.</li> </ul> </li> <li>Fire/WUI Code                             <ul style="list-style-type: none"> <li>Use education campaign to encourage WUI code actions even for those properties that are not required to adhere to it.</li> <li>Leverage recommendations in the County HMP (page 5-1) and the work of the New Mexico Fire Planning Task Force (NM-FPT) to build support to further implement regulatory mitigation measures for land use planning.</li> </ul> </li> </ul>	Reduce loss of life and structures through defensible space. Reduce wildfire risk through greater adoption of Firewise and structure hardening measures. Reduce risk of home ignitions. Empower homeowners to take the most effective actions.	Conduct on-site inspections with owners; identify and mark trees or shrubs for removal within the 100-foot safety zone. Develop a community task force to carry out assessments of properties. Annual program evaluation and updates as necessary.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Firewise grants</li> <li>EPA Environmental Education Grants</li> <li>FP&amp;S</li> </ul>
5		H	Spring 2023	Increase Structural Hardening through enforcement of the IWUI Code	Bernalillo County (all lands) Prioritize high-risk areas as identified in the Risk Assessment	Fire Department, Prevention and Community Development, HOAs	<ul style="list-style-type: none"> <li>Develop and distribute educational materials and resources on the importance of home hardening and how wildfires may ignite homes.</li> <li>Develop and distribute information regarding topography, slope, vegetation, and how it all impacts a home's risk level and defensible space needs.</li> <li>Continue to develop and adopt the latest building standards and codes.</li> <li>Retrofit existing structures, both public and private.</li> <li>Research and utilize new law to help with retrofits.</li> <li>Develop a home inspection program which includes information on risk reduction.</li> <li>Opportunities for tax breaks to harden your home.</li> <li>Send surveys to homeowners to inform the Fire Department and other groups about public perceptions of risk, as well as priority areas in which to focus efforts.</li> <li>Open up a line of dialogue between the fire department and residents regarding actions they can take to reduce their wildfire risk.</li> <li>Remove dilapidated or condemned structures.</li> </ul>	Reduce wildfire risk and loss of structures through home hardening and community education.	Annual updates to standards as necessary.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>FP&amp;S</li> <li>EPA Environmental Education Grants</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
6		H	Winter 2022	Improve agency coordination of outreach	Bernalillo County (all lands)	All agencies, Insurance Brokers	<ul style="list-style-type: none"> <li>Agency coordinated meeting to ensure a consistent message.</li> <li>Implement a platform for raising cross-boundary issues.</li> <li>Engaging insurance agency in dialogue.</li> <li>Provide incentives for mitigation actions.</li> <li>Create a one-stop-shop for landowner assistance programs in regard to mitigation (aligns with 2020 New Mexico Forest Action Plan).</li> </ul>	<p>Provides a consistent message regarding wildfire activity, fire prevention goals, actions for homeowners.</p> <p>Reduce redundancy and improve efficiency.</p>	Annual agency coordination meeting to assess priorities and action items.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Firewise grants</li> <li>Regional Catastrophic Preparedness (RCP) Grants</li> <li>Emergency Management Performance Grant (EMPG)</li> </ul>
7		H	Winter 2022/ Spring 2023	Implement strategically placed safety zones or temporary refuge areas	Communities with difficult egress, either due to large population funneling or poor road conditions	All agencies	<ul style="list-style-type: none"> <li>Utilize the CWPP risk assessment to identify areas within communities that may have lower potential for extreme fire behavior and could serve as a refuge in emergency situations.</li> <li>Develop fire-safety zones for emergency refuge/shelter.</li> <li>Utilize areas such as parking lots or school yards.</li> <li>Implement extreme defensible space, potentially including fire breaks around the safe zone.</li> <li>May utilize this area as a living example of fire-resistant landscaping.</li> </ul>	<p>Protect lives when egress routes have become blocked.</p> <p>Provide safe zones for firefighters.</p>	Regular maintenance of safe zones.	<ul style="list-style-type: none"> <li>BRIC</li> <li>Hazard Mitigation Grant Program (HMGP)</li> <li>RCP Grants</li> </ul>
8		M	Spring 2023	Identify priority ignition concerns	High risk areas	Public agencies, Fire Department, Department of Emergency Management	<p>Utilize fire history data to identify areas with frequent fire starts and develop strategy to reduce incidence of ignitions. Convene a working group to develop strategies to reduce human starts:</p> <ul style="list-style-type: none"> <li>Education campaign</li> <li>Signage</li> <li>Fire response plans</li> <li>Law enforcement</li> <li>Bosque ignitions related to homeless population</li> </ul>	<p>Reduce unnecessary ignition through unlawful or irresponsible behavior.</p>	<p>Annual evaluation of priority ignition concerns.</p> <p>5-year rerun of risk assessment to determine success in mitigating hazards.</p> <p>Review fire history data on a 2-year frequency to monitor trends.</p>	<ul style="list-style-type: none"> <li>Building Resilient Infrastructure and Communities (BRIC)</li> <li>Firewise grants</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> </ul>
9		M	Spring 2024	Implement Fire Safe Campground/Tourist hubs (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan)	Bernalillo County National Forest lands	County, Federal Agencies	<ul style="list-style-type: none"> <li>Provide firesafe structures at campgrounds/recreational areas.</li> <li>Host/distribute wildfire educational resources at all major campgrounds/recreational areas.</li> <li>Provide real-life examples of defensible space around campground/recreational structures.</li> <li>Install signage identifying firesafe landscaping, construction materials, and defensible space zones.</li> <li>Educate the public on wildfire-safe recreation activities, including when it is safe to recreate and when it is not, depending on fire risk (goal from 2020 New Mexico Forest Action Plan).</li> <li>Advertise sustainable recreation activities (goal from 2020 New Mexico Forest Action Plan).</li> </ul>	<p>Reduce wildfire risk within recreation areas.</p> <p>Promote wildfire awareness and education.</p> <p>Provide tangible examples of risk reduction work.</p>	<p>Vegetation and sign maintenance.</p> <p>Yearly updates to educational materials.</p>	<ul style="list-style-type: none"> <li>Firewise grants</li> <li>FP&amp;S</li> <li>RCP</li> <li>BRIC</li> </ul>
10		M	Winter 2023 or 2024	Increase staffing to address wildfire mitigation workload	Prioritize understaffed programs that provide the most impact.	Fire Department, County Administration and Finance	<ul style="list-style-type: none"> <li>Establish fuels mitigation crew.</li> <li>Pursue continuous and repeat interactions with residents.</li> <li>Utilize inmate crews as appropriate.</li> </ul>	Reduce wildfire risk through greater capacity in the County for wildfire projects.	Annual assessment of capacity needs.	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>Funding for Fire Departments and First Responders</li> <li>RCP</li> <li>EMPG</li> <li>BRIC</li> </ul>
11		M	Spring 2023	Improve engagement and sustainability of mitigation actions by residents	Focus on highest threat areas as identified in the risk assessment	All agencies	<p>To encourage engagement in mitigation actions and sustain engagement, entities should:</p> <ul style="list-style-type: none"> <li>Provide recognition and incentives</li> <li>Assist and facilitate actions by providing services for treating and removing slash</li> <li>Identify barriers to engagement and address</li> <li>Track progress and identify areas requiring support</li> </ul>	Increase sustainability for mitigation actions and combat fatigue amongst residents.	<p>Annual evaluation of program effectiveness and updates as necessary.</p> <p>Accomplishment tracking through an interactive online tracking system.</p> <p>Regularly update content to keep messaging fresh and relevant.</p>	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>EPA Environmental Education Grants</li> <li>FP&amp;S</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
12		M	2023	Integrate CWPP components/findings into new planning documents	Bernalillo County (all lands)	Fire Department, Emergency Management Department	Review relevant existing planning documents and, where applicable, incorporate CWPP findings and components during planning document updates.	Incorporate wildfire planning into broader-scale emergency management planning for the County.	Yearly updates to materials.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Firewise grants</li> <li>FP&amp;S</li> <li>BRIC</li> <li>HMGP</li> </ul>

## Action Items for Homeowners to Reduce Structural Ignitability

**Low or  
No Cost  
Investment  
(<\$50)**

Regularly check fire extinguishers and have a 100-foot hose available to wet perimeter.

Maintain defensible space for 30 feet around home. Work with neighbors to provide adequate fuels mitigation in the event of overlapping property boundaries.

Install an environmentally appropriate xeriscape yard instead of grass

Screen vents with non-combustible meshing with mesh opening not to exceed nominal 1/16-1/8-inch size.

Ensure that house numbers are easily viewed from the street.

Keep wooden fence perimeters free of dry leaves and combustible materials. If possible, non-combustible material should link the house and the fence.

Keep gutters free of vegetative litter. Gutters can act as collecting points for fire brands and ashes.

Store combustible materials (firewood, propane tanks, grills) away from the house; in shed, if available.

Clear out materials from under decks and/or stacked against the structure. Stack firewood at least 30 feet from the home, if possible.

Reduce your workload by considering local weather patterns. Because prevailing winds in the area are often from the west-southwest, consider mitigating hazards on the west corner of your property first, then work around to cover the entire area.

Seal up any gaps in roofing material and enclose gaps that could allow fire brands to enter under the roof tiles or shingles.

Remove flammable materials from around propane tanks.

**Minimal  
Investment  
(<\$250)**

When landscaping in the home ignition zone (HIZ) (approximately 30 feet around the property), select non-combustible plants, lawn furniture, and landscaping material. Combustible plant material like junipers and ornamental conifers should be pruned and kept away from siding. If possible, trees should be planted in islands and no closer than 10 feet to the house. Tree crowns should have a spacing of at least 18 feet when within the HIZ. Vegetation at the greatest distance from the structure and closest to wildland fuels should be carefully trimmed and pruned to reduce ladder fuels, and density should be reduced with approximately 6-foot spacing between trees crowns.

Box in eaves, attic ventilation, and crawl spaces with non-combustible material.

Work on mitigating hazards on adjoining structures. Sheds, garages, barns, etc., can act as ignition points to your home.

Enclose open space underneath permanently located manufactured homes using non-combustible skirting.

Clear and thin vegetation along driveways and access roads so they can act as a safe evacuation route and allow emergency responders to access the home.

Purchase or use a National Oceanic and Atmospheric Administration weather alert radio to hear fire weather announcements.



**Moderate to High Investment (>\$250)**

Construct a non-combustible wall or barrier between your property and wildland fuels. This could be particularly effective at mitigating the effect of radiant heat and fire spread where 30 feet of defensible space is not available around the structure.

Construct or retrofit overhanging projections with heavy timber that is less combustible.

Replace exterior windows and skylights with tempered glass or multilayered glazed panels.

Invest in updating your roof to non-combustible construction. Look for materials that have been treated and given a fire-resistant roof classification of Class A. Wood materials are highly combustible unless they have gone through a pressure-impregnation fire-retardant process.

Construct a gravel turnaround in your driveway to improve access and mobilization of fire responders.

Treat construction materials with fire-retardant chemicals.

Install a roof irrigation system.

Replace wood or vinyl siding with nonflammable materials.

Relocate propane tanks underground.

Additional resources regarding home hardening can be found in Appendix G.

## COHESIVE STRATEGY GOAL 3: WILDFIRE RESPONSE

**Goal 3 of the Cohesive Strategy/Western Regional Action Plan is Wildfire Response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions:

*“A balanced wildfire response requires integrated pre-fire planning with effective, efficient, and coordinated emergency response. Pre-fire planning helps tailor responses to wildfires across jurisdictions and landscape units that have different uses and management objectives. Improved prediction and understanding of weather, burning conditions, and various contingencies during wildfire events can improve firefighting effectiveness, thereby reducing losses and minimizing risks to firefighter and public health and safety. Wildfire response capability will consider the responsibilities identified in the Federal Response Framework. Local fire districts and municipalities with statutory responsibility for wildland fire response are not fully represented throughout the existing wildland fire governance structure, particularly at the NWCG, NMAC, and GACC levels.” (WRSC 2013:15).*

This section provides recommended actions that jurisdictions could undertake to improve wildfire response.

## RECOMMENDATIONS FOR IMPROVING FIRE RESPONSE CAPABILITIES

Educating the public so they can reduce dependence on fire departments is essential because these resources are often stretched thin due to limited personnel. Education to enhance community preparedness is a key factor in supporting local fire departments in fire response, particularly educating

residents about emergency notifications and evacuation protocols so that residents are able to safely evacuate an area while emergency responders prepare to protect life and property.

Table 4.5 below provides recommendations for improving firefighting capabilities. Many of these recommendations are general in nature.

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**Table 4.5. Recommendations for Safe and Effective Wildfire Response**

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
1		H	Spring 2023	Increase/improve water supply for fire suppression	Bernalillo County Initially focus on areas of highest wildfire hazard as determined in the risk assessment and areas with limited water pressure or no existing water supply	Fire Department, All agencies	<ul style="list-style-type: none"> <li>Install water tanks where feasible. In locations water tanks cannot be installed, have tanks filled and pre-loaded to be transported to areas of need in the event of a fire.</li> <li>Install additional tanks and standpipes</li> <li>Install helicopter dip tanks where appropriate</li> <li>Initiate a detailed study of feasible locations for water development improvements. Fire Hydrant with solid fill</li> <li>Install hand pumps or other methods independent of the grid for accessing private well water</li> <li>Ensure suppression crews have the appropriate "keys" for hydrants or standardized water fittings</li> </ul>	<p>Improve fire-fighting response if water is more readily available or closest locations could be identified on a GIS map on a tablet/computer.</p> <p>Alleviates public and agency concern for limited water supply in some WUI areas.</p>	<p>Convene annually</p> <p>Document number of meetings held</p> <p>Document number of actions taken</p>	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>Firewise grants</li> <li>BRIC</li> <li>RCP</li> </ul>
2		H	Winter 2022	Enhance emergency notification and information dissemination capabilities	Bernalillo County (all lands)	Fire Department, Emergency Management, State	<ul style="list-style-type: none"> <li>Build on current emergency notification and information dissemination capabilities to ensure redundant and alternate means of alerting the public.                             <ul style="list-style-type: none"> <li>Improve reverse 911 system</li> <li>Leverage emerging County wide system</li> <li>Ensure ability to notify all mobile devices</li> </ul> </li> <li>Install a County-wide siren system (similar to a tornado siren) to notify those the electronic system may not reach</li> </ul>	<p>Alert the public to emergencies, spread information about ongoing incidents.</p> <p>Improve situational awareness and community safety.</p>	<p>Annual review of effectiveness</p> <p>Post-incident lessons learned</p>	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>Building Resilient Infrastructure and Communities (BRIC)</li> <li>Emergency Management Performance Grant (EMPG)</li> <li>Regional Catastrophic Preparedness Grant (RCP)</li> <li>Funding for Fire Departments and First Responders</li> </ul>
3		H	Winter 2023	Identify evacuation Routes	All communities where appropriate. Prioritize high risk areas based on risk assessment. Mountain communities.	Fire Department, GIS, Maintenance Services	<ul style="list-style-type: none"> <li>Identify parcel owners along primary evacuation routes.</li> <li>Map call communities with limited ingress/egress.</li> <li>Install reflective signage along evacuation routes.</li> <li>Adopt/distribute official evacuation protocols and resources</li> <li>Encourage residents and vacationers to sign up for the emergency notification system before fire season.</li> </ul>	<p>Protect life and lessen high-risk fire behavior along important roads.</p> <p>Fuel treatments adjacent to roads can reduce fire behavior along important travel routes used for ingress by emergency vehicles and egress by residents.</p>	Annual Maintenance	<ul style="list-style-type: none"> <li>BRIC</li> <li>EMPG</li> <li>2022 Infrastructure Investments and Jobs Act</li> <li>State Farm Good Neighbor Citizenship (GNC) Grants</li> </ul>



Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
4		H	Winter 2022/ Spring 2023	Develop strategies to enhance safe wildfire response.	Areas with poor ingress and egress	Fire Department	<ul style="list-style-type: none"> <li>Address narrow access concerns for wildfire apparatus through road improvements, new egress points, or development of response plans.</li> <li>Identify alternative apparatus for access into narrow areas.</li> <li>Ensure all fire shelters are updated or replaced by 2023 to meet requirements and standards.</li> <li>Identify potential areas that threaten entrapment of response crews and develop response plans and/or safety zones.</li> <li>Map all weak bridges and develop alternative ingress/egress or response plan.</li> <li>Reduce fuel loading along ingress/egress routes. Remove fuel overhanging road and reduce fuel on both sides of road to an extent depending on potential fire behavior</li> <li>Identify and remove hazard trees that have potential to fall and block ingress/egress routes during a fire.</li> <li>Identify areas with limited all-weather access and develop response plan.</li> <li>Work with HOAs and Community Associations to address locked gates and access concerns</li> <li>Incorporate utility location data into the Wildland Fire Decision Support System (WFDSS) for fire management guidance as wildfires are occurring (goal from 2020 New Mexico Forest Action Plan).</li> <li>Utilize special data for fire season preparation (aligns with 2020 New Mexico Forest Action Plan)</li> <li>Increase access to fire training and monitoring programs (goal from 20202 New Mexico Forest Action Plan).</li> </ul>	Improve fire-fighting response if smaller, more agile vehicles are available to navigate narrow unimproved roads.	N/A	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>The Fire Prevention and Safety Grants (FP&amp;S)</li> <li>BRIC</li> <li>2022 Infrastructure Investments and Jobs Act</li> <li>RCP</li> </ul>
5		H	Winter 2022/ Spring 2023	Develop and coordinate an online comprehensive emergency preparedness, response, and recovery plan for wildfire (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan).	Bernalillo County (all lands)	Fire Department, Emergency Management	<ul style="list-style-type: none"> <li>Create an online dashboard for use by <b>emergency management</b> agency decision support.</li> </ul> <p>Dashboard could be created in a Story Map or "Hub" format and would include:</p> <ul style="list-style-type: none"> <li>Break dashboard into sections of the emergency management cycle: preparedness, response, recovery</li> <li>Identify roles and responsibilities for each agency/partner under each section of the cycle</li> <li>Include BMPs for each section of the cycle</li> <li>Include coordination plan for interagency communications before, during and after an event</li> <li>Include a tracking module to track actions needed and status</li> <li>include a funding matrix to support implementation of actions</li> <li>align actions as closely as possible with the County and State HMP</li> </ul>	Improve fire response and readiness.	Would be an active and live platform, updated in real time and reviewed on an annual basis	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>FP&amp;S</li> <li>BRIC</li> <li>RCP</li> <li>EMPG</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
6		H	Winter 2022/ Spring 2023	Proactive in addressing future wildfire challenges with climate change.	Bernalillo County and adjacent jurisdictions	County, State, Federal	Convene a working group tasked with the following: <ul style="list-style-type: none"> <li>Assess impact of climate change on wildfire potential through modeling of fire behavior under various climate scenarios.</li> <li>Establish fuel treatment plans to mitigate climate related influences on wildfire risk in existing vegetation communities.</li> <li>Establish plans and build infrastructure for water supply needs to alleviate future drought emergencies.</li> <li>Install a drought indicator/early warning system. Promote and expand a system that detects levels of soil moisture and stream/river levels to determine when conditions are trending toward a drought. Develop comprehensive education process that includes drought education (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Anchor slope mesh over areas prone to landslides that threaten infrastructure and critical facilities. Areas within Bernalillo County are vulnerable to landslides due to slope erosion. Anchor heavy-gauge metal slope mesh over areas prone to landslides along transportation routes and near critical facilities in areas of high vulnerability (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Install generators at critical facilities. This project would allow for fixed diesel-powered generators or generator connections to be installed at critical facilities to ensure continuity of emergency services to the public during high hazard events (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> </ul>	Enhance wildfire response as conditions change.	Meet annually to review plans and assess status of wildfire risk. Rerun the fire behavior analysis to determine change in wildfire risk.	<ul style="list-style-type: none"> <li>FAWRA</li> <li>BRIC</li> <li>National Urban and Community Forestry Challenge</li> <li>Leonardo DiCaprio Foundation Grants</li> <li>EQIP</li> </ul>

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## POST-FIRE RESPONSE AND REHABILITATION

The recent increase in severe fires has highlighted the numerous complexities of post-fire response.

Following a fire, heavy rains may result in widespread floods and debris flows carrying trees, boulders, and soil through canyons, ultimately damaging communities, water supply and systems, and critical infrastructure. The New Mexico Forest Action Plan has identified Bernalillo County as one of many locations susceptible to erosion (EMNRD Forestry Division 2020a).

Within Bernalillo County, the eastern portion of the county (along the Sandia Mountains and Cibola NF) and northwestern corner of the county are “likely susceptible” to landslides, with surrounding areas marked as “moderately likely susceptible.” This was proven true when landslides in 2014 resulted in mud and water up to 3 feet deep, which entered homes located along the Petroglyph National Monument (Bernalillo County et al. 2022).

The Dog Head Fire, which is the County’s largest fire in recent times, occurred in June 2016 and scorched 17,912 acres. According to the USFS Southwestern Region, burn severity mapping showed approximately 50% of the affected NFS land burned at a moderate intensity and 25% burned at high intensity. For private land (including the Chilili Land Grant where the majority of the fire burned) approximately 46% of the burned area burned at moderate intensity and 25% burned at high intensity (USFS 2016). This fire negatively impacted water systems via debris, ash, and silt pollution (Maxwell 2017).

Soil cover is dramatically reduced in areas with moderate soil burn severity (SBS), leading to increased water repellency and runoff. By contrast, soil cover is nearly non-existent in areas experiencing high SBS and the surface mineral soil has been burned to fine powder. Exposed, granular mineral soil is readily transported during rain events resulting in elevated soil erosion and sediment loading in streams, creeks, and rivers (USFS 2010).

There are many facets to post-fire recovery, including but not limited to:

- Ensuring public health and safety—prompt removal of downed and hazard trees, addressing watershed damage, and mitigating potential flooding.
- Rebuilding communities and assessing economic needs—securing the financial resources necessary for communities to rebuild homes, business, and infrastructure.
- Restoring the damaged landscape—restoration of watersheds, soil stabilization, and tree planting.
- Reducing fire risk in the future—identifying hazard areas and implementing mitigation.
- Prioritizing the needs of vulnerable and disadvantaged communities during response and disaster recovery efforts.
- Reducing post-fire recovery time by replanting native species.
- Ensuring fire protection measures enhance sustainability of restoration projects e.g., introducing prescribed fire to a fire-dependent ecosystem where fire had previously been excluded.
- Retaining downed logs for erosion control and habitat maintenance.
- Evaluating and updating disaster recovery plans every 5 years to respond to changing needs and characteristics of the community.



- Coordinating with planning, housing, health and human services, and other local, regional or state agencies to develop contingency plans for meeting short-term, temporary housing needs of those displaced during a catastrophic wildfire event.
- Incorporating forecasted impacts from climate change into trends and projections of future risk and consideration of policies to address identified risk.
- Updating codes and ordinances to specify procedures and standards for planning and permitting the reconstruction of buildings destroyed by wildfire.

Recovery of the vegetated landscape is often more straightforward than recovery of the human environment. Assessments of the burned landscape are often well-coordinated through the use of interagency crews who are mobilized immediately after a fire to assess the post-fire environment and make recommendations for rehabilitation efforts.

For the community impacted by fire, however, there is often very little planning at the local level to guide their return after the fire. Residents impacted by the fire need assistance making insurance claims; finding temporary accommodation for themselves, pets, and livestock; rebuilding or repairing damaged property; removing debris and burned trees; stabilizing the land for construction; mitigating potential flood damage; repairing infrastructure; reconnecting to utilities; and mitigating impacts to health. Oftentimes, physical impacts can be mitigated over time, but emotional impacts of the loss and change to surroundings are long-lasting and require support and compassion from the community.

## AFTER THE FIRE

### Returning Home

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

Avoid storm channels and arroyos as flash floods can be a potentially deadly hazard after a wildfire. Use extreme caution around trees, power poles, and any other tall objects that may have been weakened by the fire as they are at risk for falling. Keep a battery-powered radio on hand for emergency updates, reports of weather, and news updates (EMNRD Forestry Division and USFS 2022).

Even if the fire did not damage your house, do not expect to return to normal routines immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. Upon returning home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Request that the fire department or utility companies turn the utilities back on once the area is secured. Similarly, water supply systems may have been damaged; do not drink from the tap until you have been advised that it is safe to do so. Finally, keep a “fire watch”; look for smoke or sparks in houses and other buildings (EMNRD Forestry Division et al. 2022).

Note any changes of address with the U.S. Postal Service, banks, utilities, credit card companies, and newspapers. If you do stay elsewhere, try to locate any legal documents, medications, valuables, etc. before relocating (EMNRD Forestry Division et al. 2022).

## Insurance Claims

Your insurance agent is the best source of information for submitting a claim. It is recommended you take photographs of your home, of both the inside and outside, in preparation of an emergency. Keep the photographs in a safe place as this will make the insurance claim process easier when you need to show damage. Expenses incurred during the time you are forced to live elsewhere may be reimbursed, so be sure to keep all receipts. Do not start any repairs without the approval of your claims adjuster (EMNRD Forestry Division et al. 2022).

Natural disasters aren't always predictable, but there are steps homeowners can make to better prepare for an emergency.

- Review your insurance policy annually to see if your home is adequately insured
- Know your “loss of use” section—this section covers living expenses should your home become unlivable due to fire, smoke, or otherwise

You can view a guide on creating a home inventory here: <https://www.iii.org/article/how-create-home-inventory>

## Community Safety: Post-Fire Floods and Debris Flows

There are numerous natural hazards after a wildfire. Perhaps most dangerous are potential flash floods and landslides following rainfall in a burned area upstream from a community. Wildfires increase risk of flooding because burned soil is unable to absorb rainfall and it becomes hydrophobic. Even small rainfall can cause a flash flood, transporting debris and damaging homes and other structures. Listen and look for emergency updates, weather reports, and flash flood warnings. Develop an evacuation plan with your family and stay away from waterways, storm channels, and arroyos (EMNRD Forestry Division et al. 2022).

Checklists to prepare for flooding are available at: <https://www.afterwildfirenm.org/flood-information/before-the-flood-checklists>.

## Mobilizing Your Community

When your community is safe and capable of monitoring potential storms, coordination for recovery efforts can begin. Depending on community size, one person or a team of post-fire coordinators can be appointed to work directly with agencies or teams helping with wildfire response. It is important that this person have demonstrated management and computer skills, community knowledge, and experience with federal and state agencies. The post-fire coordinator(s) can delegate any identified recovery tasks or needs to volunteers; however, it may be helpful to specifically appoint a volunteer coordinator. Responsibilities of a volunteer coordinator include creating a volunteer database, recruitment, management, and coordination of community volunteers (EMNRD Forestry Division et al. 2022). The recovery coordinator should become familiar with representatives from local, state, and federal government agencies that will be helping with coordination or funding of post-fire recovery.

The following are resources may be helpful for the post-fire and volunteer coordinators (Coalition for the Upper South Platte [CUSP] 2016):

- New Mexico Department of Homeland Security and Management
- Federal Emergency Management Agency (FEMA)

- American Red Cross
- EMNRD Forestry Division
- Continuing Authorities Program & Emergency Flood Protection: U.S. Army Corps of Engineers
- Emergency Watershed Protection (EWP): Natural Resources Conservation Service (NRCS)
- Food Assistance and Farm Service Agency: USDA
- Forest Restoration Assistance: EMNRD Forestry Division
- Conservation Districts
- USFS
- NRCS, including Earth Team
- Disaster Distress Helpline

Any large wildfire will also involve an Incident Command System (ICS), an appropriately sized team assigned to aid in post-fire recovery. Learn more at <https://www.nps.gov/articles/wildland-fire-incident-command-system-levels.htm>.

The following should be considered when assessing community needs (EMNRD Forestry Division et al. 2022):

- Are there paid staff that will be dedicated to helping with recovery?
- Who is familiar with the ICS? Who has technical skills to help with post-fire treatments? Which community members will be able to write grants and apply for assistance? Who has accounting skills? Management skills?
- How much money will the community need? How can it be acquired?
- How will the community address immediate needs such as shelter, food, and health care? Counseling and mental health?

## Communication

After a team is assembled and immediate tasks are identified, find the best way to spread information in your community. You may distribute flyers, set up a voicemail box, work to find pets or livestock that have been displaced, develop a mailing list for property owners, hold regular public meetings, etc. It is important that a long-term communications plan is developed (CUSP 2016). Communication ideas include the following (EMNRD Forestry Division et al. 2022):

- Newspaper communications with emergency information (and phone numbers for emergency services) for flooding, landslides, and debris flows.
- Published information about ongoing flood and landslide mitigation projects.
- Information about safe flooding responses: stay out of cars and off roads, escape to dry land as soon as possible, do not attempt to cross flowing water.
- Remind residents to listen to weather reports and remain aware of rainfall. Be alert for changes in water flow and stay away from areas prone to landslides and flooding.
- Information regarding volunteer needs and planned repair projects.

## Post-Fire Rehabilitation and Resources

Wildfires that cause extensive damage necessitate dedicated efforts to avert issues afterwards. As aforementioned, loss of vegetation increases soil susceptibility to erosion; water runoff may increase and lead to flooding; sediments and debris may be transported downstream and damage properties or saturate reservoirs putting endangered species and water reserves at risk (EMNRD, Forestry Division 2020a). Following a fire, the primary priority is emergency stabilization to prevent additional damage to life, property, or natural resources. The soil stabilization work starts immediately and may proceed for up to a year. The rehabilitation effort to restore damage caused by the fire starts after the fire is out and may persist for various years. For the most part, rehabilitation efforts focus on the lands not likely to recover naturally from wildfire damage (USDA, Natural Resources Conservation Service, New Mexico 2022).

The USFS's post-fire emergency stabilization program is called the Burned Area Emergency Response (BAER) program. The goal of the BAER program is to discover post-wildfire threats to human life and safety, property, and critical natural or cultural resources on USFS lands and take appropriate actions to mitigate unacceptable risks (USFS 2010). BAER groups are composed of trained professionals in different fields: soil scientists, engineers, hydrologists, biologists, botanists, archaeologists, and others who quickly assess the burned area and advise emergency stabilization treatments.

The NRCS EWP program provides technical and financial services for watershed repair on **public (state and local) and private land**. The goal is reduced flood risk via funding and expert advice for land treatments. The EWP program can provide up to 75% of funds; remaining funds can be paid with in-kind volunteer labor (CUSP 2016). This funding is used by the State Emergency Rehabilitation Team (a multi-agency group assembled by the NRCS) to develop specific recovery and treatment plans.

Examples of potential treatments include (USFS 2021b):

- Hillside stabilization (for example, placing bundles of straw parallel to the slope to slow erosion)
- Hazard tree cutting
- Felling trees perpendicular to the slope contour to reduce runoff
- Mulching areas seeded with native vegetation
- Stream enhancements and construction of catchments to control erosion, runoff, and debris flows
- Planting or seeding native species to limit spread of invasive species

A comparison of potential hillside, channel, and road treatments is available at:

<https://www.afterwildfirenm.org/post-fire-treatments/which-treatment-do-i-use>

## Specific Treatment Details

### Hillslope Treatments

#### *Cover Applications:*

**Dry mulch:** provides immediate ground cover with mulch to reduce erosion and downstream flow.

**Wet mulch (hydromulch):** provides immediate cover to hold moisture and seeds on slopes using a combination of organic fibers, glue, suspension agents, and seeds (most effective on inaccessible slopes).



**Slash spreading:** provides ground cover to reduce erosion by felling trees in burned areas.

**Seeding:** reduces soil erosion over time with an application of native seed mixtures (most successful in combination with mulching). Breaking up and loosening topsoil to break down the hydrophobic layer on top of the soil is also effective.

### *Erosion Barrier Applications:*

**Erosion control mat:** organic mats staked on the soil surface to provide stability for vegetation establishment.

**Log erosion barrier:** trees felled perpendicular to the hillslope to slow runoff.

**Fiber rolls (wattles):** rolls placed perpendicular to the hillslope to reduce surface flows and reduce erosion.

**Silt fencing:** permeable fabric fencing installed parallel to the slope contour to trap sediment as water flows down the hillslope.

## Channel Treatments

**Check dam:** small dams built to trap and store sediment in stream channels.

**In-channel tree felling:** felling trees in a staggered pattern in a channel to trap debris and sediment.

**Grade stabilizer:** structures made of natural materials placed in ephemeral channels for stabilization.

**Stream bank armoring:** reinforcing streambanks with natural materials to reduce bank cutting during stream flow.

**Channel deflector:** an engineered structure to direct flow away from unstable banks or nearby roads.

**Debris basin:** constructed to store large amounts of sediment moving in a stream channel.

## Road and Trail Treatments

**Outsloping and rolling dips (water bars):** alter the road shape or template to disperse water and reduce erosion.

**Overflow structures:** protect the road by controlling runoff and diverting stream flow to constructed channels.

**Low water stream crossing:** culverts replaced by natural fords to prevent stream diversion and keep water in the natural channel.

**Culvert modification:** upgrading culvert size to prevent road damage.

**Debris rack and deflectors:** structure placed in a stream channel to collect debris before reaching a culvert.

**Riser pipes:** filter out debris and allow the passage of water in stream channels.

**Catchment-basin cleanout:** using machinery to clean debris and sediment out of stream channels and catchment basins.

**Trail stabilization:** constructing water bars and spillways to provide drainage away from the trail surface.

These treatments and descriptions are further detailed at: <https://afterwildfirenm.org/post-fire-treatments/treatment-descriptions>

For more information about how to install and build treatments, see the Wildfire Restoration Handbook at: [https://www.rmfi.org/sites/default/files/hero-content-files/Fire-Restoration-HandbookDraft\\_2015\\_2.compressed\\_0.pdf](https://www.rmfi.org/sites/default/files/hero-content-files/Fire-Restoration-HandbookDraft_2015_2.compressed_0.pdf)

## Timber Salvage

Many private landowners may decide to harvest trees killed in the fire, a decision that can be highly controversial. Any remaining trees post-fire can be instrumental for soil and wildlife habitat recovery. Furthermore, burned soils are especially susceptible to soil compaction and erosion. Therefore, timber salvage must be performed by professionals. Several programs assist landowners with timber salvage, including the NRCS Environmental Quality Incentives Program (EQIP) (CUSP 2016).

## Invasive Species Management and Native Revegetation

Wildfire provides opportunity for many invasive species to dominate the landscape because many of these species thrive on recently burned landscapes. It is imperative that landowners prevent invasive establishment by eradicating weeds early, planting native species, and limiting invasive seed dispersal (CUSP 2016).

Planting native seeds is an economical way to restore a disturbed landscape. Vegetation provides protection against erosion and stabilizes exposed soils. In order to be successful, seeds must be planted during the proper time of year and using correct techniques. Use a native seed mixture with a diversity of species and consider the species' ability to compete with invasive species. Before planting, the seedbed must be prepared with topsoil and by raking to break up the hydrophobic soil layer. If you choose to transplant or plant native species, consider whether the landscape has made a sufficient recovery to ensure the safety of the individuals (CUSP 2016).

## Long-Term Community Recovery

On non-federal land, recovery efforts are the responsibility of local governments and private landowners. Challenges associated with long-term recovery include homes that were severely damaged or were saved but are located in high-severity burn areas. Furthermore, homes saved but located on unstable slopes or in areas in danger of flooding or landslides present a more complicated challenge. Economically, essential businesses that were burned or were otherwise forced to close pose a challenge to communities of all sizes. Given these complications, rebuilding and recovery efforts can last for years, with invasive species control and ecosystem restoration lasting even longer (CUSP 2016). It is critical that a long-term plan is in place and there is sufficient funding and support for all necessary ecosystem and community recovery. To learn about more post-fire recovery resources, visit the After the Flames website here: <https://aftertheflames.com/resources/>.

Additional information relating to actions before, during, and after a wildfire can be found here: <https://www.cabq.gov/fire/safety-information/wildfire-safety/before-during-and-after-a-wildfire>

Additional resources regarding post-fire return and recovery can be found in Appendix G.

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## CHAPTER 5 – MONITORING AND EVALUATION

Developing an action plan and an assessment strategy that identifies roles and responsibilities, funding needs, and timetables for completing highest-priority projects is an important step in organizing the implementation of the Bernalillo County CWPP. The previous chapter identifies tentative timelines and monitoring protocols for project recommendations, the details of which are outlined below.

All stakeholders and signatories to this CWPP desire worthwhile outcomes. It is also known that risk reduction work on the ground, for the most part, is often not attainable in a few months—or even years. The amount of money and effort invested in implementing a plan such as this requires that there be a means to describe, quantitatively and/or qualitatively, if the goals and objectives expressed in this plan are being accomplished according to expectations.

Monitoring and reporting contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base about how natural resource management decisions affect both the environment and the people who live in it. Furthermore, as the CWPP evolves over time, there may be a need to track changes in policy, requirements, stakeholder changes, and levels of preparedness. These can be significant for any future revisions and/or addendums to the CWPP.

It is recommended that project monitoring be a collaborative effort. There are many resources for designing and implementing community based, multi-party monitoring that could support and further inform a basic monitoring program for the CWPP (Egan 2013). Multi-party monitoring involves a diverse group consisting of community members, community-based groups, regional and national interest groups, and public agencies. Using this multi-party approach increases community understanding of the effects of restoration efforts and trust among restoration partners. Multi-party monitoring may be more time consuming due to the collaborative nature of the work; therefore, a clear and concise monitoring plan must be developed.

Table 5.1 Identifies monitoring strategies for various aspects of all categories of CWPP recommendations and the effects of their implementation, both quantifiable and non-quantifiable, for assessing the progress of the CWPP and increase sustainability of projects. It must be emphasized that these strategies are 1) not exhaustive and 2) dependent on available funds and personnel to implement them.



**Table 5.1. Recommended Monitoring Strategies**

Strategy	Task/Tool	Lead	Remarks
Project tracking system	On-line web app to track hazardous fuels projects spatially, integrating wildfire risk layer to show progress towards wildfire hazard and risk reduction. Web app would include attribute tables that outline project details	County	Interactive tool will be easily updated and identify areas that require additional efforts
Photographic record (documents pre- and post-fuels reduction work, evacuation routes, workshops, classes, field trips, changes in open space, treatment type, etc.)	Establish field global positioning system (GPS) location; photo points of cardinal directions; keep photos protected in archival location	Core Team member	Relatively low cost; repeatable over time; used for programs and tracking objectives
Number of acres treated (by fuel type, treatment method)	GPS/GIS/fire behavior prediction system	Core Team member	Evaluating costs, potential fire behavior
Number of home ignition zones/defensible space treated to reduce structural ignitability	GPS	Homeowner	Structure protection
Number of residents/citizens participating in any CWPP projects and events	Meetings, media interviews, articles	Core Team member	Evaluate culture change objective
Number of homeowner contacts (brochures, flyers, posters, etc.)	Visits, phone	Agency representative	Evaluate objective
Number of jobs created	Contracts and grants	Core Team member	Evaluate local job growth
Education outreach: number, kinds of involvement	Workshops, classes, field trips, signage	Core Team member	Evaluate objectives
Emergency management: changes in agency response capacity	Collaboration	Agency representative	Evaluate mutual aid
Codes and policy changes affecting CWPP	Qualitative	Core Team	CWPP changes
Number of stakeholders	Added or dropped	Core Team	CWPP changes
Wildfire acres burned, human injuries/fatalities, infrastructure loss, environmental damage, suppression, and rehabilitation costs	Wildfire records	Core Team	Compare with 5- or 10-year average

## FUELS TREATMENT MONITORING

It is important to evaluate whether fuel treatments have accomplished their defined objectives and whether any unexpected outcomes have occurred.

The strategies outlined in this section consider several variables:

- Do the priorities identified for treatment reflect the goals stated in the plan? Monitoring protocols can help address this question.

- Can there be ecological consequences associated with fuels work? Items to consider include soil movement and/or invasive species encroachment post-treatment. Relatively cost-effective monitoring may help reduce long term costs and consequences.
- Vegetation will grow back. Thus, fuel break maintenance and fuels modification in both the home ignition zone and at the landscape scale require periodic assessment. Monitoring these changes can help decision-makers identify appropriate treatment intervals.
- Monitoring for all types of fuels treatment is recommended. For example, in addition to monitoring mechanical treatments, it is important to carry out comprehensive monitoring of burned areas to establish the success of pre-fire fuels reduction treatments on fire behavior, as well as monitoring for ecological impacts, repercussions of burning on wildlife, and effects on soil chemistry and physics. Adaptive management is a term that refers to adjusting future management based on the effects of past management. Monitoring is required to gather the information necessary to inform future management decisions. Economic and legal questions may also be addressed through monitoring. In addition, monitoring activities can provide valuable educational opportunities for students.

The monitoring of each fuels reduction project would be site-specific, and decisions regarding the timeline for monitoring and the type of monitoring to be used would be determined by project. The most important part of choosing a fuels project monitoring program is selecting a method appropriate to the people, place, and type of project. Several levels of monitoring activities meet different objectives, have different levels of time intensity, and are appropriate for different groups of people. They include the following:

**Minimum—Level 1:** Pre- and Post-project Photographs

Appropriate for many individual homeowners who conduct fuels reduction projects on their properties.

**Moderate—Level 2:** Multiple Permanent Photo Points

Permanent photo locations are established using rebar or wood posts, global positioning system (GPS)-recorded locations, and photographs taken on a regular basis. Ideally, this process would continue over several years. This approach might be appropriate for more enthusiastic homeowners or for agencies conducting small-scale, general treatments.

**High—Level 3:** Basic Vegetation Plots

A series of plots can allow monitors to evaluate vegetation characteristics such as species composition, percentage of cover, and frequency. Monitors then can record site characteristics such as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols based on the types of vegetation present and the level of detail needed to analyze the management objectives. This method is appropriate for foresters or other personnel monitoring fuel treatments on forested lands.

**Intense—Level 4:** Basic Vegetation Plus Dead and Downed Fuels Inventory

The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974), an appropriate photo series (Ottmar et al. 2000), or fire monitoring (Fire Effects Monitoring and Inventory System [FIREMON]) plots. This method is ideal for foresters or university researchers tracking vegetation changes in forested lands.

## IMPLEMENTATION

The Bernalillo County CWPP makes recommendations for prioritized fuels reduction projects, for measures to reduce structural ignitability, and methods with which carry out public education and outreach. Implementation projects need to be tailored to the specific project and will be unique to the location depending on available resources and regulations. As aforementioned, on-the-ground implementation of the recommendations in the Bernalillo County CWPP planning area will require development of a 1- to 2-year action plan and assessment strategy for completing each project that can be easily updated during the life of the CWPP in order to plan, implement, track, and report on progress made. The Core Team should commit to no less than annual review in regard to the action plan. This step will identify the roles and responsibilities of the people and agencies involved, as well as funding needs and timetables for completing the highest-priority projects (SAF 2004). During updates to the plan, CWPP developers should ensure that community-level plans reflect and align with the objectives and goals of the overarching countywide plan and other neighboring CWPPs.

Furthermore, outside of, or in addition to, the Core Team that developed the CWPP, there should be a community-based action plan team that carries the CWPP actions forward.

Information pertaining to funding is provided in Appendix F.

## PROJECT TRACKER

Within the Hub Site is a project tracking system designed to provide real-time updates and the ability for multi-agency coordination and collaboration. The tracking system is available for internal use and comes with the following features:

- Project database
- Project entries and sub-entries into the database
- Funding tracking
- Milestone and goal tracking
- Project constraint/opportunity tracking
- Project progress tracking
- Agency delegation
- Attach images or other files to project records
- Spatially delineated project locations/working areas

Externally, the project tracker holds the ability to display statistics to the public, such as acres treated, dollars spent, or number of meetings held.

## CWPP EVALUATION

CWPPs are intended to reduce the risk from wildfire for a community and surrounding environment. However, over time, communities change and expand, vegetation grows back, and forests and wildlands evolve. As such, the risk of wildfire to communities is constantly changing. The plans and methods to

reduce risk must be dynamic to keep pace with the changing environment. An evaluation of the CWPP will gather information and identify whether the plans and strategies are on course to meet the desired outcomes or if modifications are needed to meet expectations.

Four general steps can be used to evaluate the CWPP:

6. Identify objectives: What are the goals identified in the plan? How are they reached? Is the plan performing as intended?
  - a. Structural ignitability
  - b. Fuel treatments
  - c. Public education and outreach
  - d. Multi-agency collaboration
  - e. Emergency response
7. Assess the changing environment: How have population characteristics and the wildfire environment changed?
  - a. Population change
    - i. Increase or decrease
    - ii. Demographics
  - b. Population settlement patterns
    - i. Distribution
    - ii. Expansion into the WUI
  - c. Vegetation
    - i. Fuel quantity and type
    - ii. Drought and disease impacts
8. Review action items: Are actions consistent with the plan's objectives?
  - a. Check for status, i.e., completed/started/not started
  - b. Identify completed work and accomplishments
  - c. Identify challenges and limitations
  - d. Identify next steps
9. Assess results: What are the outcomes of the action items?
  - a. Multi-agency collaboration
    - i. Who was involved in the development of the CWPP?
    - ii. Have partners involved in the development process remained involved in the implementation?
    - iii. How has the planning process promoted implementation of the CWPP?
    - iv. Have CWPP partnerships and collaboration had a beneficial impact on the community?
  - b. Risk assessment
    - i. How is the risk assessment utilized to make decisions about fuel treatment priorities?
    - ii. Have there been new wildfire-related regulations?



- iii. Are at-risk communities involved in mitigating wildfire risk?
- c. Hazardous fuels
  - i. How many acres have been treated?
  - ii. How many projects are cross-boundary?
  - iii. How many residents have participated in creating defensible space?
- d. Structural ignitability
  - i. Have there been updates to fire codes and ordinances?
  - ii. How many structures have been lost to wildfire?
  - iii. Has the CWPP increased public awareness of structural ignitability and reduction strategies?
- e. Public education and outreach
  - i. Has public awareness of wildfire and mitigation strategies increased?
  - ii. Have residents been involved in wildfire mitigation activities?
  - iii. Has there been public involvement?
  - iv. Have vulnerable populations been involved?
- f. Emergency response
  - i. Has the CWPP been integrated into relevant plans (e.g., hazard mitigation or emergency operations)?
  - ii. Is the CWPP congruent with other hazard mitigation planning efforts?
  - iii. Has availability and capacity of local fire departments changed since the CWPP was developed?

## TIMELINE FOR UPDATING THE CWPP

The HFRA allows for maximum flexibility in the CWPP planning process, permitting the Core Team to determine the time frame for updating the CWPP. However, it is suggested that a formal revision be made on the fifth anniversary of signing and every 5 years following. The Core Team members are encouraged to meet on an annual basis to review the project list, discuss project successes, and strategize regarding project implementation funding.

## ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
AMMs	avoidance and minimization measures
AFR	Albuquerque Fire Rescue
ATV	all-terrain vehicle
BAER	Burned Area Emergency Rehabilitation
BCFR	Bernalillo County Fire & Rescue
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
BTU/ft/sec	British Thermal Units per foot per second
CAR	community at risk
CE	categorical exemption
ch/hr	chains per hour
Cibola NF	Cibola National Forest
CIG	Conservation Innovation Grants
Cohesive Strategy	National Cohesive Wildland Fire Management Strategy
County	Bernalillo County
CRS	Congressional Research Service
CUSP	Coalition for the Upper South Platte
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
DEM	digital elevation model
DHS	Department of Homeland Security
DOI	U.S. Department of the Interior
EAS	Emergency Alert System
EIR	Environmental Impact Report
EMNRD	New Mexico Energy, Minerals, and Natural Resources Department
EMS	Emergency Management System
EPA	U.S. Environmental Protection Agency
EOC	Emergency Operations Center
EQIP	Environmental Quality Incentives Program
ESRI	Environmental Systems Research Institute
EWP	Emergency Watershed Protection

FAC	Fire-adapted Community
FACNM	Fire Adapted Communities New Mexico
FAWRA	Forest and Watershed Restoration Act
FEMA	Federal Emergency Management Agency
FLAME	Federal Land Assistance, Management and Enhancement Act
FP&S	Fire Prevention and Safety
FRA	Federal Responsibility Area
FRI	fire return interval
FSG	Forest Stewards Guild
GAID	Geographic Area Interagency Division
GIS	geographic information system
GPS	global positioning system
HFRA	Healthy Forests Restoration Act
HIZ	home ignition zone
HMP	hazard mitigation plan
HVRA	highly valued resource or asset
ICC	International Code Council
ICS	Incident Command System
IFTDSS	Interagency Fuel Treatment Decision Support System
IMAS	Interstate Mutual Aid System
IPAWS	Integrated Public Alert & Warning System
ISO	Insurance Services Office
KAFB	Kirtland Air Force Base
LRA	Local Responsibility Area
MFI	mean fire interval
MND	mitigated negative declaration
NEPA	National Environmental Policy Act
ND	negative declaration
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group

OES	Office of Emergency Services
PERI	Public Entity Risk Institute
PPE	personal protective equipment
RAWS	remote automated weather station
RFA	Rural Fire Assistance
SAF	Society of American Foresters
SAFER	Staffing for Adequate Fire and Emergency Response
SE	statutory exemption
SHPO	State Historic Preservation Office
SRA	State Responsibility Area
SWCA	SWCA Environmental Consultants
SWCC	Southwest Coordination Center
SWCD	Soil and Water Conservation District
ULI	Urban Land Institute
USDA	U.S. Department of Agriculture
USFA	U.S. Fire Administration
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VAR	value at risk
VCC	Vegetation Condition Class
VDEP	Vegetation Departure
WFDSS	Wildland Fire Decision Support System
WRSC	Western Regional Strategy Committee
WUI	wildland urban interface

## GLOSSARY

**Aspect:** Cardinal direction toward which a slope faces in relation to the sun (NWCG 2021b).

**Active Crown Fire:** A crown fire in which the entire fuel complex is involved in flame, but the crowning phase remains dependent on heat released from surface fuel for continued spread. An active crown fire presents a solid wall of flame from the surface through the canopy fuel layers. Flames appear to emanate from the canopy as a whole rather than from individual trees within the canopy. Active crown fire is one of several types of crown fire and is contrasted with **passive crown fires**, which are less vigorous types of crown fire that do not emit continuous, solid flames from the canopy (SWCA Environmental Consultants [SWCA]).

**Available Canopy Fuel:** The mass of canopy fuel per unit area consumed in a crown fire. There is no post-frontal combustion in canopy fuels, so only fine canopy fuels are consumed. We assume that only the foliage and a small fraction of the branchwood is available (Wooten 2021).

**Available Fuel:** The total mass of ground, surface and canopy fuel per unit area available fuel consumed by a fire, including fuels consumed in postfrontal combustion of duff, organic soils, and large woody fuels (Wooten 2021).

**Backfiring:** Intentionally setting fire to fuels inside a control line to contain a fire (Wooten 2021).

**Biomass:** Organic material. Also refers to the weight of organic material (e. g. biomass roots, branches, needles, and leaves) within a given ecosystem (Wooten 2021).

**Burn Severity:** A qualitative assessment of the heat pulse directed toward the ground during a fire. Burn severity relates to soil heating, large fuel and duff consumption, consumption of the litter and organic layer beneath trees and isolated shrubs, and mortality of buried plant parts (SWCA).

**Canopy:** The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result (SWCA).

**Chain:** Unit of measure in land survey, equal to 66 feet (20 M) (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances. Popular in fire management because of its convenience in calculating acreage (example: 10 square chains equal one acre) (New Mexico Future Farmers of America 2010).

**Climate Adaptation:** Adaptation is an adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (California Governor's Office of Planning and Research [CA GOPR] 2020).

**Climate Change:** A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (CA GOPR 2020).

**Community Assessment:** An analysis designed to identify factors that increase the potential and/or severity of undesirable fire outcomes in wildland urban interface communities (SWCA).

**Communities at Risk:** Defined by the HFRA as "Wildland-Urban Interface Communities within the vicinity of federal lands that are at high risk from wildfire."



**Community Emergency Response Team (CERT):** The CERT program educates volunteers about disaster preparedness for the hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT offers a consistent, nationwide approach to volunteer training and organization that professional responders can rely on during disaster situations, allowing them to focus on more complex tasks (Ready 2021).

**Community Wildfire Protection Plan (CWPP):** A planning document that seeks to reduce the threat to life and property from wildfire by identifying and mitigating wildfire hazards to communities and infrastructure located in the wildland urban interface (WUI). Developed from the HFRA, a CWPP addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection (SWCA).

**Conditional Surface Fire:** A potential type of fire in which conditions for sustained conditional surface fire active crown fire spread are met but conditions for crown fire initiation are not. If the fire begins as a surface fire, then it is expected to remain so. If it begins as an active crown fire in an adjacent stand, then it may continue to spread as an active crown fire (Wooten 2021).

**Contain:** A tactical point at which a fire's spread is stopped by and within specific contain features, constructed or natural; also, the result of stopping a fire's spread so that no further spread is expected under foreseeable conditions. For reporting purposes, the time and date of containment. This term no longer has a strategic meaning in Federal wildland fire policy (Wooten 2021).

**Control:** To construct fireline or use natural features to surround a fire and any control spot fires therefrom and reduce its burning potential to a point that it no longer threatens further spread or resource damage under foreseeable conditions. For reporting purposes, the time and date of control. This term no longer has a strategic meaning in Federal wildland fire policy (Wooten 2021).

**Cover Type:** The type of vegetation (or lack of it) growing on an area, based on cover type minimum and maximum percent cover of the dominant species, species group or non-living land cover (such as water, rock, etc.). The cover type defines both a qualitative aspect (the dominant cover type) as well as a quantitative aspect (the abundance of the predominant features of that cover type; Wooten 2021).

**Creeping Fire:** A low-intensity fire with a negligible rate of spread (Wooten 2021).

**Crown Fire:** A fire that advances at great speed from crown to crown in tree canopies, often well in advance of the fire on the ground (National Geographic 2021).

**Defensible Space:** An area around a structure where fuels and vegetation are modified, cleared, or reduced to slow the spread of wildfire toward or from a structure. The design and distance of the defensible space is based on fuels, topography, and the design/materials used in the construction of the structure (SWCA).

**Duff:** The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil (SWCA).

**Ecosystem:** An interacting natural system including all the component organisms together with the abiotic environment and processes affecting them (SWCA).

**Environmental Conditions:** That part of the fire environment that undergoes short-term changes: weather, which is most commonly manifest as windspeed, and dead fuel moisture content (Wooten 2021).

**Escape Route:** A preplanned and understood route firefighters take to move to a safety zone or other low-risk area. When escape routes deviate from a defined physical path, they should be clearly marked (flagged; SWCA).

**Evacuation:** The temporary movement of people and their possessions from locations threatened by wildfire (SWCA).

**Fire-Adapted Community:** A fire-adapted community collaborates to identify its wildfire risk and works collectively on actionable steps to reduce its risk of loss. This work protects property and increases the safety of firefighters and residents (USFA 2021b).

**Fire Behavior:** The manner in which fuel ignites, flame develops, and fire spread and exhibits other related phenomena as determined by the interaction of fuels, weather, and topography (Fire Research and Management Exchange System 2021).

**Fire Break:** Areas where vegetation and organic matter are removed down to mineral soil (SWCA).

**Fire Environment:** The characteristics of a site that influence fire behavior. In fire modeling the fire environment is described by surface and canopy fuel characteristics, windspeed and direction, relative humidity, and slope steepness (Wooten 2021).

**Fire Frequency:** A broad measure of the rate of fire occurrence in a particular area. For historical analyses, fire frequency is often expressed using the fire return interval calculation. For modern-era analyses, where data on timing and size of fires are recorded, fire frequency is often best expressed using fire rotation (SWCA).

**Fire Hazard:** Fire hazard is the potential fire behavior or fire intensity in an area, given the type(s) of fuel present – including both the natural and built environment – and their combustibility (CA GOPR 2020).

**Fire History:** The chronological record of the occurrence of fire in an ecosystem or at a specific site. The fire history of an area may inform planners and residents about the level of wildfire hazard in that area (SWCA).

**Fire Intensity:** A general term relating to the heat energy released in a fire (SWCA).

**Fireline Intensity:** Amount of heat release per unit time per unit length of fire front. Numerically, the product of the heat of combustion, quantity of fuel consumed per unit area in the fire front, and the rate of spread of a fire, expressed in kilowatts per minute (SWCA). This expression is commonly used to describe the power of wildland fires, but it does not necessarily follow that the severity, defined as the vegetation mortality, will be correspondingly high (Wooten 2021).

**Fire Prevention:** Activities such as public education, community outreach, planning, building code enforcement, engineering (construction standards), and reduction of fuel hazards that is intended to reduce the incidence of unwanted human-caused wildfires and the risks they pose to life, property or resources (CA GOPR 2020).

**Fire Regime:** A measure of the general pattern of fire frequency and severity typical to a particular area or type of landscape: The regime can include other metrics of the fire, including seasonality and typical fire size, as well as a measure of the pattern of variability in characteristics (SWCA).

**Fire Regime Condition Class:** Condition classes are a function of the degree of fire regime condition class departure from historical fire regimes resulting in alterations of key ecosystem components such as composition structural stage, stand age, and canopy closure (Wooten 2021).

**Fire Return Interval:** Number of years (interval) between two successive fires in a designated area (SWCA).

**Fire Severity:** A qualitative measure of the immediate effects of fire on the fire severity ecosystem. It relates to the extent of mortality and survival of plant and animal life both aboveground and belowground and to loss of organic matter. It is determined by heat released aboveground and belowground. Fire Severity is dependent on intensity and residence dependent of the burn. For trees, severity is often measured as percentage of basal area removed. An intense fire may not necessarily be severe (Wooten 2021).

**Fire Risk:** “Risk” takes into account the intensity and likelihood of a fire event to occur as well as the chance, whether high or low, that a hazard such as a wildfire will cause harm. Fire risk can be determined by identifying the susceptibility of a value or asset to the potential direct or indirect impacts of wildfire hazard events (CA GOPR 2020).

**Flammability:** The relative ease with which fuels ignite and burn regardless of the quantity of the fuels (SWCA).

**Flame Length:** The length of flames in the propagating fire front measured along the slant of the flame from the midpoint of its base to its tip. It is mathematically related to fireline intensity and tree crown scorch height (Wooten 2021).

**Foliar Moisture content:** Moisture content (dry weight basis) of live foliage, foliar moisture content expressed as a percent. Effective foliar moisture content incorporates the moisture content of other canopy fuels such as lichen, dead foliage, and live and dead branchwood (Wooten 2021).

**Forest Fire:** uncontrolled burning of a woodland area (National Geographic 2021).

**Fuel Break:** A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled (NWCG 2021c).

**Fuel Complex:** The combination of ground, surface, and canopy fuel strata (Wooten 2021).

**Fuel Condition:** Relative flammability of fuel as determined by fuel type and environmental conditions (SWCA).

**Fuel Continuity:** A qualitative description of the distribution of fuel both horizontally and vertically. Continuous fuels readily support fire spread. The larger the fuel discontinuity, the greater the fire intensity required for fire spread (Wooten 2021).

**Fuel Loading:** The volume of fuel in a given area generally expressed in tons per acre (SWCA). Dead woody fuel loadings are commonly described for small material in diameter classes of 0 to 0.25, 0.25 to 1, and 1 to 3 inches and for large material greater than 3 inches (Wooten 2021).

**Fuel Management/Fuel Reduction:** Manipulation or removal of fuels to reduce the likelihood of ignition and to reduce potential damage in case of a wildfire. Fuel reduction methods include prescribed fire, mechanical treatments (mowing, chopping), herbicides, biomass removal (thinning or harvesting or trees, harvesting of pine straw), and grazing. Fuel management techniques may sometimes be combined for greater effect (SWCA).

**Fuel Model:** A set of surface fuel bed characteristics (load and surface-area-to- fuel model volume-ratio by size class, heat content, and depth) organized for input to a fire model (Wooten 2021).

**Fuel Modification:** The manipulation or removal of fuels (i.e., combustible biomass such as wood, leaves, grass, or other vegetation) to reduce the likelihood of igniting and to reduce fire intensity. Fuel modification activities may include lopping, chipping, crushing, piling and burning, including prescribed burning. These activities may be performed using mechanical treatments or by hand crews. Herbicides and prescribed herbivory (grazing) may also be used in some cases. Fuel modification may also sometimes be referred to as “vegetation treatment” (CA GOPR 2020).

**Fuel Moisture Content:** This is expressed as a percent or fraction of oven dry fuel moisture content weight of fuel. It is the most important fuel property controlling flammability. In living plants, it is physiologically bound. Its daily fluctuations vary considerably by species but are usually above 80 to 100 percent. As plants mature, moisture content decreases. When herbaceous plants cure, their moisture content responds as dead fuel moisture content, which fluctuates according to changes in temperature, humidity, and precipitation (Wooten 2021).

**Fuel Treatment:** The manipulation or removal of fuels to minimize the probability of ignition and/or to reduce potential damage and resistance to fire suppression activities (NWCG 2021d). Synonymous with fuel modification.

**Grazing:** There are two types of grazing: (1) traditional grazing, and (2) targeted grazing. Traditional grazing refers to cattle that are managed in extensive pastures to produce meat. Targeted grazing involves having livestock graze at a specific density for a given period of time for the purpose of managing vegetation. Even though both kinds of grazing manage fuel loading in range- and forested lands, targeted grazing is different in that its sole purpose is to manage fuels. Targeted grazing is done by a variety of livestock species such as sheep, goats, or cows (University of California, Agriculture and Natural Resources [UCANR] 2019).

**Ground Fire:** Fire that burns organic matter in the soil, or humus; usually does not appear at the surface (National Geographic 2021).

**Ground Fuels:** Fuels that lie beneath surface fuels, such as organic soils, duff, decomposing litter, buried logs, roots, and the below-surface portion of stumps (Wooten 2021).

**Hazard:** A “hazard” can be defined generally as an event that could cause harm or damage to human health, safety, or property (CA GOPR 2020).

**Hazardous Areas:** Those wildland areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems (SWCA).

**Hazardous Fuels:** A fuel complex defined by type, arrangement, volume, condition, and location that poses a threat of ignition and resistance to fire suppression (NWCG 2021e).

**Hazardous Fuels Reduction:** Any strategy that reduces the amount of flammable material in a fire-prone ecosystem. Two common strategies are mechanical thinning and controlled burning (Wooten 2021).

**Hazard Reduction:** Any treatment that reduces the threat of ignition and spread of fire (SWCA).

**Highly Valued Resources and Assets:** Landscape features that are influenced positively and/or negatively by fire. Resources are naturally occurring, while Assets are human-made (IFTDSS 2021).

**Ignition:** The action of setting something on fire or starting to burn (SWCA).

**Incident:** An occurrence or event, either natural or person-caused, which requires an emergency response to prevent loss of life or damage to property or natural resources (Wooten 2021).

**Influence Zone:** An area that, with respect to wildland and urban fire, has a set of conditions that facilitate the opportunity for fire to burn from wildland fuels to the home and or structure ignition zone (NWCG 2021a).

**Initial Attack:** The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire (SWCA).

**Invasive Species:** An introduced, nonnative organism (disease, parasite, plant, or animal) that begins to spread or expand its range from the site of its original introduction and that has the potential to cause harm to the environment, the economy, or to human health (USGS 2021).

**Ladder Fuels:** Fuels that provide vertical continuity allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease (SWCA).

**Litter:** Recently fallen plant material that is only partially decomposed and is still discernible (SWCA).

**Manual Treatments:** Felling and piling of fuels done by hand. The volume of material generated from a manual fuel treatment is typically too small to warrant a biomass sale therefore collected material is disposed of by burning or chipping. The work can be performed by either a single individual or a large organized crew with powered equipment (UCANR 2021a).

**Mechanized Treatments:** Mechanical treatments pulverize large continuous patches of fuel to reduce the volume and continuity of material. Mechanical treatments can be applied as either mastication or chipping treatments. Both treatments shred woody material, but mastication leaves residue on-site while chipping collects the particles for transportation off site. Similar to hand treatments, mechanical treatments can target specific areas and vegetation while excluding areas of concern. In addition, mechanical treatment is easily scalable to large areas (>30 acres) with little added cost (UCANR 2021b).

**Mitigation:** Action that moderates the severity of a fire hazard or risk (SWCA).

**Mutual Aid:** Assistance in firefighting or investigation by fire agencies, irrespective of jurisdictional boundaries (NWCG 2021f).

**Native Revegetation:** The process of replanting and rebuilding the soil of disturbed land (e.g., burned) with native plant species (USDA 2005).

**Native Species:** A species that evolved naturally in the habitat, ecosystem, or region as determined by climate, soil, and biotic factors (USDA 2005).

**National Cohesive Strategy:** The National Cohesive Wildland Fire Management Strategy is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress toward three goals:

- Resilient Landscapes
- Fire-Adapted Communities
- Safe and Effective Wildfire Response

*Vision:* To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire (Forests and Rangelands 2021).

**Overstory:** That portion of the trees in a forest which forms the upper or uppermost layer (SWCA).



**Passive Crown Fire:** A type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire encompasses a wide range of crown fire behavior, from occasional torching of isolated trees to nearly active crown fire. Passive crown fire is also called torching or candling. A fire in the crowns of the trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface (SWCA).

**Prescribed Burning:** Any fire ignited by management actions under specific, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. Usually, a written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition (USFS 2021c).

**Rate of Spread:** The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually, it is expressed in chains or acres per hour for a specific period in the fire's history (NWCG 2021g).

**Resilience:** Resilience is the capacity of any entity – an individual, a community, an organization, or a natural system – to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience (CA GOPR 2020).

**Response:** Movement of an individual firefighting resource from its assigned standby location to another location or to an incident in reaction to dispatch orders or to a reported alarm (SWCA).

**Safety Element:** One of the seven mandatory elements of a local general plan (a county plan that forms the foundation for future development), the safety element must identify hazards and hazard abatement provisions to guide local decisions related to zoning, subdivisions, and entitlement permits. The element should contain general hazard and risk reduction strategies and policies supporting hazard mitigation measures (CA GOPR 2020).

**Slash:** Debris left after logging, pruning, thinning, or brush cutting. Slash includes logs, chips, bark, branches, stumps, and broken trees or brush that may be fuel for a wildfire (SWCA).

**Slope Percent:** The ratio between the amount of vertical rise of a slope and horizontal distance as expressed in a percent. One hundred feet of rise to 100 feet of horizontal distance equals 100 percent (NWCG 2021h).

**Suppression:** The most aggressive fire protection strategy, it leads to the total extinguishment of a fire (SWCA).

**Surface Fire:** fire that typically burns only surface litter and undergrowth (National Geographic 2021).

**Surface Fuel:** Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants (SWCA).

**Structural Ignitability:** The ability of structures (such as homes or fences) to catch fire (SWCA).

**Topography:** The arrangement of the natural and artificial physical features of an area (SWCA).

**Total Fuel Load:** The mass of fuel per unit area that could possibly be consumed in a hypothetical fire of the highest intensity in the driest fuels (Wooten 2021).

**Tree Crown:** The primary and secondary branches growing out from the main stem, together with twigs and foliage (SWCA).

**Understory:** Low-growing vegetation (herbaceous, brush or reproduction) growing under a stand of trees. Also, that portion of trees in a forest stand below the overstory (SWCA).

**Understory Fire:** A fire burning in the understory, more intense than a surface fire with flame lengths of 1 to 3 m (Wooten 2021).

**Values and Assets at Risk:** The elements of a community or natural area considered valuable by an individual or community that could be negatively impacted by a wildfire or wildfire operations. These values can vary by community and can include public and private assets (natural and manmade) -- such as homes, specific structures, water supply, power grids, natural and cultural resources, community infrastructure-- as well as other economic, environmental, and social values (CA GOPR 2020).

**Vulnerable Community:** Vulnerable communities experience heightened risk and increased sensitivity to natural hazard and climate change impacts and have less capacity and fewer resources to cope with, adapt to, or recover from the impacts of natural hazards and increasingly severe hazard events because of climate change. These disproportionate effects are caused by physical (built and environmental), social, political, and/ or economic factor(s), which are exacerbated by climate impacts. These factors include, but are not limited to, race, class, sexual orientation and identification, national origin, and income inequality (CA GOPR 2020).

**Wildfire:** A “wildfire” can be generally defined as any unplanned fire in a “wildland” area or in the wildland-urban interface (WUI) (CA GOPR 2020).

**Wildfire Exposure:** During fire suppression activities, an exposure is any area/property that is threatened by the initial fire, but in National Fire Incident Reporting System (NFIRS) a reportable exposure is any fire that is caused by another fire, i.e., a fire resulting from another fire outside that building, structure, or vehicle, or a fire that extends to an outside property from a building, structure, or vehicle (USFA 2020).

**Wildfire Influence Zone:** A wildland area with susceptible vegetation up to 1.5 miles from the interface or intermix WUI (CA GOPR 2020).

**Wildland:** Those unincorporated areas covered wholly or in part by trees, brush, grass, or other flammable vegetation (CA GOPR 2020).

**Wildland Fire:** Fire that occurs in the wildland as the result of an unplanned ignition (CA GOPR 2020).

**Wildland Fuels (aka fuels):** Fuel is the material that is burning. It can be any kind of combustible material, especially petroleum-based products, and wildland fuels. For wildland fire, it is usually live, or dead plant material, but can also include artificial materials such as houses, sheds, fences, pipelines, and trash piles. In terms of vegetation, there are 6 wildland fuel types (Fuel Type: An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.) The 6 wildland fuel types are (NWCG 2021i):

- Grass
- Shrub
- Grass-Shrub
- Timber Litter
- Timber-Understory
- Slash-Blowdown

**Wildland Urban Interface (WUI):** The WUI is the zone of transition between unoccupied land and human development. It is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (USFA 2021a). In the absence of a Community Wildfire Protection Plan, Section 101 (16) of the Healthy Foresters Restoration Act defines the wildland urban interface as “ (I) an area extending ½ mile from the boundary of an at-risk community; (II) an area within 1 ½ miles of the boundary of an at-risk community, including any land that (1) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; (2) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or (3) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; (III) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuels reduction to provide safer evacuation from the at-risk community.” A Community Wildfire Protection Plan offers the opportunity to establish a localized definition and boundary for the wildland urban interface (USFS 2021c, 2021d).

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SWCA

## APPENDIX A:

Community and CWPP Background Information

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# GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness. Another goal of the CWPP is to enhance public awareness by helping residents better understand the natural- and human-caused risk of wildland fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the HFRA, are:

**Collaboration:** Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (SAF 2004).

**Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment that will protect one or more communities at risk (CARs) and their essential infrastructures (SAF 2004).

**Treatments of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan (SAF 2004).

## PLANNING PROCESS

The SAF, in collaboration with the National Association of Counties and the National Association of State Foresters, developed a guide entitled *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (SAF 2004) to provide communities with a clear process in developing a CWPP. The guide outlines eight steps for developing a CWPP and has been followed in preparing the Bernalillo CWPP:

**Step One: Convene Decision-makers.** Form a Core Team made up of representatives from the appropriate local governments, local fire authorities, and state agencies responsible for forest management.

**Step Two: Involve Federal Agencies.** Identify and engage local federal representatives and contact and involve other land management agencies as appropriate.

**Step Three: Engage Interested Parties.** Contact and encourage active involvement in plan development from a broad range of interested organizations and stakeholders.

**Step Four: Establish a Community Base Map.** Work with partners to establish a base map(s) defining the community's WUI and showing inhabited areas at risk, wildland areas that contain critical human infrastructure, and wildland areas at risk for large-scale fire disturbance.

**Step Five: Develop a Community Risk-Hazard Assessment.** Work with partners to develop a community Risk-Hazard Assessment that considers fuel hazards; risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other values at risk (VARs); and local preparedness capability. Rate the level of risk for each factor and incorporate this information into the base map as appropriate.

**Step Six: Establish Community Priorities and Recommendations.** Use the base map and community Risk-Hazard Assessment to facilitate a collaborative community discussion that leads to the identification of local priorities for treating fuels, reducing structural ignitability and other issues of

interest, such as improving fire response capability. Clearly indicate whether priority projects are directly related to the protection of communities and essential infrastructure or to reducing wildfire risks to other community values.

**Step Seven: Develop an Action Plan and Assessment Strategy.** Consider developing a detailed implementation strategy to accompany the CWPP as well as a monitoring plan that will ensure its long-term success.

**Step Eight: Finalize Community Wildfire Protection Plan.** Finalize the CWPP and communicate the results to community and key partners.

## FIRE MANAGEMENT POLICY

The primary responsibility for WUI fire prevention and protection lies with property owners and state and local governments. Property owners must comply with existing state statutes and local regulations. These primary responsibilities should be carried out in partnership with the federal government and the private sector. The current Federal Fire Policy states that protection priorities are 1) life, 2) property, and 3) natural resources. These priorities often limit flexibility in the decision-making process, especially when a wildland fire occurs within the WUI.

## LEGISLATIVE DIRECTION

### Federal Direction

In response to a landmark fire season in 2000, the National Fire Plan (NFP) was established to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient firefighting capacity for the future. The NFP was followed by a report in 2001 entitled *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-year Comprehensive Strategy*, which was updated in 2002 to include an implementation plan. This plan was updated once more in 2006, with a similar focus on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, mitigating risks to communities, providing economic benefits, and improving fire prevention and suppression strategies. The 2006 implementation plan also emphasizes information sharing and monitoring of accomplishments and forest conditions, a long-term commitment to maintaining the essential resources for implementation, a landscape-level vision for restoration of fire-adapted ecosystems, the importance of using fire as a management tool, and continued improvements to collaboration efforts (*Forests and Rangelands 2006*). Progress reports and lessons learned reports for community fire prevention are provided annually.

In 2003, the U.S. Congress recognized widespread declining forest health by passing the Healthy Forests Restoration Act (HFRA), and President Bush signed the act into law (Public Law 108–148, 2003).

The HFRA was revised in 2009 to address changes to funding and provide a renewed focus on wildfire mitigation (H.R. 4233 - Healthy Forest Restoration Amendments Act of 2009). The HFRA expedites the development and implementation of hazardous fuels reduction projects on federal land and emphasizes the need for federal agencies to work collaboratively with communities. A key component of the HFRA is the development of Community Wildlife Protection Plans (CWPPs), which facilitate the collaboration between federal agencies and communities in order to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. A CWPP also allows communities to establish their own definition of the WUI, which is used to delineate priority areas for treatment.

In addition, priority is placed upon municipal watersheds, critical wildlife habitat, and areas impacted by

wind throw, insects, and disease. Communities with an established CWPP are given priority for funding of hazardous fuels reduction projects carried out in accordance with the HFRA.

In 2014, the final stage of the development of a national cohesive strategy for wildfire was developed: *The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy* (Forests and Rangelands 2014). The national strategy takes a holistic approach to the future of wildfire management:

***To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.***

In order to achieve this vision, the national strategy goals are:

1. **Restore and maintain landscapes:** Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
2. **Fire-adapted communities:** Human populations and infrastructure can withstand a wildfire without loss of life and property.
3. **Wildfire response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions (Forests and Rangelands 2014:3).

## State Direction

The 2020 New Mexico State Forest Action Plan recognizes that New Mexico faces continued and urgent threats from catastrophic wildfire. The State Forest Action Plan includes a resource assessment to identify threats to resources, including wildfire, post-wildfire flooding, erosion and debris flow, disease and insects, climate changes, development and fragmentation, and use and forest management activities. The Plan then provides strategies to protect these resources over the next decade. There are several strategies and sub-strategies outlined in the Draft Plan; those specific to wildfire include:

- **Restore Forests and Watersheds:** addresses the legacy of fire exclusion and excessive fuels.
- **Fire Management:** addresses wildfire response on state and private land; supports regional, state, and national wildfire response for all jurisdictions; and restores the ecological role of fire to foster resilient landscapes and watershed health.

The passing of H.B. 266, the Forest and Watershed Restoration Act (2019) provides support for landscape resilience throughout the State, by allocating state funds to the EMNRD for the purpose of forest and watershed restoration. EMNRD has been tasked with determining which proposed projects will be funded, in coordination with a newly established Advisory Board (EMNRD 2022).

Like the 2014 national strategy, the NFP, the State Forest Action Plan, 10-year comprehensive strategy, and Federal Emergency Management Agency (FEMA) Disaster Mitigation Act of 2000, all mandate community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multiagency cooperation. In compliance with Title 1 of the Healthy Forests Restoration Act (HFRA), a CWPP must be mutually agreed upon by the local government, local fire departments, and the state agency responsible for forest management (EMNRD Forestry Division). As outlined in HFRA, this CWPP is developed in consultation with interested parties and the federal agencies managing land surrounding the at-risk communities.

**Forest and Watershed Restoration Act:** The Forest and Watershed Restoration Act (FAWRA) was created by house bill 266. FAWRA allocates funding annually to the EMNRD Forestry Division. The funding is to restore forests and watersheds in the state of New Mexico and establishes a Forest and

Watershed Advisory Board, which evaluates proposed projects and recommends guidelines, protocols, and best management practices. When projects have been selected and approved, EMNRD Forestry Division will administer, implement, and report on the projects. Work funded by FAWRA includes on-the-ground restoration treatments; project planning; economic development programs to advance the use of small-diameter trees and woody biomass; and workforce development for wood utilization projects (EMNRD 2022). For more information on the FAWRA, please visit: <https://www.emnrd.nm.gov/sfd/forest-and-watershed-restoration-act-fawra/>.

## Municipal Direction

### Fire Code

The Bernalillo County Municipal Code contains the Fire Code of the County and is found in Chapter 34 “Fire Prevention and Protection”. The Fire Code of the County was adopted in 2020 from the 2015 International Fire Code and amended where appropriate to suit the needs of the County (see Section 34-76 - Amendments to the Fire Code). The Fire Code is effective within the boundaries of Bernalillo County, including private land. Implementation, administration, and enforcement of the provisions of the Fire Code are carried out by BCFR. The Fire Code applies to all new construction and contains provisions for, but not limited to, fire protection water supply, access road width, and locations of aboveground propane tanks. More information on the Fire Code is provided here: [https://library.municode.com/nm/bernalillo\\_county/codes/code\\_of\\_ordinances?nodet=BECOCO\\_CH34FIPRPR\\_ARTIIIIINFICO](https://library.municode.com/nm/bernalillo_county/codes/code_of_ordinances?nodet=BECOCO_CH34FIPRPR_ARTIIIIINFICO)

With regard to wildfire, under the amendments to the fire code, the Bernalillo County Municipal Code also defines a defensible space as “an area either natural or man-made, where material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur” (Bernalillo County 2022d).

## PAST PLANNING EFFORTS

There are several existing documents relating to fire management in Bernalillo County. This CWPP is meant to supplement and not replace any other existing plans. See Chapter 2 for information on agency fire management planning and the growing use of spatial fire planning and decision support tools.

### Federal

[The Cibola National Forest Land Management Plan](#) is the guiding policy for forest and fire management within the Cibola NF. The USFS finished its revised plan in September 2021. The new plan considers how the ecological, climatic, and fire ecology conditions have changed since the last published Forest Land Management Plan (published in 1985) and describes the desired conditions for fire and fuels, objectives for creating the desired conditions, the agreed upon standards for dealing with wildfire and fuels, and the guidelines for managing fire and fuels (USFS 2021a).

### Tribal

**To’Hajiilee Cañoncito Band of Navajos** – This band is a non-contiguous section of the Navajo Nation lying in parts of western Bernalillo, eastern Cibola, and southwestern Sandoval Counties. The To’Hajiilee band of the Navajo Nation does not have an official wildfire fire management plan; however, the Navajo



Nation's Department of Fire and Rescue Service's mission is to "safeguard the public welfare by protecting life, health and property from fire, hazardous materials and other perils." On BIA lands, wildfire planning is guided by the Branch of Wildland Fire Management of the BIA. The goal of this branch is to "*execute our fiduciary trust responsibility by protecting lives, property, and resources while restoring and maintaining healthy ecosystems through cost-effective and creative fire-management programs, collaboration, and promoting Indian self-determination.*" This program includes, but is not limited to, wildland fire management response, fuel management, workforce development and training, wildland fire safety, fire information and social media, and building partnerships (DOI 2019).

**Pueblo of Isleta Tribe Fire Management Plan** – The Pueblo of Isleta Wildland Fire Management Plan is the guiding plan for wildfire management for the Isleta Pueblo Tribe. It describes wildfire policy, partnerships, and wildfire management goals/objectives. Within the plan, the tribal areas are defined by Management Action Areas, which are specific descriptions of areas with similar management constraints, requirements, and guidelines. These include WUI areas, recreation areas, rangelands, and commercial timber areas, among others. It also describes pre- and post-wildfire planning efforts as well as pre- and post-wildfire mitigation efforts. The plan also presents various recommendations for wildfire management, including thinning treatments, prescribed burns, invasive species removal, fuels monitoring, and WUI assessments (Pueblo of Isleta 2021).

**Pueblo of Laguna Wildfire Response** – The Pueblo of Laguna wildfire response is headed by the Fire & Rescue Program through the Laguna Fire and Rescue Department. There is no publicly available guiding wildfire plan for the Pueblo of Laguna, but the tribe's Fire & Rescue Program states that its mission is to "*protect and preserve lives, property and the environment through fire suppression, emergency medical and rescue services, disaster preparedness, community involvement, and hazardous material mitigation*". The Fire & Rescue Program has three fire stations, in addition to one administration office. These fire stations employ 27 career firefighters. One of the main responsibilities of the fire department is suppression of and response to wildland fires (Pueblo of Laguna 2021). For more information visit: <https://www.lagunapueblo-nsn.gov/departments/departament-of-public-safety/fire-rescue-program/>.

**Pueblo of Sandia** – The Pueblo of Sandia does not have an official wildfire management or protection plan. However, wildfire and emergency planning is headed by the tribe's emergency management department. The department's mission is to "provide a comprehensive and integrated system to help save lives, prevent injuries, protect property and preserve the Pueblo of Sandia's invaluable cultural and natural resources in the event of a major emergency or disaster" (Pueblo of Sandia 2021). The department achieves its goals through public outreach, cross department coordination, and collaboration with local partners on emergency and hazard mitigation planning efforts For more information visit: <https://sandiapueblo.nsn.us/emergency-management/>.

## State

**State of New Mexico Hazard Mitigation Plan**: The New Mexico Hazard Mitigation Plan was developed in 2013 and updated in 2018. It was a collaborative effort of state agencies under the coordination of the New Mexico Department of Homeland Security and Emergency Management. Within the plan is a discussion of the process used to "identify, profile, and assess natural hazards in New Mexico and the actions which should be taken to mitigate those hazards." The plan focuses on hazard identification and risk assessment; federal, state, and local capabilities and resources; New Mexico vulnerabilities; mitigation strategies, goals, and actions; and implementation strategies. The plan is renewed and enhanced as new mitigation opportunities become available (New Mexico Department of Homeland Security and Emergency Management 2018).

**2020 New Mexico Forest Action Plan:** As part of the federal Farm Bill, the USFS requires states to develop a Forest Action Plan on recurring 10-year cycles. Using the best science available, the EMNRD of State of New Mexico worked as part of a collaborative group to create the 2020 New Mexico Forest Action Plan (EMNRD Forestry Division 2020a). The plan provides a current assessment of the state's natural resources and, with the perspective of a changing climate, proposes strategies to address pressing issues in forest and watershed management. The plan focuses on natural resource assets and their assessments in regard to wildfire, post-wildfire conditions, disease and insects, climate change, human development, and forest management activities. The Plan provides information on risk assessments, relative importance of resources, and strategies for managing natural resources, among other information. The 10 strategies set forth in this 2020 plan are restoring forests and watersheds, fire management, private land stewardship, utility rights of way, rare plants, reforestation, urban forests and communities, restoration economy, land conservation, and outdoor recreation (EMNRD Forestry Division 2020a). The plan also identifies priority landscapes for the application of the strategies:

1. Priority landscapes for restoration across all jurisdictions with forest and woodland cover types and identifies the top 500 watersheds in the state ranked by wildfire risk and importance for water source protection and biodiversity. These priority landscapes account for approximately 20% of all watersheds at risk.
2. Shared stewardship for high priority landscapes on National Forest System lands and adjacent lands and identifies the top 250 watersheds in the state ranked by wildfire risk and importance for water source protection and biodiversity.

## Local

**East Mountain CWPP:** In 2006, a multijurisdictional team prepared the East Mountains CWPP. The plan was developed to help communities prepare for, and prevent, wildfire near their communities. The plan was partially updated in 2012, and a comprehensive update was completed in 2015. The 2015 update, prepared by Arid Land Innovations, LLC, focused on gathering public feedback regarding fire issues, depicting the current conditions, identifying current fire mitigation needs, and summarizing progress on action items identified in 2006. A key component of the 2015 update was to shift the fire mitigation efforts from prevention to accepting the inevitability of fire, preparing for it, and living with it. Major goals of the plan were to implement fuel treatments (including residential fuels), engage in public outreach, increase wildfire protection services, and develop household and community evacuation plans, among others (Arid Land Innovation, LLC 2015).

**Middle Rio Grande Bosque CWPP:** In 2007, SWCA developed the Middle Rio Grande Bosque CWPP, a multijurisdictional collaborative effort. The Middle Rio Grande Bosque CWPP was developed to address wildfire threat, as well as assist in protecting human life and reducing property loss due to wildfire in the communities and recreation areas of the Middle Rio Grande Bosque and the surrounding areas. This CWPP provided recommendations for helping communities prepare for and mitigate impacts from wildfire that could occur within the planning area and surrounding communities. Important recommendations include invasive vegetation removal and/or treatments, targeted fuel reduction treatments, prescribed fire, and community outreach, among others (SWCA 2007).

**Albuquerque/Bernalillo County Hazard Mitigation Plan (2022 update):** The Albuquerque/Bernalillo County Hazard Mitigation Plan was originally developed in 2007 and revised in 2015 and again in 2022. The overall purpose of the plan is to reduce or eliminate long-term risk to people and property from disasters or hazard events. The plan analyzes human and natural hazards that pose threats to the city and county and develops appropriate mitigations strategies to address said hazards. Communities and

entities which are covered by the Plan include the following: Bernalillo County, City of Albuquerque, Village of Los Ranchos de Albuquerque, Village of Tijeras, Albuquerque Metropolitan Arroyo Flood Control Authority, Middle Rio Grande Conservancy District, and the Albuquerque Bernalillo County Water Utility Authority. Hazard mitigation actions include, but are not limited to, securing water sources, public education, water conservation, tree trimming near power lines, and invasive plant species treatments (Bernalillo County et al. 2022).

**Albuquerque/Bernalillo County Comprehensive Plan (2017)**: This is a comprehensive plan that focuses on the City of Albuquerque and unincorporated Bernalillo County. The primary goals of the plan are economic development, protection of the City's/County's neighborhoods and resources, and streamlining and promoting sustainable development. In regard to wildfire, the plan includes recommendations for improving firefighting infrastructure and promoting sustainable development that has reduced risk to wildfire. The plan also discusses the various risks that wildfire pose to the City and County and how the City and County can improve their resilience to wildfire, such as improving response times, implementing wildfire hazard mitigation practices, and utilizing cross-agency collaborative firefighting efforts (City of Albuquerque and Bernalillo County 2017).

## PUBLIC LAND MANAGEMENT

### LAND MANAGEMENT STRATEGIES

In 2019, the Forest and Watershed Restoration Act (FAWRA) was signed into law. The FAWRA distributes funding to the EMNRD Forestry Division with the objective of restoring forests and watersheds in the state of New Mexico and creates a Forest and Watershed Advisory Board to assess and recommend projects. Restoration projects under the FAWRA are planned and implemented with collaboration between the EMNRD Forestry Division and partnering organizations, including local, state, federal, tribal, non-governmental organizations, and other partners and stakeholders. Between 2020 and 2022, a total of 6,050 acres of forest restoration were completed, including fuels treatments, thinning, invasive species removal, and prescribed fire (EMNRD 2022).

The Forestry Division's Forest and Watershed Health Office has been concentrating on three work areas related to forest and watershed health: 1) supporting collaborations that expand the State's capacity to get more work done on the ground; 2) implementing the National Cohesive Strategy in New Mexico; and 3) using science, policy, and legislation to facilitate the Forestry Division's mission. Forest managers in the region are addressing land management objectives through the use of prescribed fire, and mechanical and manual treatments to promote more resilient forest land. Private, state, and federal lands are interspersed, creating a matrix of land ownership, which is often a hurdle to implementation of landscape-level treatments. By working with private landowners, forest managers are enhancing landscape-scale efforts to create more resilient forest communities.

### Federal Land

#### Cibola National Forest

The Cibola NF covers 1,633,783 acres, with elevations ranging from 5,000 to 11,305 feet at the summit of Mt. Taylor. By descending order, the Cibola NF comprises land in Socorro, Cibola, McKinley, Catron, Torrance, Bernalillo, Sandoval, New Mexico, Lincoln, Sierra, and Valencia Counties.

The Cibola National Forest Land Management Plan is the guiding policy for forest and fire management in the Cibola NF (USFS 2021). Management considerations outlined in the plan primarily involve creating “suitable and desirable” conditions in the WUI, such as allowing wildland fires to sustain characteristic ecosystem function while preserving property and human health and safety. Furthermore, the plan states that fuel conditions in the WUI will be managed so that firefighters can suppress and manage fire safely and efficiently. The plan also states that prescribed fire and other fuel treatments will be used to create a return to more desired “natural” fuel conditions. Outlined in the plan are objectives and goals for fire and fuels, which include, but are not limited to, setting acreage for plans for prescribed burns in needed areas; allowing natural wildfires to perform their ecological function in areas where there is minimal to no threat to human life or property; managing the forest ecosystem so it is resilient to uncharacteristic wildfire; and efficient coordination and collaboration across agencies and stakeholders for wildfire response, planning, mitigation, and research efforts. Furthermore, Cibola NF works closely with neighboring entities to develop cross-boundary landscape projects focused on landscape resiliency and forest health.

## Petroglyph National Monument

The Petroglyph National Monument is developing its own fire management plan, which will provide guidelines for how to utilize and manage wildland fire to safely accomplish resource protection and management goals. The plan will seek to manage impacts of wildfires to communities and the environment, protect people and sustain resources in fire-adapted ecosystems, and create a collaborative approach to managing wildfire. The plan will include a 10-year comprehensive implantation program to ensure its wildland fire program is compatible with the Petroglyph National Monument’s stated land management and resource goals and objectives (NPS 2022). The current guiding wildland fire management policies for the monument are the “Director’s Order #18: Wildland Fire Management” and the “Reference Manual 18.” These plans guide the NPS in protecting community, culture, and natural resource values; restoring and maintaining fire adapted ecosystems; utilizing science-based wildland fire management; integrating wildland fire with other NPS programs; conducting outreach efforts to ensure the public and external audiences understand and support wildland fire programs; and ensuring fire management programs build and promote organizational effectiveness. Wildland fire management strategies focus on safety, ecosystem sustainability, fire response, use of wildfire, WUI, restoration/rehabilitation; interagency cooperation, planning, and protection priorities, among others (NPS 2008, 2019, 2022)

## Tribal Lands

Generally, the BIA is responsible for initial fire attack for tribal lands. On BIA lands, wildfire planning and management is guided by the Branch of Wildland Fire Management of the BIA. This program includes, but is not limited to, wildland fire management response, fuel management, workforce development and training, wildland fire safety, fire information and social media, and building partnerships (DOI 2019). The general policy of the BIA is to work closely with tribal elders and fire specialists to identify the desired management objects for their tribe’s land. These objectives are typically designed to restore landscapes to their traditional uses. The ultimate goal of management is to create traditional landscapes that foster diversity and sustainability; supports edible and medicinal plants; and creates an environment that encourages spiritual involvement (DOI 2019). Currently, many of the tribes engage in intra-tribal mutual aid agreements for wildfire response and management. Furthermore, the tribes within Bernalillo County also engage in mutual aid agreements with BCFR and the Albuquerque Fire Department (Navajo Nation 2022; Pueblo of Laguna 2021). Currently, only the Pueblo of Isleta Tribe has its own fire management plan, which is discussed above.

## Department of Defense (DOD) Lands

The Kirtland Airforce Base (KAFB), which is situated between the Rio Grande and the Cibola NF, is owned and managed by the U.S. Air Force. The base comprises over 50,000 acres and engages in research, development, and testing; readiness and training; munition maintenance; and support to mission partners. The base houses its own fire department and has an active fire management program, which is primarily aimed at wildfire prevention and containing wildfire within the confines of the military installation (KAFB 2019).

## Bureau of Land Management (BLM) Lands

In New Mexico, the BLM is responsible for fire management on 13.5 million acres of public land in four BLM districts in New Mexico, including the Albuquerque District. Only minor portions of Bernalillo County contain BLM public lands, which are in the northwest corner of the county. The land managed by the BLM in Bernalillo County is managed by the Rio Puerco Field Office, which is overseen by Albuquerque District Office (BLM 2021a, 2021e). The BLM was established in 1946 to “sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations” (BLM 2021a). The BLM operates a national fire program, which focuses on public safety as its main priority. The BLM’s fire management program is organized at three levels: national, state, and field (local) levels. The national office provides direction and oversight of the program while developing policy and budget; the state offices coordinate policy and interagency management efforts within their state; and the field offices are responsible for executing field operations such as fire management activities and providing initial attack (BLM 2021c, 2021d, 2021e). The BLM collaborates with federal, state, and local organizations to develop and implement wildland fire programs.

For instance, BLM’s fuels management program directs a wide range of active management vegetation treatments using mechanical, biological, and chemical tools, and prescribed fire. The program consists of creating fuel breaks, reducing fuel loads, reducing fire risk near communities, targeted grazing, and herbicide to break fire-grass cycles. Fuels treatments are planned and implemented jointly with other BLM programs, and with federal, state, local, and non-governmental collaborators (BLM 2021c, 2021d). Furthermore, on BLM lands there is an active vegetation treatment program with priority to reduce wildfire risk around powerlines (BLM 2020a).

## State Land

The EMNRD Forestry Division has statutory responsibilities for cooperation with federal, state, and local agencies in the development of systems and methods for the prevention, control, suppression, and use of prescribed fires on rural land and within rural communities on all non-federal and non-municipal lands in the state (New Mexico Statutes Annotated 1978, Section 68-2-8). As a result, the EMNRD Forestry Division is involved in the CWPP planning process. The New Mexico Fire Planning Task Force was created in 2003 by the New Mexico legislature to identify the WUI areas (CARs) in the state that were most vulnerable to wildland fire danger. The task force updates its CARs list annually, reviews completed CWPPs, and approves CWPPs that are compliant with the HFRA.

**Fire Planning Taskforce:** In 2003, the New Mexico State Legislature created the fire planning taskforce. This taskforce is collaborative and is composed of stakeholders and land managers from local, state, and tribal cooperators. These cooperators assist the EMNRD Forestry Division in identifying areas of New Mexico most vulnerable to wildfire. This taskforce also guides policy and land management recommendations that are designed to reduce the threat of wildfires to communities. Responsibilities and roles the taskforce include, but are not limited to, developing model ordinances and standards for building



codes; considering the benefits of thinning and prescribed burn projects; and guiding recommendations for defensible space standards for infrastructure and property. This taskforce meets once per year to approve CWPPs (EMNRD 2021). For more information on participating members please see: <https://www.emnrd.nm.gov/sfd/fire-planning-task-force/#:~:text=The%20New%20Mexico%20Fire%20Planning%20Task%20Force%20%28Task,identify%20and%20protect%20areas%20most%20vulnerable%20to%20wildfires.>

## STEWARDSHIP AGREEMENTS

In 2019, the EMNRD and USFS signed a shared stewardship agreement to commit to collaborative forest management and set landscape-scale priorities for targeted treatments that manage risks and increase benefits in areas where they will have the greatest impact across broad landscapes. The shared stewardship agreement includes a commitment to implement the Cohesive Strategy. As part of the agreement, EMNRD and USFS will use their respective authorities to conduct government-to-government consultation directly with the tribes and pueblos throughout the state to encourage shared stewardship strategies (USFS 2019).

## LOCATION AND GEOGRAPHY

Bernalillo County is 1,167 square miles and is bordered by five New Mexico counties: Sandoval to the North, Santa Fe to the east, Torrance to the east, Valencia to the south, and Cibola to the west. The Rio Grande River runs north–south through the central portion of Bernalillo County. The eastern portion of the county is mountainous with peaks reaching high elevations. The two dominant mountain ranges in Bernalillo County are the Sandia and Manzanita Mountain ranges. The Sandia Mountains are located to the northeast of Albuquerque, and the Manzanita Mountains are located to the southeast of Albuquerque. The highest point in Bernalillo County is the Sandia Crest (within the Sandia Mountain Wilderness Area) at an elevation of 10,678 feet. The Sandia Mountain Wilderness and much of the Manzanita Mountains are within the Cibola NF, an area comprising approximately 1.6 million acres. KAFB is located directly southeast of Albuquerque. The western portion of the county is characterized by high desert. Petroglyph National Monument is directly west of Albuquerque. Patches of the Navajo Reservation occur throughout the western and southern portion of the county. Large patches of private land are dispersed throughout the county. The topography of Bernalillo County is discussed further below and typical landscapes within the county are shown in Figures A.1 and A.2.

**Table A.2. Breakdown of Land Ownership in Bernalillo County.**

Land Ownership	Acres	% of Focus Area
U.S Forest Service	74,718.73	10.01
Bureau of Land Management	6,763,49	0.91
National Park Service	7,099.16	0.95
Tribal Lands	226,839.60	30.51
Department of Defense	30,908.31	4.14
State Land (including Chilili land Grant)	20,629.98	2.76
Private land	378,873.80	50.73



**Figure A.1. Typical landscape in Bernalillo County.**



**Figure A.2. Typical landscape in Bernalillo County.**

## ROADS AND TRANSPORTATION

Within Bernalillo County the main transportation corridors include I-25 and I-40, which bisect the county north–south and east–west, respectively, in Albuquerque. Other local transportation corridors include NM-

45 and NM-528, which run adjacent to I-25 to the west; NM-528/U.S. 550, which runs northwest–southeast until it merges with I-25; and NM-165, NM-536, NM-14, and NM-337, which run through the Cibola NF and other forested lands in the Manzanita Mountains. Access to other county lands consists of narrow, winding roads, including maintained two-lane roads, some one-lane gravel roads, several four-wheel-drive dirt roads, and multiple dead-end roads.

## TOPOGRAPHY

The Bernalillo County CWPP planning area rises from approximately 4,900 feet along the Rio Grande corridor in south central region of the county to 10,678 feet at the summit of the Sandia Crest in the eastern portion of the county. The Sandia Mountains and Manzanita Mountains in the eastern portion display dramatic western slopes and changes in elevation as they rise from the Rio Grande, while shallower slopes and relatively more gradual changes in elevation are typical on the eastern slope of the mountains. These mountains were uplifted approximately 10 million years ago as part of the formation of the Rio Grande Rift and form the eastern boundary of the Albuquerque Basin. The western portion of the county is mostly high elevation desert, interspersed with high mesas, volcanic cliffs, and canyons.

Although large portions of the county are relatively flat, the topography varies greatly throughout the CWPP planning area. The percentage of slope is an important factor in determining the types of treatments that should be implemented.

## POPULATION

The following information is drawn primarily from U.S. census data (U.S. Census Bureau 2022). As of the 2020 census, the population of Bernalillo County was 676,444, an increase of 2.1% compared with the 2010 census population of 662,564. As of 2019, there were 296,404 housing units in the county. The county has a population density of 570.8 people per square mile. The majority of the county citizens live within the city limits of Albuquerque, which has a population of 564,559.

## RECREATION

Outdoor recreation is extremely popular in Bernalillo County, with the Cibola NF (including the Sandia Mountain Wilderness), Petroglyph National Monument, BLM lands, city and state parks, and cultural attractions throughout the county, attracting thousands of visitors. Hunting and camping are also popular on the county's public lands.

During peak seasons and large events, a significant number of people can congregate in a relatively small space, which constitutes a large population to evacuate.

## VALUES AT RISK

Earlier compilation of the critical infrastructure in the planning area, coupled with the community evaluations, public outreach, and Core Team input, has helped in the development of a list of values at risk (VARs) from wildland fire. These data are also supplemented with Highly Valued Resources and Assets (HVRA) data, which is a data set that is being gathered nationwide and available through the Interagency Fuel Treatment Decision Support System (IFTDSS). The public was encouraged to provide



additional VARs during the public outreach period, via the story map survey link. Based on feedback provided, this section and the associated mapping was revised.

In addition to critical infrastructure (Map 9 in Appendix B), VARs can also include natural, socioeconomic, and cultural resources (see Maps 6–8 in Appendix B). It is important to note that although an identification of VARs can inform treatment recommendations, a number of factors must be considered in order to fully prioritize areas for treatment; these factors include appropriateness of treatment, land ownership constraints, locations of ongoing projects, available resources, and other physical, social, or ecological barriers to treatment.

The scope of this CWPP does not allow determination of the absolute natural, socioeconomic, and cultural values that could be impacted by wildfire in the planning area. In terms of socioeconomic values, the impact due to wildfire would cross many scales and sectors of the economy and call upon resources locally, regionally, and nationally.

## Natural Values at Risk

The CWPP planning area, Cibola NF, and Petroglyph National Monument have a variety of natural resources of particular concern to land managers, such as rare habitats and listed plant and wildlife species. Public outreach throughout Bernalillo County has emphasized the importance of protecting natural/ecological values to the general public. Examples of natural values identified by the public and the Core Team include the following:

- Public land (e.g., Cibola NF)
- Trail systems
- Agricultural land
- Scenic viewsheds (Figure A.3)
- Wildlife habitat and sensitive species
- Watersheds and preservation of water quality (such as drinking water).



**Figure A.3. Example of a natural VAR, a scenic viewshed.**

## Socioeconomic Values at Risk

Social values include population, recreation, infrastructure, and the built environment. Examples include the following:

- Communications Infrastructure (e.g., cell phone and radio towers)
- Tourism values (e.g., restaurants, recreational facilities)
- Schools
- Public safety infrastructure
- Highways
- Care homes, senior housing, day care, and other group homes
- Water storage
- Business facilities (Figure A.4)
- Recreation sites (e.g., golf courses, hot springs, trails, parks)



**Figure A.4. Example of a socioeconomic VAR, the Netflix campus.**



## Cultural Values at Risk

Many historical landmarks are scattered throughout county, for example the Petroglyph National Monument. Cultural VARs that have been identified by the Core Team and the public in the CWPP planning area are the following:

- Historical markers and memorials
- Churches
- Museums
- Cemeteries
- Reservoirs
- Petroglyph sites



**Figure A.5. Example of a cultural VAR, the Petroglyph National Monument.**

Source: <https://www.nps.gov/petr/planyourvisit/bn.htm>.

## CLIMATE AND WEATHER PATTERNS

Differences in topographical characteristics throughout the state of New Mexico and Bernalillo County contribute to the variable climatic regimes within the planning area. The state generally has a mild, arid to semiarid, continental climate characterized by abundant sunshine, light total precipitation, low relative humidity, and relatively large annual and diurnal temperature ranges. Across the state, the annual average number of hours of sunshine ranges from nearly 3,700 hours in the southwestern portions of the state to 2,800 hours in the north-central portions (New Mexico State University 2022).

Highly varied topographical characteristics along the WUI, especially in the mountainous areas, contribute to slope variability within the planning area. Shifts in elevation affect wildland fuels, wind speed and direction, and the configuration of the interface (downslope fuels). The county has various ridges, canyons, and steep mountain slopes that interface with the main wildland interface. Many of the areas that border the WUI, especially in the suburban, exurban, and rural mountainous regions of the county,

are surrounded by steep forested terrain. These topographical features, especially elevation, contribute to variable climatic regimes within the CWPP planning area. Temperatures in the valley and desert areas can rise well over 100°F in the summer, while winter temperatures can drop below 10°F in the high-elevation mountainous regions. Most of Bernalillo County is typically categorized as high elevation, arid desert, with dry, hot summers and mild, cool to cold winters (PRISM 2020). Most precipitation falls in the Sandia and Manzanita Mountains, while Albuquerque and the western portions of the county are relatively dry.

**Table A.3. Mean Annual Temperature and Precipitation by Region in Bernalillo County**

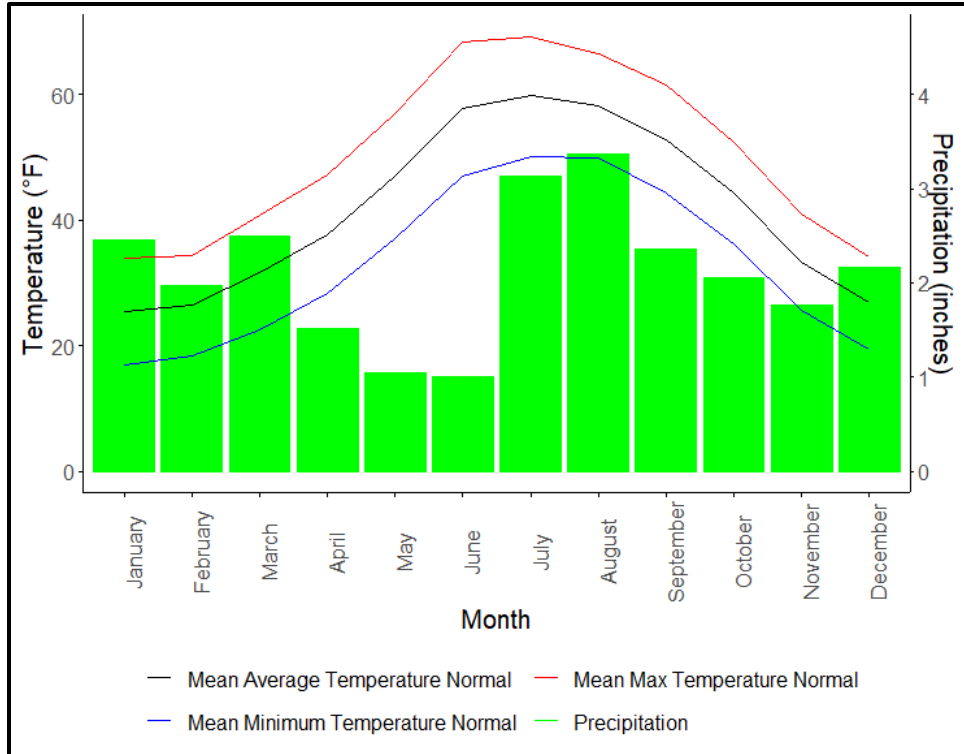
Region	Period of Record	Mean Annual Precipitation (Inches)	Mean Annual Temperature (°F)		
			Max	Min	Mean Annual
Sandia Crest	1991–2020	25.35	50.5	33.0	41.8
Albuquerque	1991–2020	9.38	72.7	40.7	56.7
W. Bernalillo	1991–2020	9.84	71.1	40.0	55.5

Source: PRISM (2020)

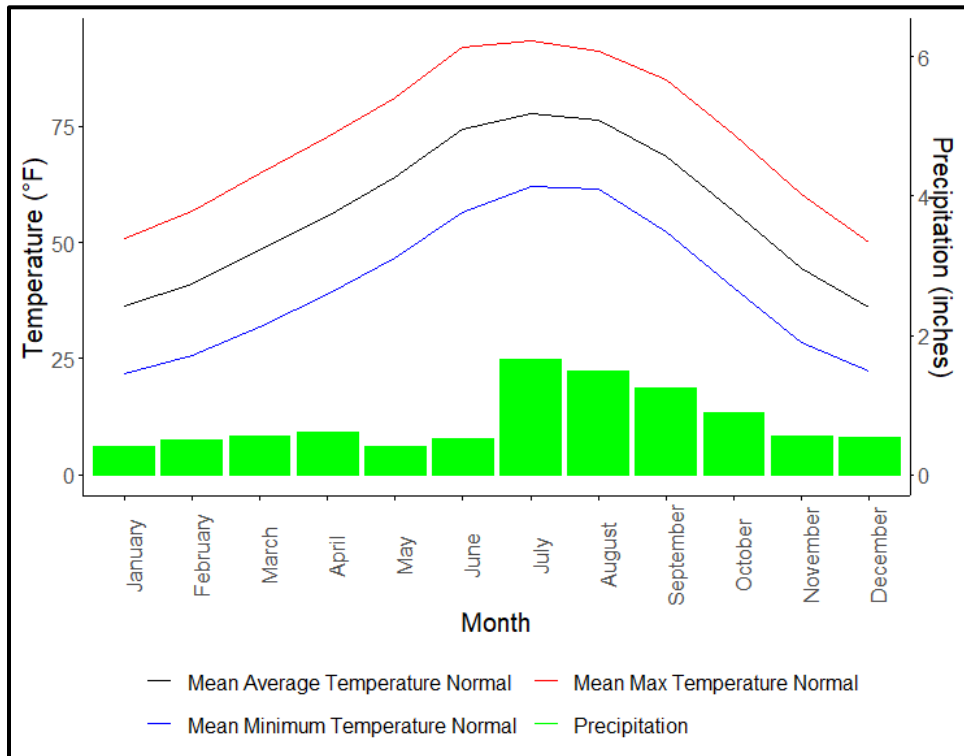
June and July are typically the hottest and driest months of the year in Bernalillo County, with temperatures ranging from 69.3°F at the Sandia Crest to 93.6°F in Albuquerque. December and January are usually the coldest months, with average December and January minimum temperatures ranging from 17.0°F near the Sandia Crest area to 21.8°F in the Albuquerque region (PRISM 2020). Mean annual temperatures are high and precipitation is generally low throughout Albuquerque and extending to the western portions of the county. However, mean annual temperatures decrease rapidly in the eastern portions of the county with dramatic gains in elevation found with the Sandia and Manzanita Mountains. For example, Albuquerque, which is near the base of the Sandia Mountains, records a mean annual temperature of 56.7°F (see Table A.3), while the Sandia Crest (approximately 15 miles away) has a mean annual temperature of 41.8°F. In general, communities located in the western, desert portions of the county experience warmer temperatures, while communities in the eastern, mountainous portions of the county experience cooler temperatures.

Mean annual precipitation within the county is highly variable and is largely dependent on elevation. Annual precipitation ranges from 9.38 inches in Albuquerque to 25.35 inches near the Sandia Crest. Due to the Southwestern Monsoon, the later summer months of July and August are typically the wettest months. Precipitation highs range from 1.66 inches (month of July) in Albuquerque to 3.67 inches (month of August) near the Sandia Crest. In the western, arid portions of the county winters are usually dry. January is typically the driest month of the year, with a low 0.41 inch of precipitation in Albuquerque. Areas closer to the mountains typically receive substantially more winter precipitation than the arid western portions of the county. In the mountainous regions, the later spring months of May and June are typically the driest months. June is typically the driest, with a low average of 1.00 inch of precipitation.

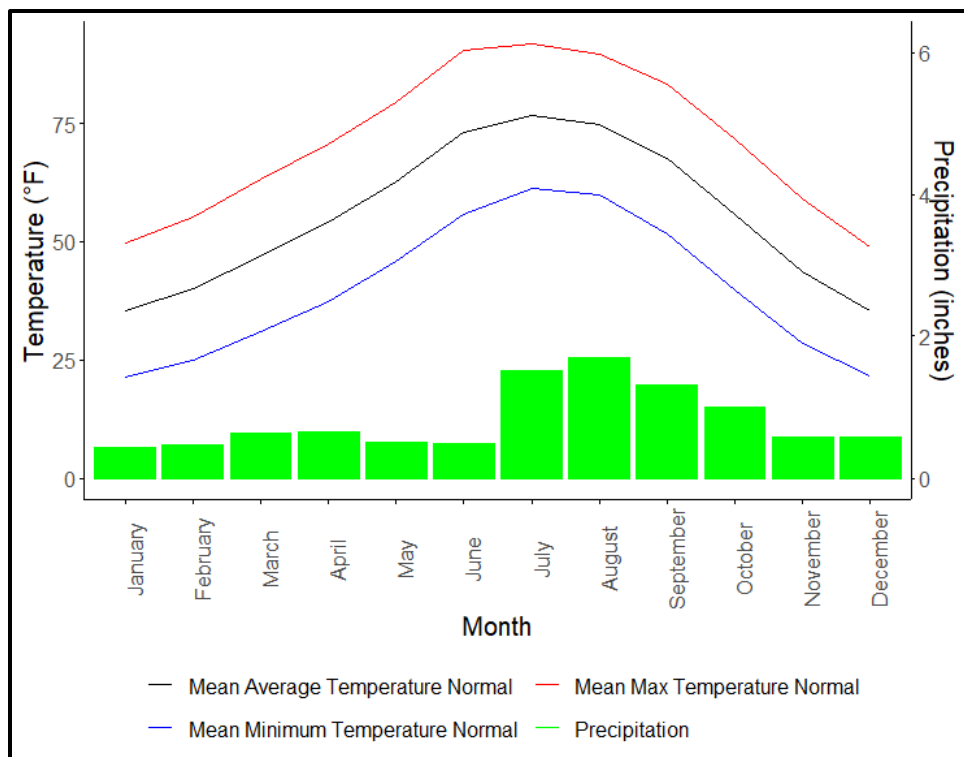
Monthly climate normals (30-year averages) for Bernalillo County (PRISM 2020) are graphed by regions below (Figures A.6–A.8).



**Figure A.6. Monthly climate averages for the Sandia Crest Region taken for the period of 1991–2020.**



**Figure A.7. Monthly climate averages for the Albuquerque region for the period of 1991–2020.**



**Figure A.8. Monthly climate averages for the western region of Bernalillo County for the period of 1991–2020.**

## VEGETATION AND LAND COVER

Vegetation zones within Bernalillo County are primarily a function of elevation, slope, aspect, substrate, and associated climatic regimes. Since a broad range in elevation and topography exists across the county, characteristics in vegetative communities are quite variable from site to site (Figure A.9).

Dominant vegetation types within the county are described based on a large spatial scale and represent the overall community structure that will play a general role in fire occurrence and behavior. Although the vegetation types are outlined and described for the county, site-specific evaluations of the vegetative composition and structure in each area of focus should be taken into consideration when planning fuel treatments.

The major vegetation types in the county are listed in Table A.4 and are described below the table in more detail using the 2004 U.S. Geological Survey (USGS) GAP Analysis Program, specifically the Southwest Regional Gap Analysis Project (SWReGAP 2022). Other types of land cover (e.g., agricultural and developed) also exist in the county but are not described in more detail as they do not play a significant role in fire behavior. For reference, Figure A.9 shows a detailed map of the vegetation in Bernalillo County. Table A.5 provides a key to the vegetation codes used in Figure A.9.

**Table A.4. Major Vegetation Types within the Bernalillo County**

Existing Vegetation Type	Acres	Percent
Inter Mountain Basins Semi-Desert Grassland	277,928.2	37.21%
Southern Rocky Mountain Piñon-Juniper Woodland	99,557.28	13.33%
Rocky Mountain Ponderosa Pine Woodland	73,985.53	9.91%
Southern Rocky Mountain Juniper Woodland and Savanna	28,601.54	3.02%
Intermountain Basins Semi-Desert Shrub Steppe	22563.37	3.021%
Mixed Conifer/Spruce-Fir Forests	11,731.74	1.57%
Rocky Mountain Lower Montane Riparian Woodland and Shrubland*	11889.43	1.59%
Western Great Plains Riparian Woodland and Shrubland*	4,027.56	0.54%

\*Vegetation type representative of the bosque ecosystem.

## GRASSLAND AND ARID SHRUB-STEPPE COMMUNITIES

**Inter Mountain Basins Semi-Desert Grassland:** A good portion of vegetation in Bernalillo County consists primarily of semi-desert grasslands. These typically occur on dry plains and mesas. The dominant perennial bunch grasses and shrubs within this system are all very drought-resistant. Common grasses include *Achnatherum hymenoides*, *Aristida* spp., blue grama (*Bouteloua gracilis*), needle and thread grass (*Hesperostipa comata*), *Muhlenbergia torreyana*, and James’ galleta (*Hilaria jamesii*). Common scattered shrubs in the semi desert grasslands may include species of sagebrush (*Artemisia* spp.), saltbush (*Atriplex* spp.), blackbrush (*Coleogyne* spp.), Mormon tea (*Ephedra* spp.), snakeweed (*Gutierrezia* spp.), and winterfat (*Krascheninnikovia lanata*).

**Intermountain Basins Semi-Desert Shrub-Steppe:** The shrub steppe has similar species composition as the semi-desert grassland, but with a higher proportion of shrub cover (SWReGAP 2022).

## FORESTED COMMUNITIES

**Southern Rocky Mountain Piñon-Juniper Woodland:** The most common forested areas within Bernalillo County consists of piñon-juniper woodlands. This ecological system occurs on dry mountains and plateaus of north-central New Mexico and is represented in the elevational region between ponderosa pine and grassland communities. Piñon pine (*Pinus edulis*) and/or oneseed juniper (*Juniperus monosperma*) dominate the tree canopy; however, Rocky Mountain juniper (*J. scopulorum*) may codominate or replace oneseed juniper in higher elevations. Understory layers are variable and may be dominated by shrubs or graminoids, or may be absent. Associated understory species may include blue grama, James’s galleta (*Hilaria jamesii*), Arizona fescue (*Festuca arizonica*), Bigelow sage (*Artemisia bigelovii*), mountain mahogany (*Cercocarpus montanus*), and Gambel oak (*Quercus gambelii*).

**Southern Rocky Mountain Piñon-Juniper Woodland and Savanna:** These vegetative communities are similar to the Southern Rocky Mountain Piñon-Juniper Woodlands (see above) except there is a lower degree of canopy cover and a higher degree of grass abundance in the understory.

**Rocky Mountain Ponderosa Pine Woodland:** Ponderosa pine (*Pinus ponderosa*) forests exist in mountainous areas on all slopes and aspects within the county above an elevation of approximately 7,000 feet where the transition from piñon-juniper woodlands to ponderosa pine communities typically



takes place. Ponderosa pine is the predominant conifer in these forests; however, Douglas-fir (*Pseudotsuga menziesii*), piñon pine, and Rocky Mountain juniper may also be present in the sub-canopy. The understory of this community is usually shrubby and includes species such as big sagebrush, mountain mahogany, wild rose (*Rosa* spp.), Gambel oak, and snowberry (*Symphoricarpos* sp.). Common graminoids are similar to those of other communities in the county, including needle and thread, fescue, muhly, and grama species.

**Mixed Conifer/Spruce-Fir Forests:** Mixed-conifer forests also exist in the more mesic, higher elevations of the county above ponderosa pine and consist primarily of Douglas-fir, white fir (*Abies concolor*), and Engelmann spruce (*Picea engelmannii*); however, ponderosa pine may also be present in some areas. Associated understory species may include kinnikinnick (*Arctostaphylos uva-ursi*), creeping barberry (*Mahonia repens*), Oregon boxleaf (*Paxistima myrsinites*), snowberry, fivepetal cliffbush (*Jamesia americana*), Gambel oak, and Rocky Mountain maple (*Acer glabrum*). Herbaceous species include sedge species (*Carex* spp.), muhly grass, Arizona fescue, strawberry (*Fragaria* sp.), and meadow rue (*Thalictrum* sp.). A small amount of aspen (*Populus tremuloides*) woodlands exist in the county but are not well represented. These deciduous forests are dominated by aspen but may have some shade-tolerant coniferous species such as white fir and spruce developing in the understory in older stands. The understory may consist of shrub and herbaceous layers or may only have a simple herbaceous layer. Understory species may consist of snowberry, serviceberry (*Amelanchier* spp.), kinnikinnick, and thimbleberry (*Rubus parviflorus*). This community type is typically created and maintained by stand-replacing disturbances, including fire (SWReGAP 2022).

## RIPARIAN WOODLAND COMMUNITIES

**Rocky Mountain Lower Montane Riparian Woodland and Shrubland and Western Great Plains Riparian Woodland and Shrubland:** The bosque riparian habitat type stretches throughout Bernalillo County along the Rio Grande corridor. The bosque and lowland regions are also where most of the urban and suburban development and agricultural land use occurs, with the highest densities of human population occurring within and around the city of Albuquerque. Riparian vegetation makes up 2.1% of the total land cover in the county. Dominant native woody vegetation includes Rio Grande cottonwood (*Populus deltoides* var. *wislizeni*), coyote willow (*Salix exigua*), and Goodding's willow (*S. gooddingii*). Invasive species such as saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), and Siberian elm (*Ulmus pumila*) also exist within large stands along the bosque ecosystem. Herbaceous plant species commonly associated with the bosque understory include a variety of wheatgrass (*Pascopyrum* spp.), ryegrass (*Elymus* spp.), dropseed and sacaton, and inland saltgrass (*Distichlis stricta*). Near the river or floodplain, the dominant native shrub species are coyote willow, arrowweed (*Pluchea sericea*), willow baccharis (*Baccharis salicina*), three-leaf sumac (*Rhus trilobata*), Torrey's wolfberry (*Lycium torreyi*), and screwbean mesquite (*Prosopis pubescens*) (SWReGAP 2022). Invasive trees, such as saltcedar and Russian olive, are becoming more common and replacing/outcompeting native vegetation.

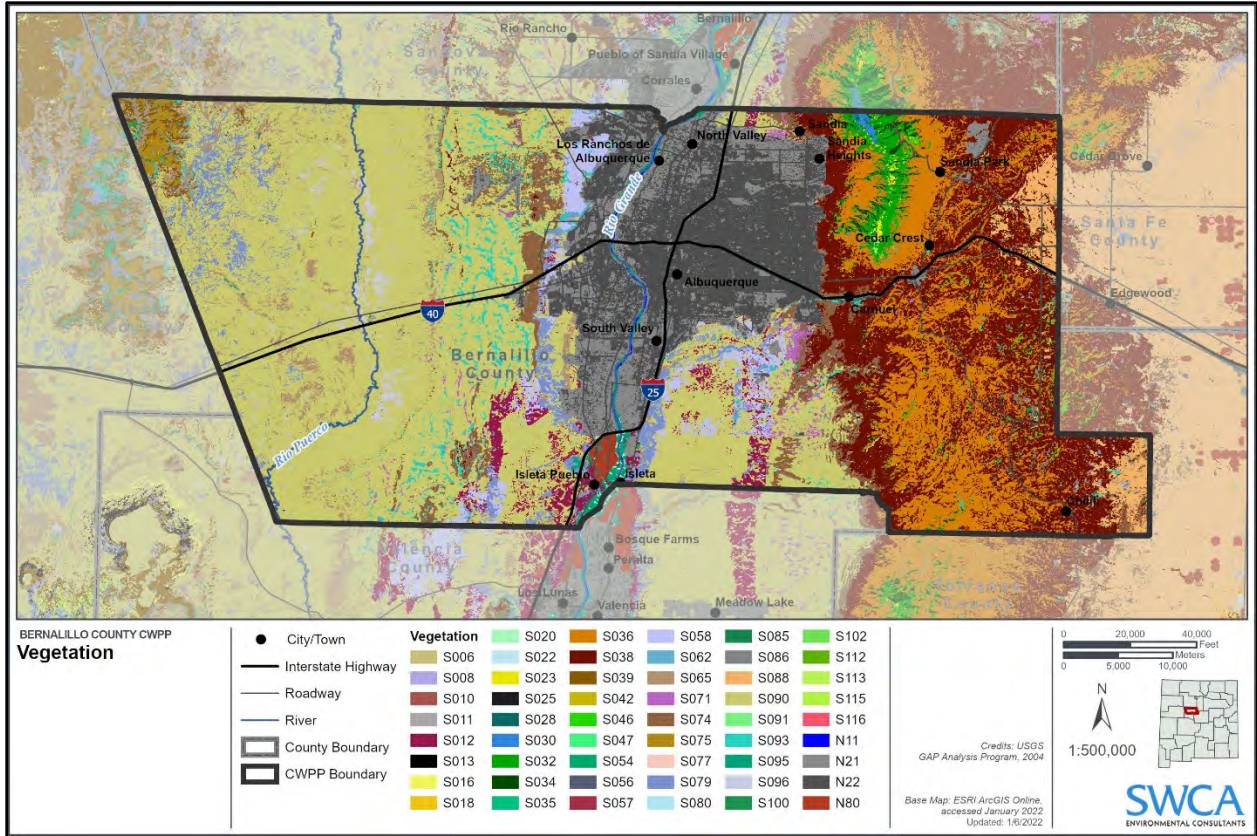


Figure A.9. Vegetation types in Bernalillo County derived from SWReGAP.

Table A.5. Codes and Descriptions for Vegetation Layers within Bernalillo County

Code	Description	Code	Description
N80	Agriculture	S020	North American Warm Desert Wash
S058	Apacherian-Chihuahuan Mesquite Upland Scrub	N11	Open Water
S080	Chihuahuan Gypsophilous Grassland and Steppe	S102	Rocky Mountain Alpine-Montane Wet Meadow
S010	Colorado Plateau Mixed Bedrock Canyon and Tableland	S023	Rocky Mountain Aspen Forest and Woodland
S056	Colorado Plateau Mixed Low Sagebrush Shrubland	S006	Rocky Mountain Cliff and Canyon
S039	Colorado Plateau Piñon-Juniper Woodland	S046	Rocky Mountain Gambel Oak-Mixed Montane Shrubland
N22	Developed, Medium - High Intensity	S093	Rocky Mountain Lower Montane Riparian Woodland and Shrubland
N21	Developed, Open Space - Low Intensity	S032	Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland
S012	Inter-Mountain Basins Active and Stabilized Dune	S034	Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland

Code	Description	Code	Description
S054	Inter-Mountain Basins Big Sagebrush Shrubland	S036	Rocky Mountain Ponderosa Pine Woodland
S096	Inter-Mountain Basins Greasewood Flat	S028	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
S075	Inter-Mountain Basins Juniper Savanna	S030	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
S065	Inter-Mountain Basins Mixed Salt Desert Scrub	S025	Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland
S071	Inter-Mountain Basins Montane Sagebrush Steppe	S091	Rocky Mountain Subalpine-Montane Riparian Shrubland
S090	Inter-Mountain Basins Semi-Desert Grassland	S074	Southern Rocky Mountain Juniper Woodland and Savanna
S079	Inter-Mountain Basins Semi-Desert Shrub Steppe	S085	Southern Rocky Mountain Montane-Subalpine Grassland
S011	Inter-Mountain Basins Shale Badland	S038	Southern Rocky Mountain Piñon-Juniper Woodland
S042	Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	S008	Western Great Plains Cliff and Outcrop
S115	Madrean Juniper Savanna	S086	Western Great Plains Foothill and Piedmont Grassland
S035	Madrean Pine-Oak Forest and Woodland	S095	Western Great Plains Riparian Woodland and Shrubland
S112	Madrean Piñon-Juniper Woodland	S088	Western Great Plains Shortgrass Prairie
S100	North American Arid West Emergent Marsh	-	-

## FOREST HEALTH CONSIDERATIONS

### Insects

Native insect epidemics within plant communities are usually part of a natural disturbance cycle similar to wildfire. They are often cyclic in nature and are usually followed by the natural succession of vegetation over time. Of primary interest are those that attack tree species because of the implications for fire management.

Present-day insect epidemics in forests are more extensive than they have been in the past (Kurz et al. 2008). This may be a result of drought-related stress and/or faster completion of insect life cycles due to warmer climate regimes. Stands of trees that have been killed by insects have varying degrees of associated fire danger depending on the time lapse following an insect attack and structure of the dead fuels that remain. However, forests with a large degree of mortality following an insect attack may have the potential to experience extremely high fire danger, especially if a large degree of needle cover remains in the canopy.

For the past two decades, forests and woodlands in the southwestern United States have been subjected to increased drought, insect infestation, and disease, which have resulted in a decline in forest health (Clifford et al. 2008). Mortality from drought and bark beetle infestation of ponderosa pine, piñon-juniper, and other forest and woodland species throughout the Southwest region increased dramatically between

2000 and 2008 (McDowell et al 2008). Piñon pine was especially affected, with over 1.9 million acres (774,771 hectares) of piñon across New Mexico and Arizona showing evidence of bark beetle attack by 2003. Some areas experienced greater than 90% piñon mortality (Gaylord et al. 2013), while juniper mortality was significantly lower. Piñon mortality was largely a result of the piñon ips bark beetle (*Ips confusus*), which generally attacks water-stressed or recently dead trees (Raffa et al. 2008). A plethora of recent research has focused on the effects that restoration treatments have on the species resistance/susceptibility to bark beetles in ponderosa pine forests (Gaylord 2013).

Insects that have infested or have the potential to infect the forests within and around the Bernalillo County CWPP planning area are discussed below.

**Bark Beetles (Ips Beetles)** (*Ips* spp. and *Dendroctonus* spp.). Ips beetles, also called engraver beetles, are native insects to North American forests. They attack ponderosa and piñon pines as well as other conifers and are responsible for piñon die-off in the region over the last several years. *Dendroctonus* beetles attack medium to large ponderosa pines, blue spruce (*Picea pungens*), Engelmann spruce, and Douglas-fir. Each of these species creates egg galleries, which are distinct to that species in form and shape, which eventually girdle the infected tree. The natural defense of a healthy, rigorous tree is to *pitch out*, or excrete sap into the beetle entrance holes, covering it with sap and killing the invader. Trees are most likely to be successful at this strategy when they are not stressed by competition as a result of high tree density or drought. Once a tree has been colonized, it cannot be stopped.

**Twig Beetle** (*Pityophthorus* spp.). Twig beetles frequently attack piñon pines, as well as other conifers and occasionally spruce. High populations of this poorly understood native beetle develop in drought-stressed and otherwise injured trees. Breeding is restricted to twigs and small branches. Fading branches throughout the crown and tan sawdust around the attack site can identify trees attacked by the twig beetle. Hand pruning and vigorous watering can sometimes control attacks.

**Piñon Needle Scale (Scale)** (*Matsucoccus acalyptus*). Scale is a native insect that has the appearance of small, black, bean-shaped spots on the piñon pine needles during outbreaks. Scale feeds on the sap of piñon pine needles, damaging cells and leading to decreased vigor, needle drop and dieback, and increased susceptibility to other insects or disease. Sometimes small trees are killed by repeated attacks, and larger trees are weakened to such an extent that they fall victim to attack by bark beetles. Repeated, heavy scale infestations leave trees with only a few needles alive at the tips of the branches. Destroying the eggs before they hatch can greatly reduce potential damage.

**Piñon Spindle Gall Midge (Midge)** (*Pinyonia edulicola*). Midges produce a spindle-shaped swelling from the needle base that is about 0.5 inch long. This insect is a common parasitic insect that rarely causes serious damage. Control is usually not necessary.

**Piñon Needle Miners (Needle Miners)** (*Coleotechnites edulicola*, *C. ponderosae*). Needle miners are locally common on piñon and ponderosa pines. The various species resemble one another in appearance and damage but have different life cycles. Damage first becomes evident as foliage browns. Closer examination reveals hollowed-out needles. Early needle drop, reduced growth, and tree mortality can result from needle miner infestation. Trees normally recover from needle miner damage without suffering serious injury, but the current drought may alter this.

**Roundheaded and Flatheaded Wood Borers** (Family *Cerambycidae* and Family *Buprestidae*). Roundheaded and flatheaded wood borers attack recently cut, dead, or dying trees and often create complex tunnel systems. Roundheaded borers are the most destructive and tunnel deep into the wood. Freshly cut logs in the woods or firewood stored at a home are common infestation sources. These borers are most prominent after a wildfire. They may also spread into vigas in homes.



**Juniper Borers** (*Callidium* spp.). Several juniper borers aggressively attack drought-stressed junipers throughout their range. Damage can be extensive before symptoms are apparent. Usually a large portion of the tree or the entire tree dies before the insects' exit holes are noticed. Larvae bore beneath the bark, making galleries and tunneling deep into the wood to complete their life cycle over the course of the winter.

**Tiger Moth** (*Halisidota argentata*). Tiger moth caterpillars are one of the most common defoliators throughout the West. The species typically selects only a few host trees within an area, and the impacts are thus generally limited. Tiger moth caterpillars defoliate host trees, and while the appearance may seem severe, the damage is generally nonlethal. Host species for tiger moth caterpillars include Douglas-fir, true fir, spruce, and pine, all of which exist in the higher plateau and mountain range elevations surrounding the planning area.

## Diseases

Diseases of trees, such as parasitic plants, fungi, and bacteria, can also affect forests in the Bernalillo County CWPP planning area. These diseases impact forest systems by degrading the productivity and health of the forest. Some of the more common forest diseases found in the county are described below. Trees that are killed by disease have similar potential to increase fire hazards.

**Mistletoe** (*Arceuthobium* spp., *Phoradendron* spp.). Both dwarf and true mistletoe are common in the forested regions of the planning area. Mistletoes are parasitic plants that gradually degrade tree vigor and may eventually kill their hosts over a long period of time following further infestation. Essential water and nutrients within the host are used by the mistletoe, thus depriving the host of needed food. Dwarf mistletoe is found on juniper, piñon pine, ponderosa pines, and firs. It is host-specific (i.e., the species that infects piñon does not infect other trees). True mistletoe is common on junipers in the Southwest. Both types of mistletoe spread from tree to tree and are difficult to control. Dwarf mistletoe spreads its seed by shooting berries; true mistletoe seeds are spread by birds. In residential areas, pruning can sometimes be effective on smaller trees. Heavy infestations in large trees can be controlled only by cutting down the trees and removing them to stop the spread of the mistletoe to other trees nearby.

**Fir Broom Rust** (*Melampsorella caryophyllacearum*). Fir broom rust is a species of fungus that has a broom appearance in the tree canopy. Fir broom rust is primarily a forest problem on white firs at higher elevations. A species also infects Engelmann spruce, but it is less common. These infections cause growth loss, top kill, and eventually tree mortality. Both species require alternate hosts to complete their life cycle. No chemical or biological control exists for fir broom rusts.

**Needle Cast** (*Elytroderma deformans*). Needle cast affects piñon and ponderosa pines. This disease can be damaging because it invades twigs and needles and persists for several years. Symptoms appear in the spring when the year-old needles turn brown 6 to 12 mm from the needle base.

**White Pine Blister Rust** (*Cronartium ribicola*). White pine blister rust can infect and kill local white pines, such as limber pine (*Pinus flexilis*) and southwestern white pine (*Pinus strobiformis*). Blister rust is a non-native disease caused by a fungus that first arrived in America in the early twentieth century from Asia and Europe. The complex life history of the fungus ultimately results in a lethal infestation of the host tree. The branch and stem canker that result from infestation can result in top kill, branch die-back, and eventually tree mortality.



## Physiological Stress

As climate change progresses, rising temperatures, prolonged growing seasons, and increased spatial and temporal variation in water availability are having considerable effects on tree physiology and health. When trees experience extreme water stress during periods of prolonged and/or intense drought considerable tree mortality can be exacerbated due to physiological stresses (Anderegg et al 2015; McDowell 2011; Park Williams et al. 2013). Usually, large-scale tree mortality is exacerbated by, and sometimes even caused by, one of or a combination of two physiological pressures: 1) hydraulic failure – this is more common and occurs when a tree’s water column (its xylem) is no longer able to transport water to its leaves due to the column embolizing under extreme tension; 2) carbon starvation – this occurs when a tree consumes more sugars than it photosynthesizes due to limited photosynthesis during prolonged drought (Adams et al. 2009; McDowell 2011; Venturas et al. 2020). During periods of extreme drought, physiological stress can inhibit plant and tree defenses (due to the limits on photosynthates being mobilized for defense) and make trees more susceptible to disease pests and pathogens. Furthermore, extreme water stress in trees can also make forests more prone to extreme fire events. Large-scale forest die-offs in New Mexico in the 1990s and twenty-first century during periods of intense drought have been linked and attributed to physiological stress (Allen 2014).

## WILDLIFE

Vegetation management treatments are commonly applied throughout the county to benefit habitat for general wildlife species or game habitat. Most native wildlife species found in the region evolved with a frequent fire regime. However, impacts to wildlife should still be considered when planning fuel treatments.

## THREATENED AND ENDANGERED SPECIES

Bernalillo County is home to six threatened and endangered species. Endangered species are the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), the southwestern willow flycatcher (*Empidonax traillii extimus*), and the Rio Grande silvery minnow (*Hybognathus amarus*). Threatened species are the Mexican spotted owl (*Strix occidentalis lucida*), the yellow-billed cuckoo (*Coccyzus americanus*), and the monarch butterfly (*Danaus plexippus*). Additionally, Bernalillo County contains critical habitat for the Mexican spotted owl and the Rio Grande silvery meadow (USFWS 2021).

Treatments on federal land would be subject to the National Environmental Policy Act (NEPA) and associated analysis of impacts to these species. Treatments in areas that may impact threatened and endangered species would require application of certain mitigation measures to prevent degradation to habitat.

## MANAGEMENT OF NON-NATIVE PLANTS

The USDA maintains a list of introduced, invasive, and noxious plants by state (USDA 2022). Fuel treatment approaches should always consider the potential for introduction or proliferation of invasive non-native species as a result of management actions. Fuel treatments typically include monitoring and treatment of noxious weeds, especially those that can increase fire risk shortly after a treatment (e.g., burningbush [*Kochia scoparia*] and cheatgrass [*Bromus tectorum*]). Other fuel treatments, such as mowing and fuel reduction projects, could create areas of disturbance that may provide suitable

conditions for invasive establishment and propagation. Land managers should monitor for invasives before and after all fuel treatments and employ appropriate treatment and management strategies to mitigate potential risks from invasive/noxious species. However, areas of the county, especially within the WUI, with considerable noxious weed infestation can create areas of high fire risk. Land managers should target these areas for invasive treatments/removal and native plant restoration. Finally, certain species, particularly cheatgrass, have significantly altered the fire regime for much of the vegetation ecology in Bernalillo County. Land managers should carefully consider the ecological impacts of treatments in areas which already have established invasive populations and consider how fuel treatments may impact (i.e., increase or decrease) these populations.

## PUBLIC EDUCATION AND OUTREACH PROGRAMS

Public education and outreach programs are a common factor in virtually every agency and organization challenged by wildfires. A goal identified in the Albuquerque/Bernalillo County 2022 Hazard Mitigation Plan is to mitigate the risk of wildfire damage to life and property by public education and outreach activities (Bernalillo County et al. 2022). Detailed information regarding fire education programs that can support existing efforts by the County is provided in Appendix A.

## LOCAL AND STATE PROGRAMS

### Albuquerque Fire Rescue Wildland Fire Task Force

Albuquerque Fire Rescue (AFR) offers fire prevention and safety education programs to elementary school students. The programs are offered throughout the year but are focused in October, during National Fire Prevention Week. AFR also offers fire safety and prevention to children, seniors, and local businesses in the community. In addition, AFR offers classes regarding the basic types of extinguishers, their components, and when and how to use one (City of Albuquerque 2022e).

To view other educational resources offered by AFR, visit: <https://www.cabq.gov/fire/safety-information/wildfire-safety>

### Bernalillo County Fire & Rescue

BCFR offers various resources for topics such as fire planning, home safety, disaster preparedness, evacuation planning, and communication plans. The fire related resources include the BCFR's special response instructions, which include the Citizen Address Response Enhancement 911 Program (CARE). The CARE program provides special instructions and information to the 911 operator before an emergency occurs. Vital information that the CARE program can provide includes gate codes for providing quick access, instructions that notify responders of latchkey kids, and relevant special needs of community residents. BCFR also has a community outreach program that allows the community to see and talk to members of the department and get up-to-date material and information on fire safety and prevention for their homes, businesses, and schools (Bernalillo County 2022c).

BCFR also has an active fire prevention program. This program assists design and construction professionals in building fire-resistant structures. It also assists homeowners in making structures fire resistant. Resources in the fire prevention program include detailed instructions on fire plan requirements, a WUI ignition-resistant construction manual, a reference guide for fire safety for people with disabilities,

the Red Cross Fire Safety Guide, a check list for home fire safety and prevention, a list fire hazards in the home, and guide to preventing kitchen fires (Bernalillo County 2022c).

You can find more information on the BCFR preparedness program located here:  
<https://www.bernco.gov/fire/>

## New Mexico Energy, Minerals, and Natural Resources Department Forestry Division

The EMNRD Forestry Division participates in various nationally recognized programs that guide homeowners and landowners with wildfire prevention and preparation. The EMNRD Forestry Division collaborates with local, state, federal, and tribal partners on public education efforts to promote fire prevention and education throughout New Mexico.

Interagency programs used by the EMNRD Forestry Division include:

- Ready, Set, Go!
- Smokey Bear
- Living with Fire
- Fire Adapted Communities
- Firewise USA

For more information please visit: <https://www.emnrd.nm.gov/sfd/fire-prevention-programs/>

## Bureau of Land Management - New Mexico

The BLM New Mexico Office conducts fire prevention and education programs and coordinates interagency fire messaging throughout the state and within the Southwest geographic area. This includes broad and targeted public messaging via social media, traditional media, and interagency prevention and mitigation publications with cooperators such as the recent revisions of Ready, Set, Go and NM Living with Fire. This also includes the funding and maintenance of the primary interagency fire information site in the state, NMFireInfo.com. Through a partnership with New Mexico Counties, the BLM funds the Wildfire Risk Reduction Grant Program that includes awards for education and outreach, CWPPs, and fuels reduction projects to local government, tribes, and non-profit entities. In addition, the BLM provides support to the Fire Adapted New Mexico Learning Network and has provided support to the Bernalillo area (BLM 2020b).

## NATIONAL PROGRAMS

### Ready, Set, Go!

The Ready, Set, Go! Program, which is managed by the International Association of Fire Chiefs, was launched in 2011 at the WUI conference. The program seeks to develop and improve the dialogue between fire departments and residents, providing teaching for residents who live in high-risk wildfire areas—and the WUI—on how to best prepare themselves and their properties against fire threats (International Association of Fire Chiefs 2021). The County utilizes the Ready, Set, Go Program for their public outreach with a focus on making communities “fire adapted”.

The tenets of Ready, Set, Go! as included on the website (<http://www.wildlandfirersg.org>) are:

**Ready** – Take personal responsibility and prepare long before the threat of a wildland fire so your home is ready in case of a fire. Create defensible space by clearing brush away from your home. Use fire-resistant landscaping and harden your home with fire-safe construction measures. Assemble emergency supplies and belongings in a safe place. Plan escape routes and ensure all those residing within the home know the plan of action.

**Set** – Pack your emergency items. Stay aware of the latest news and information on the fire from local media, your local fire department, and public safety.

**Go** – Follow your personal wildland fire action plan. Doing so will not only support your safety but will allow firefighters to best maneuver resources to combat the fire.

## National Fire Protection Association

The NFPA is a global non-profit organization devoted to eliminating death, injury, property, and economic loss due to fire, electrical, and related hazards. Its 300 codes and standards are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation around the world.

The NFPA develops easy-to-use educational programs, tools, and resources for all ages and audiences, including Fire Prevention Week, an annual campaign that addresses a specific fire safety theme.

The NFPA's Firewise Communities program ([www.firewise.org](http://www.firewise.org)) encourages local solutions for wildfire safety by involving homeowners, community leaders, planners, developers, firefighters, and others in the effort to protect people and property from wildfire risks.

The NFPA is a premier resource for fire data analysis, research, and analysis. The Fire Analysis and Research division conducts investigations of fire incidents and produces a wide range of annual reports and special studies on all aspects of the nation's fire problem.

## National Interagency Fire Center

The National Interagency Fire Center (NIFC) provides a wide array of fire resources and services.

The National Interagency Coordination Center offers communication assistance to over 32,000 firefighters and 50 major events at one given time (NIFC 2021c). The Predictive Services Group creates wildfire forecasts and predictions from fuel and weather data. The NIFC has a Remote Automated Weather Base with over 2,000 weather stations which help inform the Predictive Services Group.

The National Wildfire Coordinating Group, which is nested under the NIFC, provides operational coordination to federal, state, local, tribal, and territorial partners (NIFC 2021c). The NIFC also has a training branch where training curriculums are developed to be used across the nation. For those too young to participate in the standard trainings, the NIFC offers FireWorks, an educational program designed for kids K-12. The program teaches children topics such as wildland fire science, ecosystem fluctuations, human interaction on the environment, and other environmental science topics (NIFC 2021d). The NIFC also provides public education resources (NIFC 2021e):

- [Wildfire Readiness – Home](#)
- [Wildfire Readiness – Business](#)
- [Wildfire Readiness – Farm and Ranch](#)
- [Weekend Wildfire Preparedness](#)

- [What to Do if a Wildfire is Approaching](#)
- [Wildfire Risk – Community](#)
- [Prepare and Protect Your Home](#)
- [Prepare Your Community](#)
- [One Less Spark, One Less Wildfire](#)
- [Only You Can Prevent Wildfires](#)

## U.S. Fire Administration's WUI Toolkit

The U.S. Fire Administration (USFA) is an entity of the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) that aids in the preparation for and response to fire. Their WUI toolkit consists of a list of websites and other information regarding risk assessments, public outreach, and community training. Find the toolkit here: <https://www.usfa.fema.gov/wui/training/>

## WILDFIRE RESEARCH CENTER (WiRē)

Wildfire Research Center (WiRē) is a non-profit organization that works with local wildfire services to achieve community-tailored pathways which reduce risk to wildfire while simultaneously promoting pathways to fire adaptation. WiRē's mission states that fire adaptation is "about living with fire", while "creating safe and resilient communities that reduce wildfire risk on their properties before a fire, and supporting effective response when fires threaten a community." WiRē states that wildfire is an integral component of many ecosystems, and that fire must be allowed, when safe, as to ensure the health of forests. Core to WiRē's approach are four main concepts. One, residents are critical actors in the wildland-urban interface wildfire problem. Two, action is central to adaptation. Three, people and their decisions are complex. Finally, four, decisions are not made in a vacuum. To achieve its goals and serve communities, WiRē will typically conduct a "rapid wildfire risk assessment," which assesses what contributes to wildfire risk, such as, building materials, vegetation near homes, background fuels, local topography, and access to emergency fire services. Additionally, they also conduct "social surveys", which assess residents' perceptions about wildfire, wildfire risk, risk mitigation behavior, and assess their willingness towards taking action to reduce wildfire risk.

For more information, please visit <https://wildfireresearchcenter.org/>.

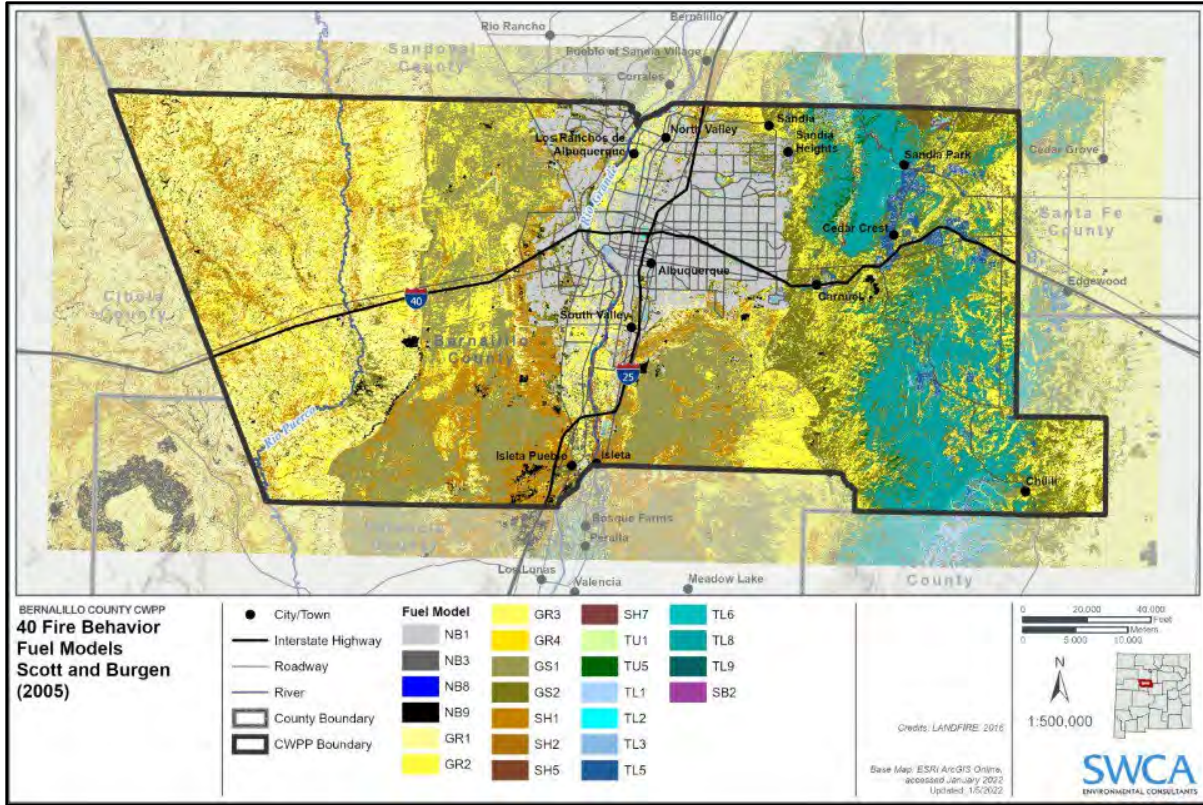


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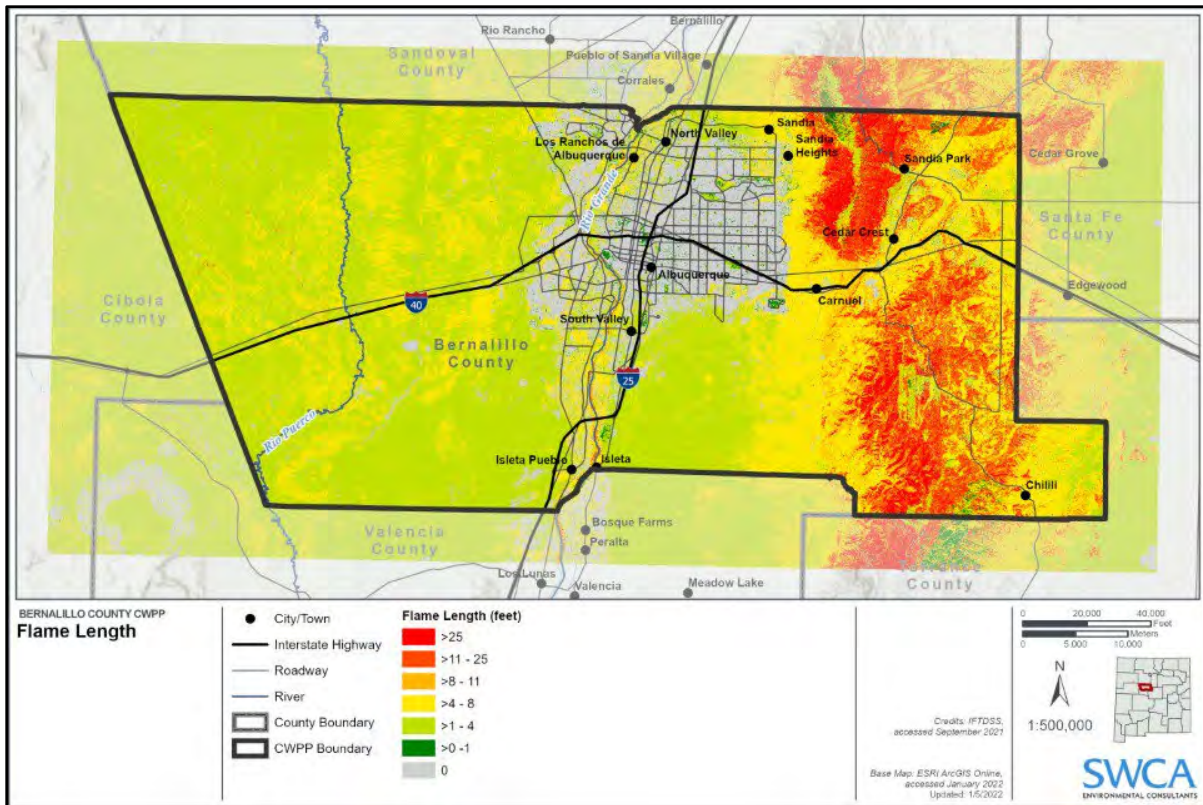
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APPENDIX B:  
Additional Mapping

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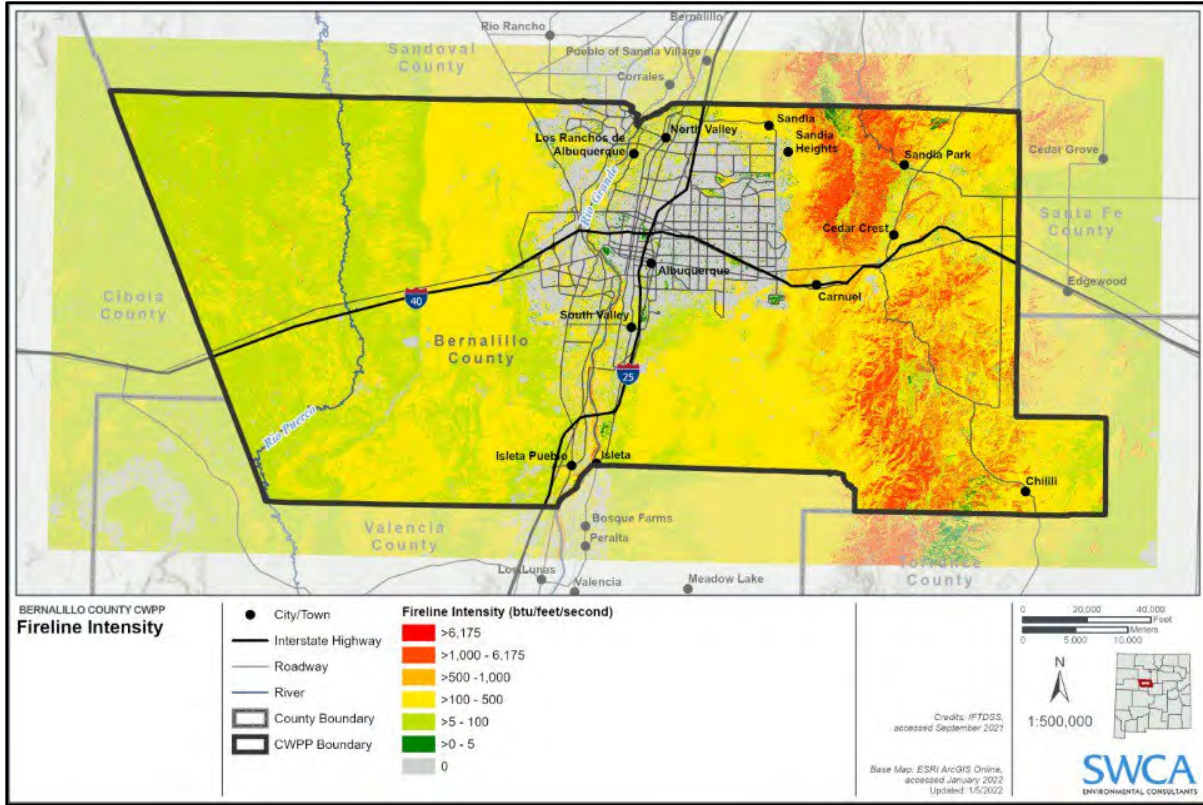


Map 1. Scott and Burgan 40 Fire Behavior Fuel Models.

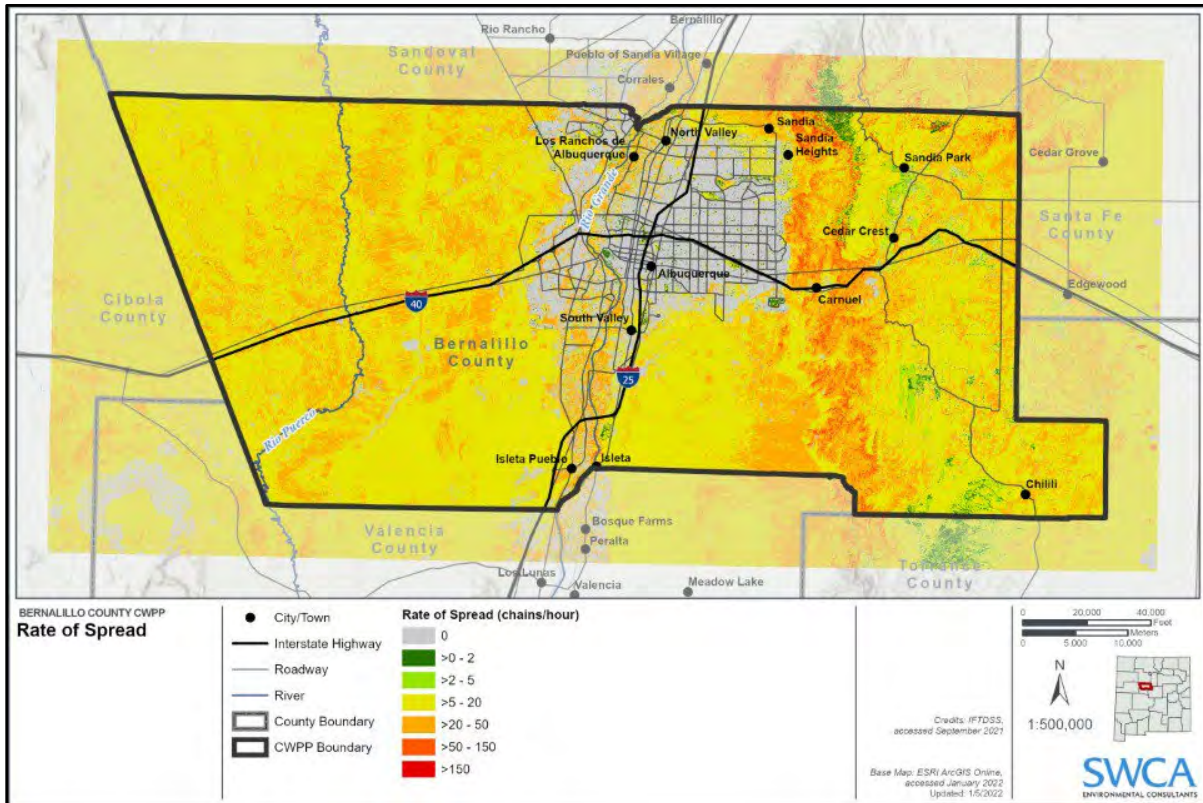


Map 2. Fire behavior model output: flame length.



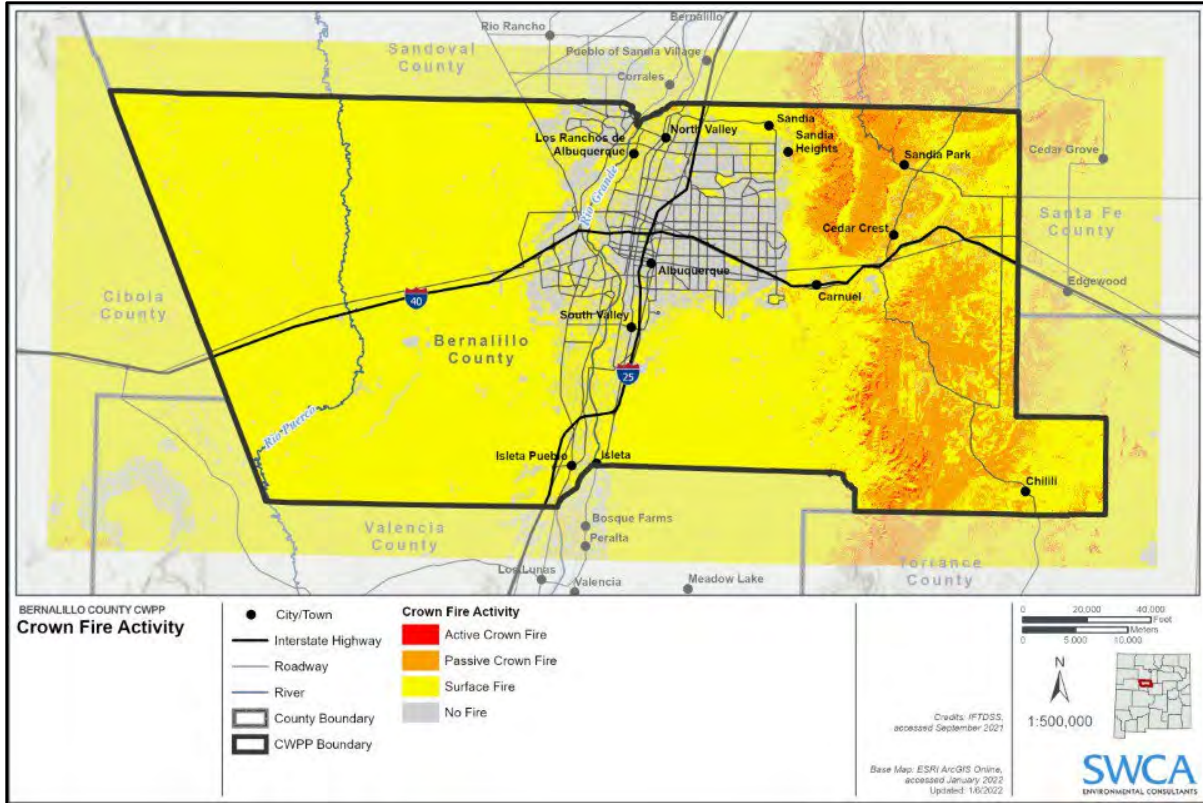


Map 3. Fire behavior model output: fireline intensity.

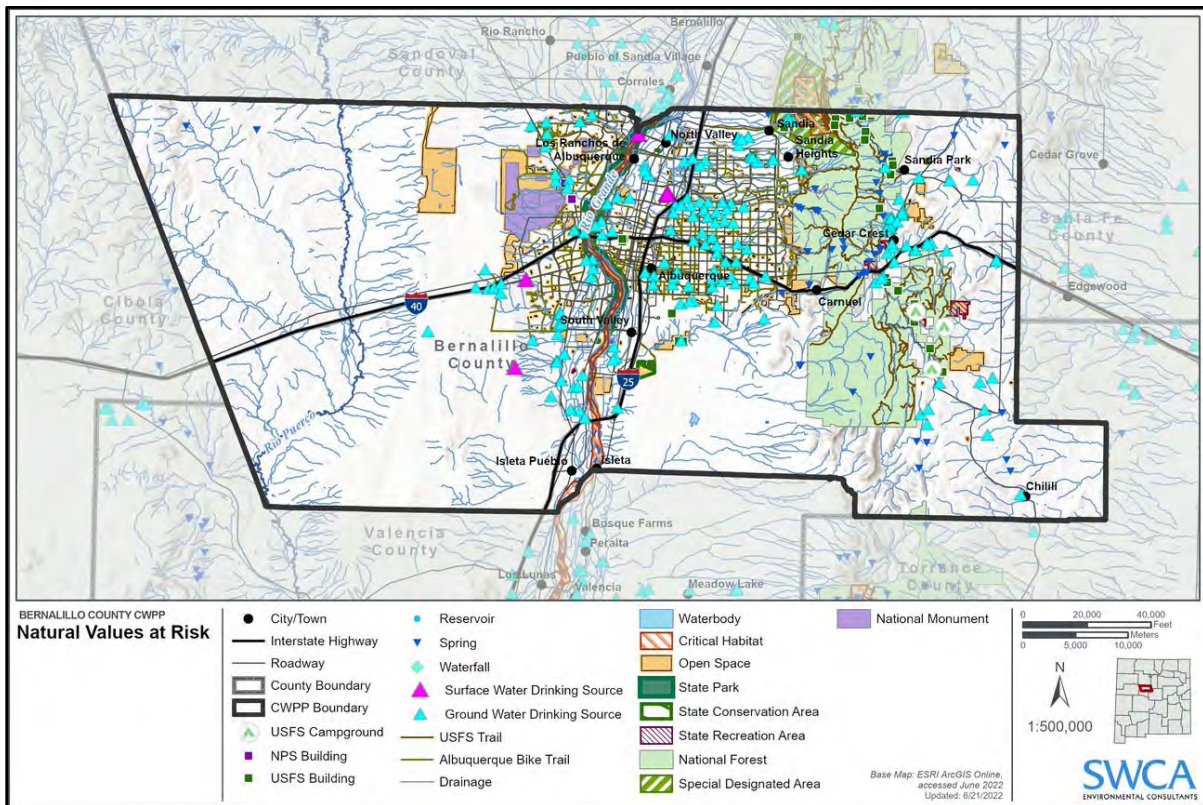


Map 4. Fire behavior model output: rate of spread.



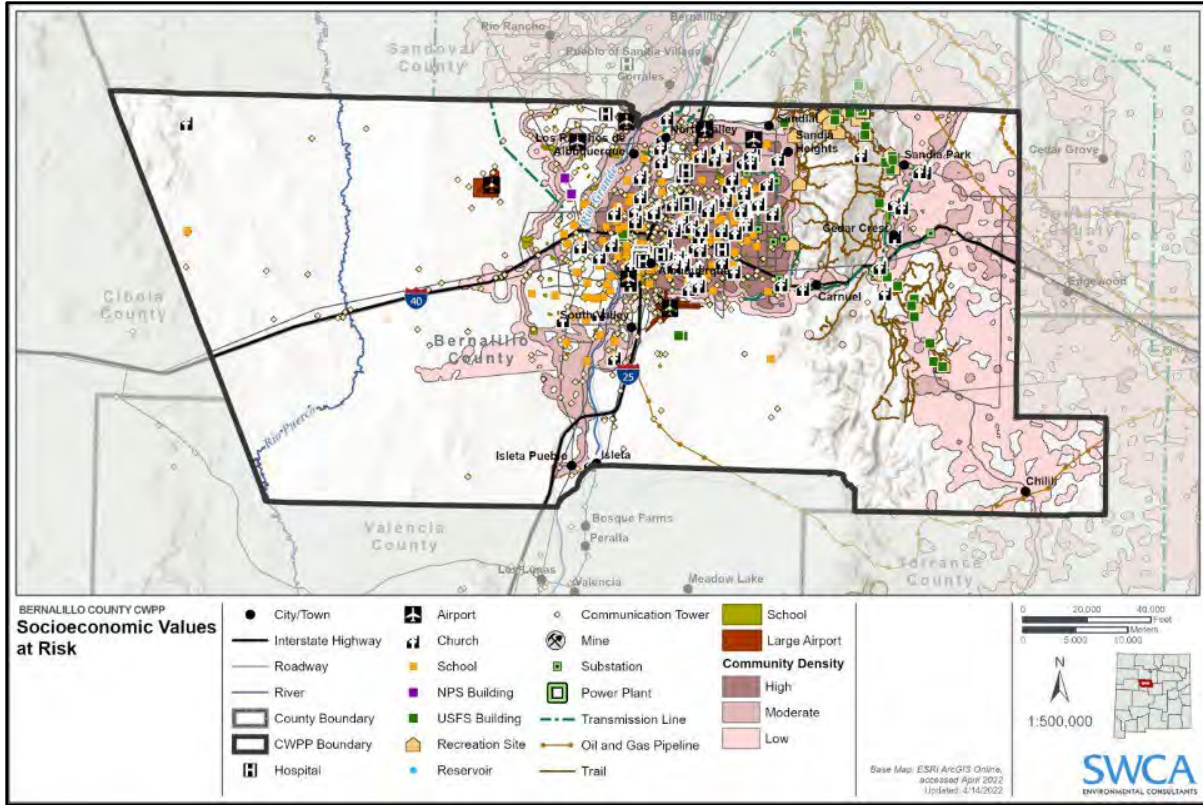


Map 5. Fire behavior model output: crown fire activity.

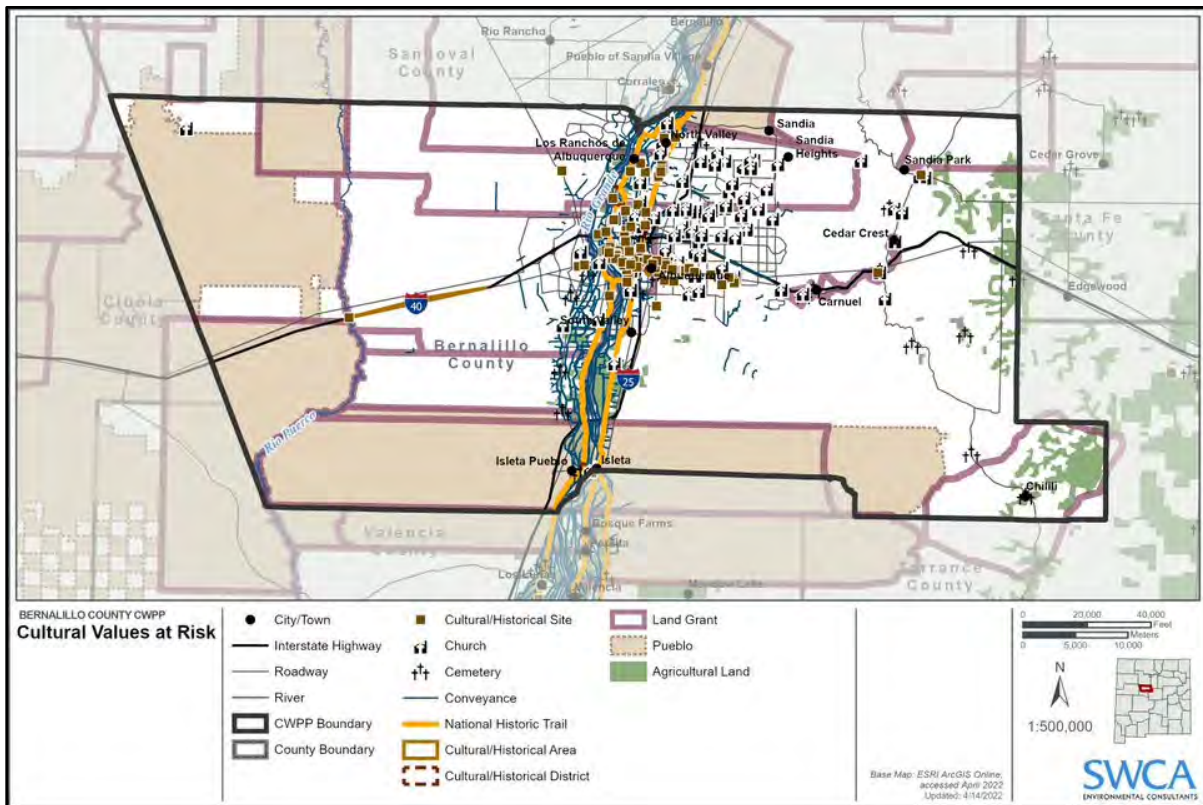


Map 6. Natural values at risk.

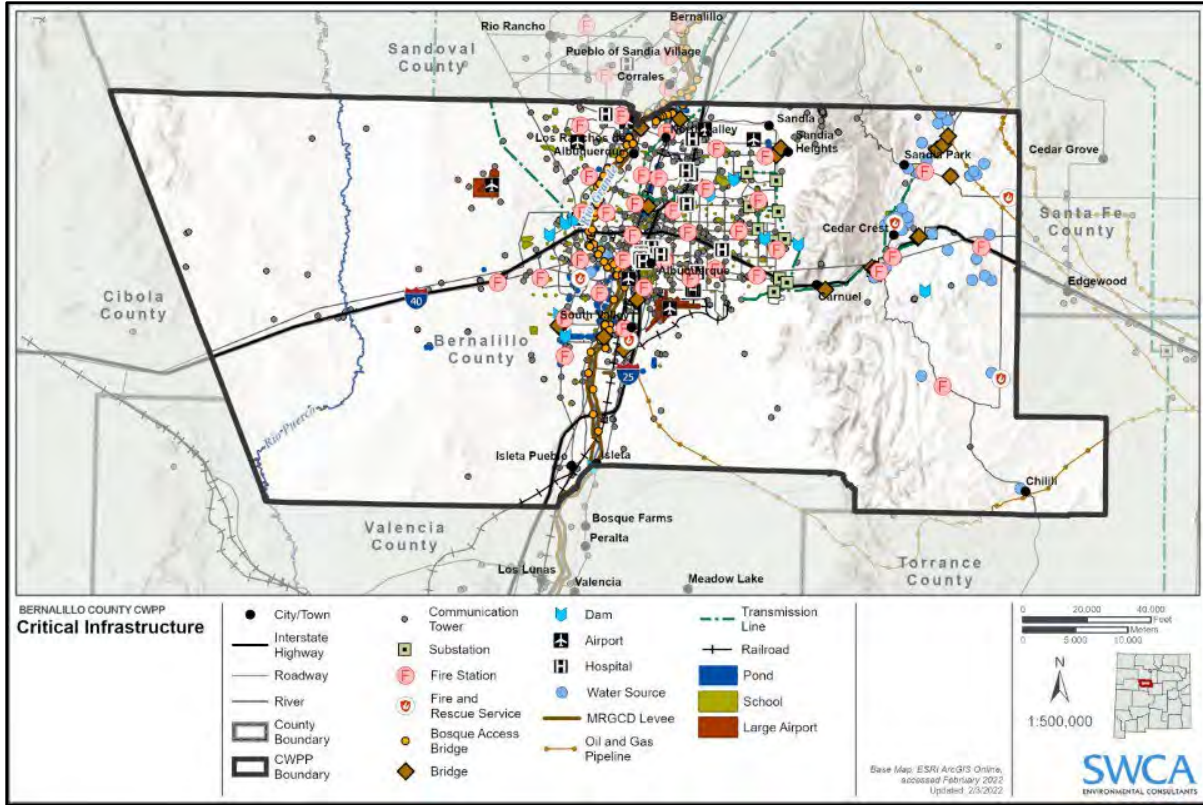




Map 7. Socioeconomic values at risk.



Map 8. Cultural values at risk.



Map 9. Critical infrastructure.

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APPENDIX C:  
Core Team List



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## CORE TEAM LIST

Organization	Name
Bernalillo County Open Space	Adam Splitek
Village of Corrales	Anthony Martinez
Edgewood SWCD	Brenda Smythe
USFS Sandia Ranger District	Chris Kirby
EMNRD	Chris Romo
City of Albuquerque Open Space	Colleen Langan-McRoberts
Bernalillo County Fire & Rescue	Danny Valenzuela
Isleta Pueblo	Derek Janer
Albuquerque/Bernalillo County Water Authority	Diane Agnew
Claunch Pinto SWCD	Dierdre L. Tarr
Isleta Pueblo	Lester Gary
New Mexico State Parks	Heather MacCurdy
Village of Tijeras	Jake Burton
Bernalillo County Fire & Rescue	Javier Torres
Fish and Wildlife Service (Valle del Oro)	Jennifer Owen-White
Bernalillo County Office of Emergency Management	Jerome Macdonald
City of Albuquerque Fire Rescue (AFR)	Joseph Kandel
Chilili Land Grant	Juan Sanchez
U.S. Fish and Wildlife Service	Ken Roberts
Bernalillo County Open Space	Mari Simbaña
New Mexico State Land Office	Mark Meyers
Torrance County	Matt Propp
Sandia Pueblo	Michael Scialdone "Scial"
Santa Fe County	Mike Feulner
National Park Service	Nancy Hendricks
Ciudad SWCD	Sean Ludden
Ciudad SWCD	Steve Glass
New Mexico State Forestry	Todd Haines
Bureau of Land Management	Todd Richards
Middle Rio Grande Conservancy District	Yasmeen Najmi
Bernalillo County Fire & Rescue	Zachary Lardy
Bureau of Indian Affairs Southern Pueblos Agency	Myron Sheche
Kirtland Wildland Module	Clyde Burris
Tijeras Fire Department	Kyle Kollo

Organization	Name
PNM Business Continuity Specialist	Seth Muller
Cody Stropki	SWCA Environmental Consultants
Paul Makarewicz	SWCA Environmental Consultants
Victoria Amato	SWCA Environmental Consultants
Anne Russel	SWCA Environmental Consultants
Breanna Plucinski	SWCA Environmental Consultants
Montiel Ayala	SWCA Environmental Consultants
Tim Clute	SWCA Environmental Consultants

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## APPENDIX D:

Community Risk-Hazard Assessments for WUI Communities

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# BERNALILLO COUNTY CWPP WILDLAND URBAN INTERFACE COMMUNITIES COMMUNITY ASSESSMENT SUMMARIES

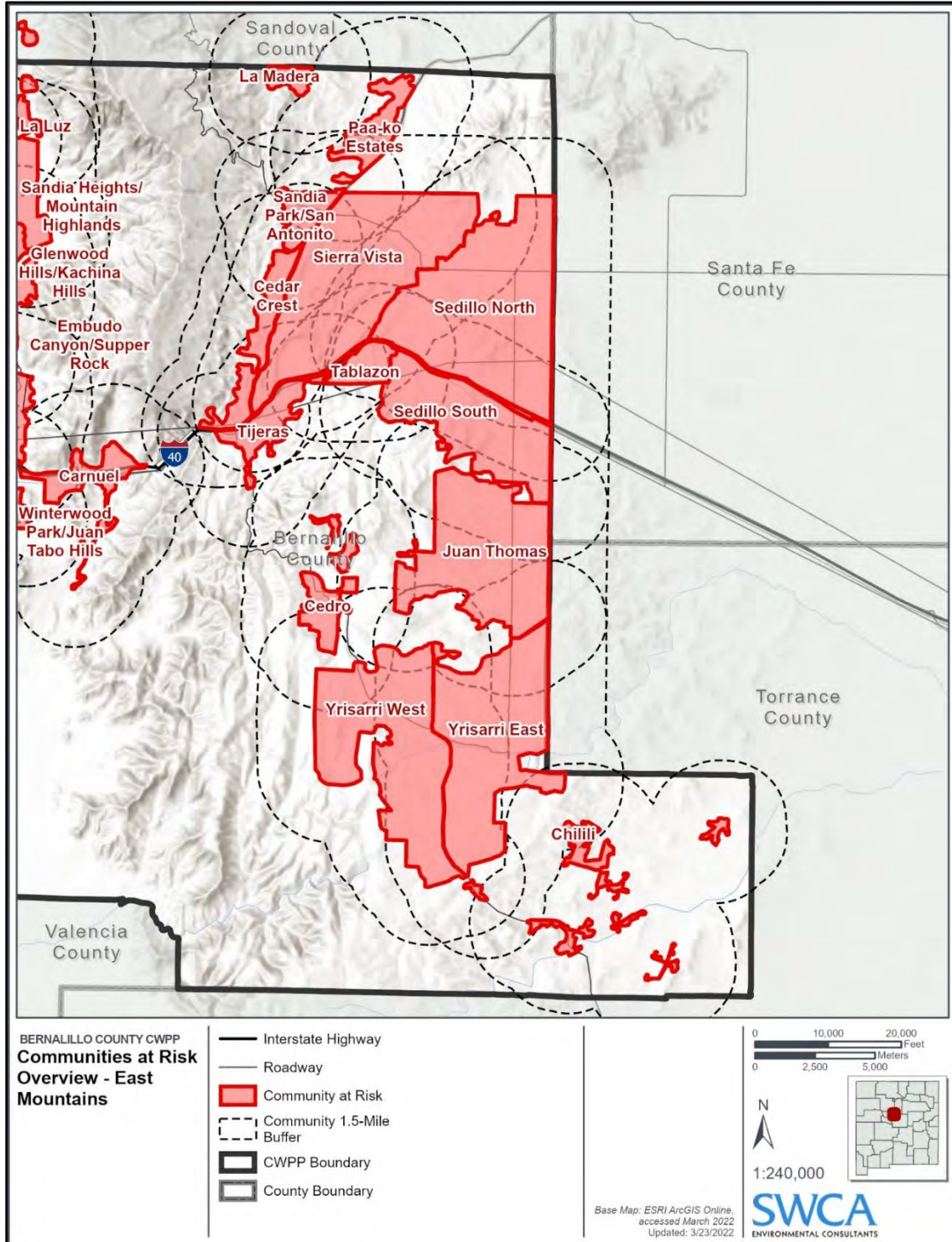


Figure D.1. East Mountains community polygons.



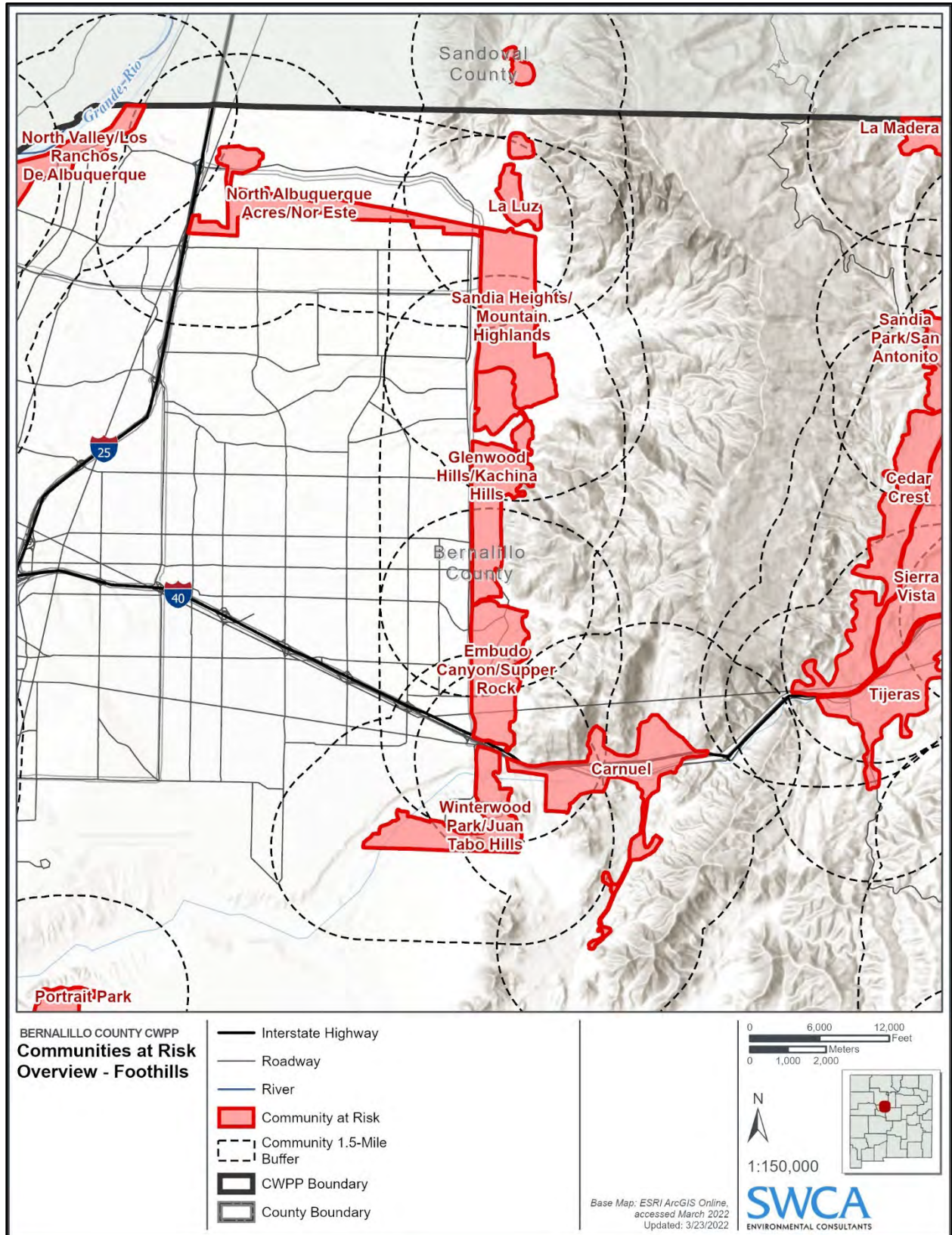


Figure D.2. Foothill community polygons.



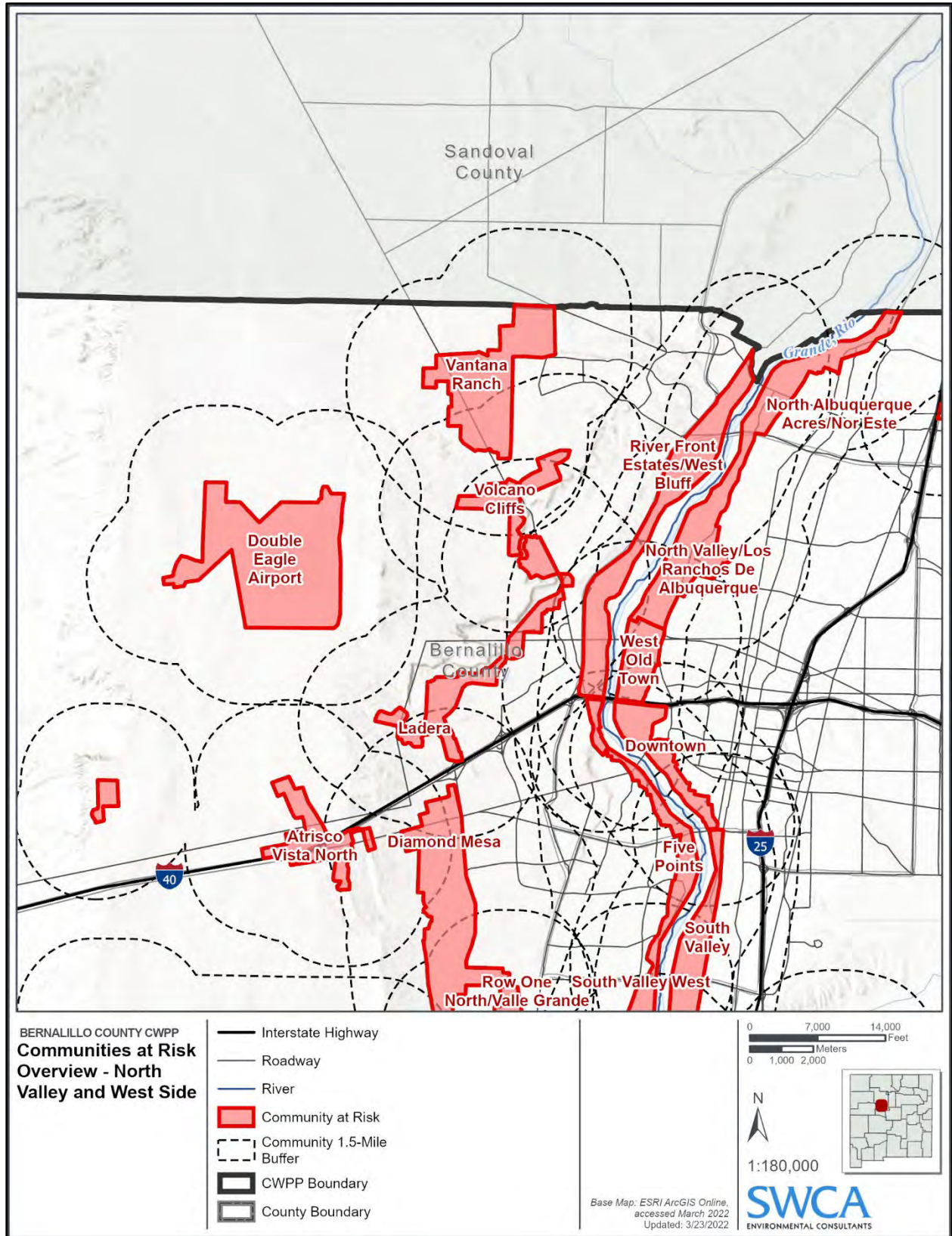


Figure D.3. North Valley and West Side community polygons.



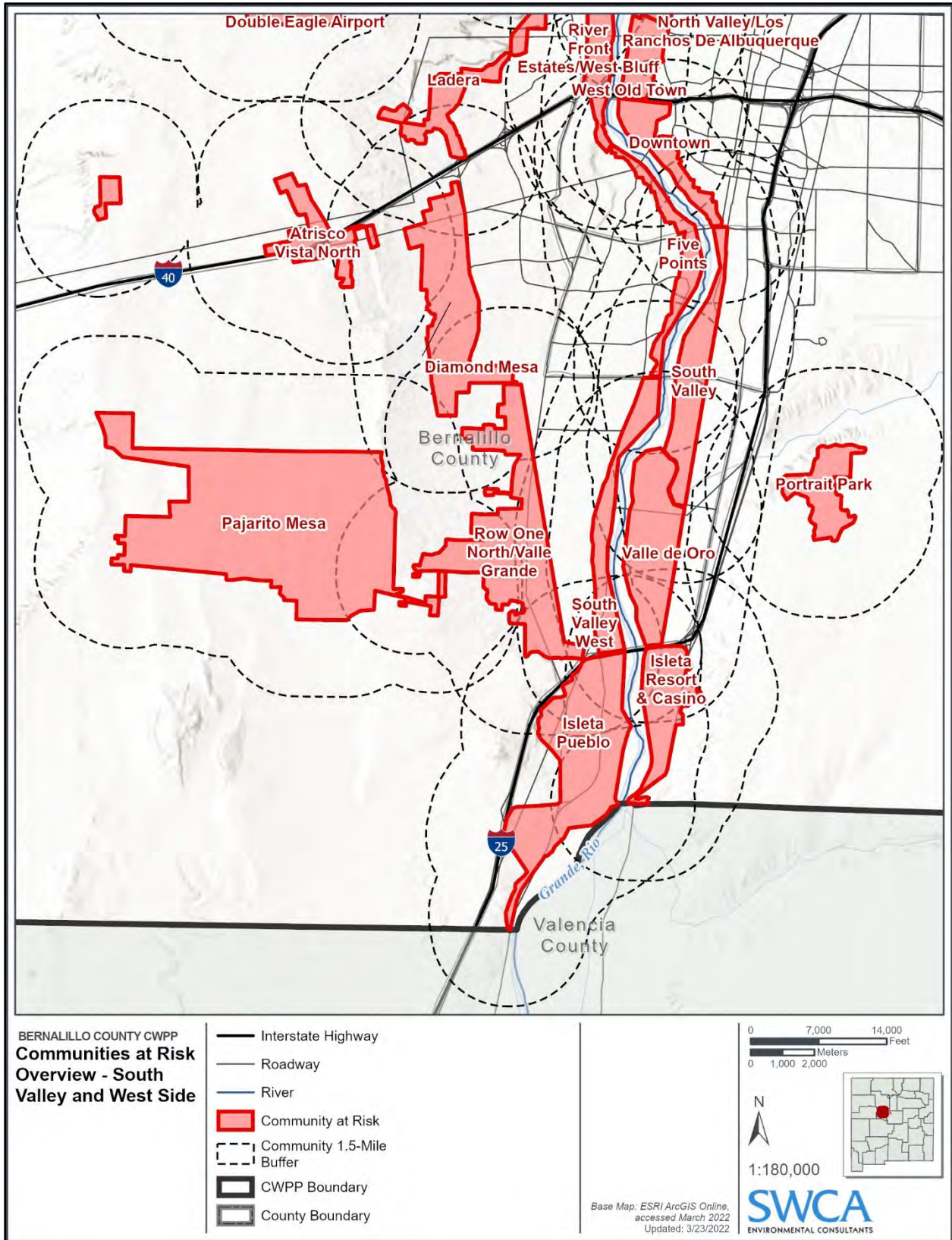


Figure D.4 South Valley and West Side community polygons.

## 1.5-MILE WUI BUFFERS\*

According to the HFRA, the WUI can be defined by a CWPP. In this CWPP, the WUI is defined as an area extending 1.5 miles from the boundary of an at-risk community.

The following maps (and the four above) represent the WUI boundaries for each community, which were delineated by the Core Team and visited in the field during the NFPA assessments. The 1.5-mile buffer represents an area where WUI fuel treatments should be considered in order to provide additional protection to the community from potential wildfire spread. In some cases, the WUI may extend beyond the 1.5-mile area to meet a strategic suppression point or topographic feature to enhance protection, as dictated by land management agencies.

The maps use different scales to provide detail, but all buffer distances are the same (1.5 miles).



## WUI COMMUNITY #1: WILDLAND URBAN INTERFACE COMMUNITIES

### ATRISCO NORTH POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Atrisco Vista North	<b>Total Score:</b> 30	<b>Rating:</b> Low
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.2		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 255.3		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.7
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
31.6%	28.1%	10.3%	0.0%	1.0%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0%	0-5 minutes: 2.7%
4-8 (ft): 0.0%	5-10 minutes: 13.3%
8-12 (ft): 0.0%	10-15 minutes: 47.9%
>12 (ft): 0.0%	15+ minutes: 36.2%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> Albuquerque Fire Rescue (AFR) #14 and Bernalillo County Fire & Rescue (BCFR) # 33				
<u>Fulltime Firefighters:</u> 36		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 2	2	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 2</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Buildings made from modern materials</li> <li>• Sparce low grasses</li> <li>• Multiple ingress/egress</li> <li>• Ample fire hydrant access</li> </ul>	<ul style="list-style-type: none"> <li>• Single wide trailers are made from a mix of materials</li> <li>• Some construction yards have exposed combustible materials</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• Grasslands on the top of Pajarito Mesa.</li> </ul>

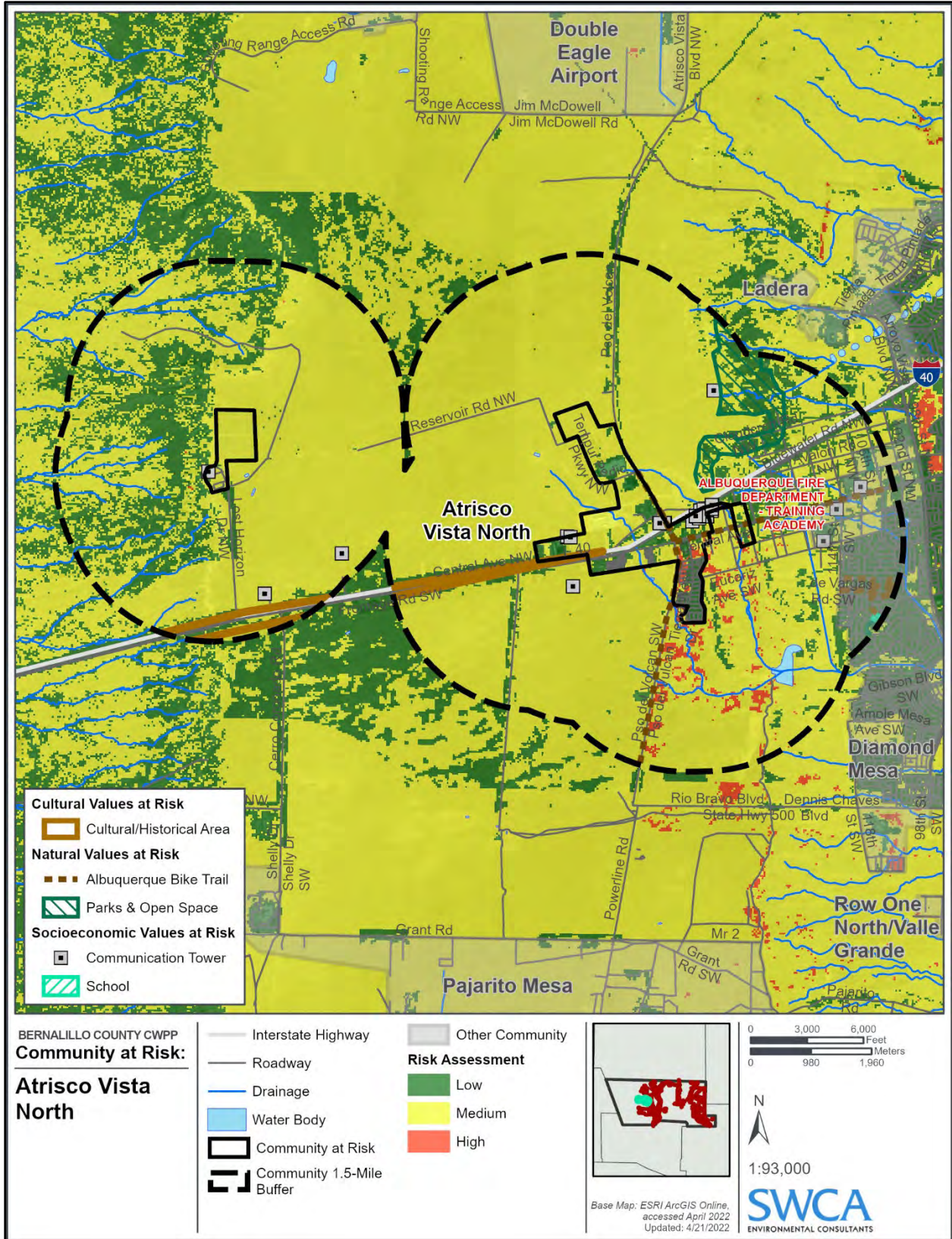


Figure D.5. Atrisco Vista North polygon.



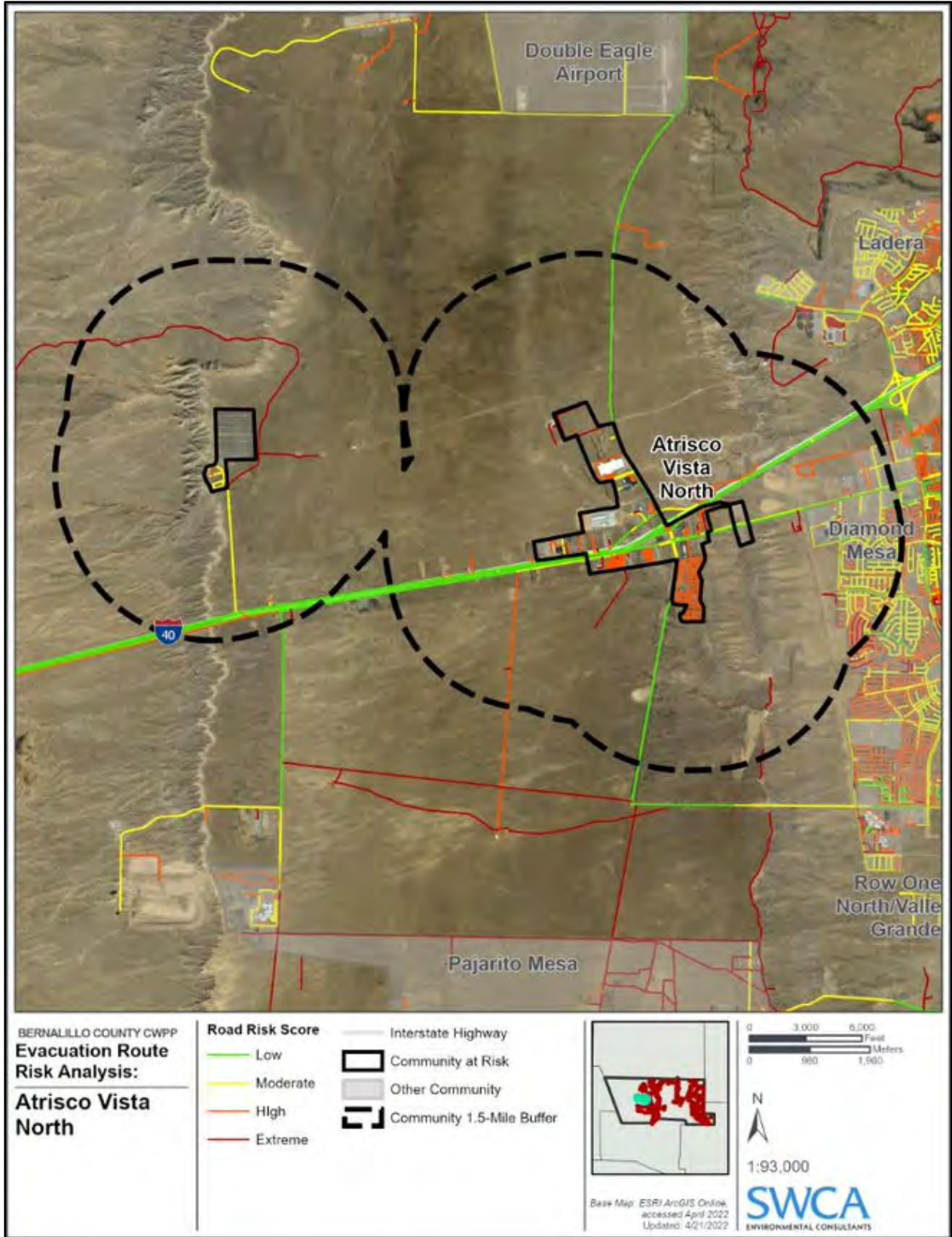


Figure D.6. Evacuation route risk analysis for Atrisco Vista North.

## WUI COMMUNITY # 2: WILDLAND URBAN INTERFACE COMMUNITIES

### CARNUEL POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Carnuel	<b><u>Total Score:</u></b> 114	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.4		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 433.9		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 2.1
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
12.4%	44.7%	0.2%	11.0%	10.9%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 98.6%	0-5 minutes: 0.02%
4-8 (ft): 0.2%	5-10 minutes: 0.1%
8-12 (ft): 0.0%	10-15 minutes: 86.3%
>12 (ft): 0.1%	15+ minutes: 13.8%



<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #40 and AFR #12				
<u>Fulltime Firefighters:</u> 36		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 2	2	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 2				
<u>Recent Fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 18</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• East Mountain CWPP</li> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Access to Interstate Highway 40 and Route 66</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Overall poor combustible materials used for building materials</li> <li>• Dirt roads with narrow turnarounds</li> <li>• Continuous fuel buildup around residences located south of I-40</li> <li>• Continuous fuels within the area.</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• Urban interface zone with structures in the intermix as well.</li> <li>• Difficult access.</li> <li>• Limited egress.</li> <li>• Limited water supply.</li> </ul>

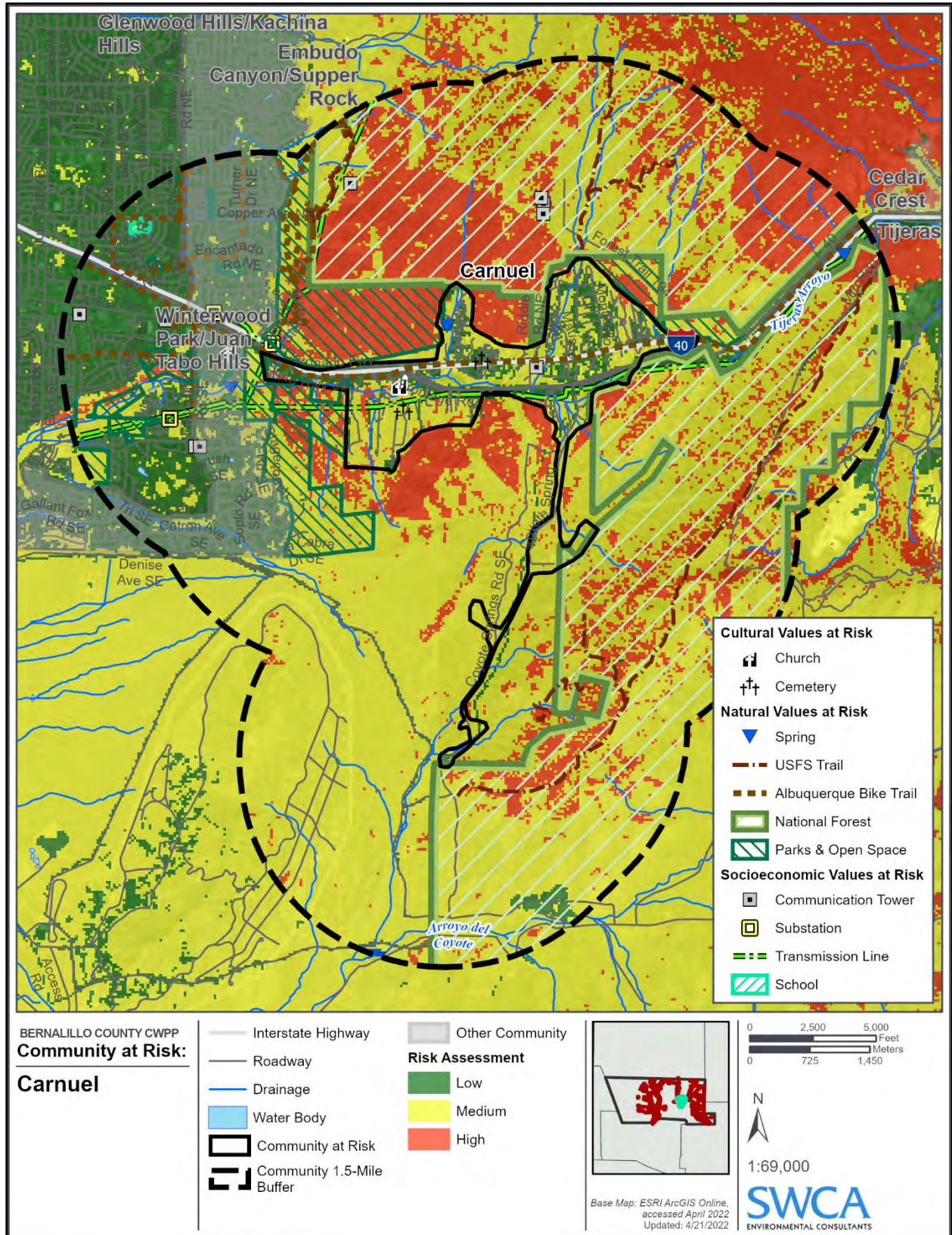


Figure D.7. Carnuel polygon.



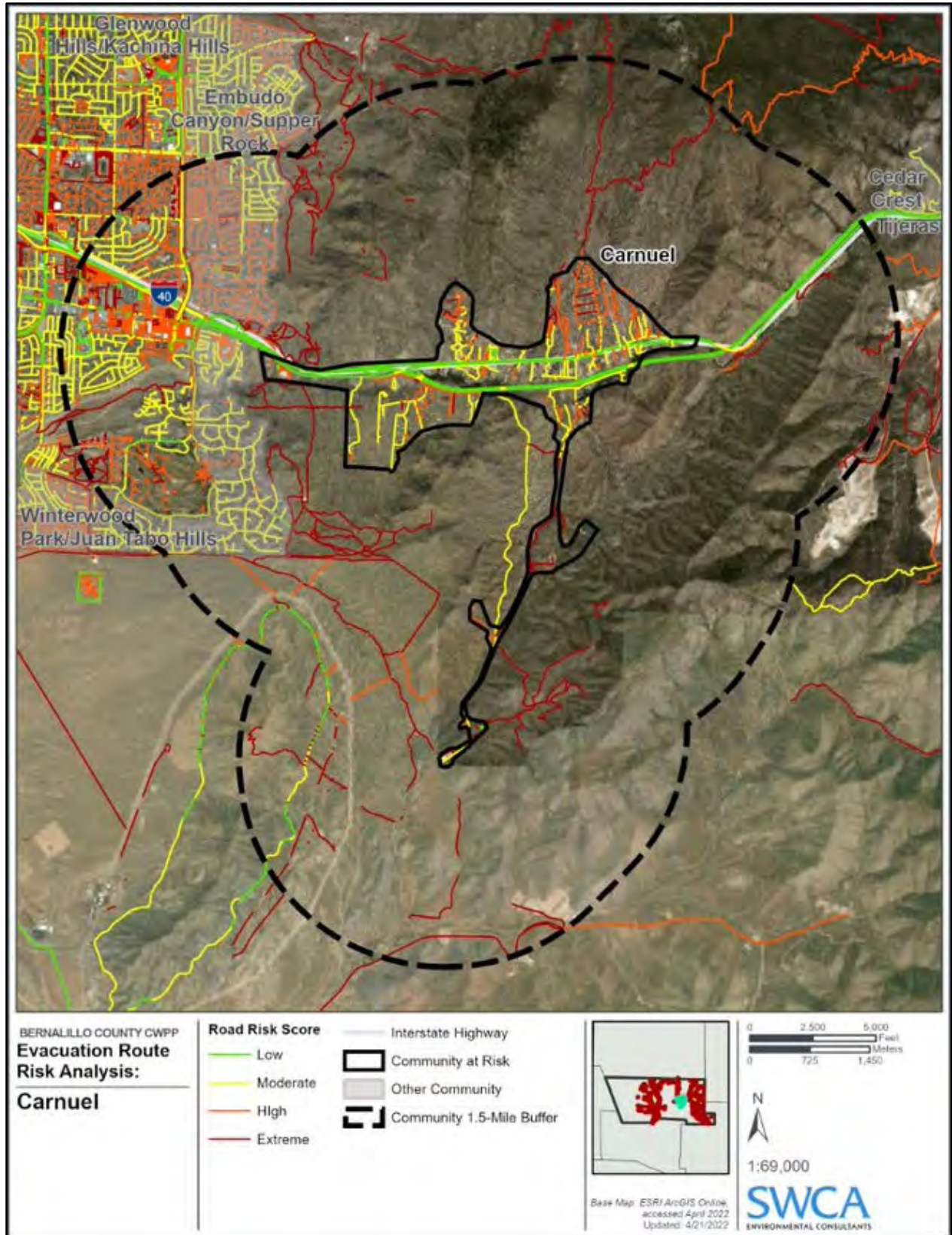


Figure D.8. Evacuation route risk analysis for Carnuel.

## WUI COMMUNITY # 3: WILDLAND URBAN INTERFACE COMMUNITIES

### CEDAR CREST POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Cedar Crest	<b><u>Total Score:</u></b> 99	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 2.2		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 265.1		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 2.6
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
8.2%	15.7%	0.4%	0.2%	60.4%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 98.3%	0-5 minutes: 0.2%
4-8 (ft): 1.9%	5-10 minutes: 32.1%
8-12 (ft): 0.4%	10-15 minutes: 52.3%
>12 (ft): 0.2%	15+ minutes: 15.5%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #40 and #46				
<u>Fulltime Firefighters:</u> 33		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 2	2	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 5</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• East Mountain CWPP</li> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Modern materials used for building construction</li> <li>• Fuels treatments to the west of the community</li> </ul>	<ul style="list-style-type: none"> <li>• Narrow roads with limited turnarounds</li> <li>• Continuous high-load fuels around houses</li> <li>• Intermittent road signs</li> <li>• One-way ingress/egress</li> <li>• Defensible space is limited</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• Access limitations.</li> <li>• Structures in the interface and the intermix.</li> <li>• Limited egress.</li> <li>• Limited water supply.</li> </ul>



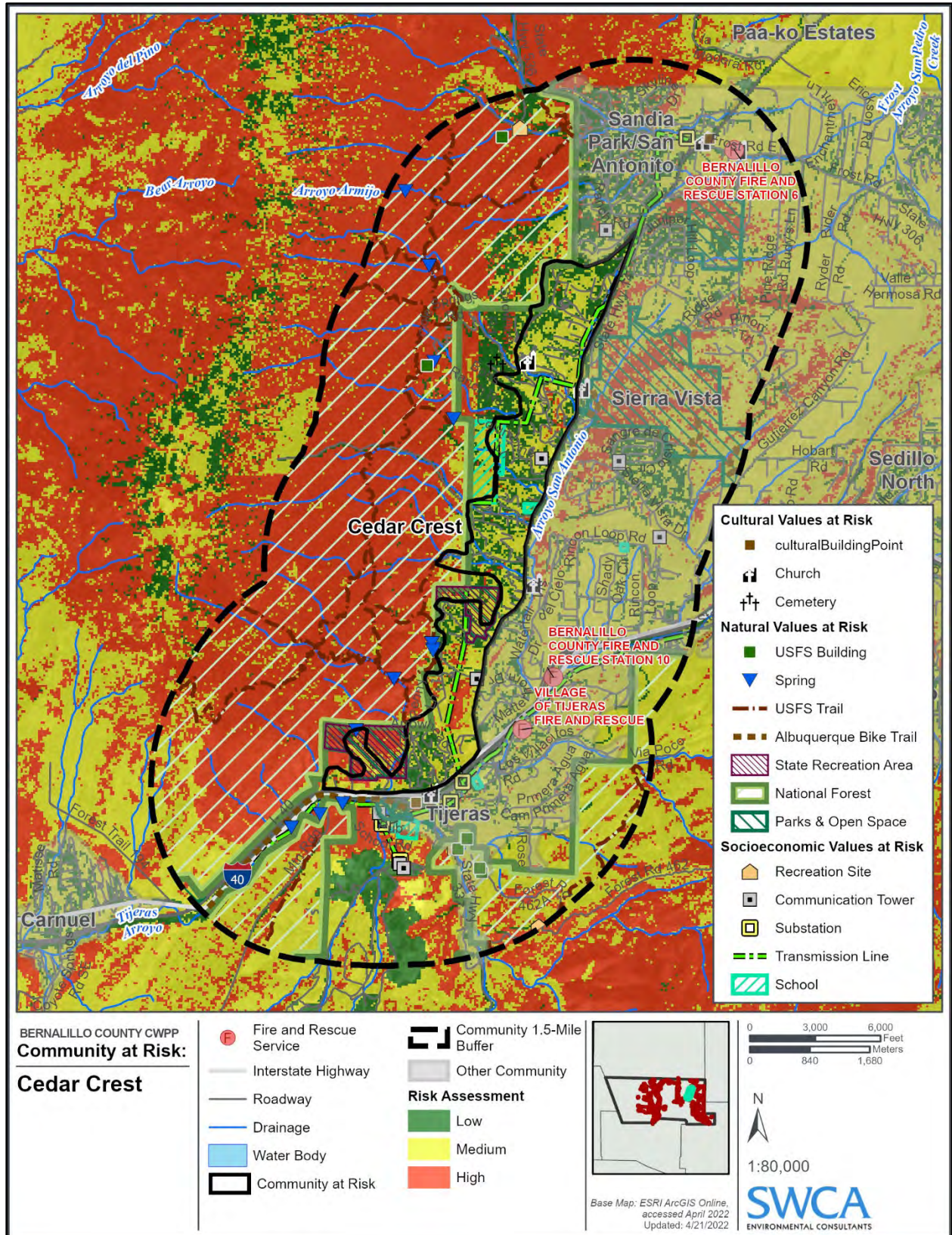


Figure D.9. Cedar Crest polygon.



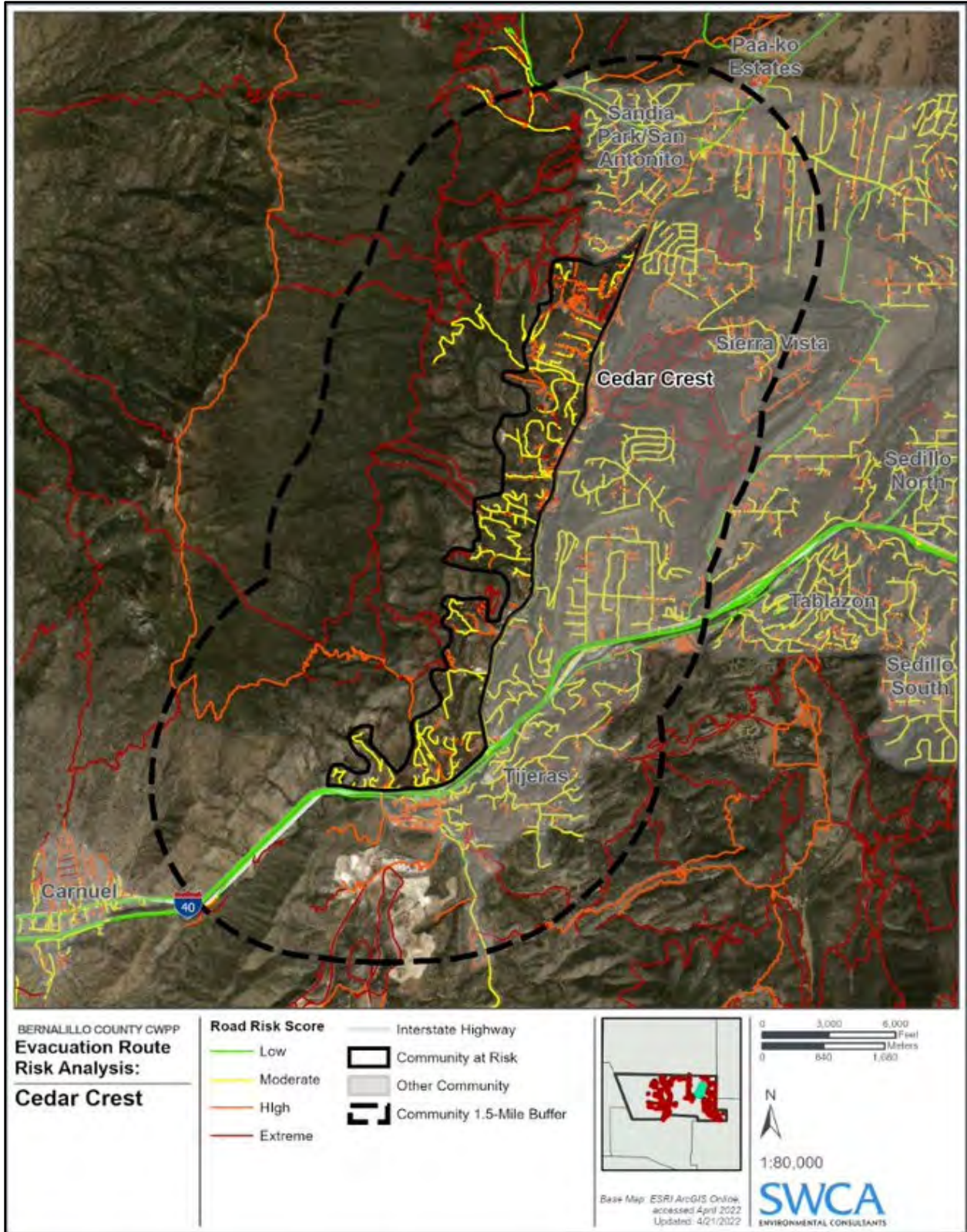


Figure D.10. Evacuation route risk for Cedar Crest.

## WUI COMMUNITY # 4: WILDLAND URBAN INTERFACE COMMUNITIES

### CEDRO POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Cedro	<b><u>Total Score:</u></b> 128	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.9		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 181.6		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 2.0
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
18.6%	14.8%	3.2%	0.1%	43.0%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 68.6%	0-5 minutes: 23.3%
4-8 (ft): 27.7%	5-10 minutes: 61.0%
8-12 (ft): 5.5%	10-15 minutes: 10.7%
>12 (ft): 0.6%	15+ minutes: 5.1%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #40 and #41				
<u>Fulltime Firefighters:</u> 33		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 2	2	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 5</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• East Mountain CWPP</li> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous fuels with ground to canopy connectivity</li> <li>• Limited water sources</li> <li>• Variety of building materials</li> <li>• Area has a variety of topographical features</li> <li>• One-way ingress/egress</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• Limited ingress and egress.</li> <li>• Structures in the intermix.</li> <li>• Limited water supply.</li> </ul>



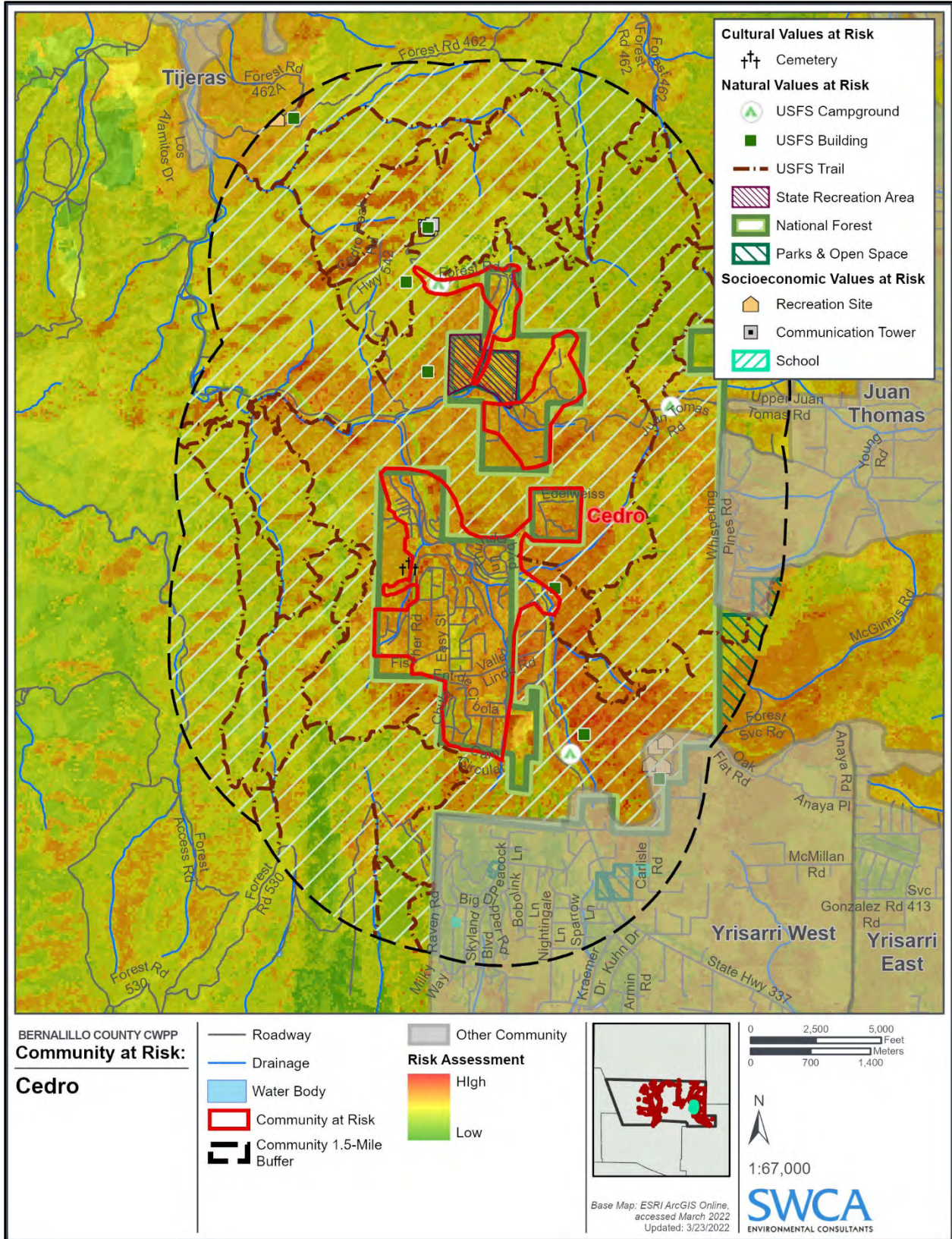


Figure D.11. Cedro polygon.



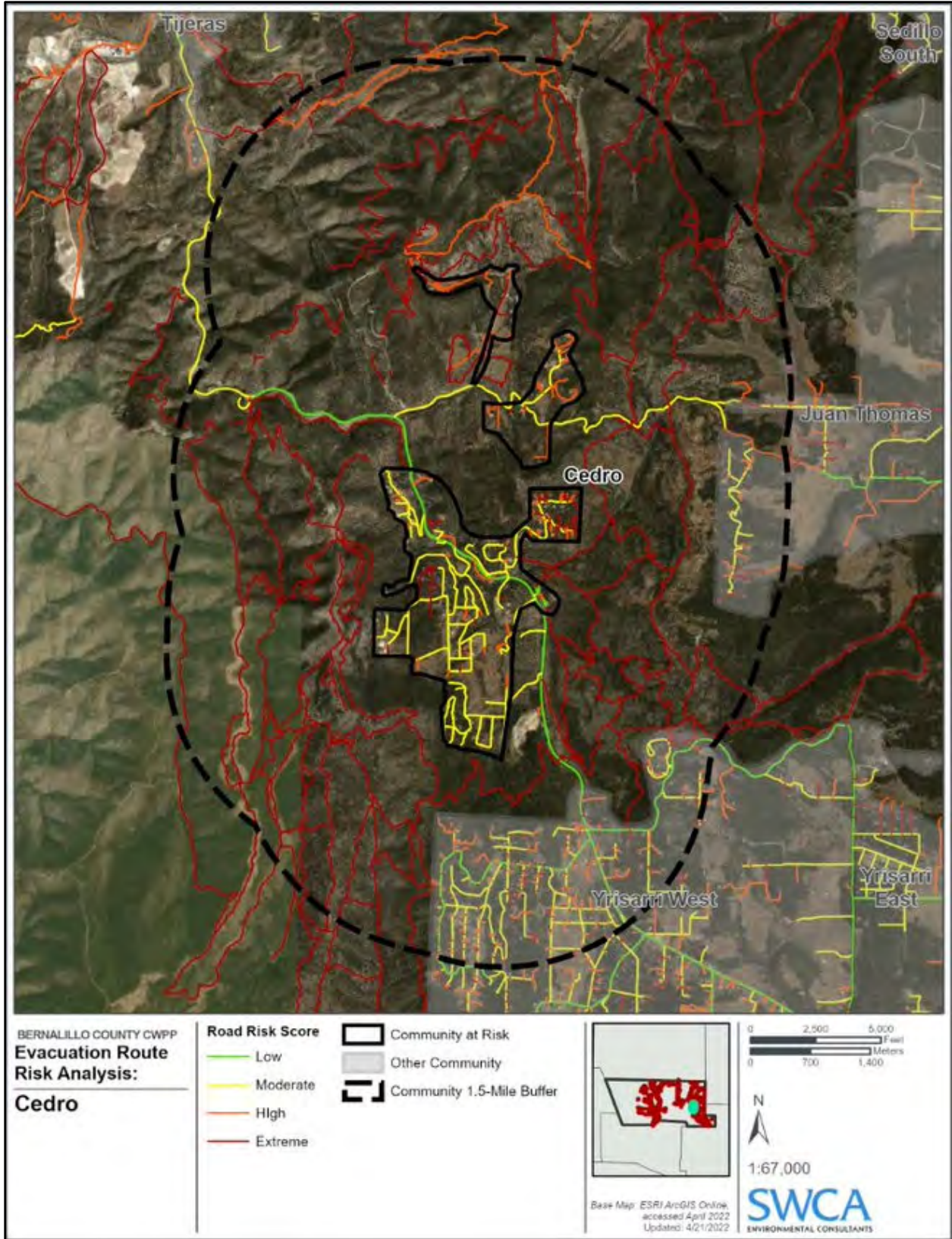


Figure D.12. Evacuation route risk analysis for Cedro.

## WUI COMMUNITY # 5: WILDLAND URBAN INTERFACE COMMUNITIES

### CHILILI POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Chilili	<b><u>Total Score:</u></b> 92	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.9		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 153.9		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 2.0
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
35.9%	46.6%	0.5%	0.3%	11.9%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 95.1%	0-5 minutes: 0.0%
4-8 (ft):2.2%	5-10 minutes: 2.8%
8-12 (ft):0.7%	10-15 minutes: 43.0%
>12 (ft):0.1%	>1.5 (mi.): 54.2%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #41				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

- Current Fire and Fuel Management Programs and Plans**
- Bernalillo County Hazard Mitigation Plan
  - East Mountain CWPP

**1144 Survey Summary Highlights**

<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Street signs are present</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Continuous fuels with ground to canopy connectivity</li> <li>• Limited water sources</li> <li>• Variety of building materials</li> <li>• Defensible space is limited</li> <li>• Fire station &gt;5 miles</li> </ul>

- Suggested Mitigation Focus Area**
- Fire Department Concerns:
- Very rural area.
  - Very limited water supply.
  - No hydrants.
  - One-way ingress/egress.



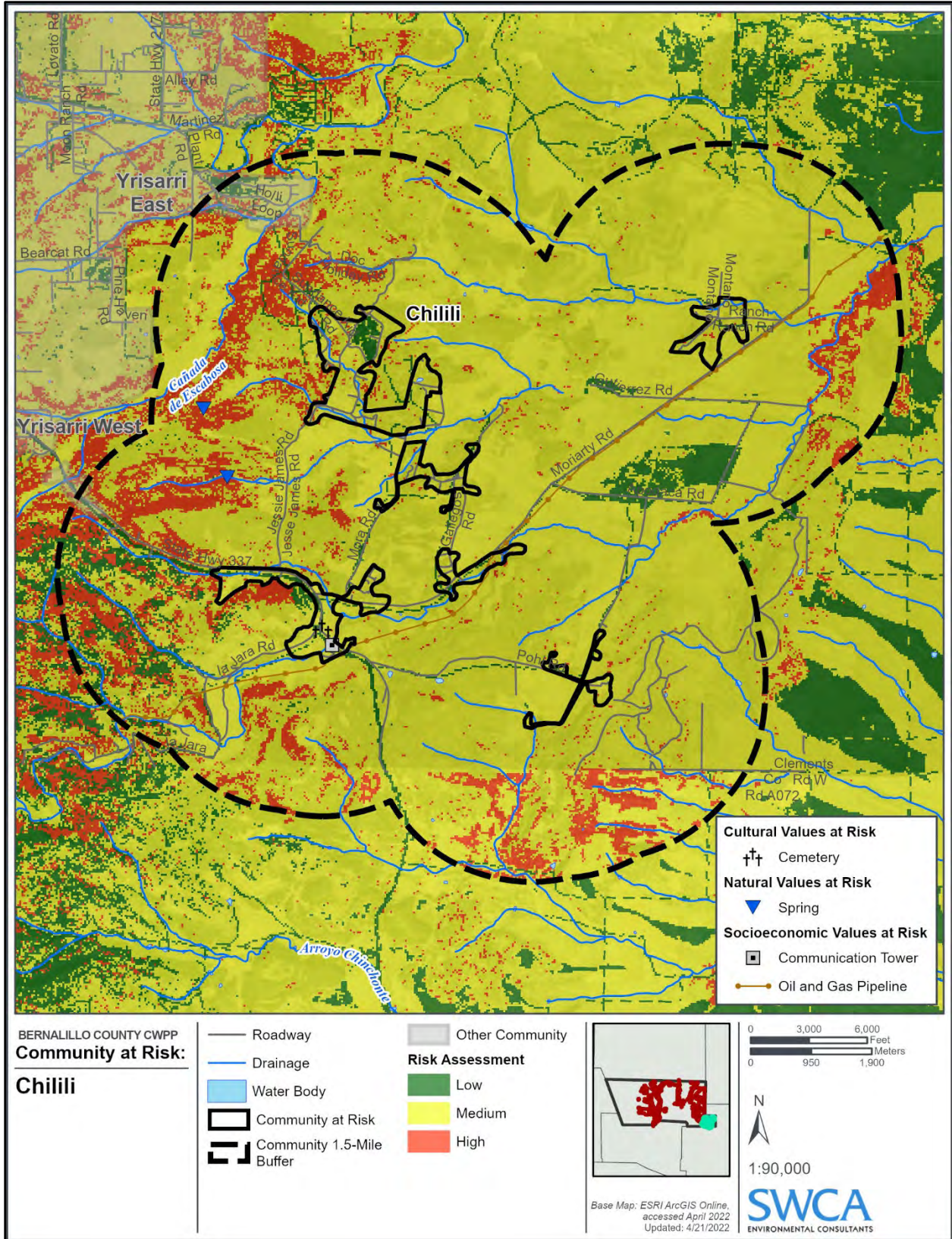


Figure D.13. Chilili polygon.



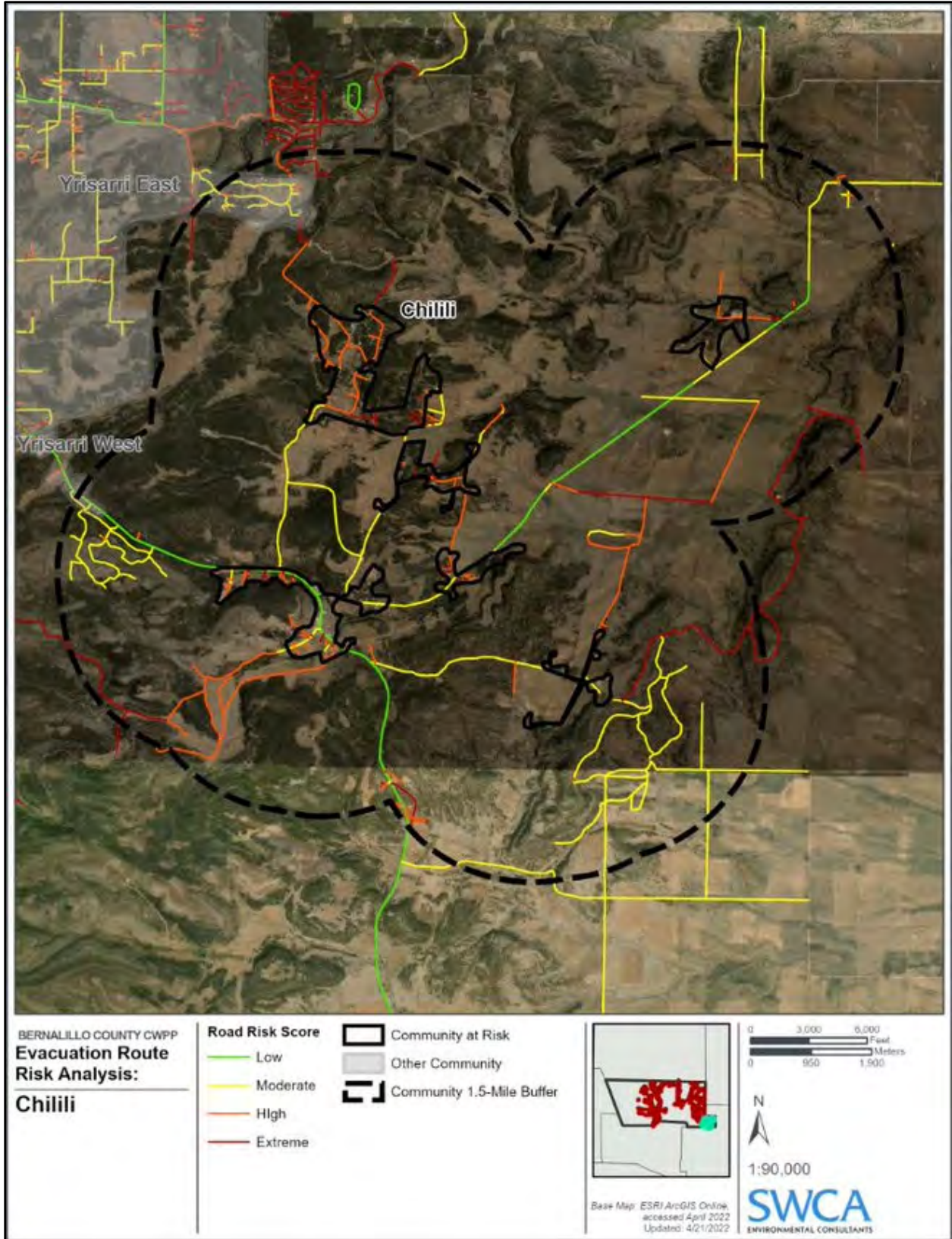


Figure D.14. Evacuation route risk analysis for Chilili.

## WUI COMMUNITY # 6: WILDLAND URBAN INTERFACE COMMUNITIES

### DIAMOND MESA POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Diamond Mesa	<b><u>Total Score:</u></b> 87	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.5		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 960.4		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 3.9
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
9.3%	14.3%	11.1%	0.0%	2.8%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 100.0%	0-5 minutes: 0.9%
4-8 (ft): 0.0%	5-10 minutes: 45.1%
8-12 (ft): 0.0%	10-15 minutes: 53.0%
>12 (ft): 0.0%	15+ minutes: 1.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #14 and BCFR #33				
<u>Fulltime Firefighters:</u> 36		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 2	2	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Xeriscape landscaping</li> <li>• Mostly new construction</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Defensible space is limited</li> <li>• Wooden fences noted</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• Grasslands and mix of shrubs.</li> <li>• Difficult access.</li> </ul>



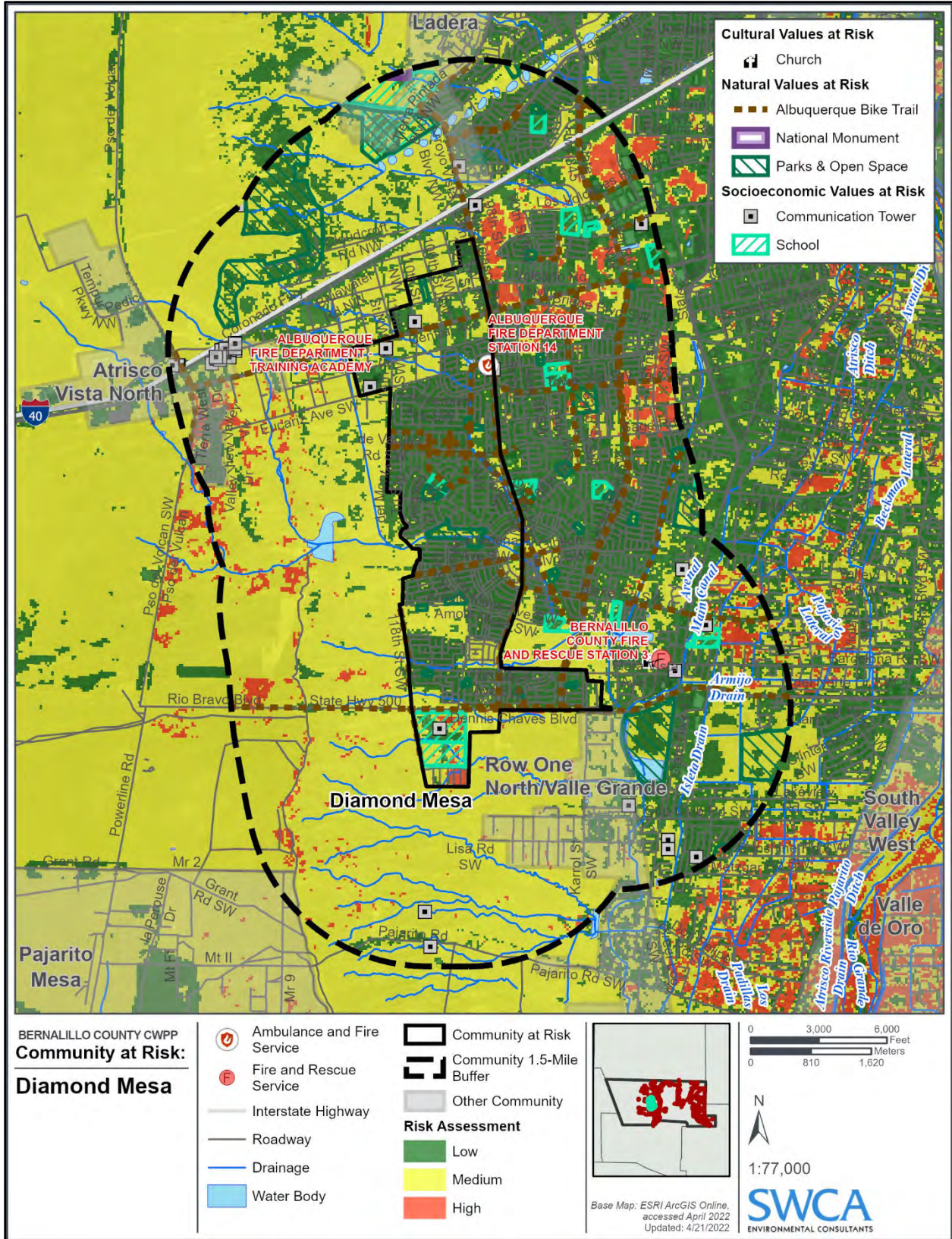


Figure D.15. Diamond Mesa polygon.



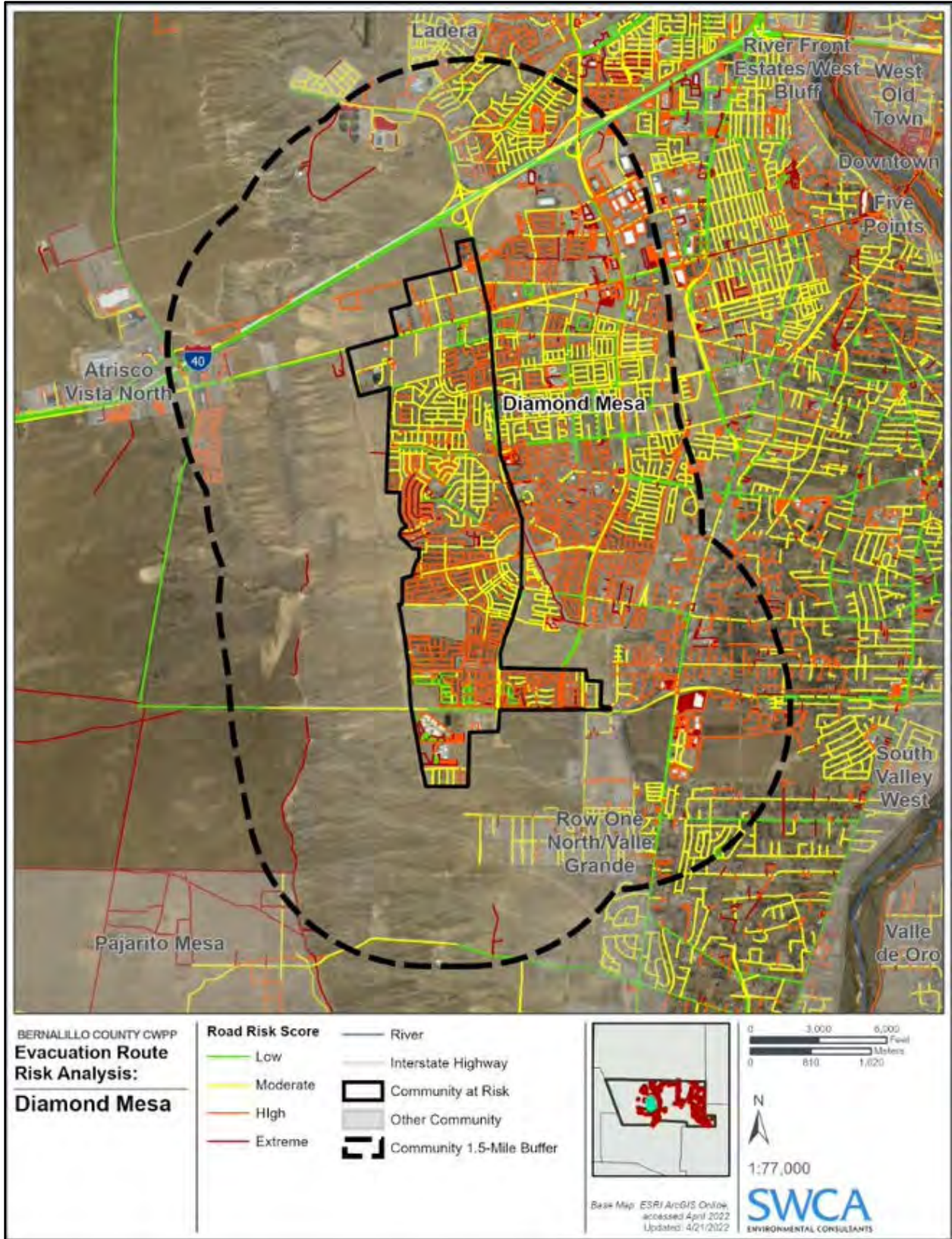


Figure D.16. Evacuation Route Risk Analysis for Diamond Mesa.

# WUI COMMUNITY # 7: WILDLAND URBAN INTERFACE COMMUNITIES

## DOUBLE EAGLE AIRPORT POLYGON SUMMARY STATISTICS

<b>Community Polygon Background</b>		
<b><u>Community Polygon Name:</u></b> Double Eagle Airport	<b><u>Total Score:</u></b> 29	<b><u>Rating:</u></b> Low
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 5.8		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 8.9		

<b>Percent of Community Classified by Wildland Urban Interface (WUI) Types</b>
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 6.1
<b><u>Percent:</u></b> 100.0

<b>Dominant Fuel Type</b>				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
42.2%	44.5%	8.4%	0.0%	0.1%

<b>Percent of Community by Modeled/Calculated Wildfire Risk Inputs</b>	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 99.4%	0-5 minutes: 0.0%
4-8 (ft): 0.1%	5-10 minutes: 0.0%
8-12 (ft): 0.0%	10-15 minutes: 9.1%
>12 (ft): 0.0%	15+ minutes: 90.9%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #22				
<u>Fulltime Firefighters:</u> 18		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• None</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Low scarce fuels</li> <li>• New construction</li> <li>• Hydrants throughout the area</li> </ul>	<ul style="list-style-type: none"> <li>• Fire station &gt;5 miles</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



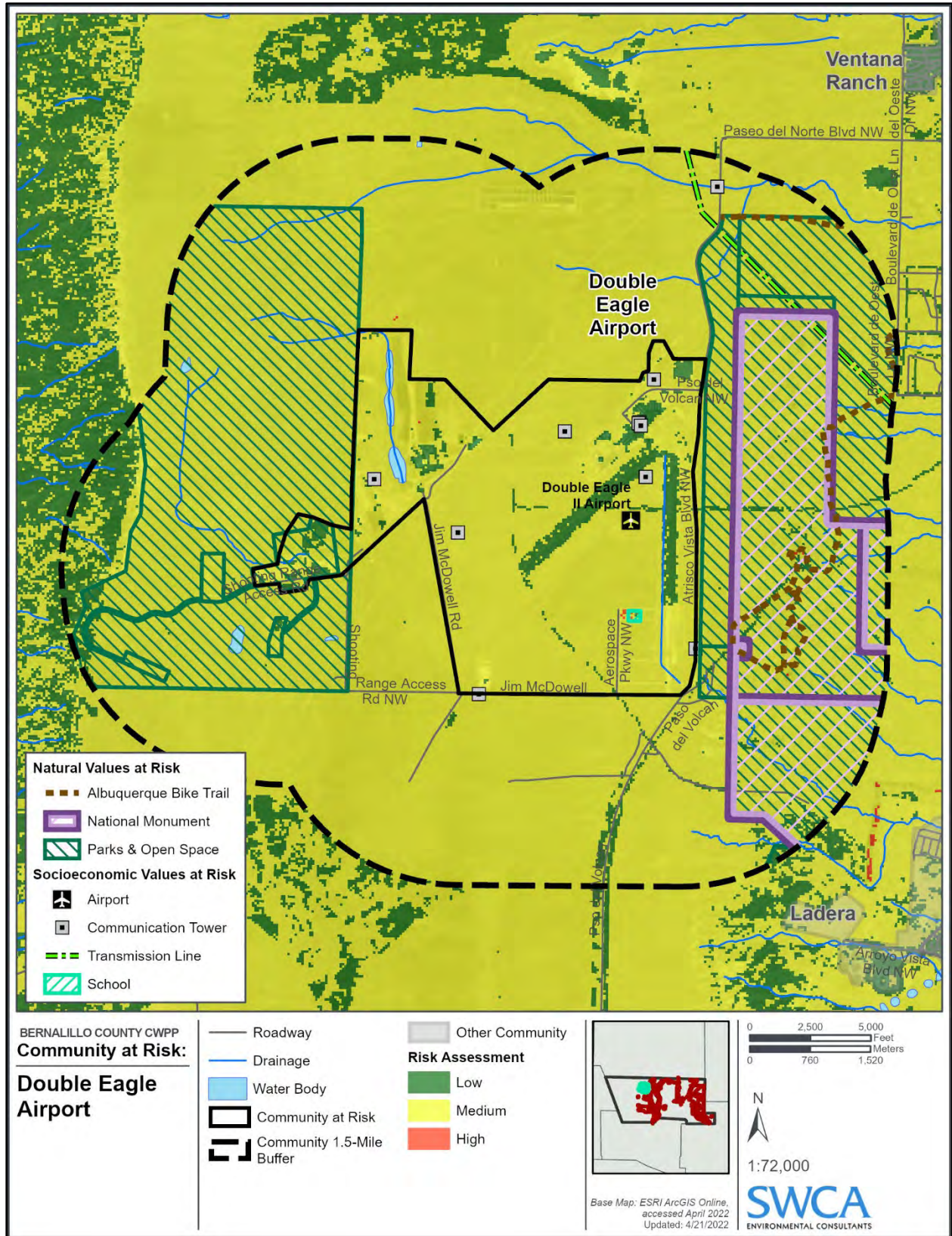


Figure D.17. Double Eagle Airport polygon.



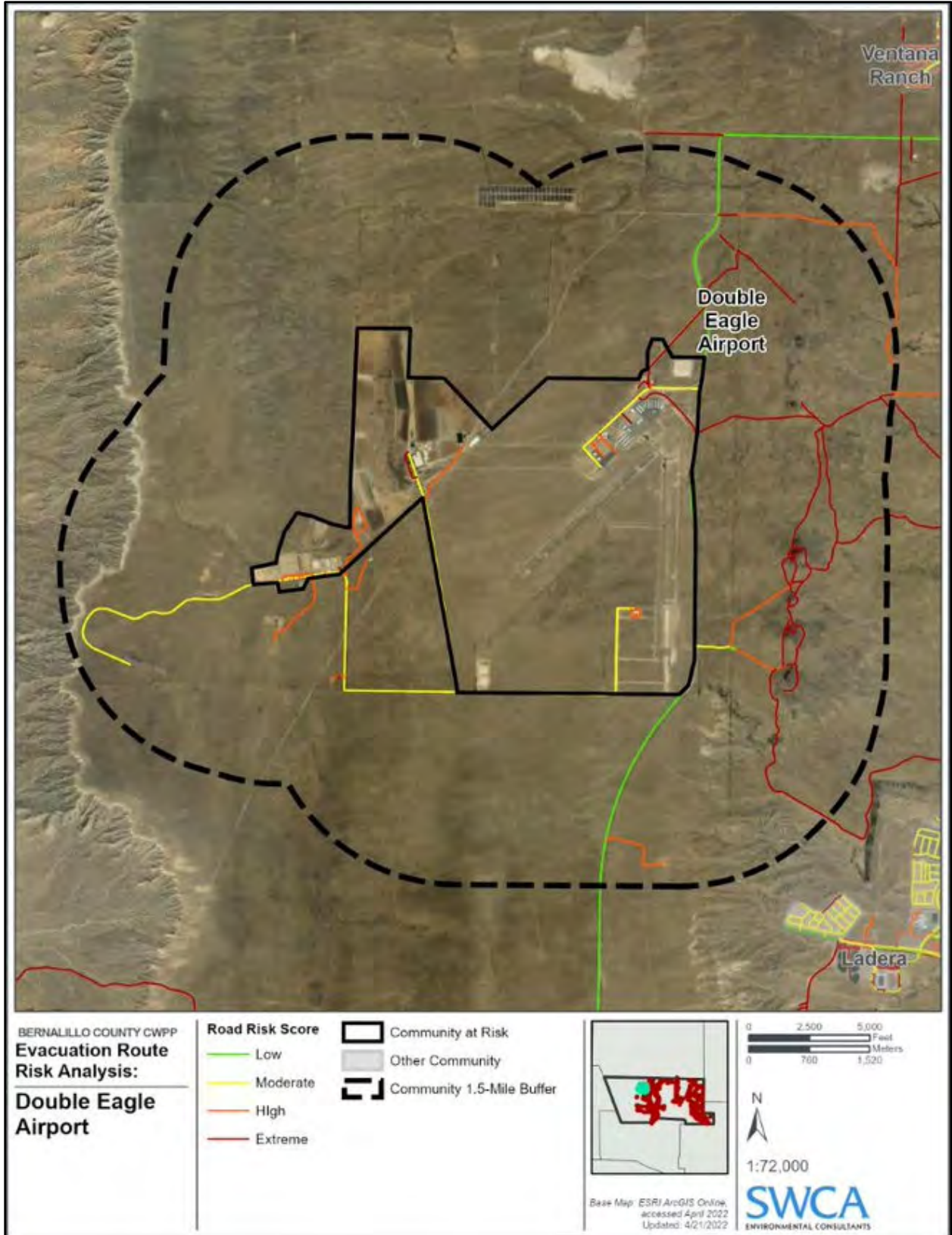


Figure D.18. Evacuation route risk analysis for Double Eagle Airport.

## WUI COMMUNITY # 8: WILDLAND URBAN INTERFACE COMMUNITIES

### DOWNTOWN POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Downtown Albuquerque	<b><u>Total Score:</u></b> 88	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> Downtown		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.2		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 820.6		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 0.6
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
2.6%	2.3%	0.6%	0.0%	28.5%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 100.0%
8-12 (ft): 0.0%	10-15 minutes: 0.0%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #1 and #7				
<u>Fulltime Firefighters:</u> 54		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3: 1	1	
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> <li>• Reference Middle Rio Grande Bosque CWPP</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Connectivity to the bosque area</li> <li>• Mature old growth trees</li> <li>• Limited defensible space</li> <li>• Variable building materials</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



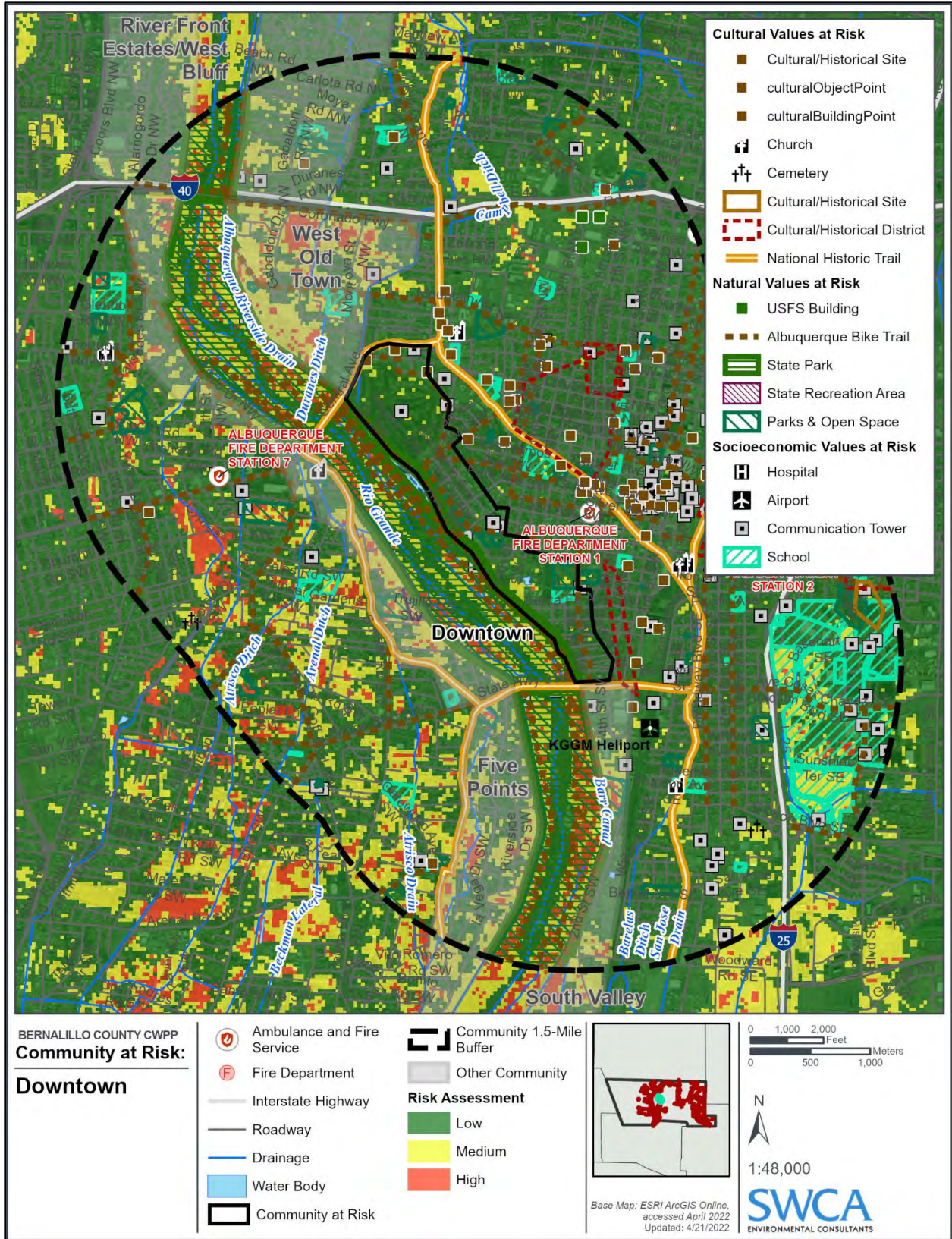


Figure D.19. Downtown polygon.



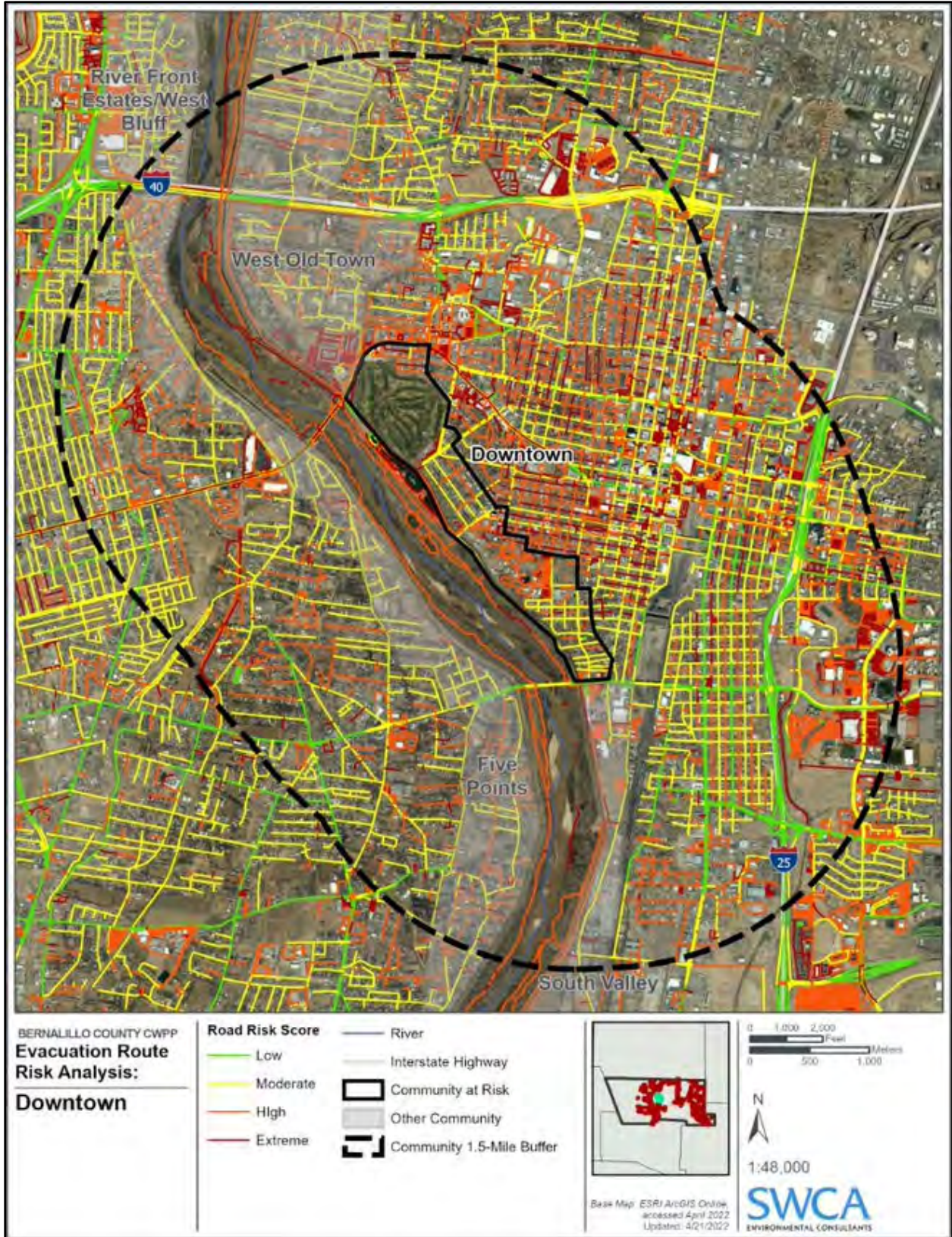


Figure D.20. Evacuation route risk analysis for Downtown.

## WUI COMMUNITY # 9: WILDLAND URBAN INTERFACE COMMUNITIES

### EMBUDO CANYON/SUPPER ROCK POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Embudo Canyon/Supper Rock	<b>Total Score:</b> 70	<b>Rating:</b> High
<b>Geographic Area:</b> Sandia Foothills		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.1		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 1896.8		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.7
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
0.8%	3.7%	0.0%	0.0%	3.7%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 0.0%
8-12 (ft): 0.0%	10-15 minutes: 100.0%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #8				
<u>Fulltime Firefighters:</u> 18		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Xeriscaped lawns</li> <li>• Hydrants throughout the unit</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Varying types of roofing material</li> <li>• Limited defensible space</li> <li>• Wooden fences</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



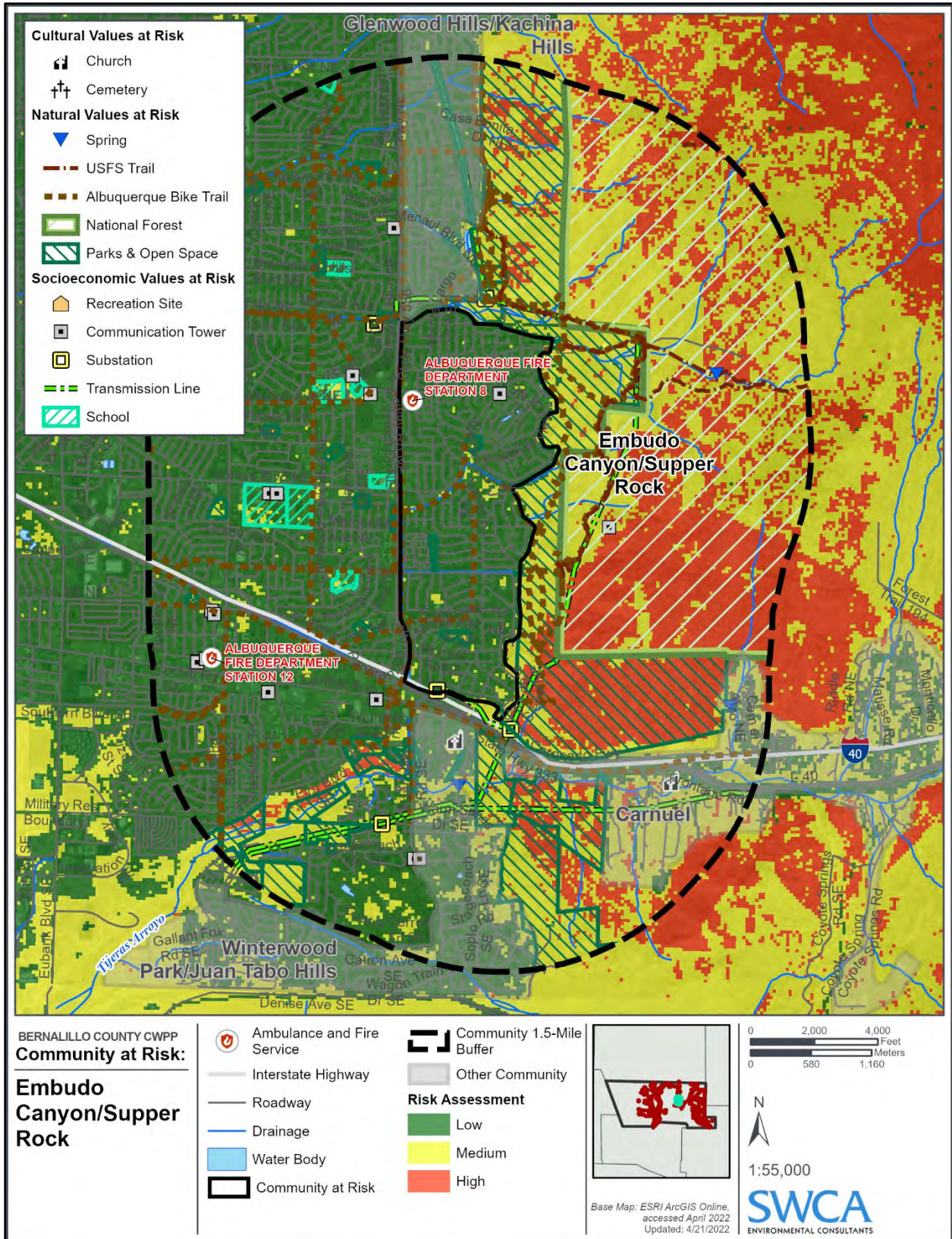


Figure D.21. Embudo Canyon/Supper Rock polygon.



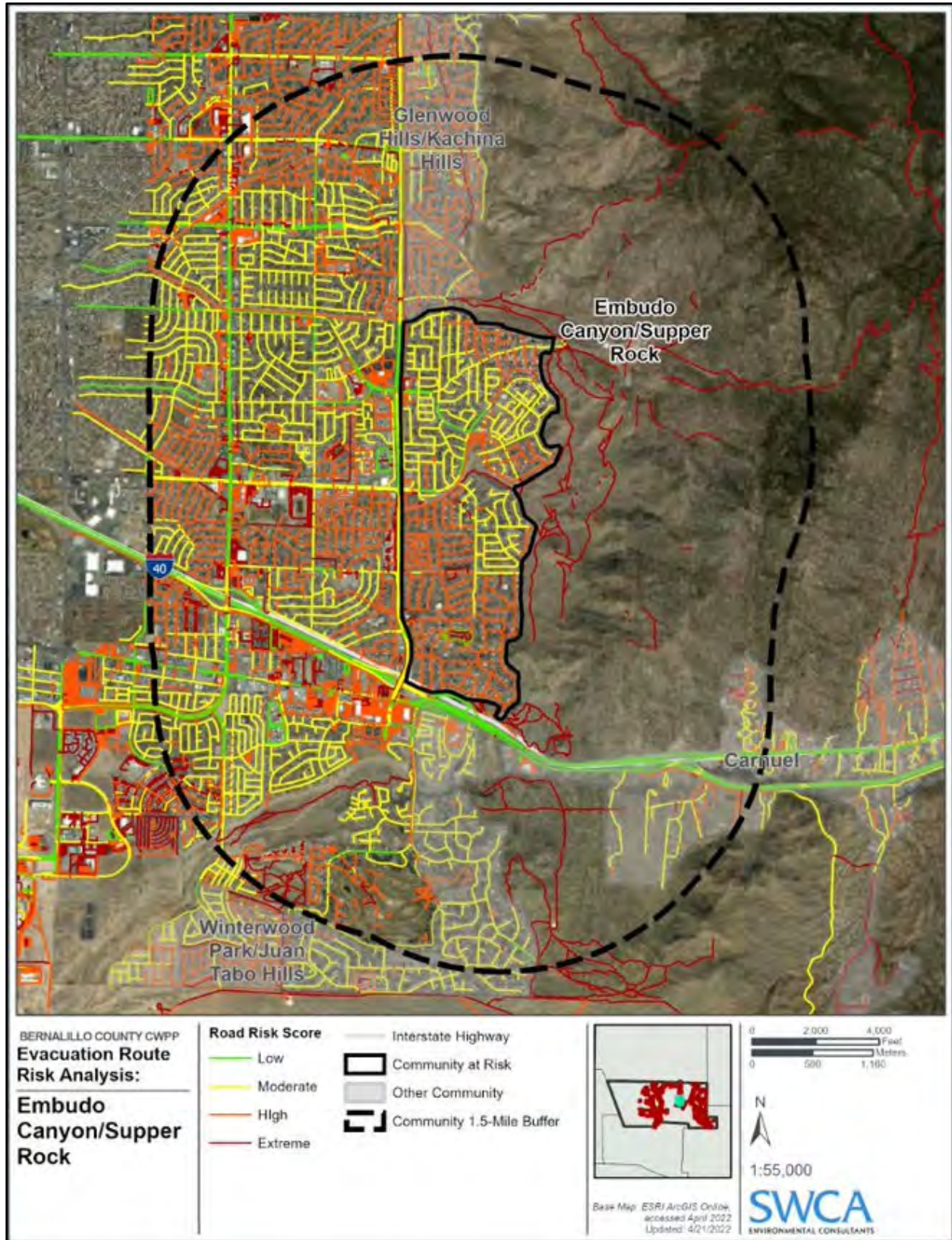


Figure D.22. Evacuation route risk analysis for Embudo Canyon/Supper Rock.

## WUI COMMUNITY # 10: WILDLAND URBAN INTERFACE COMMUNITIES

### FIVE POINTS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Five Points	<b><u>Total Score:</u></b> 79	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.5		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 1407.4		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 1.2
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
30.6	4.8%	0.8%	0.1%	5.8%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 13.7%
8-12 (ft): 0.0%	10-15 minutes: 86.8%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #7, BCFR #32, #33, and #38				
<u>Fulltime Firefighters:</u> 72		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3: 1	1	
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 3		Type 6: 2	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u> 1				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> <li>• Reference Middle Rio Grande Bosque CWPP</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Mostly Class B building materials</li> <li>• Hydrants throughout the unit</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Connectivity to bosque with mature old growth vegetation</li> <li>• Variety of roofing materials</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



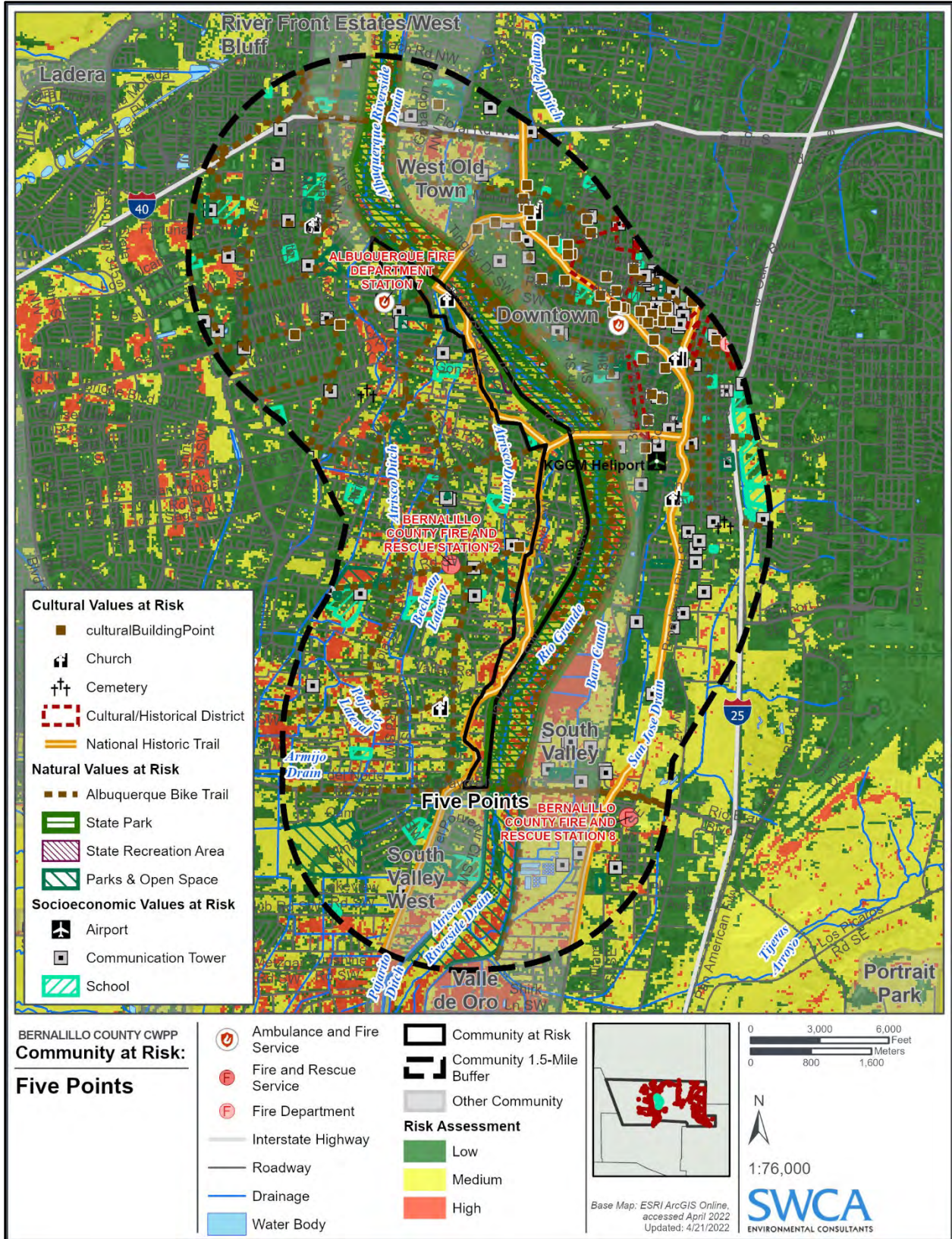


Figure D.23. Five Points polygon.



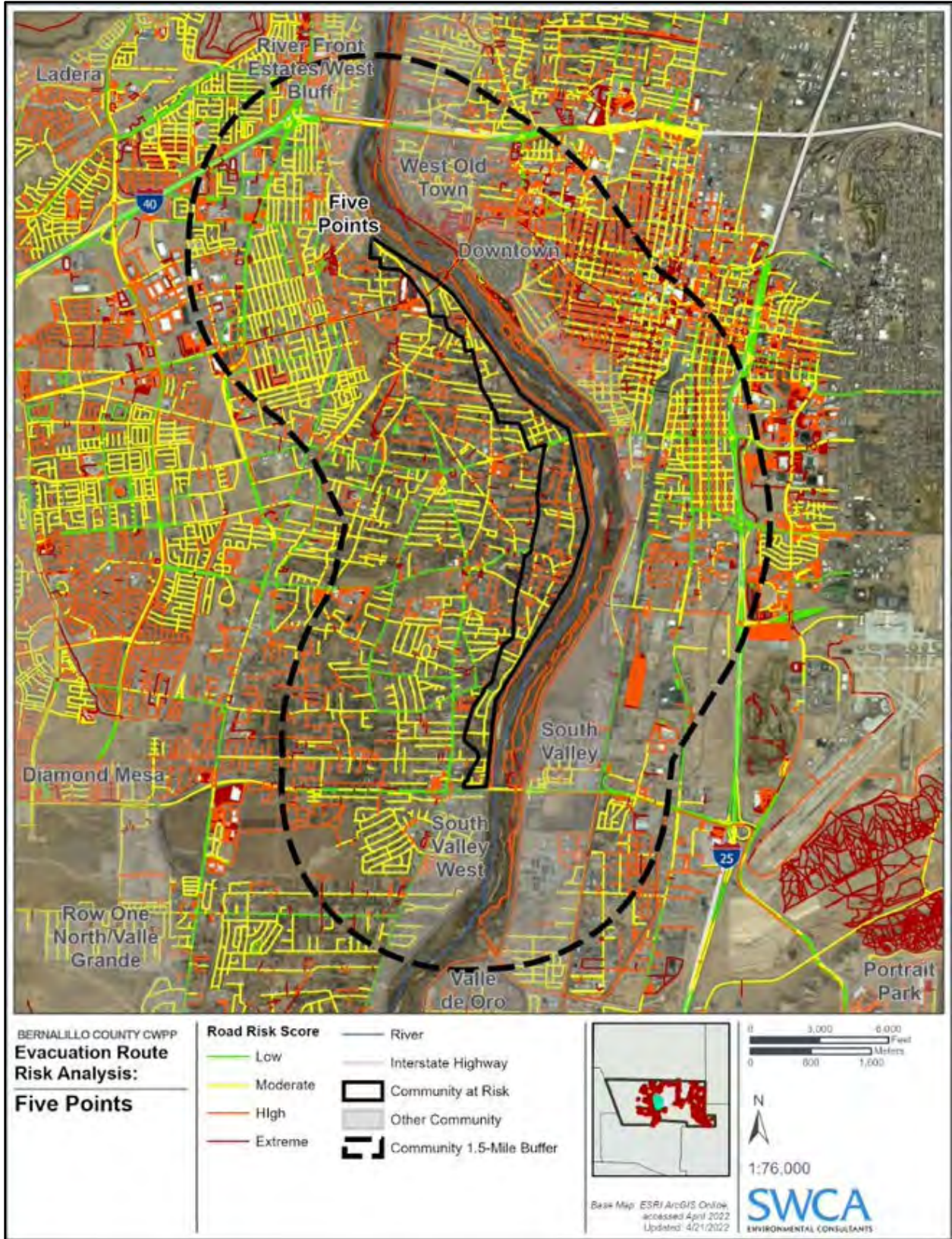


Figure D.24. Evacuation route risk analysis for Five Points.

# WUI COMMUNITY # 11: WILDLAND URBAN INTERFACE COMMUNITIES

## GLENWOOD HILLS/KACHINA HILLS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Glenwood Hills/Kachina Hills	<b>Total Score:</b> 71	<b>Rating:</b> High
<b>Geographic Area:</b> Sandia foothills		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.5		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 1458.5		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 2.2
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
2.6%	11.1%	0.0%	0.0%	8.3%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 0.0%
8-12 (ft): 0.0%	10-15 minutes: 100.0%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #8 and #16				
<u>Fulltime Firefighters:</u> 36		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 1		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 3</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Xeriscape landscaping</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Older building materials</li> <li>• Wooden fences</li> <li>• Limited defensible space</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



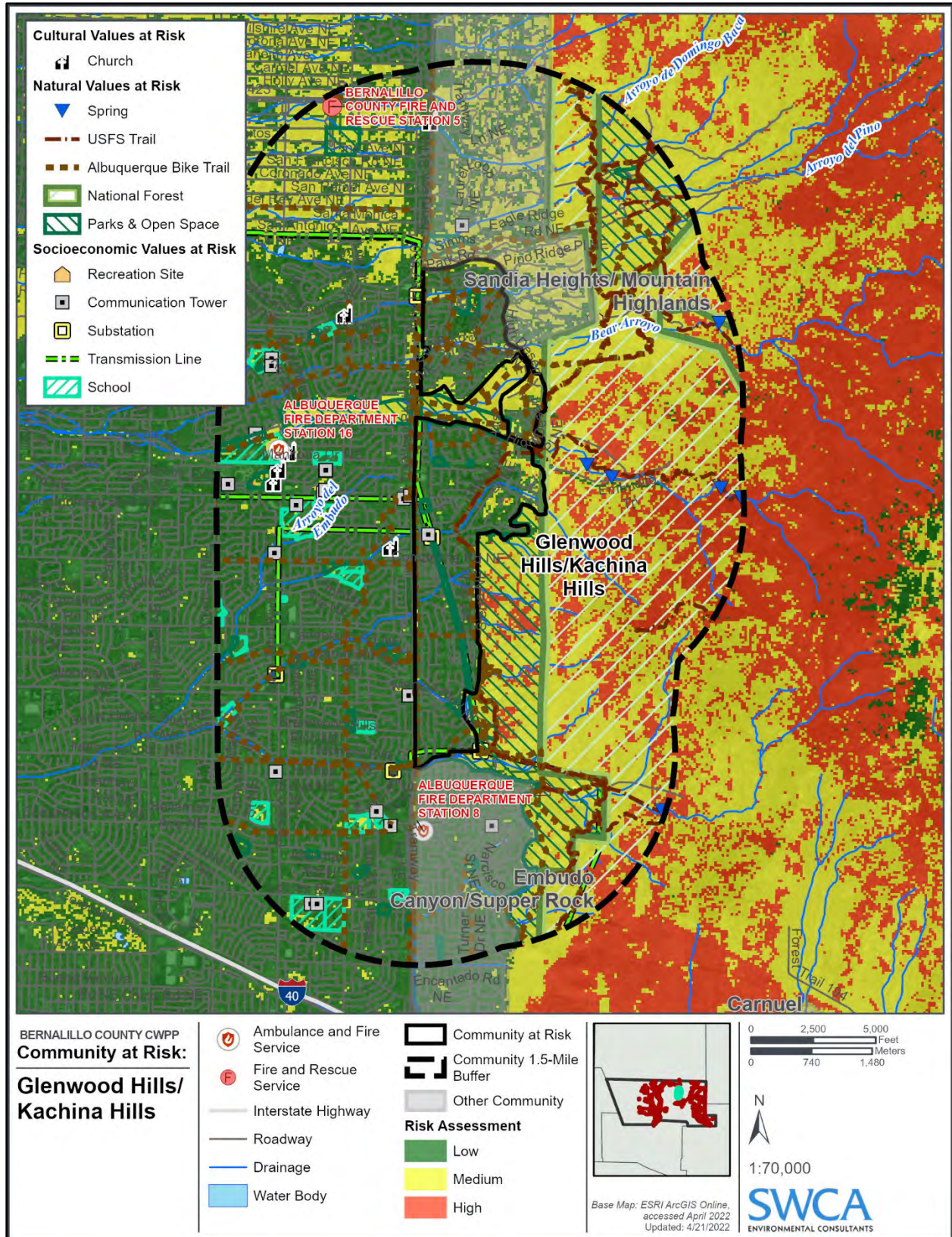


Figure D.25. Glenwood Hills/Kachina Hills polygon.



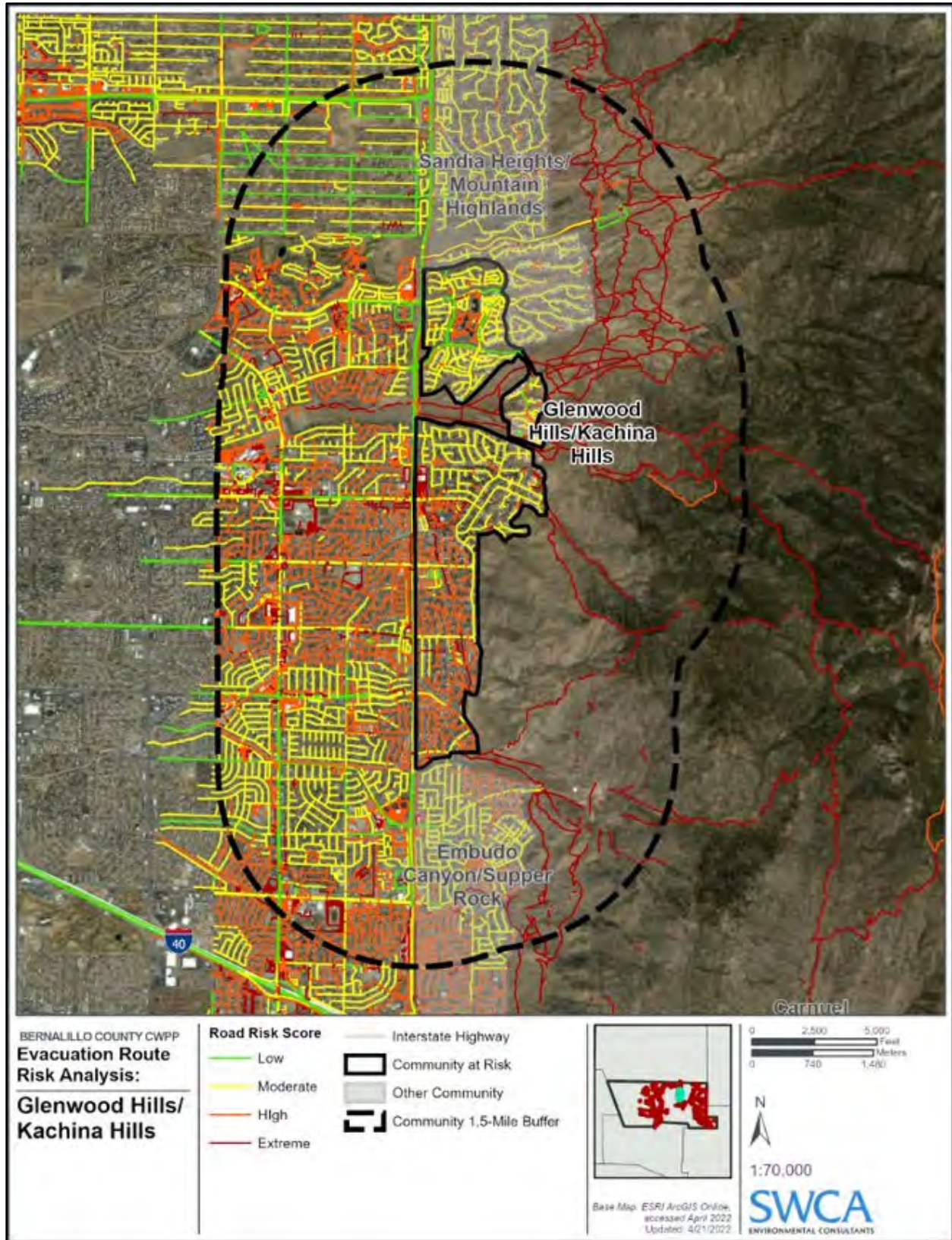


Figure D.26. Evacuation route risk analysis for Glenwood Hills/Kachina Hills.

## WUI COMMUNITY # 12: WILDLAND URBAN INTERFACE COMMUNITIES

### ISLETA PUEBLO POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Isleta Pueblo	<b><u>Total Score:</u></b> 75	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 3.5		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 226.8		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 5.3
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
37.3%	17.1%	9.6%	0.7%	1.4%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 99.1%	0-5 minutes: 0.0%
4-8 (ft): 1.2%	5-10 minutes: 6.0%
8-12 (ft): 0.0%	10-15 minutes: 94.0%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> Isle				
<u>Fulltime Firefighters:</u> 1	<u>On-call Firefighters:</u>	<u>Volunteer Firefighters:</u> 12		
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>	
Type 2:	Type 3:			
Type 3:	Type 4:			
<u>Structure Engines:</u>	Type 5:			
Type 1: 1	Type 6:	3		
Type 2:	Type 7:			
<u>Port-A-Tanks:</u> 3				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

- Current Fire and Fuel Management Programs and Plans**
- Pueblo of Isleta Tribe Fire Management Plan
  - Pueblo of Isleta Hazard Mitigation Plan
  - Bernalillo County Hazard Mitigation Plan

**1144 Survey Summary Highlights**

<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Good defensible space</li> </ul>	<ul style="list-style-type: none"> <li>• Shingled roofs</li> <li>• Mixed building materials</li> <li>• No fire hydrants</li> <li>• Nearest fire station is &gt;5 miles</li> </ul>

- Suggested Mitigation Focus Area**
- Fire Department Concerns:
- Volunteer response times
  - Bosque



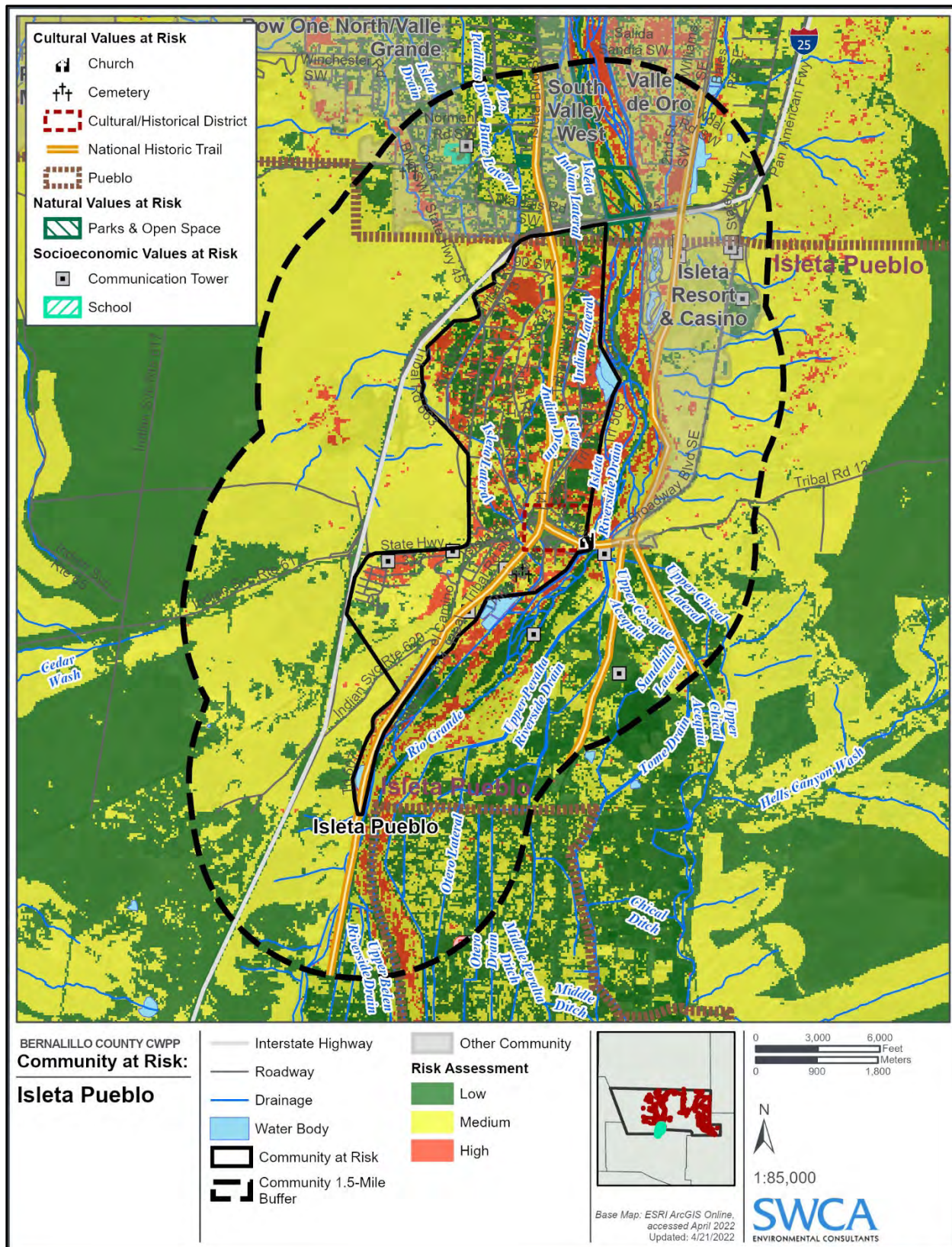


Figure D.27. Isleta Pueblo polygon.



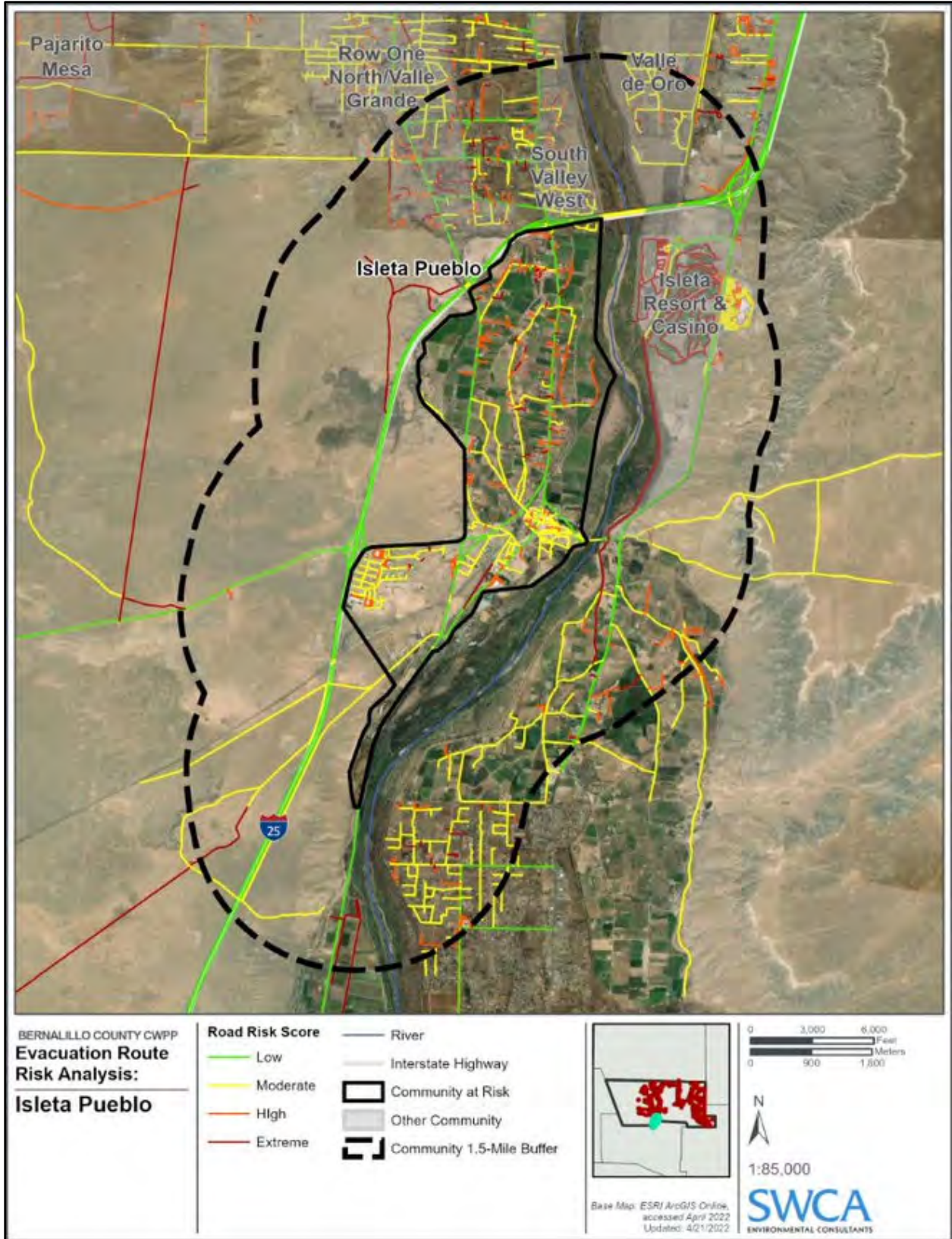


Figure D.28. Evacuation route risk analysis for Isleta Pueblo.

# WUI COMMUNITY # 13: WILDLAND URBAN INTERFACE COMMUNITIES

## ISLETA RESORT & CASINO POLYGON SUMMARY STATISTICS

<b>Community Polygon Background</b>		
<b>Community Polygon Name:</b> Isleta Pueblo Resort & Casino	<b>Total Score:</b> 31	<b>Rating:</b> Medium
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.6		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 26.6		

<b>Percent of Community Classified by Wildland Urban Interface (WUI) Types</b>
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.9
<u>Percent:</u> 100.0

<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
21.0%	21.6%	30.7	0.1%	10.0%

<b>Percent of Community by Modeled/Calculated Wildfire Risk Inputs</b>	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 98.0%	0-5 minutes: 0.0%
4-8 (ft): 0.9%	5-10 minutes: 5.7%
8-12 (ft): 0.0%	10-15 minutes: 92.4%
>12 (ft): 0.0%	15+ minutes: 2.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> Isle				
<u>Fulltime Firefighters:</u> 1	<u>On-call Firefighters:</u>	<u>Volunteer Firefighters:</u> 12		
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>	
Type 2:	Type 3:			
Type 3:	Type 4:			
<u>Structure Engines:</u>	Type 5:			
Type 1: 1	Type 6:	3		
Type 2:	Type 7:			
<u>Port-A-Tanks:</u> 3				
<u>Portable Pumps:</u> 2				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

- Current Fire and Fuel Management Programs and Plans**
- Pueblo of Isleta Tribe Fire Management Plan
  - Pueblo of Isleta Hazard Mitigation Plan
  - Bernalillo County Hazard Mitigation

**1144 Survey Summary Highlights**

<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Paved roads</li> <li>• Manicured lawns and golf courses</li> </ul>	<ul style="list-style-type: none"> <li>• New building construction</li> <li>• Modern building materials</li> </ul>

- Suggested Mitigation Focus Area**
- Fire Department Concerns:
- Bosque
  - Volunteer response times



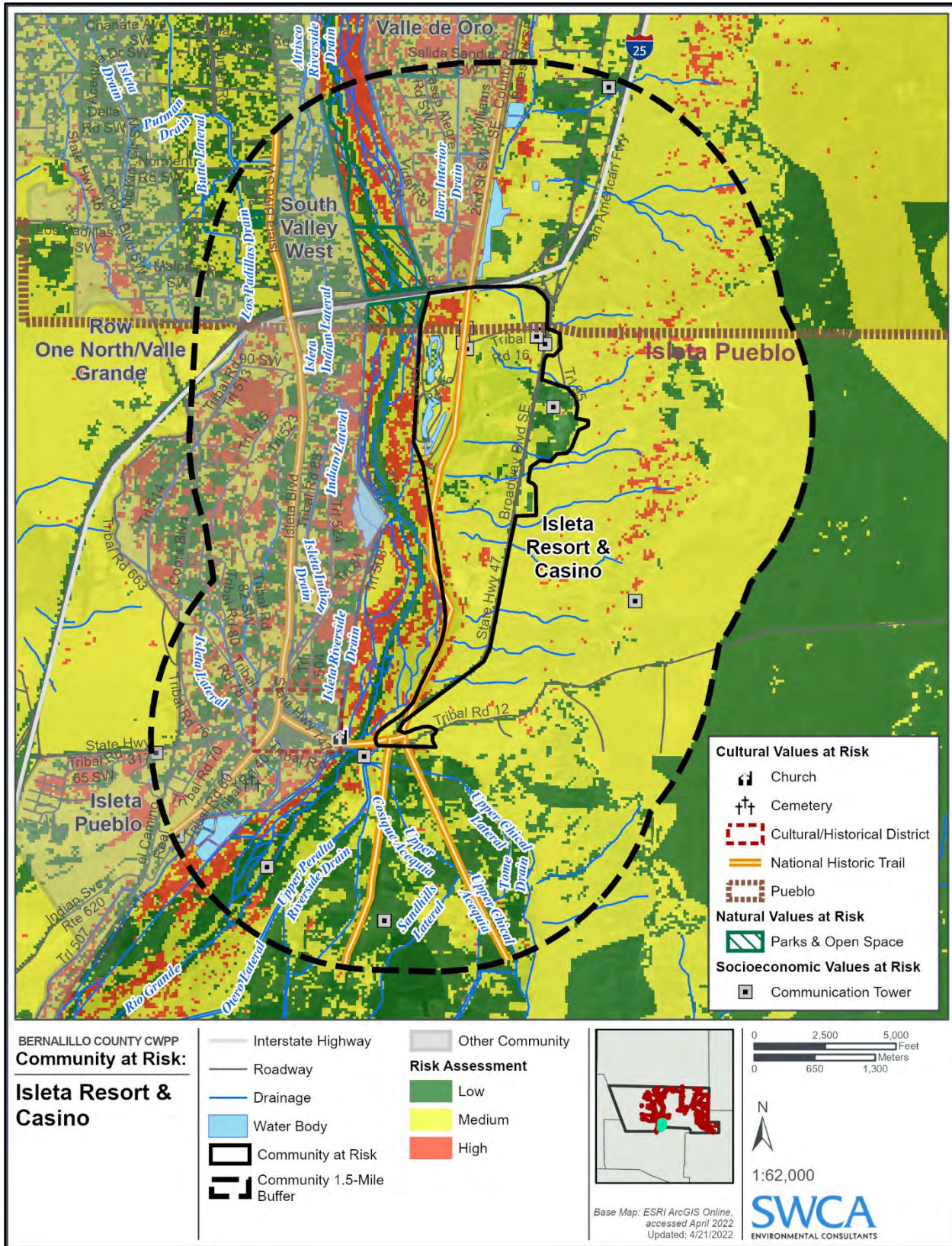


Figure D.29. Isleta Pueblo Resort & Casino polygon.



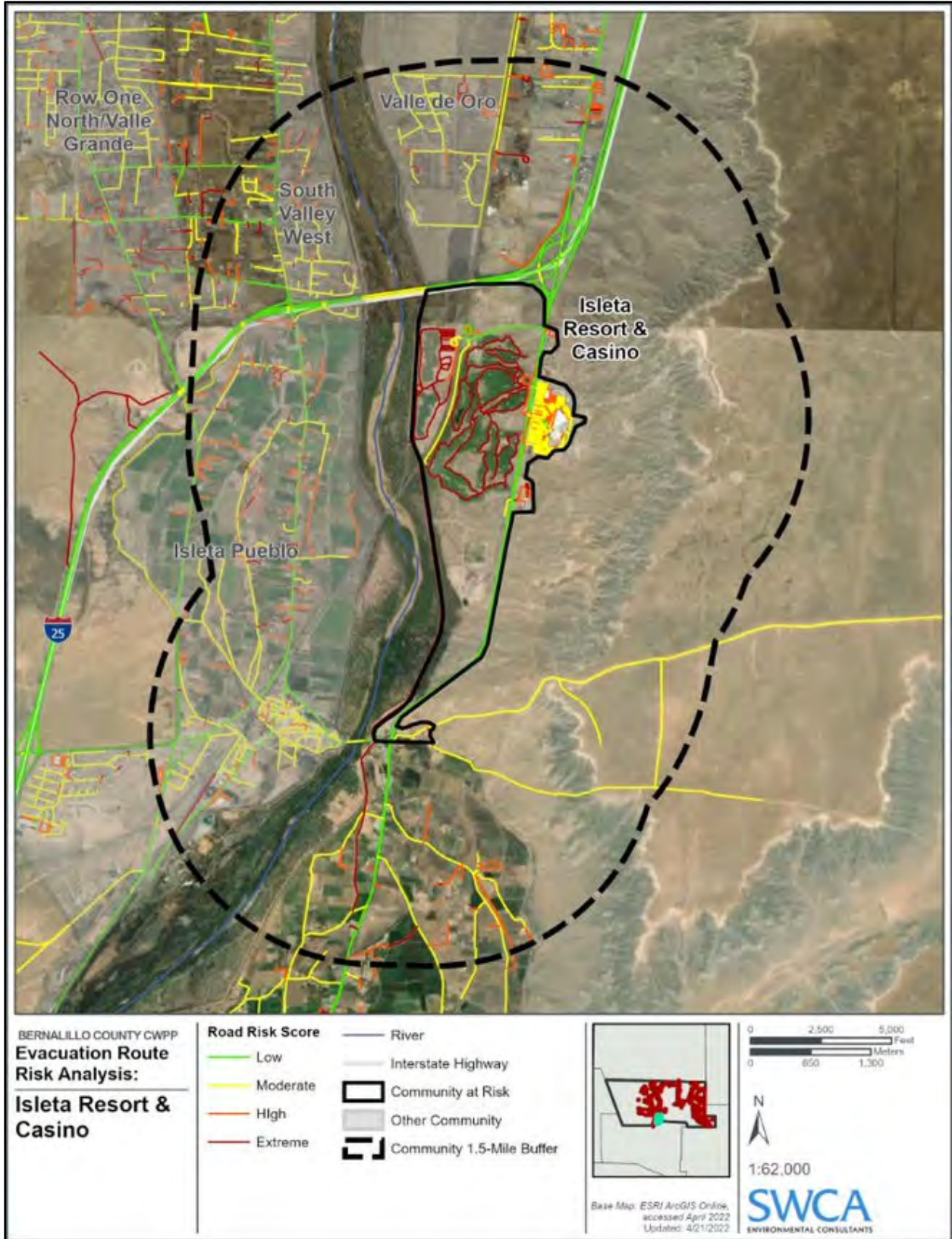


Figure D.30. Evacuation route risk analysis for Isleta Pueblo Resort & Casino.

# WUI COMMUNITY # 14: WILDLAND URBAN INTERFACE COMMUNITIES

## JUAN THOMAS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Juan Thomas	<b>Total Score:</b> 114	<b>Rating:</b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 11.1		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 35.6		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 11.4
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
30.7%	30.3%	0.4%	0.0%	36.4%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 71.8%	0-5 minutes: 0.0%
4-8 (ft): 26.2%	5-10 minutes: 6.7%
8-12 (ft): 1.5%	10-15 minutes: 80.0%
>12 (ft): 0.1%	15+ minutes: 13.3%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #41 and #43				
<u>Fulltime Firefighters:</u> 30		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 6</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• East Mountain CWPP</li> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Present and reflective road signs</li> <li>• Class A roofing material</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Mostly dirt roads</li> <li>• Pockets of dense continuous vegetation</li> <li>• Multiple classes of building materials</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



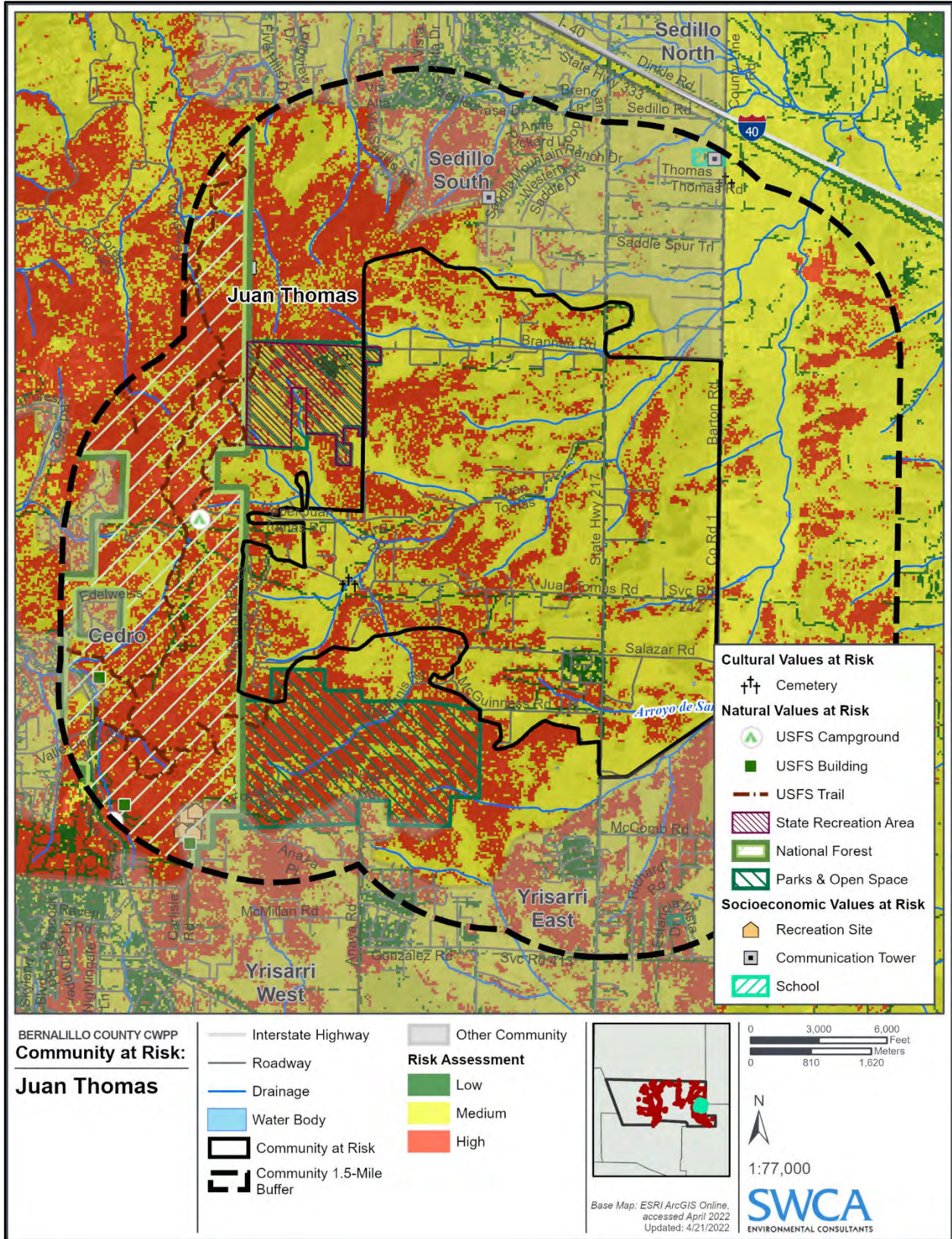


Figure D.31. Juan Thomas polygon.



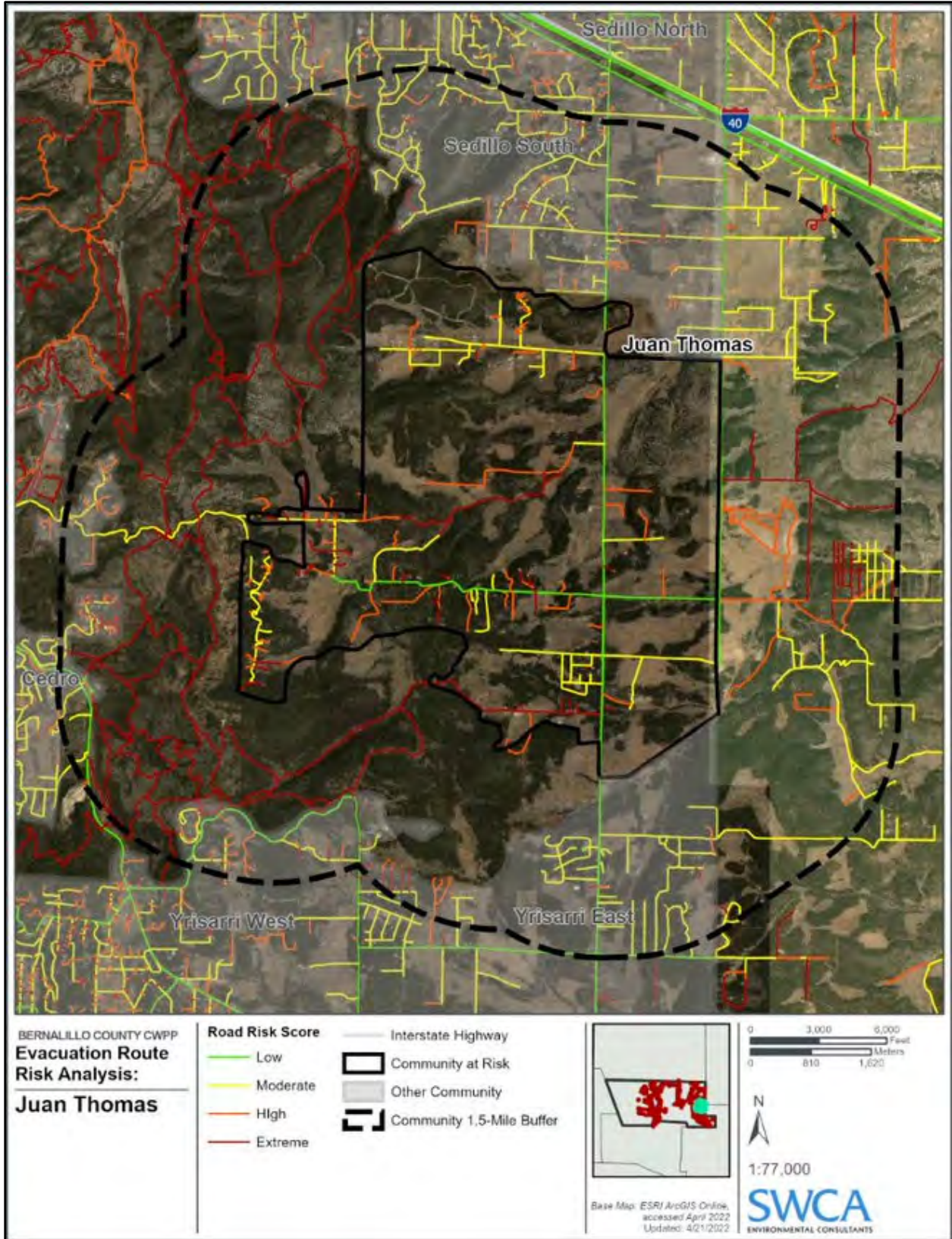


Figure D.32. Evacuation route risk analysis for Juan Thomas.

# WUI COMMUNITY # 15: WILDLAND URBAN INTERFACE COMMUNITIES

## LA LUZ POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> La Luz	<b><u>Total Score:</u></b> 120	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> Sandia Mountain		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.6		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 330.2		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 0.7
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
14.1%	37.5%	0.4%	0.0%	32.2%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 94.4%	0-5 minutes: 0.0%
4-8 (ft): 0.3%	5-10 minutes: 0.1%
8-12 (ft): 0.1%	10-15 minutes: 90.7%
>12 (ft): 0.0%	15+ minutes: 9.2%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> Bureau of Indian Affairs (BIA) Southern Pueblos, USFS				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 4</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Some hydrants</li> <li>• Class B building materials</li> <li>• Reflective road signs</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Continuous vegetation around houses</li> <li>• Multiple road surface conditions</li> <li>• Houses places &lt;30 feet from slope setback</li> <li>• Terrain would negatively influence fire behavior</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



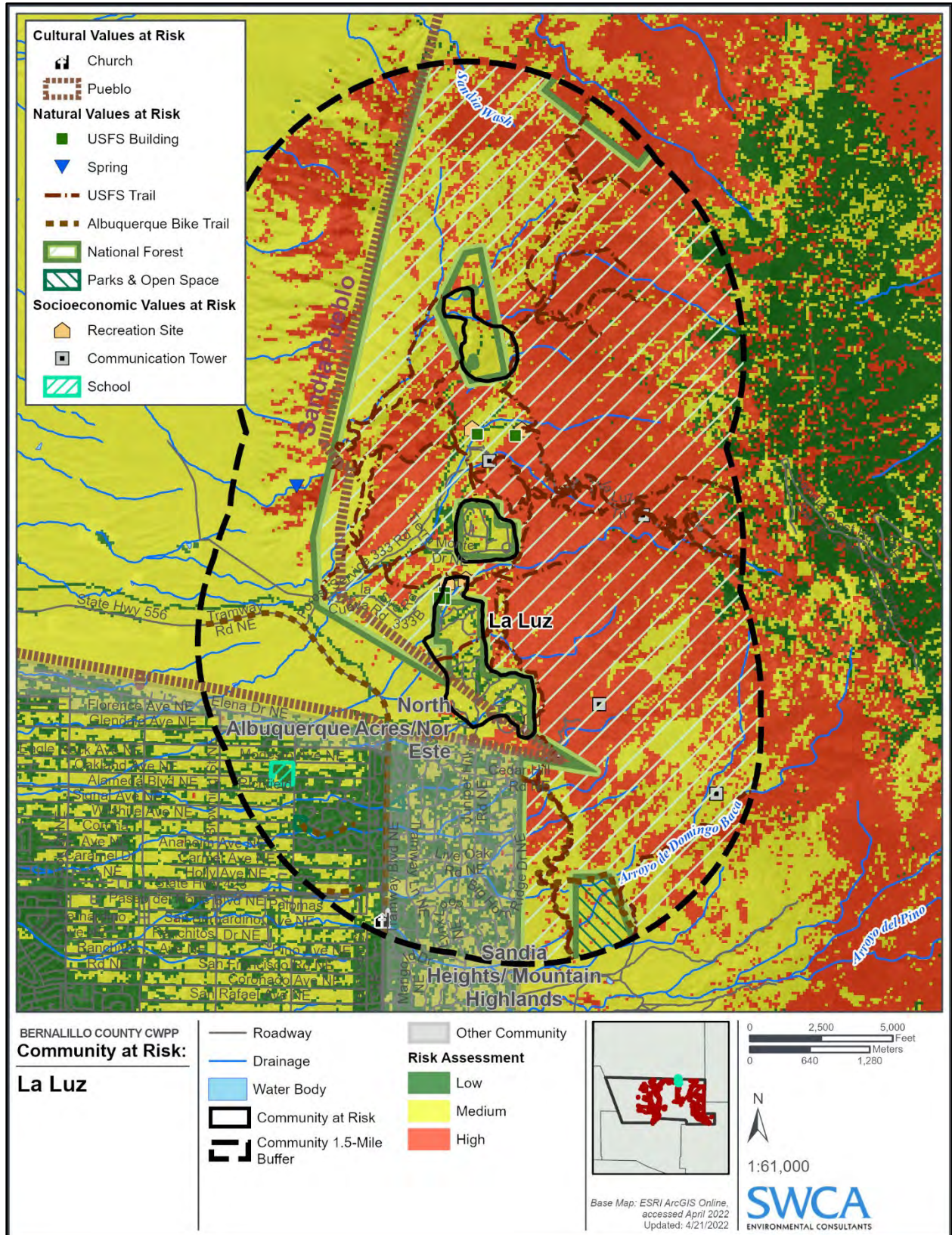


Figure D.33. La Luz polygon.



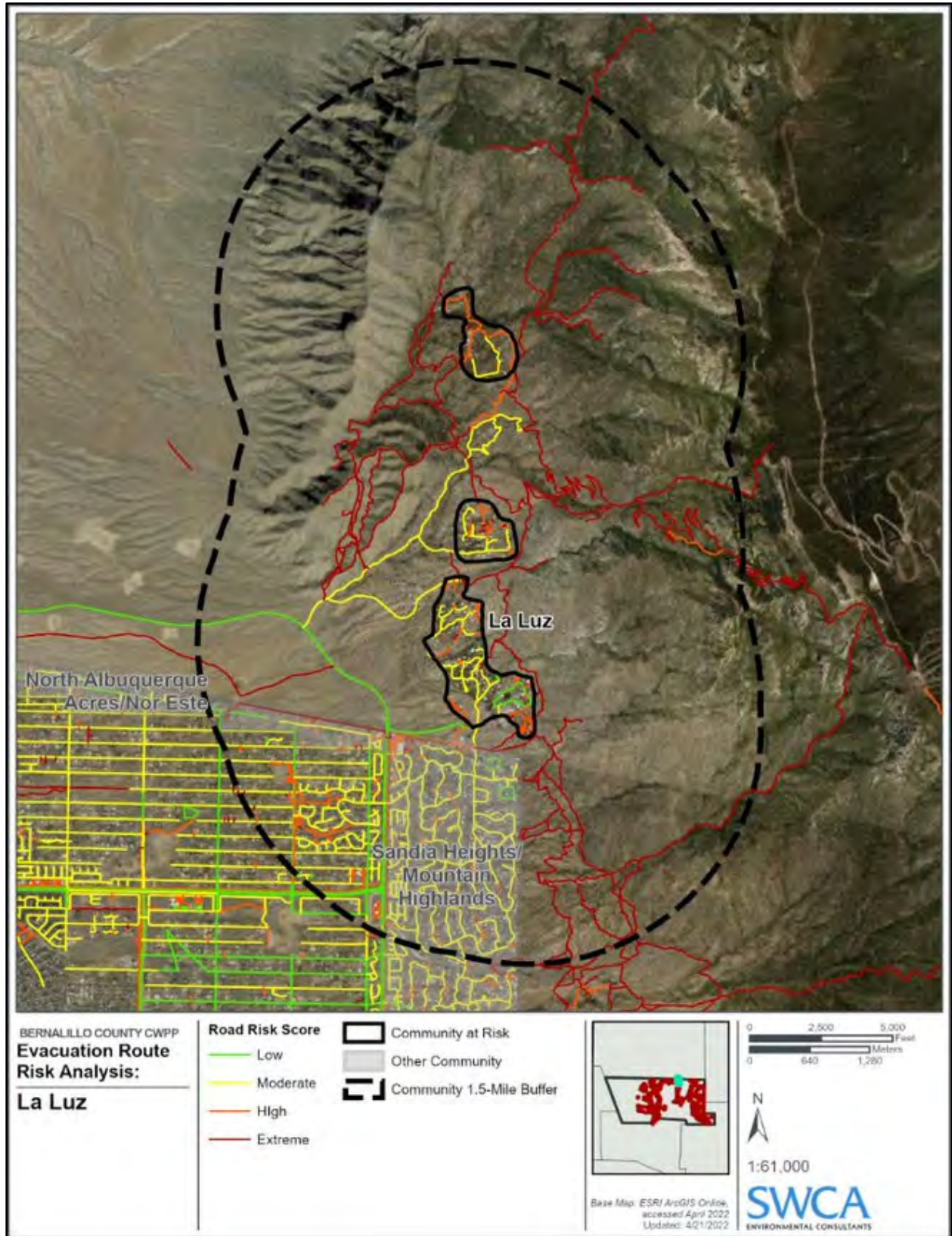


Figure D.34. Evacuation route risk analysis for La Luz.

## WUI COMMUNITY # 16: WILDLAND URBAN INTERFACE COMMUNITIES

### LA MADERA POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> La Madera	<b>Total Score:</b> 117	<b>Rating:</b> High
<b>Geographical Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.6		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 100.3		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 0.6
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
8.6%	64.6%	16.2%	0.0%	10.3%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 71.8%	0-5 minutes: 0.0%
4-8 (ft): 30.6%	5-10 minutes: 13.0%
8-12 (ft): 0.3%	10-15 minutes: 37.2%
>12 (ft): 0.4%	15+ minutes: 49.9%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #46				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 6</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• East Mountain CWPP</li> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Community is active in defensible space/vegetation management</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely isolated community</li> <li>• Many locked gates</li> <li>• An assortment of building materials</li> <li>• Fire station is &gt;5 miles away</li> <li>• No hydrants or other water bodies</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



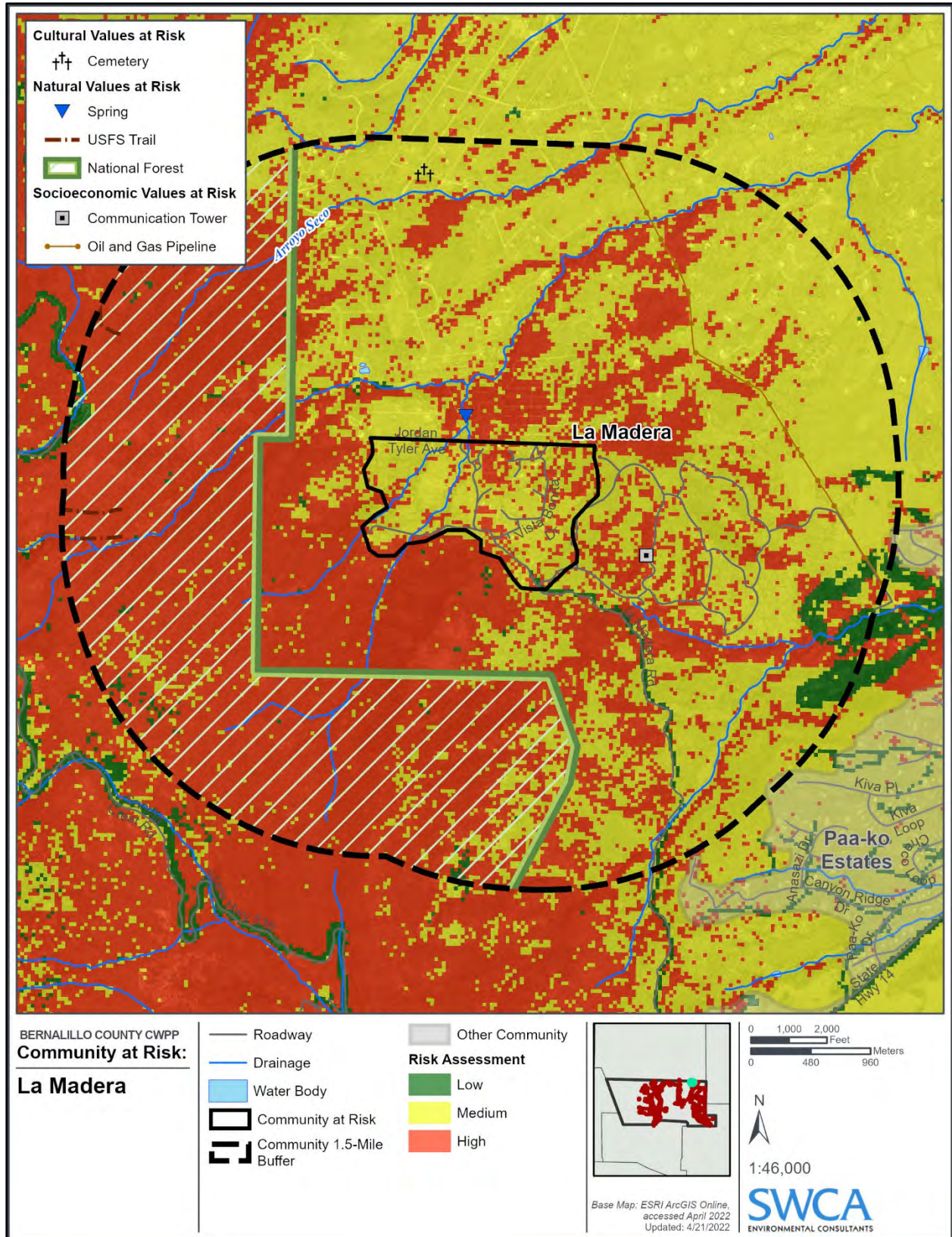


Figure D.35. La Madera polygon.



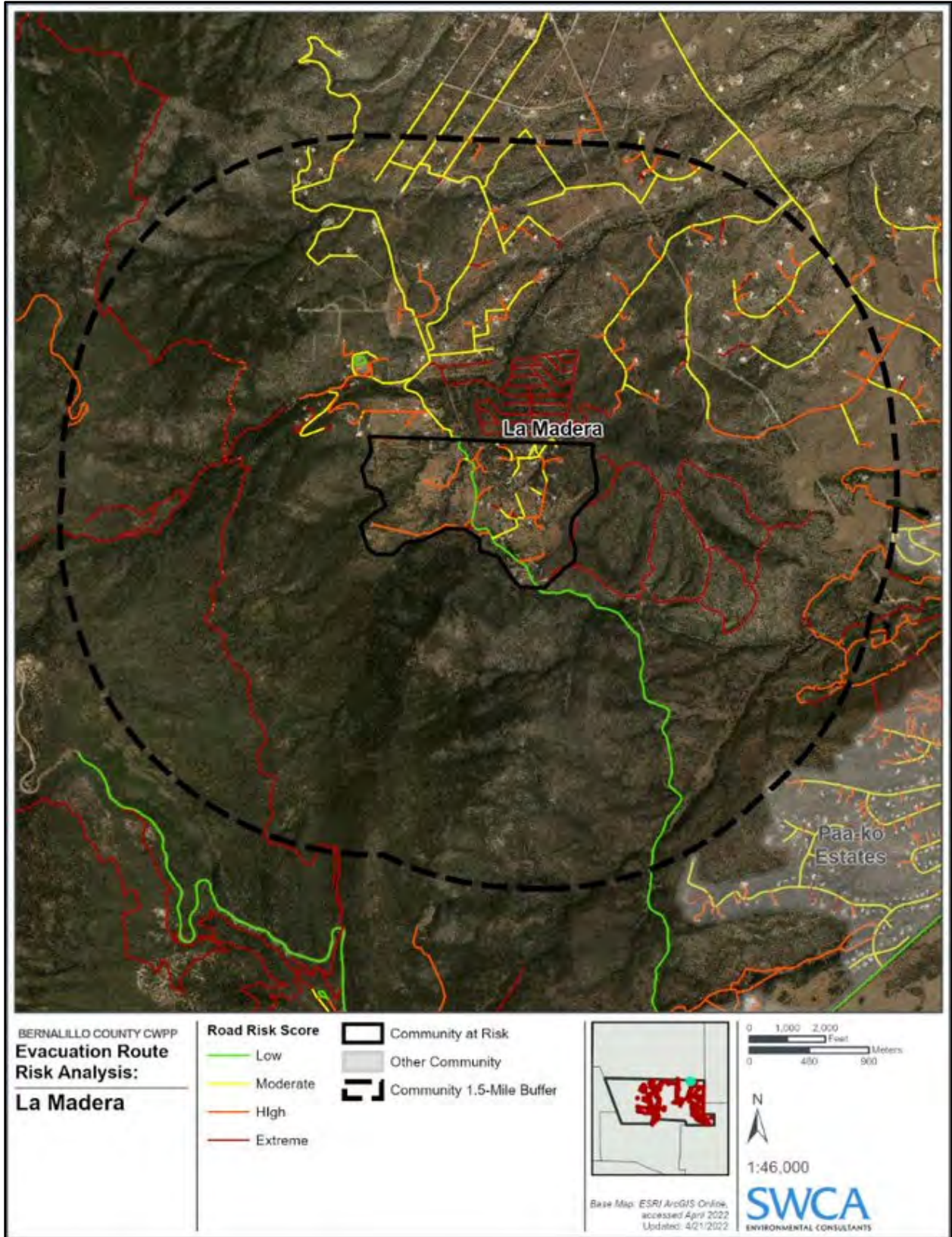


Figure D.36. Evacuation route risk analysis for La Madera.

# WUI COMMUNITY # 17: WILDLAND URBAN INTERFACE COMMUNITIES LADERA POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Ladera	<b><u>Total Score:</u></b> 91	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.0		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 1,265.6		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 2.2
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
12.6%	18.3%	14.3%	0.0%	1.2%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 98.1%	0-5 minutes: 0.3%
4-8 (ft): 0.1%	5-10 minutes: 41.1%
8-12 (ft): 0.0%	10-15 minutes: 46.2%
>12 (ft): 0.0%	15+ minutes: 12.4%

Fire Department Statistics:		
<b><u>Fire District:</u></b> AFR #17 and #18		
<b><u>Fulltime Firefighters:</u></b> 51	<b><u>On-call Firefighters:</u></b>	<b><u>Volunteer Firefighters:</u></b>
<b><u>Water Tender:</u></b>		<b><u>Wildland Engines</u></b>
Type 1:	<b><u>Total Number:</u></b>	<b><u>4WD/AWD:</u></b>
Type 2:	Type 3:	<b><u>Brush Breaker:</u></b>
Type 3:	Type 4:	
<b><u>Structure Engines:</u></b>	Type 5:	
Type 1: 2	Type 6:	
Type 2:	Type 7:	
<b><u>Port-A-Tanks:</u></b>		
<b><u>Portable Pumps:</u></b>		

Recent fires within the polygon:

- None

**Current Fire and Fuel Management Programs and Plans**

- Bernalillo County Hazard Mitigation Plan

**1144 Survey Summary Highlights**

Positive Attributes (Low Scores)

- Low and sparse vegetation component
- Mostly brick construction
- Xeriscaped lawns
- Multiple ingress/egress points
- Hydrants throughout the unit

Negative Attributes (High Scores)

- Multiple and prevalent wooden fences present
- Limited defensible space

**Suggested Mitigation Focus Area**

Fire Department Concerns:

- N/A\*

\* Data were not provided.



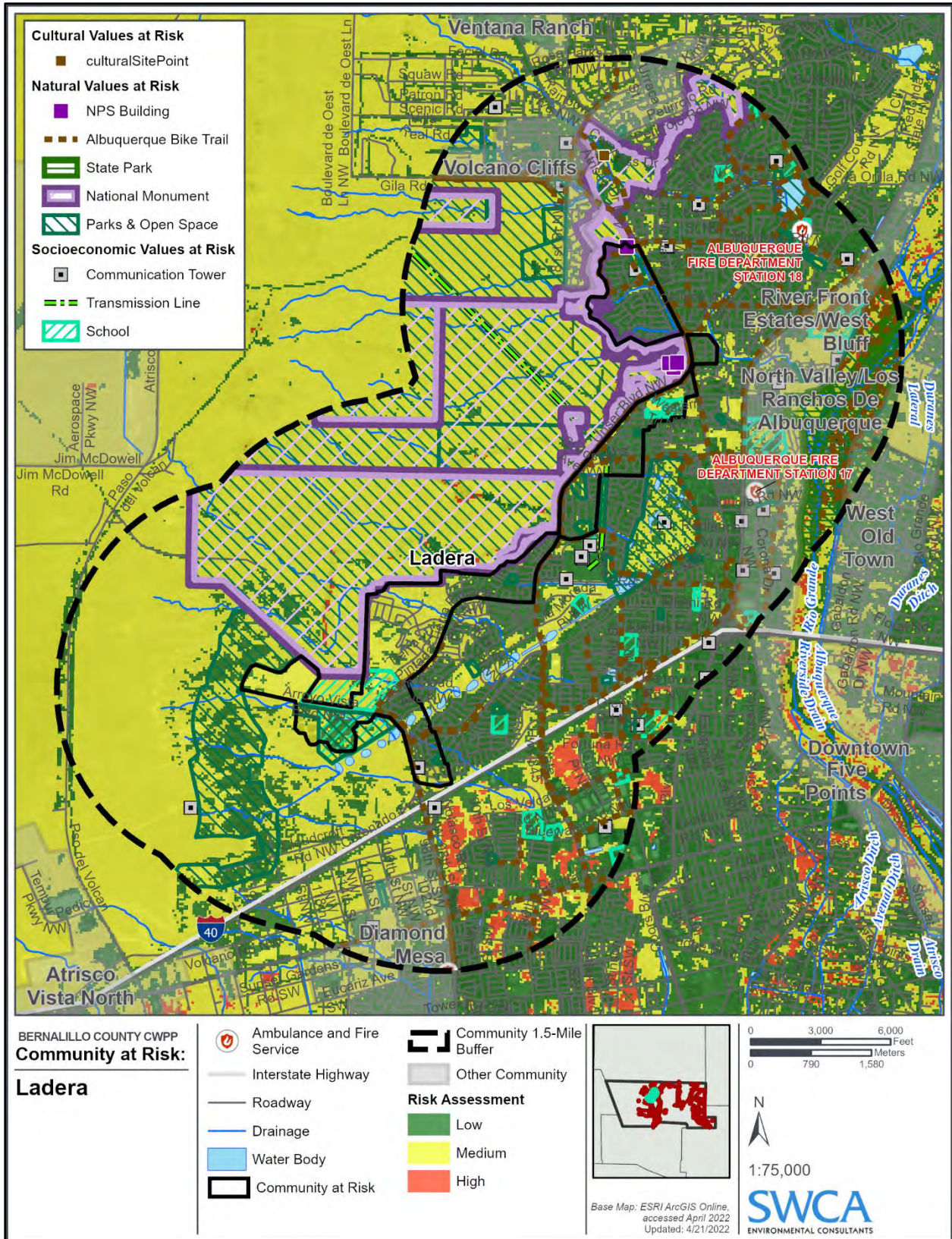


Figure D.37. Ladera polygon.



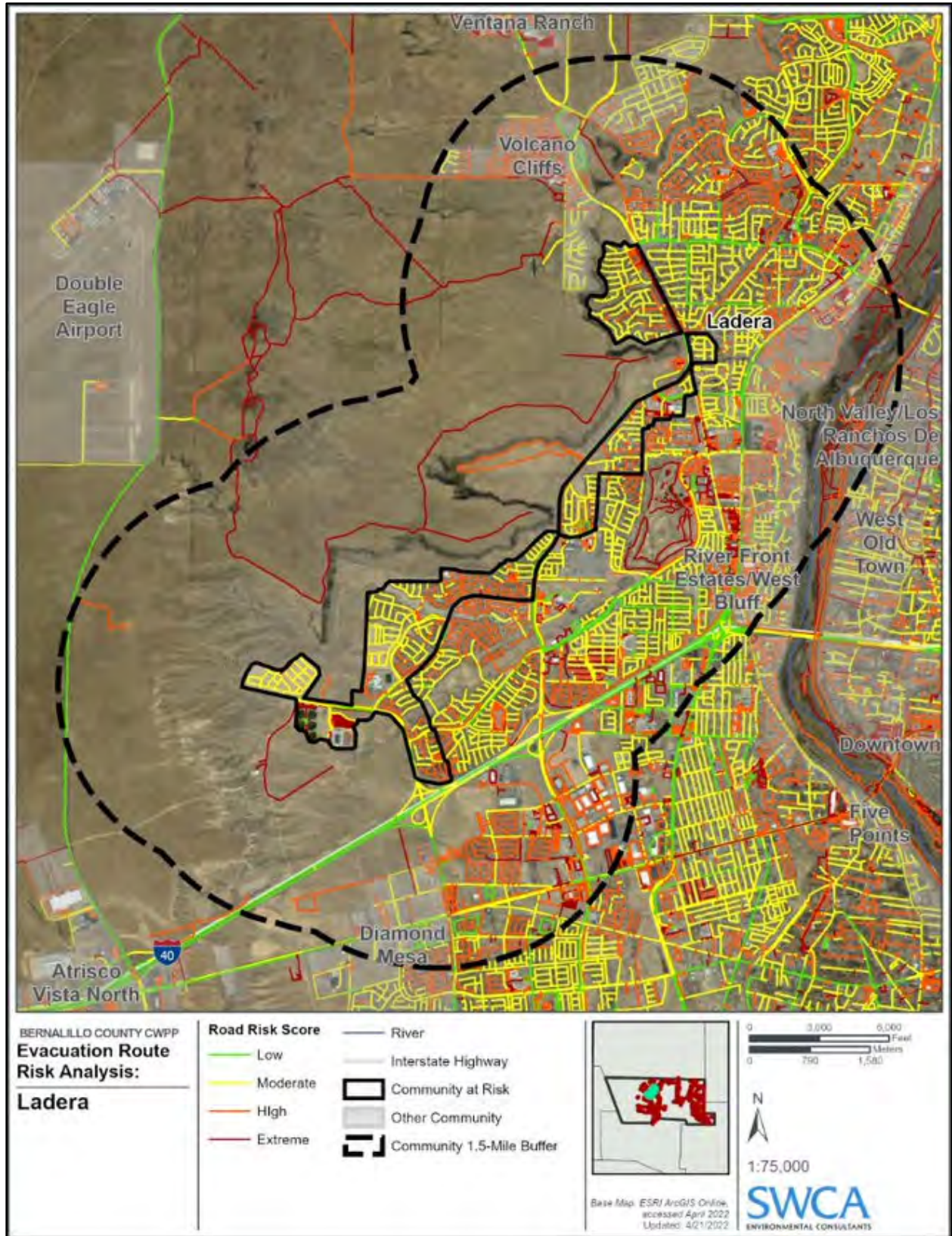


Figure D.38. Evacuation route risk analysis for Ladera.

## WUI COMMUNITY # 18: WILDLAND URBAN INTERFACE COMMUNITIES

# NORTH ALBUQUERQUE ACRES/NOR ESTE POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> North Albuquerque Acres/Nor Este	<b>Total Score:</b> 60	<b>Rating:</b> Medium
<b>Geographical Area:</b> North Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.8		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 467		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.5
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
16.4%	33.0%	1.4%	0.0%	4.7%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 96.8%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 2.8%
8-12 (ft): 0.0%	10-15 minutes: 92.4%
>12 (ft): 0.0%	15+ minutes: 4.9%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #20, BCFR #35, BIA Southern Pueblos Agency				
<u>Fulltime Firefighters:</u> 42		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Total Number:</u>		<u>Wildland Engines</u>
Type 1: 1		Type 3:	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 4:		
Type 3:		Type 5:		
<u>Structure Engines:</u>		Type 6: 1		
Type 1: 2		Type 7:		
Type 2:				
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• 2</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• New building construction</li> <li>• Hydrants throughout the unit</li> <li>• Defensible space</li> <li>• Low sparse fuel</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation becomes continuous and thick in the east</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



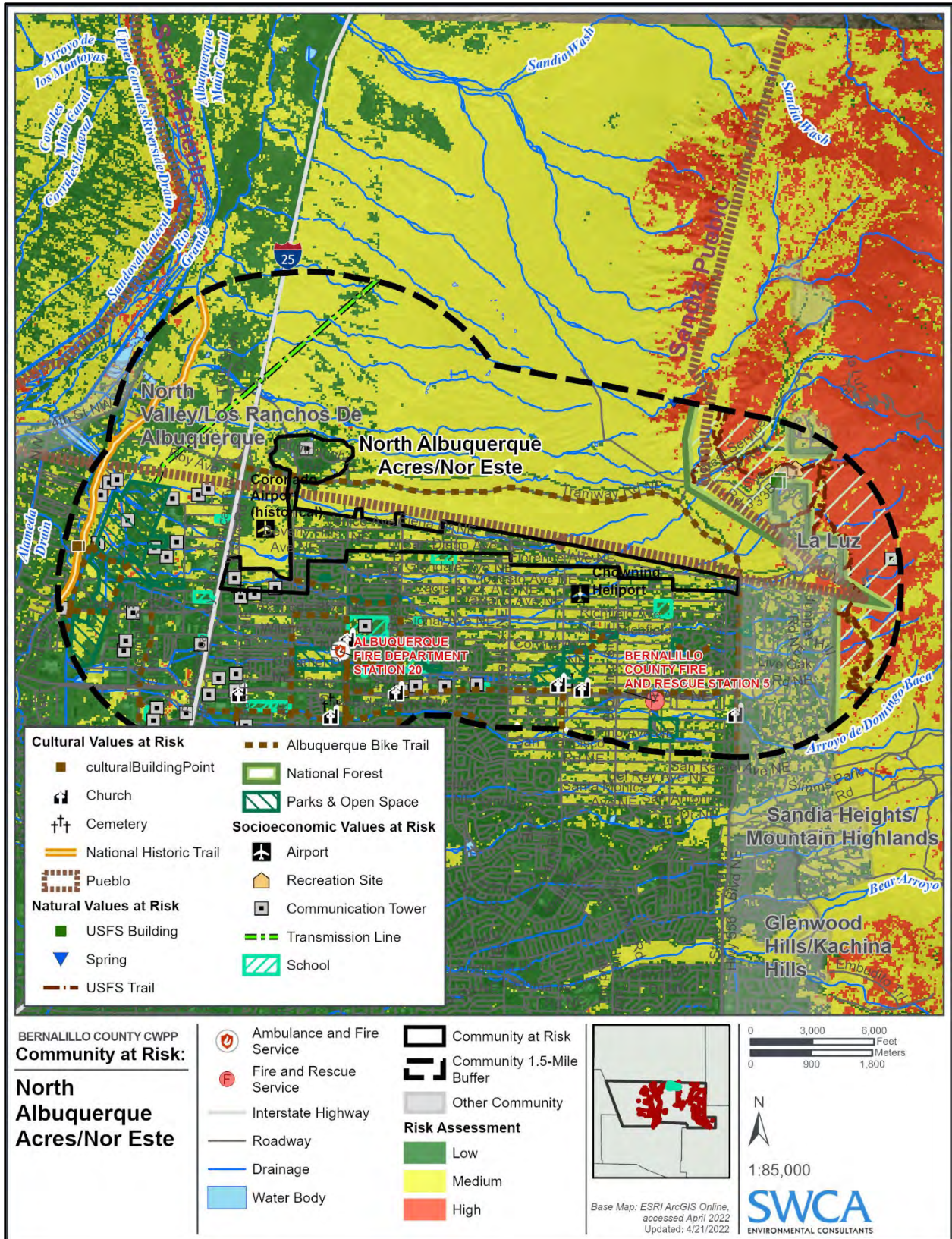


Figure D.39. North Albuquerque Acres/Nor Este polygon.



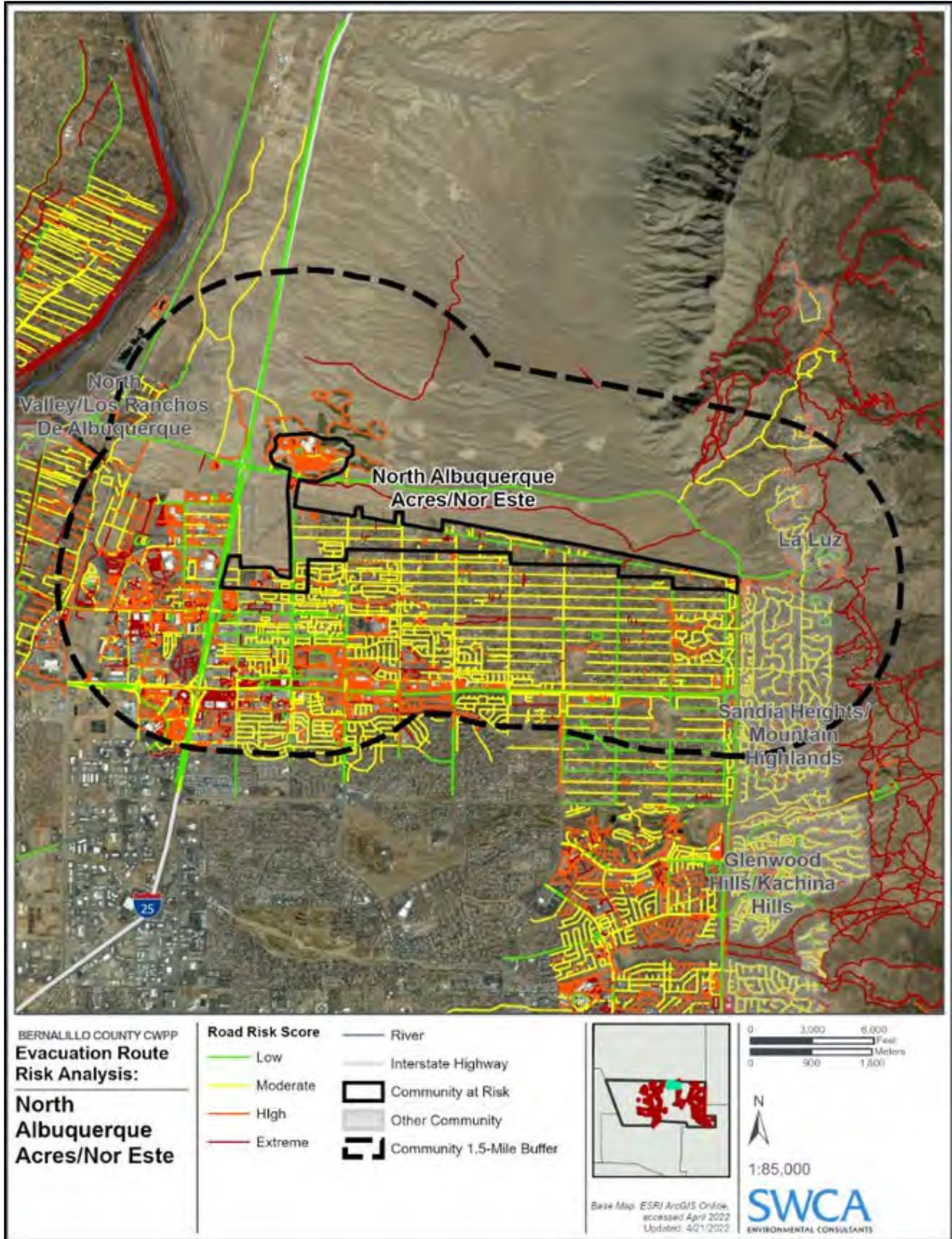


Figure D.40. Evacuation route risk analysis for North Albuquerque Acres/Nor Este.

## WUI COMMUNITY # 19: WILDLAND URBAN INTERFACE COMMUNITIES

# NORTH VALLEY/LOS RANCHOS DE ALBUQUERQUE POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> North Valley/Los Ranchos De Albuquerque	<b>Total Score:</b> 90	<b>Rating:</b> High
<b>Geographic Area:</b> North Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 2.6		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 490.3		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 3.9
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
55.8	2.5%	2.1%	0.2%	7.0%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 99.1%	0-5 minutes: 0.0%
4-8 (ft): 0.7%	5-10 minutes: 2.4%
8-12 (ft): 0.0%	10-15 minutes: 93.8%
>12 (ft): 0.0%	15+ minutes: 3.4%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #15, BCFR #30 and #31				
<u>Fulltime Firefighters:</u> 48		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 2		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 3		Type 6: 1		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u> 2				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 8</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> <li>• Reference Middle Rio Grande Bosque CWPP</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• New building construction</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Large cottonwood trees connecting to bosque</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



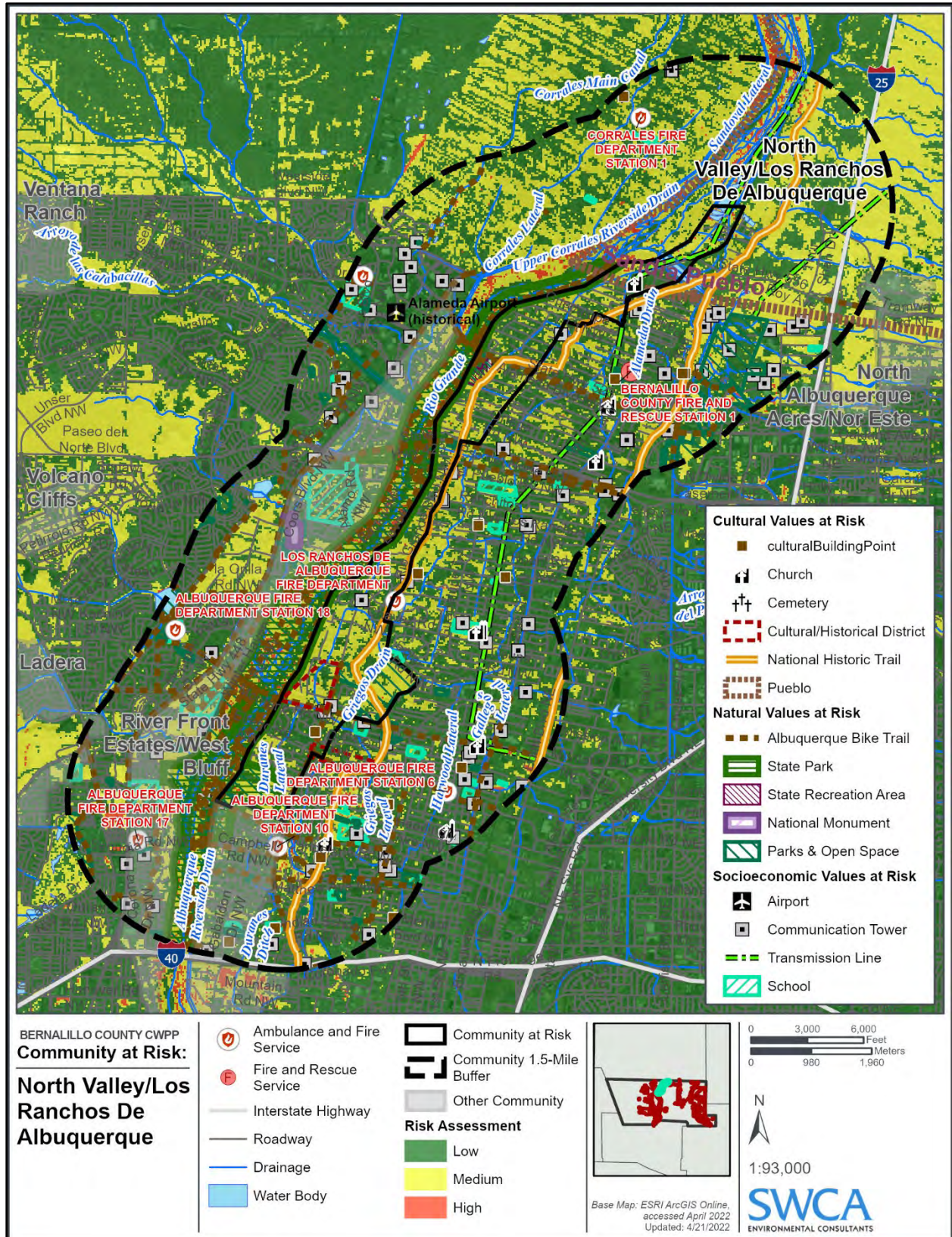


Figure D.41. North Valley/Los Ranchos De Albuquerque polygon.



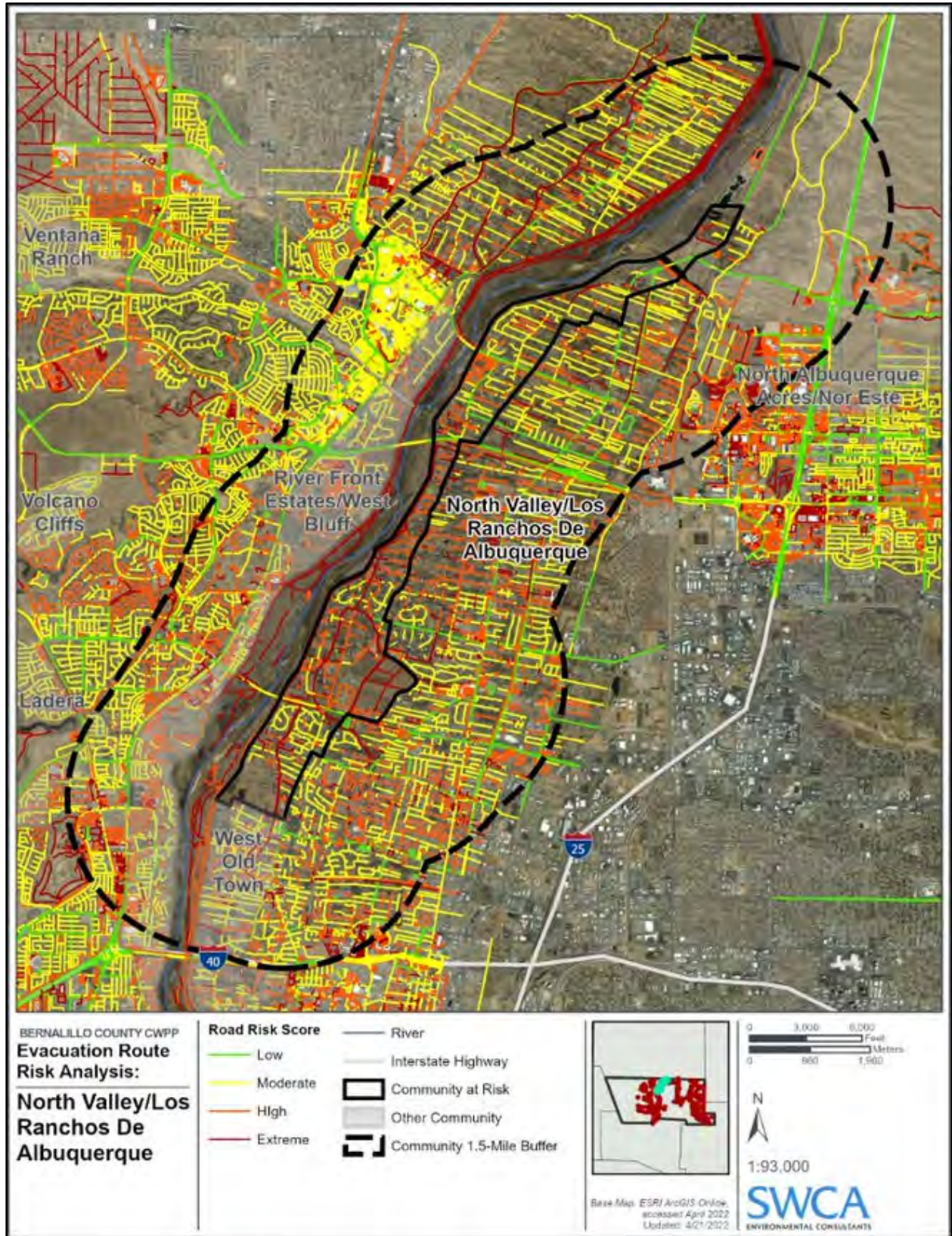


Figure D.42. Evacuation route risk analysis for North Valley/Los Ranchos De Albuquerque.

## WUI COMMUNITY # 20: WILDLAND URBAN INTERFACE COMMUNITIES

### PAA-KO ESTATES POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Paa-ko Estates	<b>Total Score:</b> 102	<b>Rating:</b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 2.0		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 174.5		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 2.1
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
26.3%	51.3%	5.4%	0.3%	11.9%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 91.8%	0-5 minutes: 0.3%
4-8 (ft): 5.6%	5-10 minutes: 31.4%
8-12 (ft): 0.2%	10-15 minutes: 44.8%
>12 (ft): 0.0%	15+ minutes: 23.6%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #46				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6: 1		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>	1			
<u>Portable Pumps:</u>	1			
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 3</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• East Mountain CWPP</li> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Large turnarounds every ¼ mile</li> <li>• New construction materials</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous vegetation throughout the area</li> <li>• Some houses are built on ridgelines and gullies</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



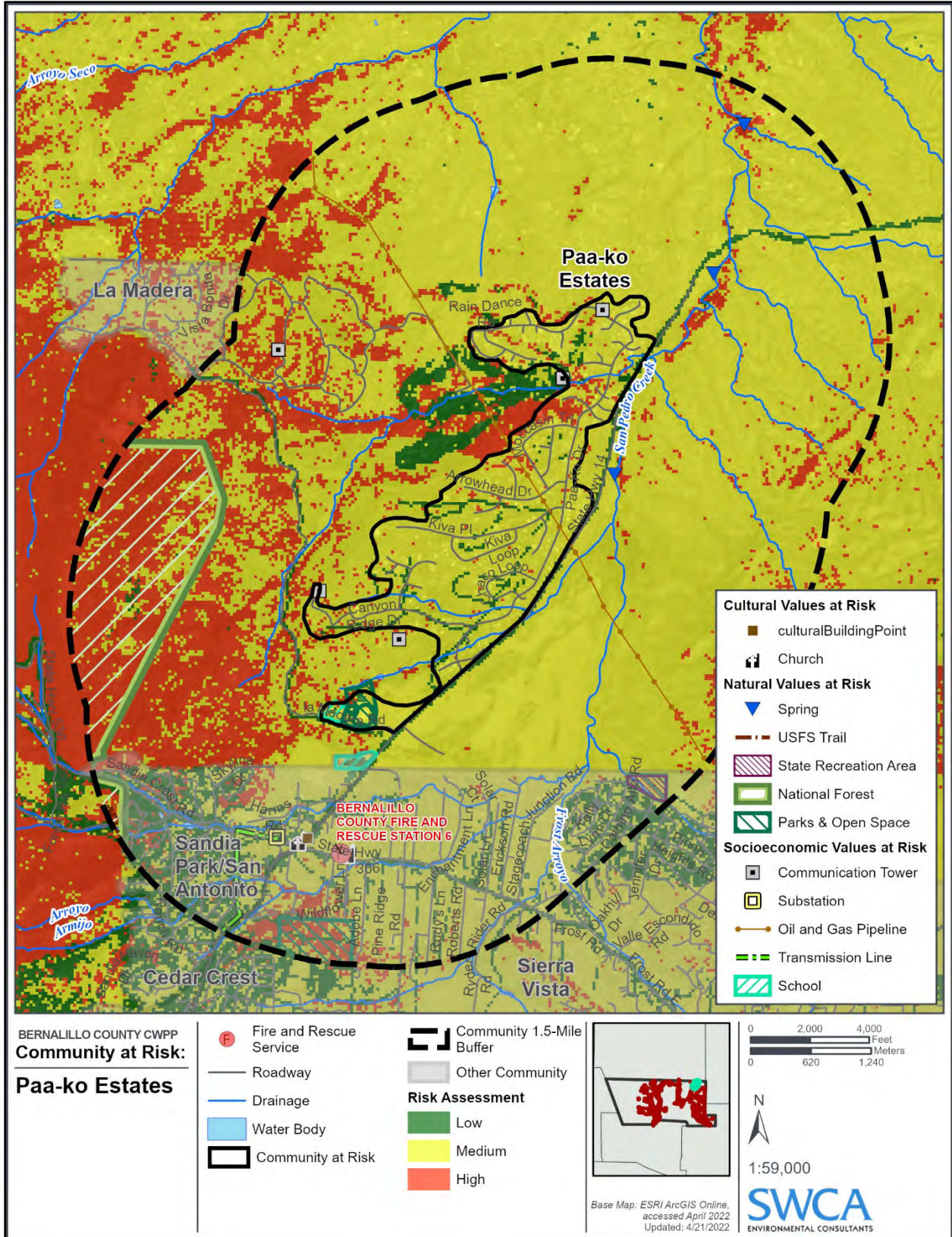


Figure D.43. Paa-ko polygon.



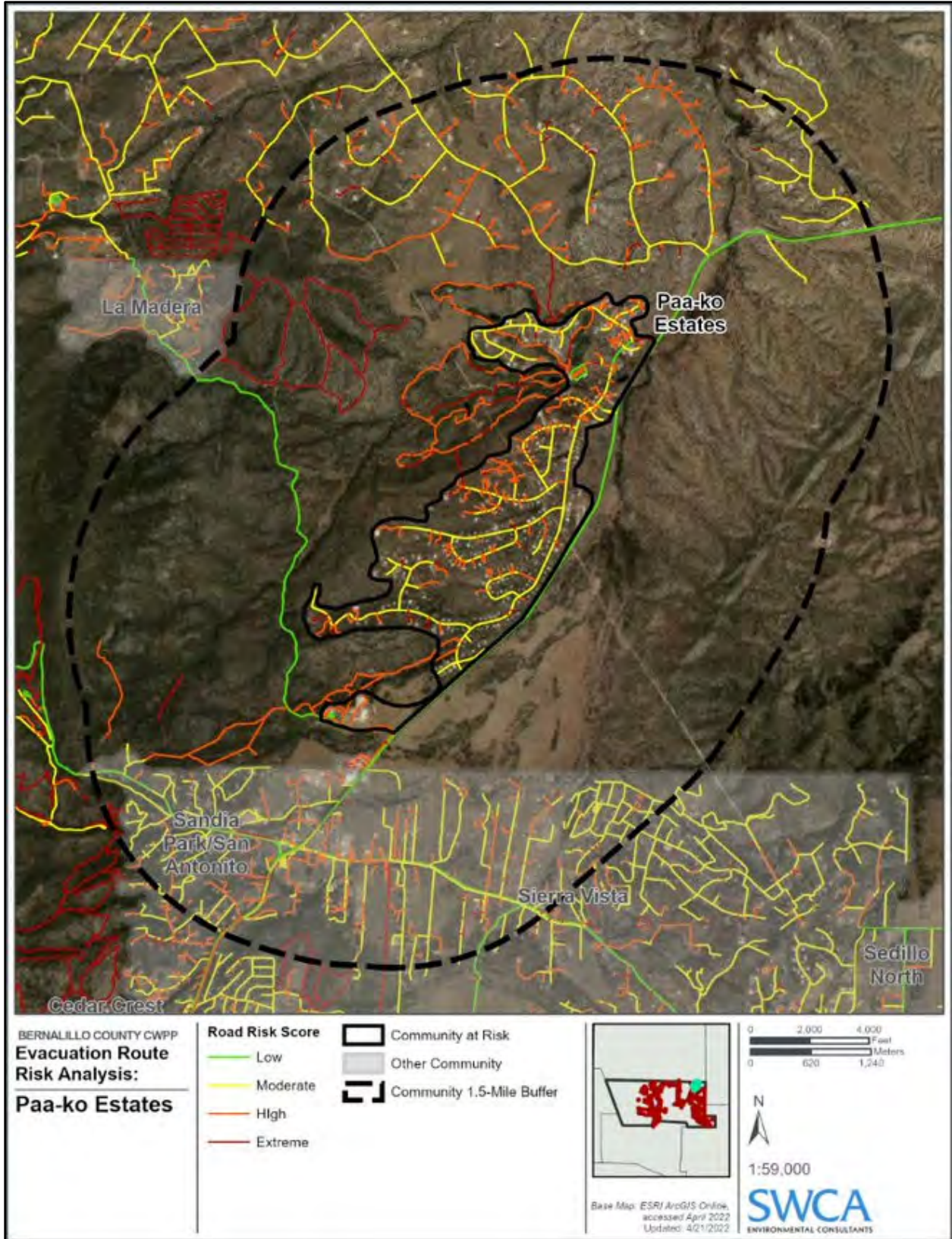


Figure D.44. Evacuation route risk analysis for Paa-ko.

## WUI COMMUNITY # 21: WILDLAND URBAN INTERFACE COMMUNITIES

### PAJARITO MESA POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Pajarito Mesa	<b><u>Total Score:</u></b> 57	<b><u>Rating:</u></b> Medium
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 13.2		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 24.5		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 13.5
<b><u>Percent:</u></b> 100.0

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
8.0%	54.3%	10.4%	0.0%	0.3%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 100.0%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 25.3%
8-12 (ft): 0.0%	10-15 minutes: 48.2%
>12 (ft): 0.0%	15+ minutes: 26.6%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #34				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3: 1	1	
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>	1			
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• 8</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Low history of wildfires</li> <li>• Limited and sparse fuels</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple dirt roads</li> <li>• No hydrants or water sources</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



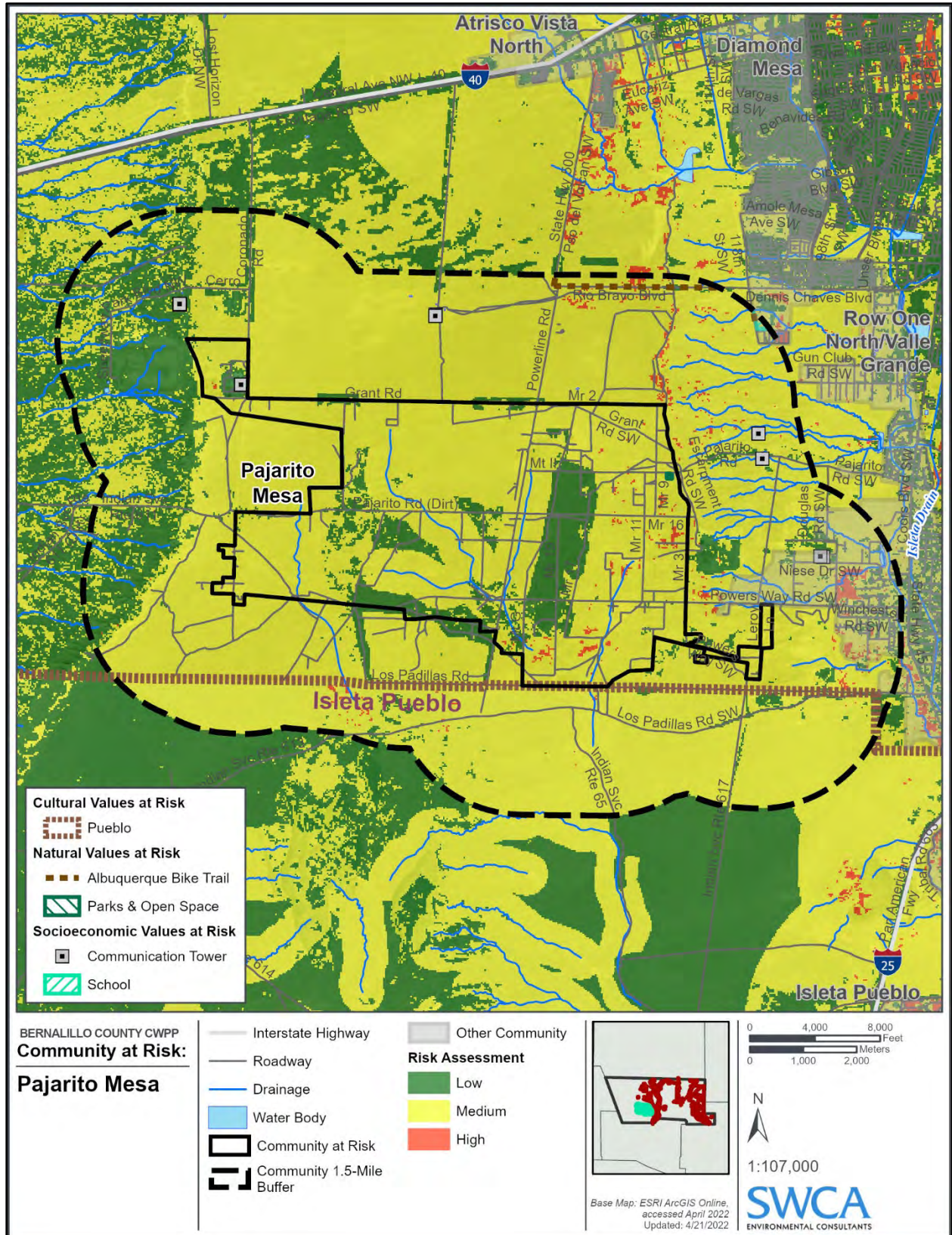


Figure D.45. Pajarito Mesa polygon.



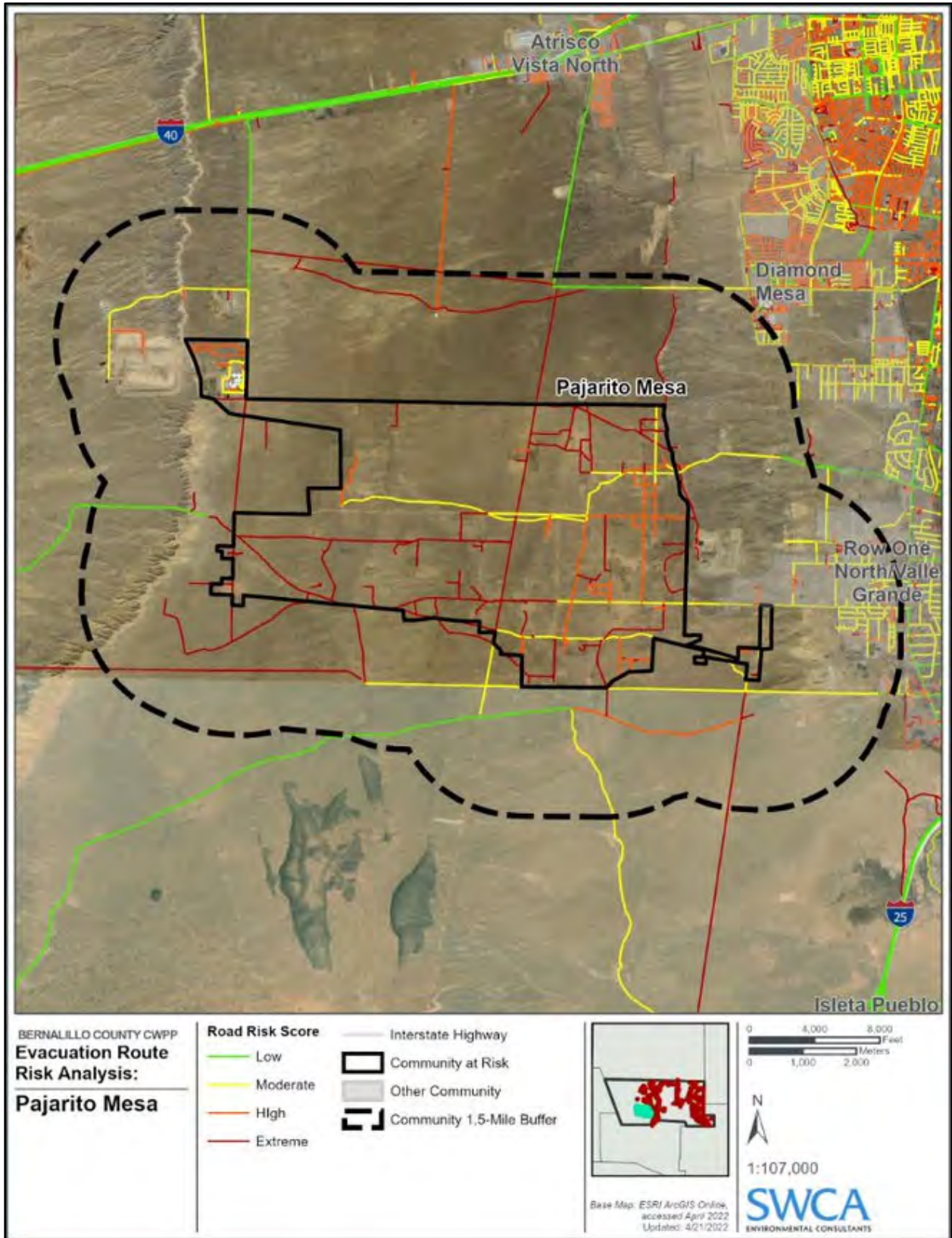


Figure D.46. Evacuation route risk analysis for Pajarito Mesa.

## WUI COMMUNITY # 22: WILDLAND URBAN INTERFACE COMMUNITIES

### PORTRAIT PARK POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Portrait Park	<b><u>Total Score:</u></b> 54	<b><u>Rating:</u></b> Medium
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.0		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 214.8		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.4
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
8.0%	54.3%	10.4%	0.0%	0.3%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 12.5%
8-12 (ft): 0.0%	10-15 minutes: 62.9%
>12 (ft): 0.0%	15+ minutes: 24.7%

Fire Department Statistics:			
<u>Fire District:</u> BCFR #38			
<u>Fulltime Firefighters:</u> 15	<u>On-call Firefighters:</u>	<u>Volunteer Firefighters:</u>	
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1:	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:	Type 3:		
Type 3:	Type 4:		
<u>Structure Engines:</u>	Type 5:		
Type 1: 1	Type 6: 1	1	
Type 2:	Type 7:		
<u>Port-A-Tanks:</u>			
<u>Portable Pumps:</u> 1			
<u>Recent fires within the polygon:</u>			
<ul style="list-style-type: none"> <li>• None</li> </ul>			

**Current Fire and Fuel Management Programs and Plans**

- Bernalillo County Hazard Mitigation Plan

**1144 Survey Summary Highlights**

Positive Attributes (Low Scores)

- Sparse fuels throughout the area
- New building and roofing materials

Negative Attributes (High Scores)

- Limited defensible space

**Suggested Mitigation Focus Area**

Fire Department Concerns:

- N/A\*

\* Data were not provided.



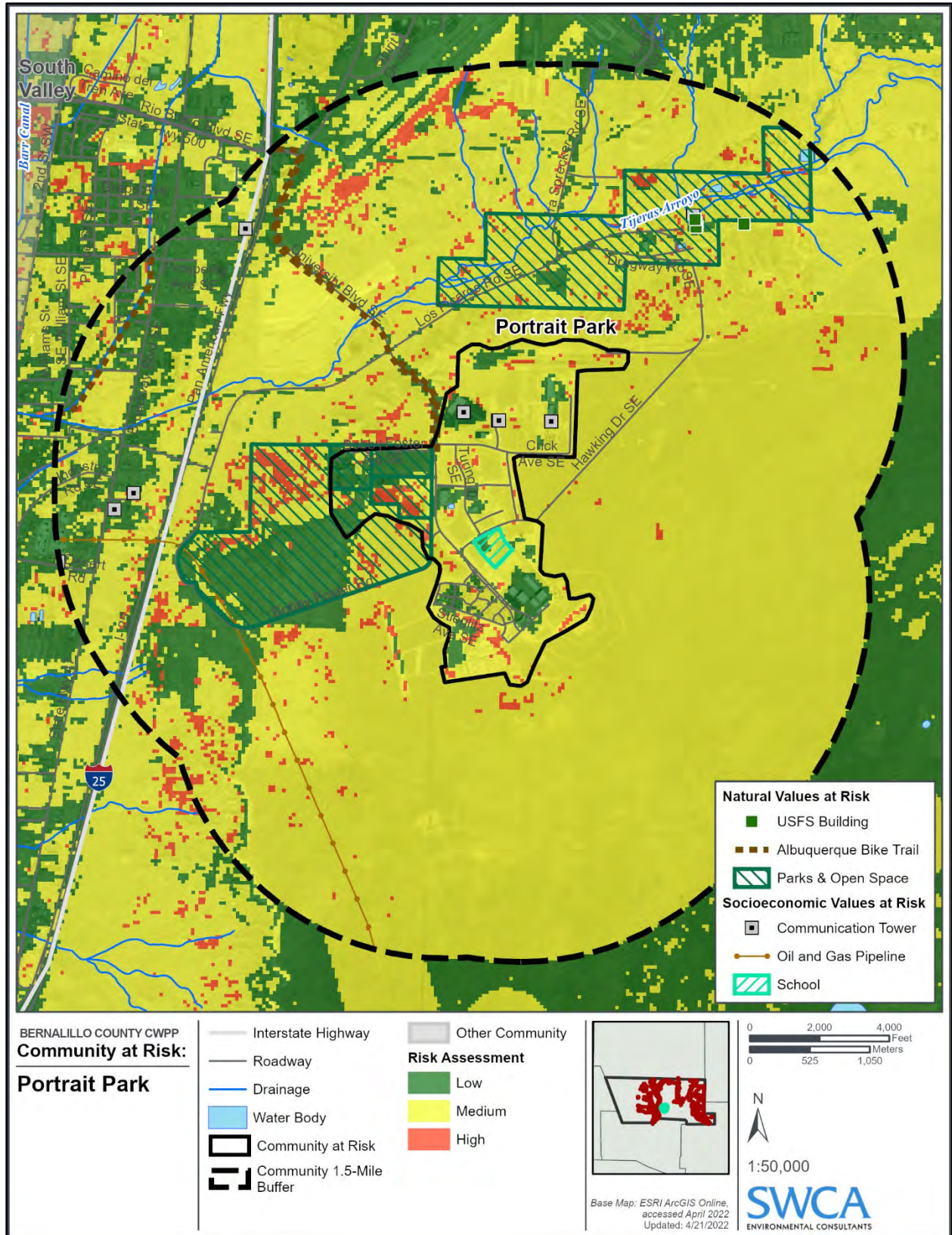


Figure D.47. Portrait Park polygon.



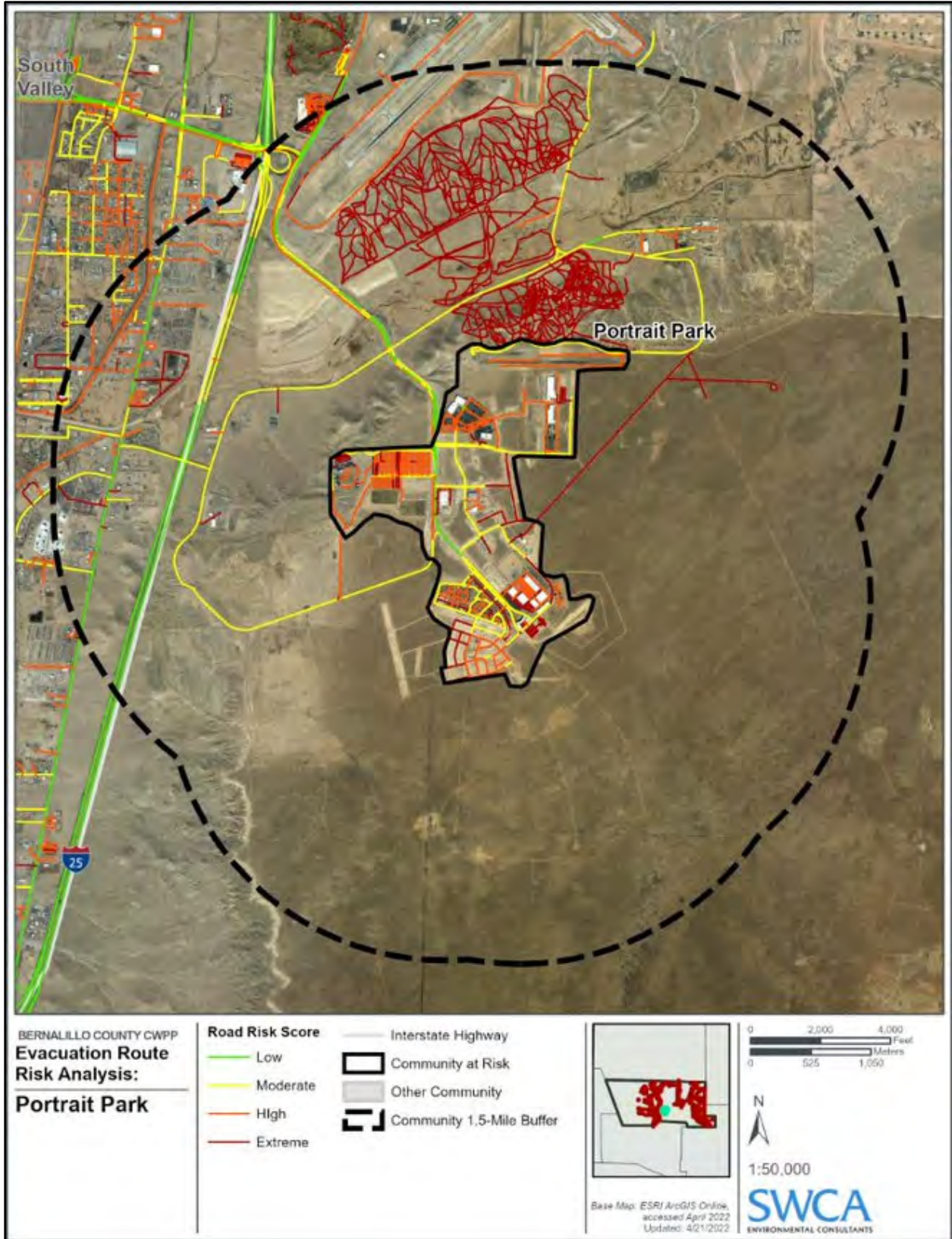


Figure D.48. Evacuation route risk analysis for Portrait Park.

# WUI COMMUNITY # 23: WILDLAND URBAN INTERFACE COMMUNITIES

## RIVER FRONT ESTATES/WEST BLUFF POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> River Front Estates/West Bluff	<b>Total Score:</b> 73	<b>Rating:</b> High
<b>Geographic Area:</b> North Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.7		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 498.1		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 3.5
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
15.7%	21.3%	5.9%	0.0%	5.7%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 99.6%	0-5 minutes: 0.0%
4-8 (ft): 0.4%	5-10 minutes: 49.8%
8-12 (ft): 0.0%	10-15 minutes: 50.2%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #7, #17, #18, #21				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Total Number:</u>		<u>Wildland Engines</u>
Type 1:		Type 3:	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 4:		
Type 3:		Type 5:		
<u>Structure Engines:</u>		Type 6:		
Type 1:		Type 7:		
Type 2:				
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> <li>• Reference Middle Rio Grande Bosque CWPP</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• New and modern building materials</li> <li>• Flat topography</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous fuels extending from the bosque</li> <li>• One-way ingress/egress</li> <li>• Limited defensible space</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



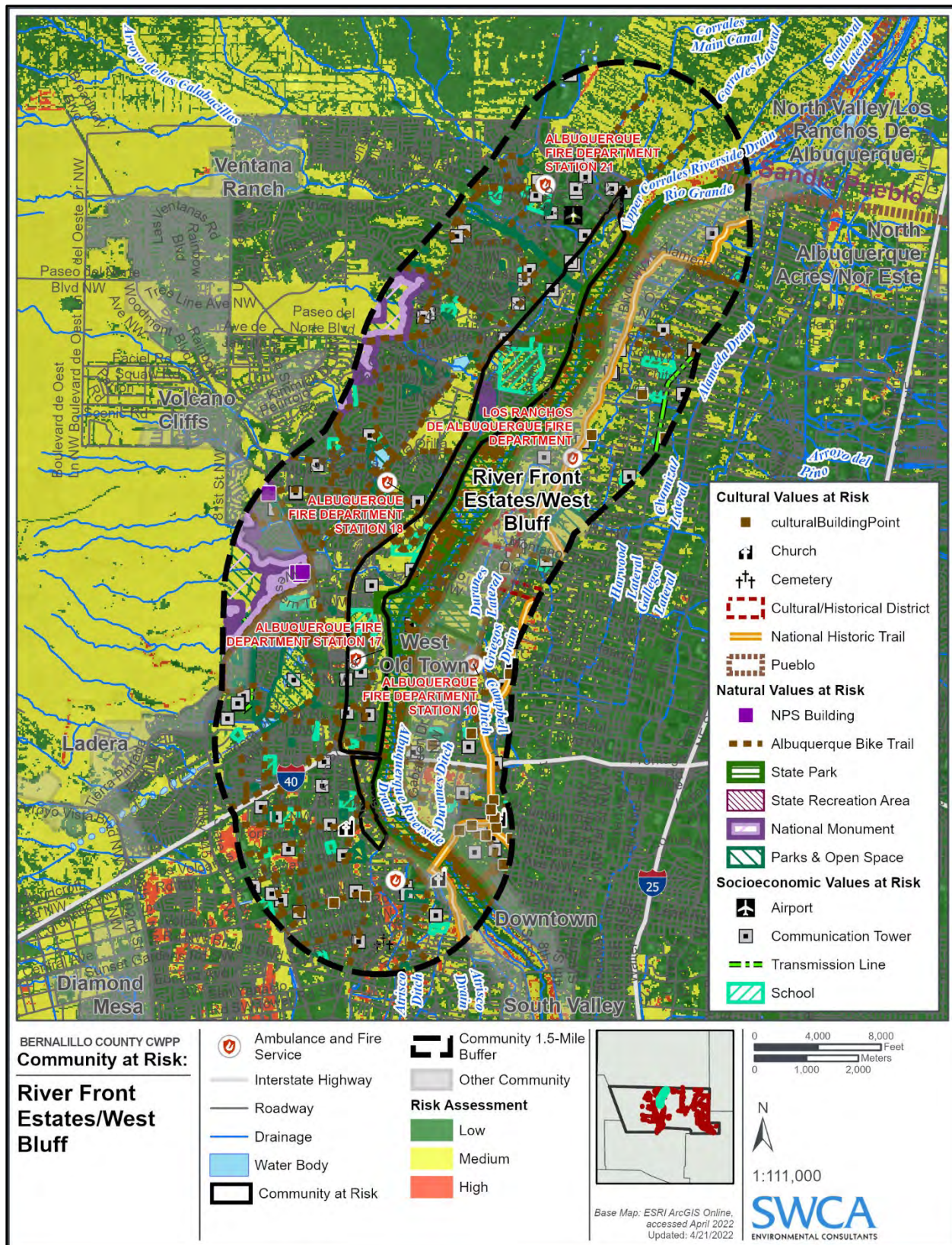


Figure D.49. River Front Estates/West Bluff polygon.



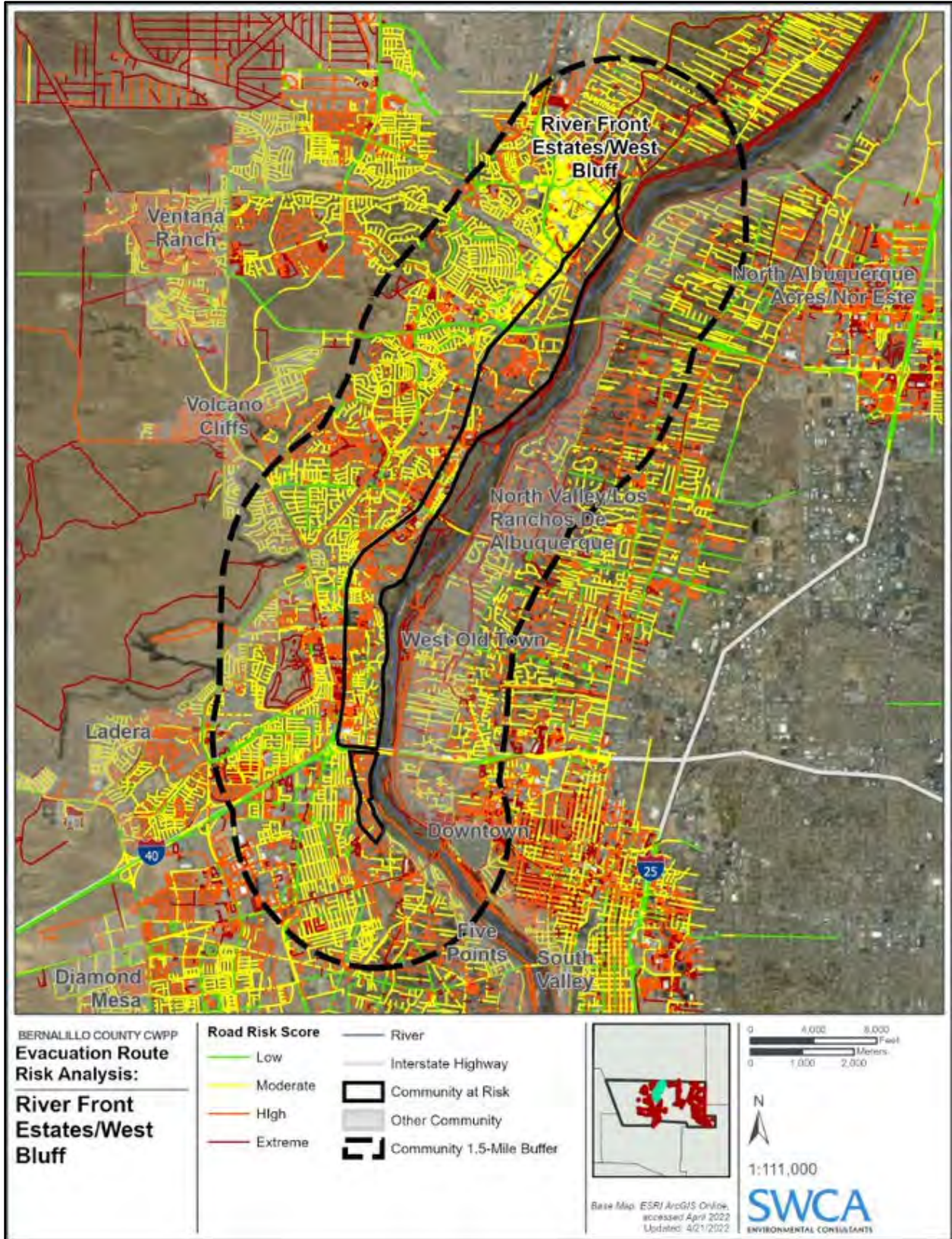


Figure D.50. Evacuation route risk analysis for River Front Estates/West Bluff.

# WUI COMMUNITY # 24: WILDLAND URBAN INTERFACE COMMUNITIES

## ROW ONE NORTH/VALLE GRANDE POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Row One North/Valle Grande	<b>Total Score:</b> 63	<b>Rating:</b> Medium
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 4.1		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 95.2		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 5.5
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
25.6%	22.1%	25.6%	0.0%	1.6%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 98.9%	0-5 minutes: 63.9%
4-8 (ft): 0.2%	5-10 minutes: 23.0%
8-12 (ft): 0.0%	10-15 minutes: 11.1%
>12 (ft): 0.0%	15+ minutes: 2.1%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #34				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3: 1	1	
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>	1			
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• 7</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Class B roofing materials</li> <li>• Class B building materials</li> <li>• Defensible space</li> <li>• Low fire potential</li> </ul>	<ul style="list-style-type: none"> <li>• Dispersed hydrants</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



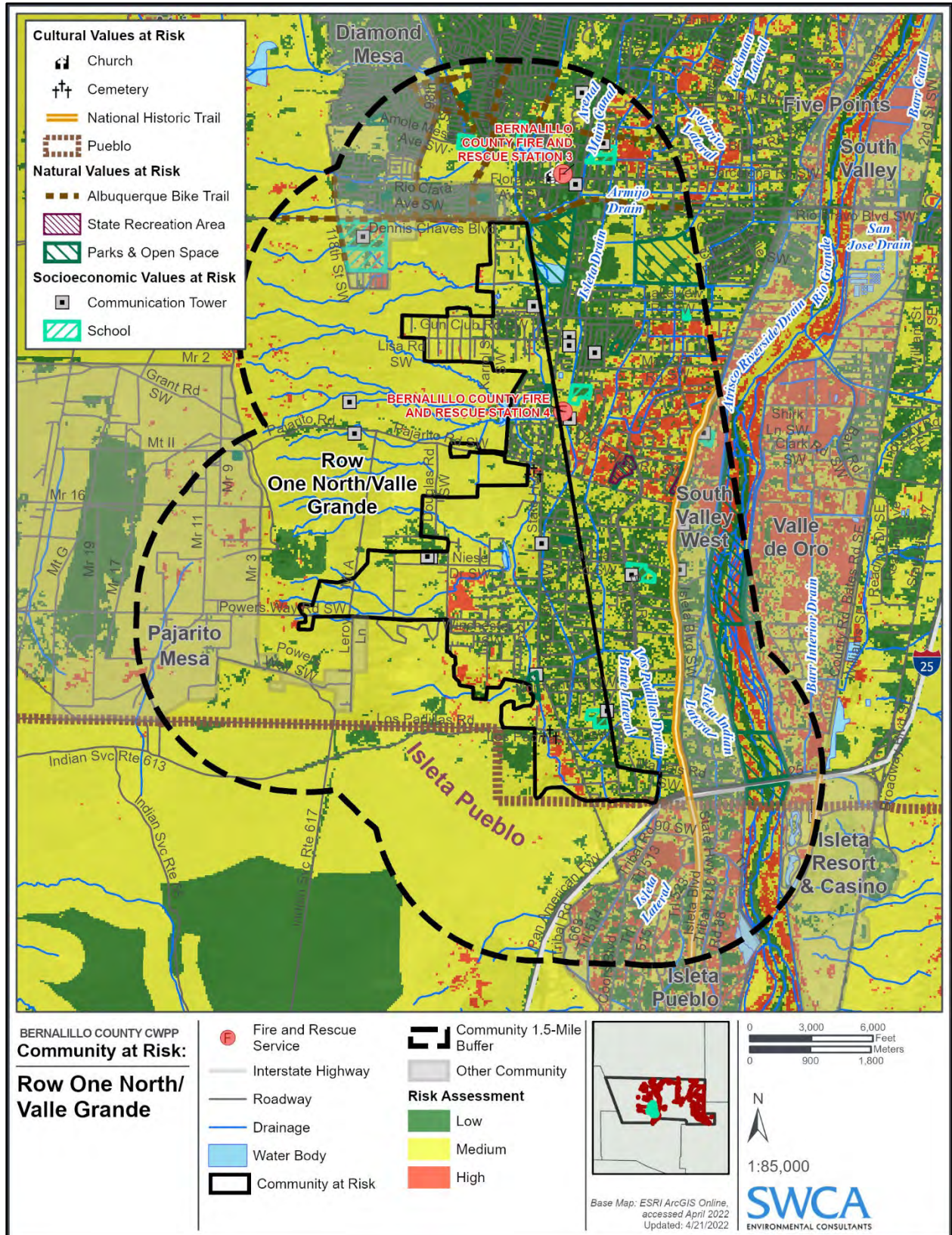


Figure D.51. Row One North/Valle Grande polygon.



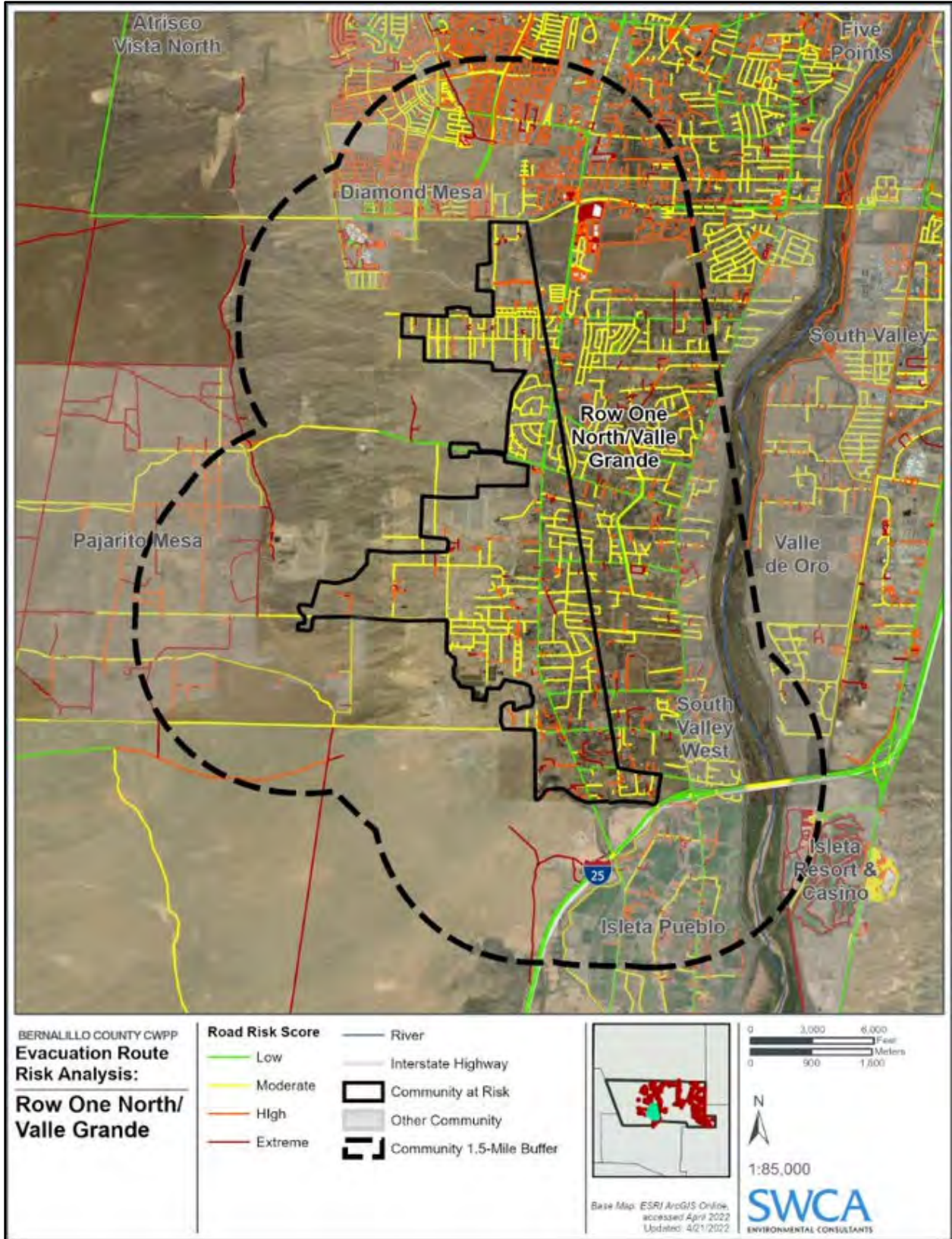


Figure D.52. Evacuation route risk analysis for Row One North/Valle Grande.

# WUI COMMUNITY # 25: WILDLAND URBAN INTERFACE COMMUNITIES

## SANDIA HEIGHTS/MOUNTAIN HIGHLANDS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Sandia Heights/ Mountain Highlands	<b>Total Score:</b> 54	<b>Rating:</b> Medium
<b>Geographic Area:</b> Sandia Foothills		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.5		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 527.0		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 2.5
<u>Percent:</u> 100.0

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
4.3%	41.7%	0.0%	0.0%	13.1%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 98.3%	0-5 minutes: 0.0%
4-8 (ft): 0.7%	5-10 minutes: 0.1%
8-12 (ft): 0.0%	10-15 minutes: 97.6%
>12 (ft): 0.0%	15+ minutes: 2.4%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #19 and BCFR #35				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 7</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• Xeriscape landscaping</li> <li>• Class B roofing and building materials</li> <li>• Present and reflective street signage</li> </ul>	<ul style="list-style-type: none"> <li>• Wooden fences</li> <li>• Buildings placed on undulating terrain</li> <li>• Narrow roadways with limited turnarounds</li> <li>• Overgrown arroyos near roadways</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



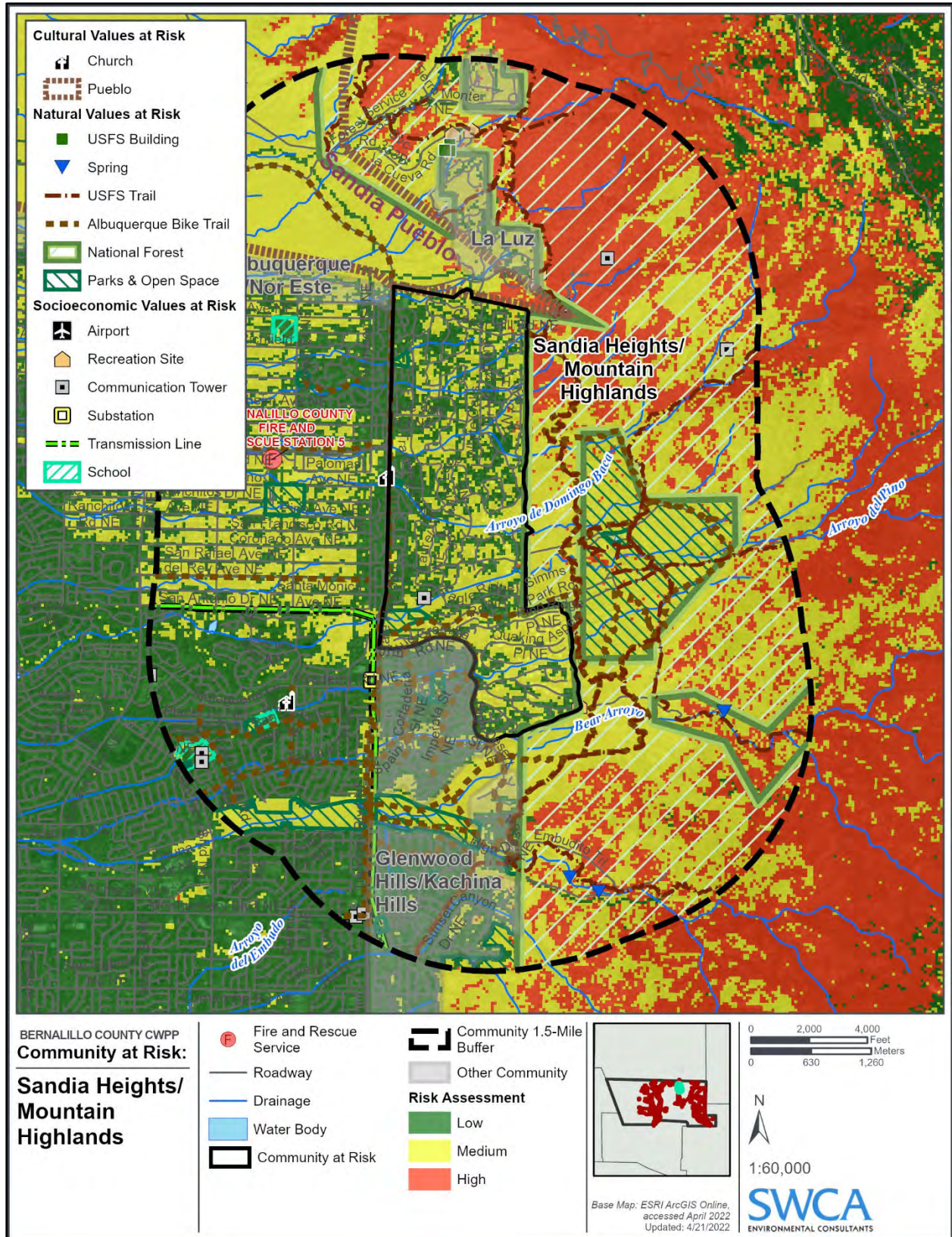


Figure D.53. Sandia Heights/Mountain Highlands polygon.



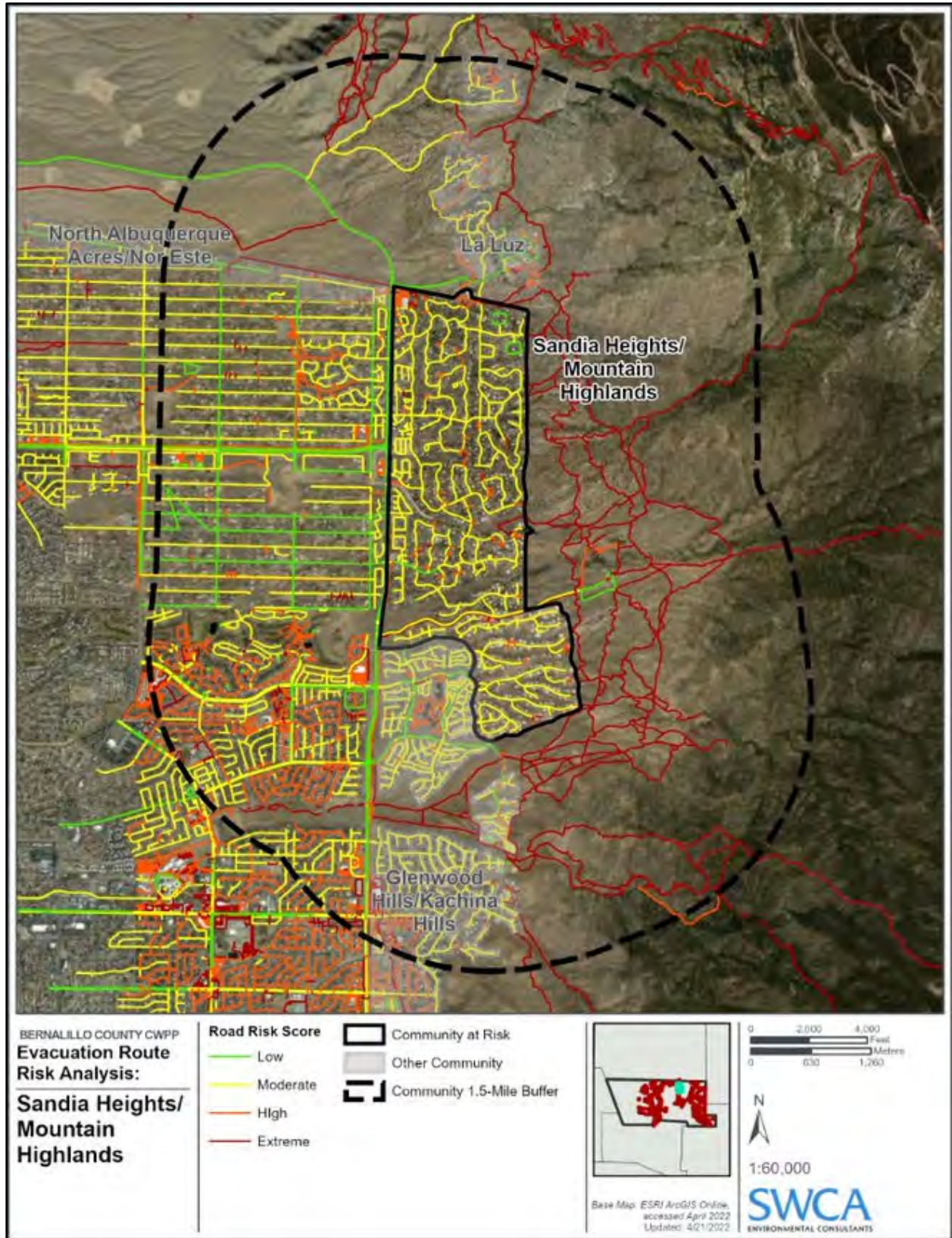


Figure D.54. Evacuation route risk analysis for Sandia Heights/Mountain Highlands.

# WUI COMMUNITY # 26: WILDLAND URBAN INTERFACE COMMUNITIES

## SANDIA PARK/SAN ANTONITO POLYGON SUMMARY STATISTICS

<b>Community Polygon Background</b>		
<b>Community Polygon Name:</b> Sandia Park/San Antonito	<b>Total Score:</b> 115	<b>Rating:</b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.5		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 527.0		

<b>Percent of Community Classified by Wildland Urban Interface (WUI) Types</b>
<u>WUI Land Area (mi.<sup>2</sup>):</u> 2.5
<u>Percent:</u> 100.0

<b>Dominant Fuel Type</b>				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
6.2%	10.3%	0.6%	0.0%	66.4%

<b>Percent of Community by Modeled/Calculated Wildfire Risk Inputs</b>	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 98.3%	0-5 minutes: 0.0%
4-8 (ft): 0.0%	5-10 minutes: 0.1%
8-12 (ft): 0.0%	10-15 minutes: 97.6%
>12 (ft): 0.0%	15+ minutes: 2.4%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #46				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>				
Type 1: 1		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 4</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Some dispersed hydrants</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Narrow roadways</li> <li>• Vegetation is growing into electrical utilities</li> <li>• Winding, poorly signed roads</li> <li>• Houses are not mitigated for vegetation</li> <li>• Some homes are situated in chimneys and canyons.</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



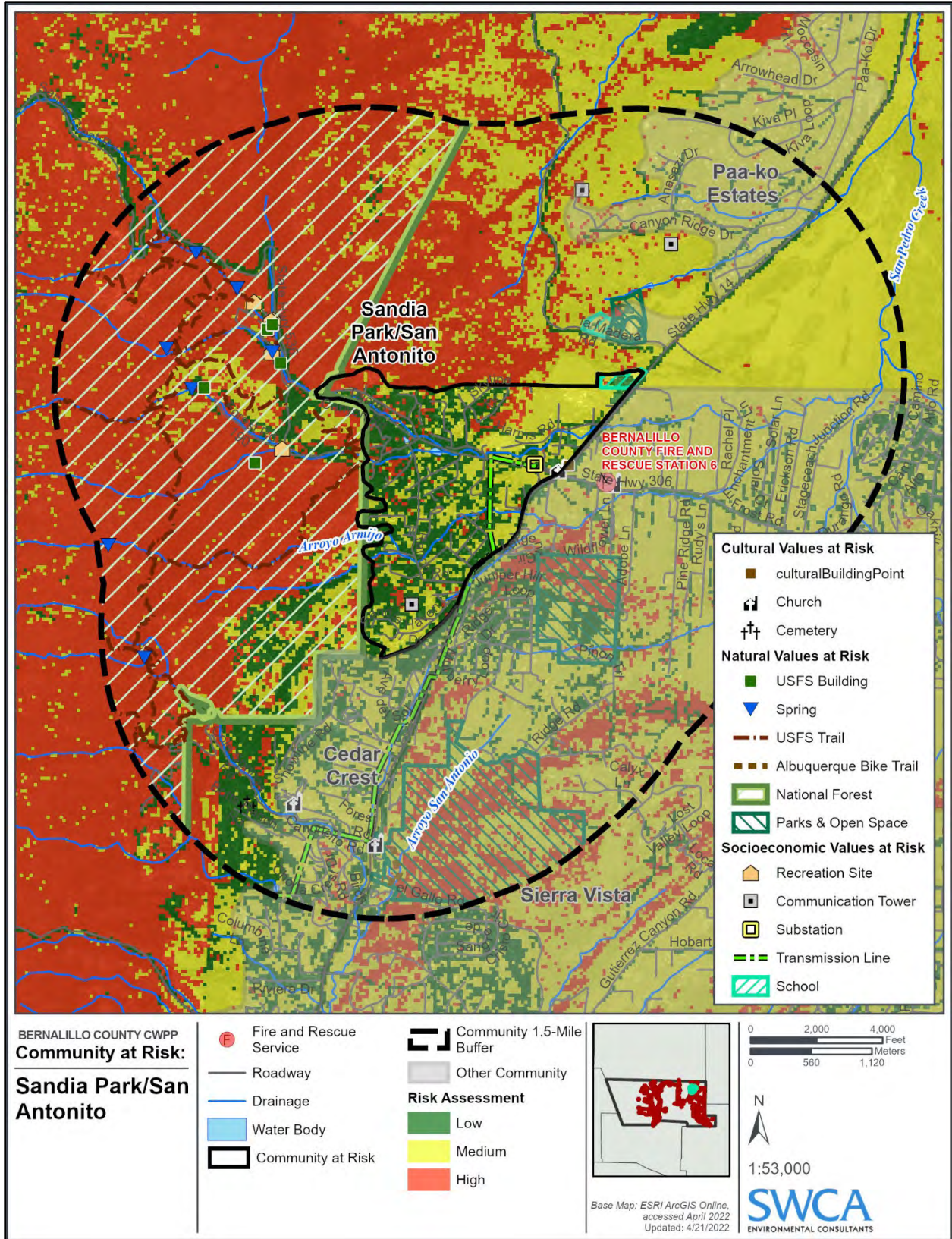


Figure D.55. Sandia Park/San Antonio polygon.



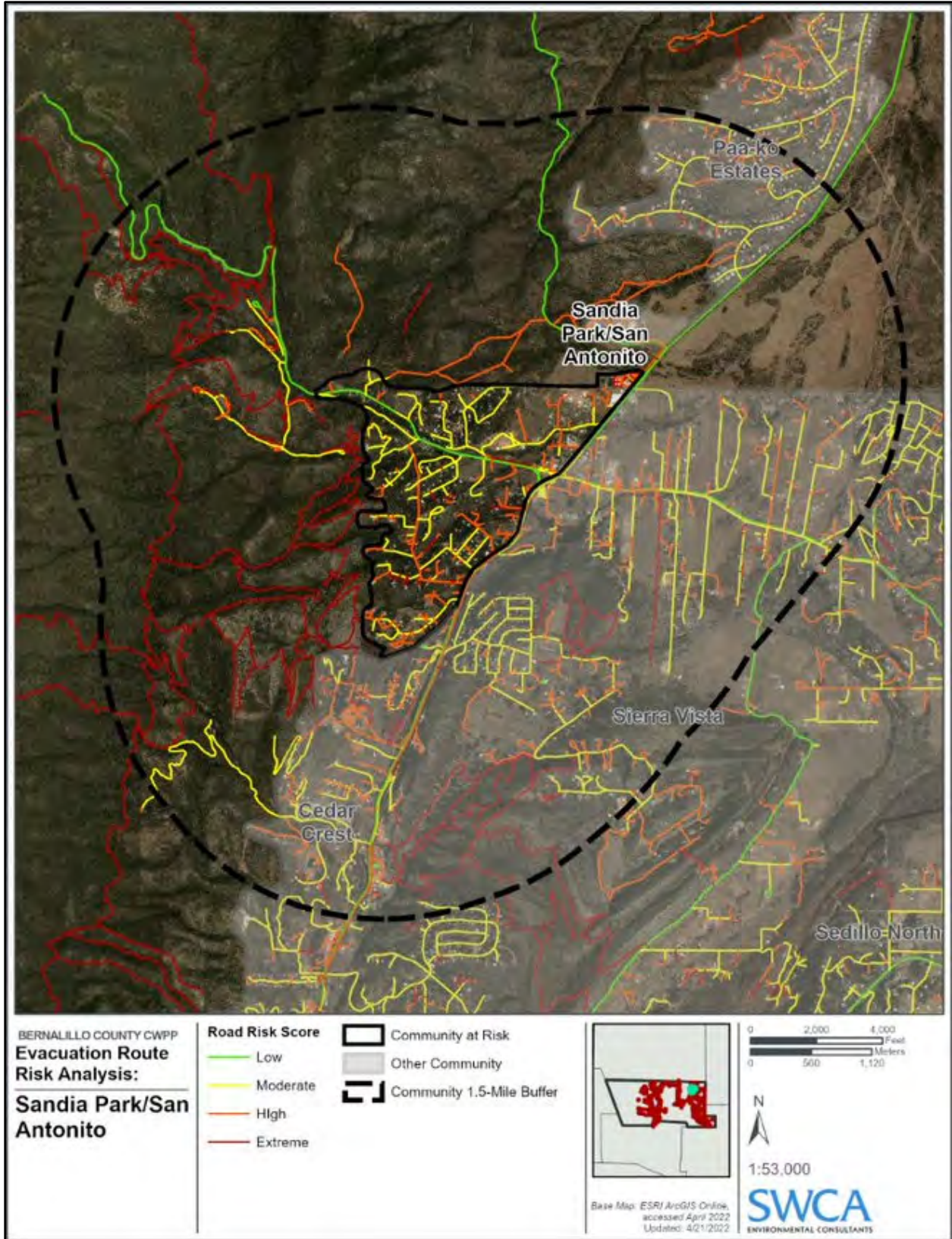


Figure D.56. Evacuation route risk analysis for Sandia Park/San Antonio.

## WUI COMMUNITY # 27: WILDLAND URBAN INTERFACE COMMUNITIES

### SEDILLO NORTH POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Sedillo North	<b>Total Score:</b> 81	<b>Rating:</b> High
<b>Geographic Areas:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 15.3		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 132.5		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 16.1
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
49.8%	30.9%	0.4%	<0.1%	13.9%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 94.3%	0-5 minutes: 0.0%
4-8 (ft): 5.0%	5-10 minutes: 15.0%
8-12 (ft): 0.6%	10-15 minutes: 83.8%
>12 (ft): 0.1%	15+ minutes: 1.2%



<b>Fire Department Statistics:</b>		
<u>Fire District:</u> BCFR #43 and #46		
<u>Fulltime Firefighters:</u> 30	<u>On-call Firefighters:</u>	<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>
1	<u>Total Number:</u>	<u>4WD/AWD:</u> <u>Brush Breaker:</u>
Type 2:	Type 3:	
Type 3:	Type 4:	
<u>Structure Engines:</u>	Type 5:	
Type 1: 2	Type 6: 1	1
Type 2:	Type 7:	
<u>Port-A-Tanks:</u> 1		
<u>Portable Pumps:</u> 1		
<u>Recent fires within the polygon:</u>		
<ul style="list-style-type: none"> <li>• 7</li> </ul>		

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Defensive space</li> <li>• Low, sparse fuels</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Some communities built within mature piñon-juniper woodlands</li> <li>• Wooden fences noted</li> <li>• Some buildings are built in narrow canyons</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

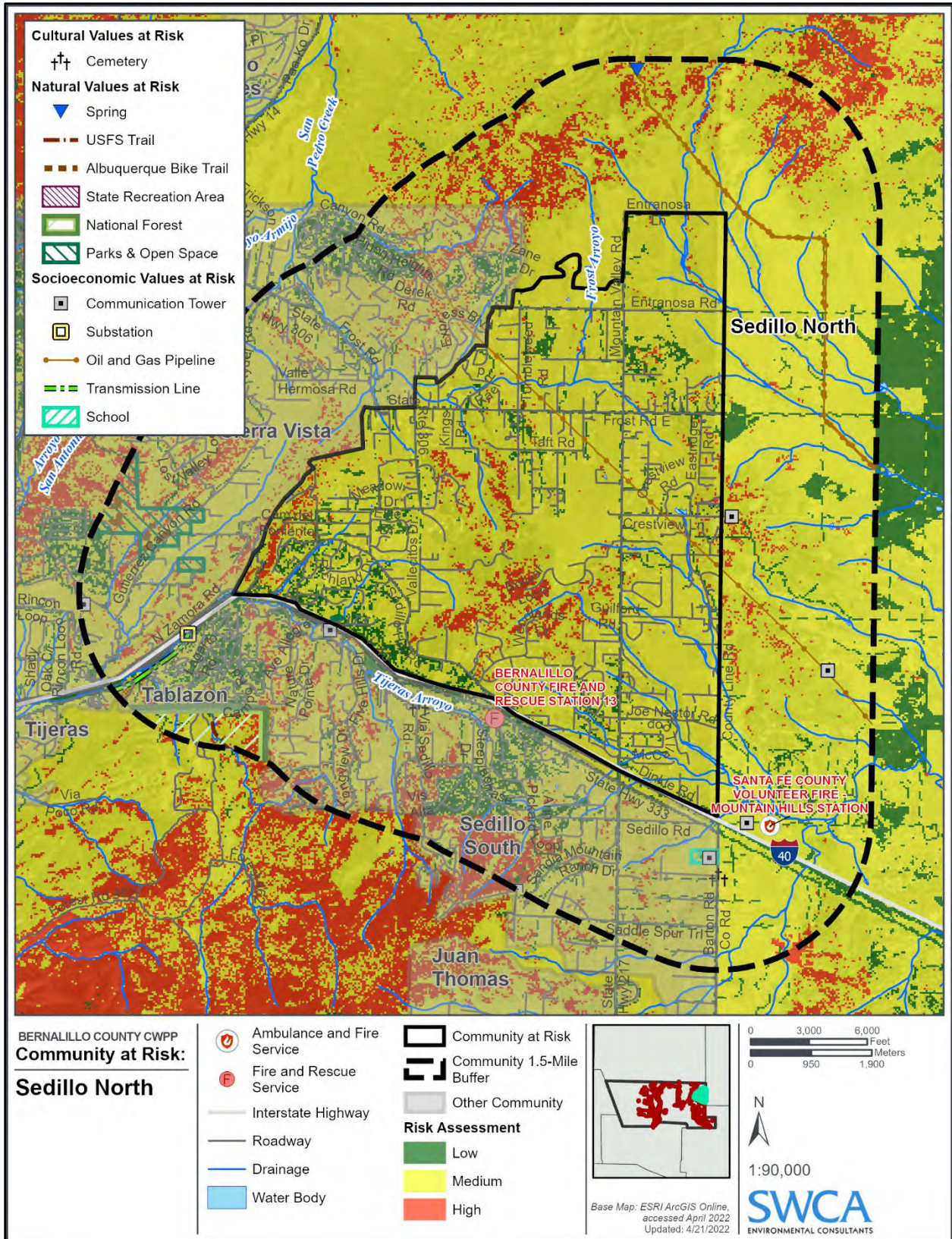


Figure D.57. Sedillo North polygon.



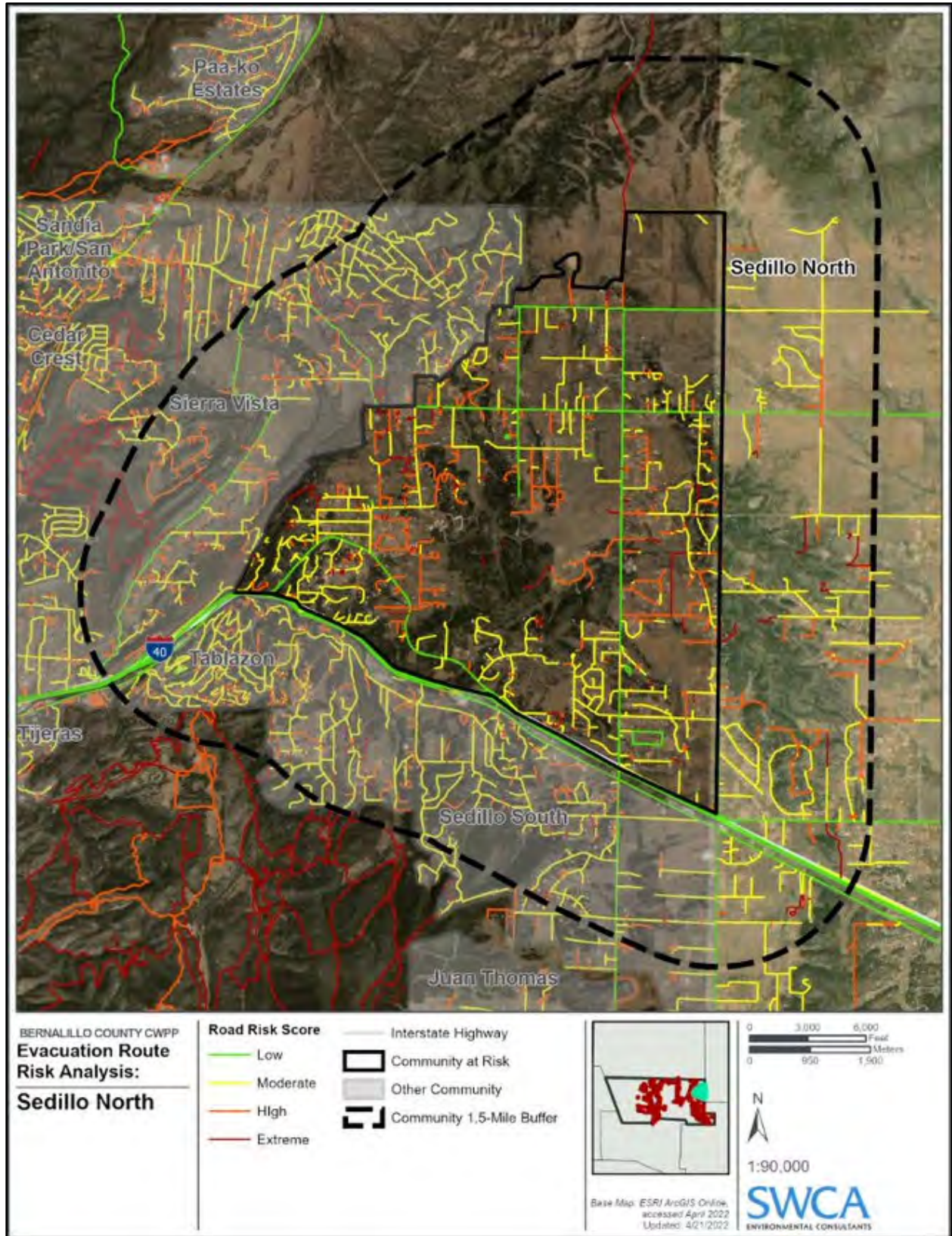


Figure D.58. Evacuation route risk analysis for Sedillo North.



# WUI COMMUNITY # 28: WILDLAND URBAN INTERFACE COMMUNITIES

## SEDILLO SOUTH POLYGON SUMMARY STATISTICS

<b>Community Polygon Background</b>		
<b><u>Community Polygon Name:</u></b> Sedillo South	<b><u>Total Score:</u></b> 89	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (<i>mi.</i><sup>2</sup>):</b> 7.3		
<b>Home Density (<i>housing units/ mi.</i><sup>2</sup>):</b> 146.5		

<b>Percent of Community Classified by Wildland Urban Interface (WUI) Types</b>
<b><u>WUI Land Area (<i>mi.</i><sup>2</sup>):</u></b> 8.0
<b><u>Percent:</u></b> 100

<b>Dominant Fuel Type</b>				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
34.0%	31.7%	0.8%	0.2%	24.5%

<b>Percent of Community by Modeled/Calculated Wildfire Risk Inputs</b>	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 86.7%	0-5 minutes: <0.1%
4-8 (ft): 11.1%	5-10 minutes: 20.6%
8-12 (ft): 2.2%	10-15 minutes: 77.0%
>12 (ft): 0.4%	15+ minutes: 2.4%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #43				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 7</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Defensive space</li> <li>• Low, sparse fuels</li> <li>• Fire station &lt;5 miles</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Some communities built within mature piñon-juniper woodlands</li> <li>• Wooden fences noted</li> <li>• Some buildings are built in narrow canyons</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

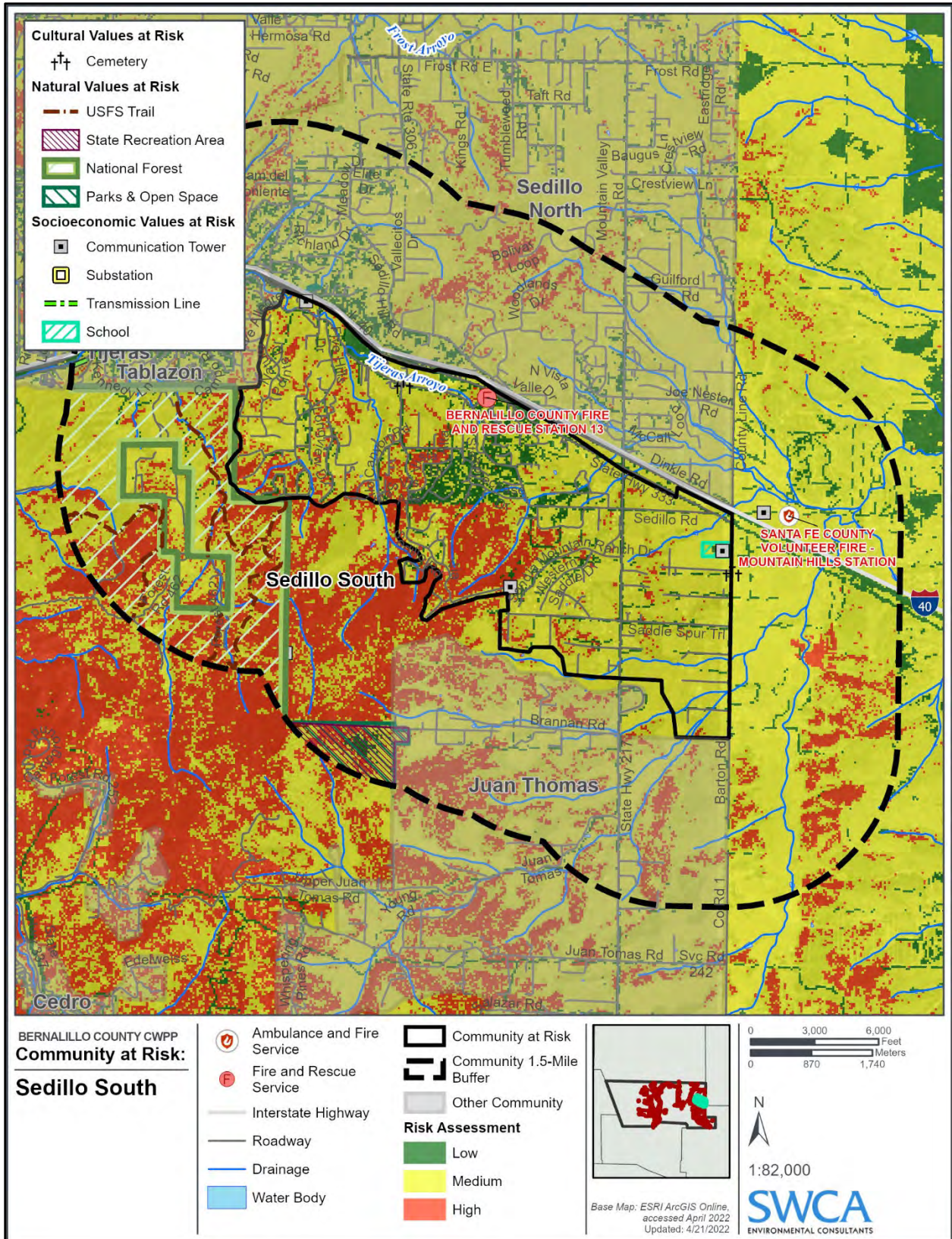


Figure D.59. Sedillo South polygon.



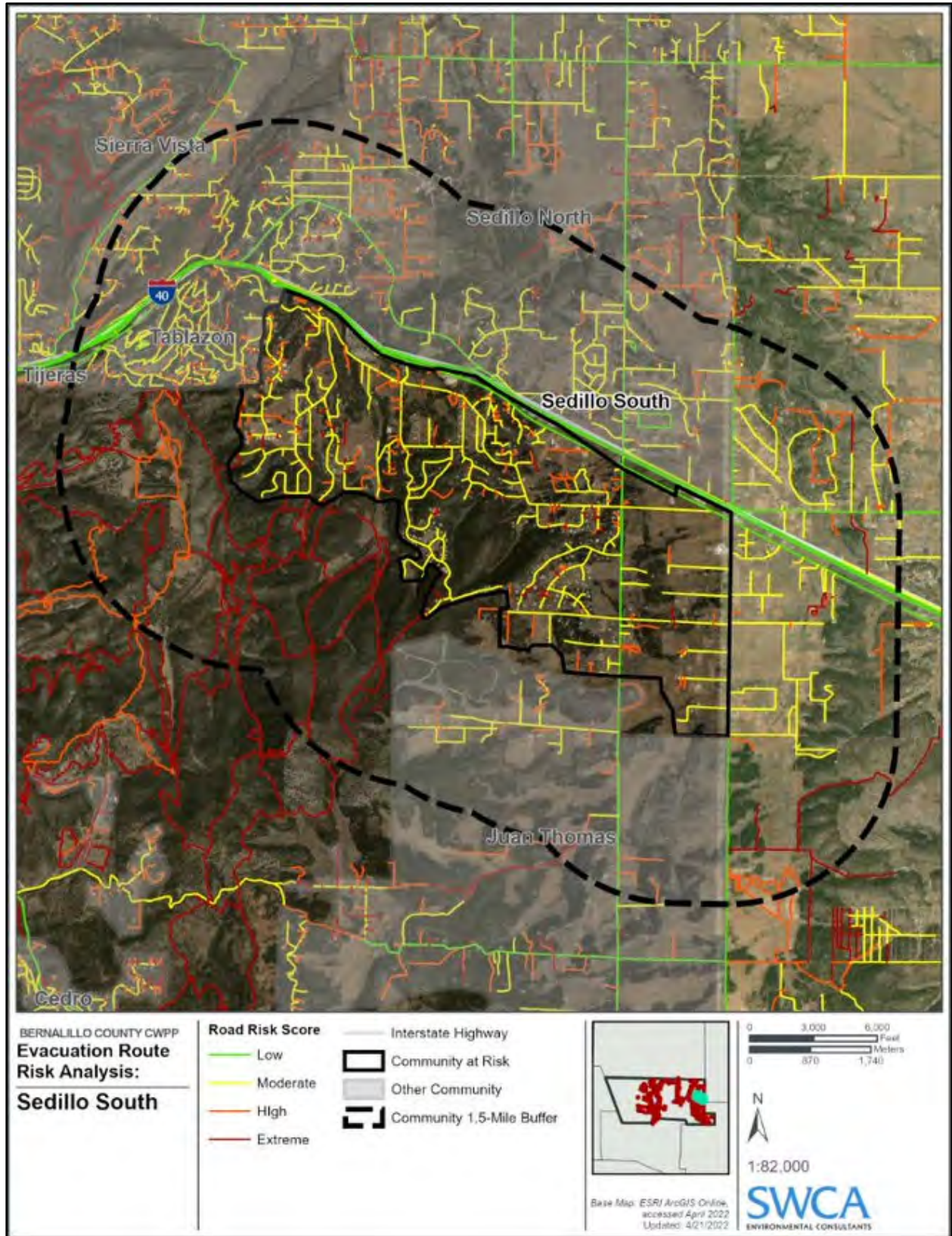


Figure D.60. Evacuation route risk analysis for Sedillo South.

# WUI COMMUNITY # 29: WILDLAND URBAN INTERFACE COMMUNITIES

## SIERRA VISTA POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Sierra Vista	<b>Total Score:</b> 99	<b>Rating:</b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 13.9		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 168.6		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 15.2
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
25.2%	35.4%	1.2%	0.3%	29.6%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 87.1%	0-5 minutes: <0.1%
4-8 (ft): 9.9%	5-10 minutes: 25.4%
8-12 (ft): 2.3%	10-15 minutes: 70.5%
>12 (ft): 0.7%	15+ minutes: 4.1%

Fire Department Statistics:				
<u>Fire District:</u> BCFR #40, 46				
<u>Fulltime Firefighters:</u> 30		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 7</li> </ul>				

Current Fire and Fuel Management Programs and Plans
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

1144 Survey Summary Highlights	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• Class B building and roofing materials</li> </ul>	<ul style="list-style-type: none"> <li>• Some communities have limited defensible space</li> <li>• Varied topographic terrain</li> <li>• Continuous vegetation from ground to canopy in some areas</li> </ul>

Suggested Mitigation Focus Area
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



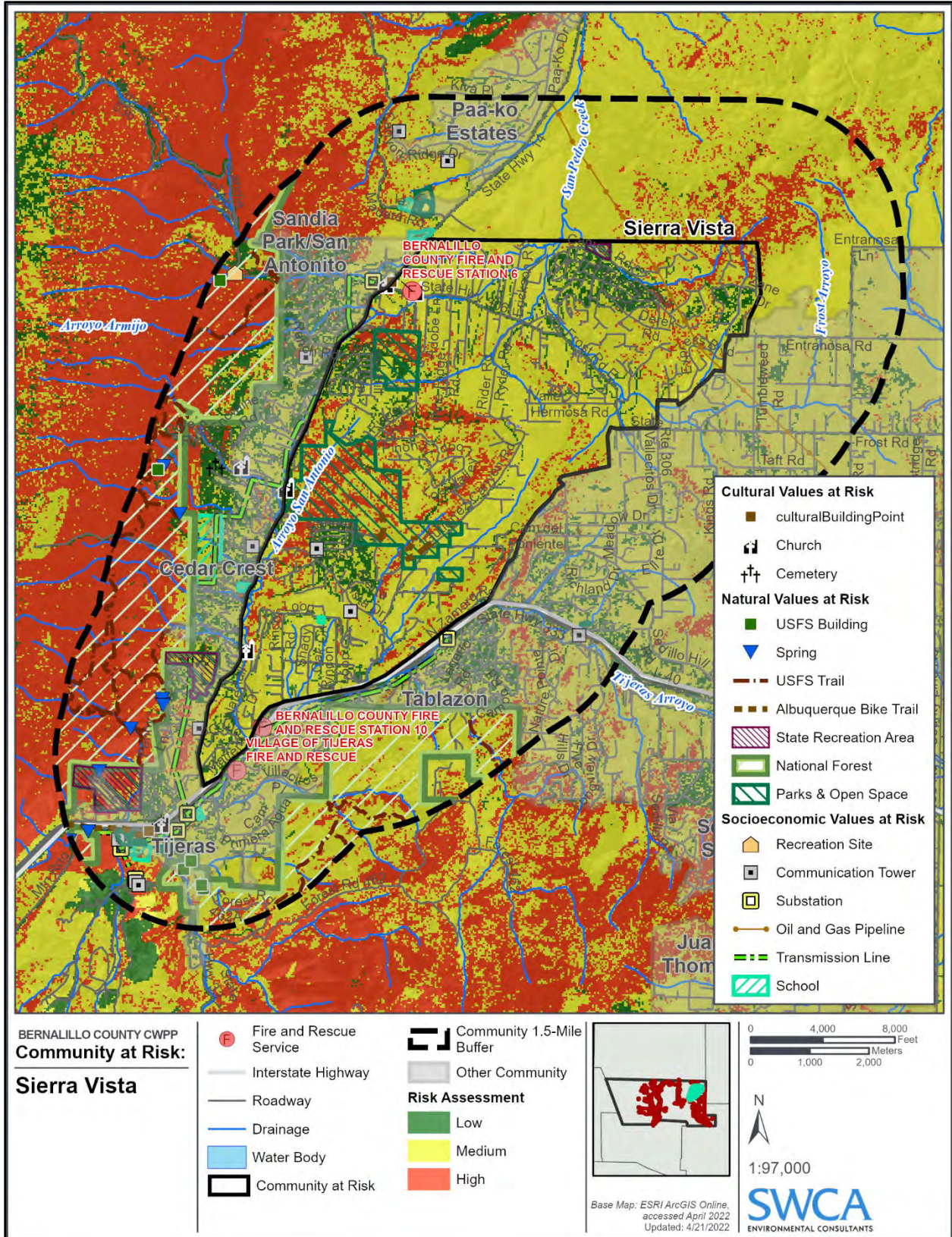


Figure D.61. Sierra Vista polygon.



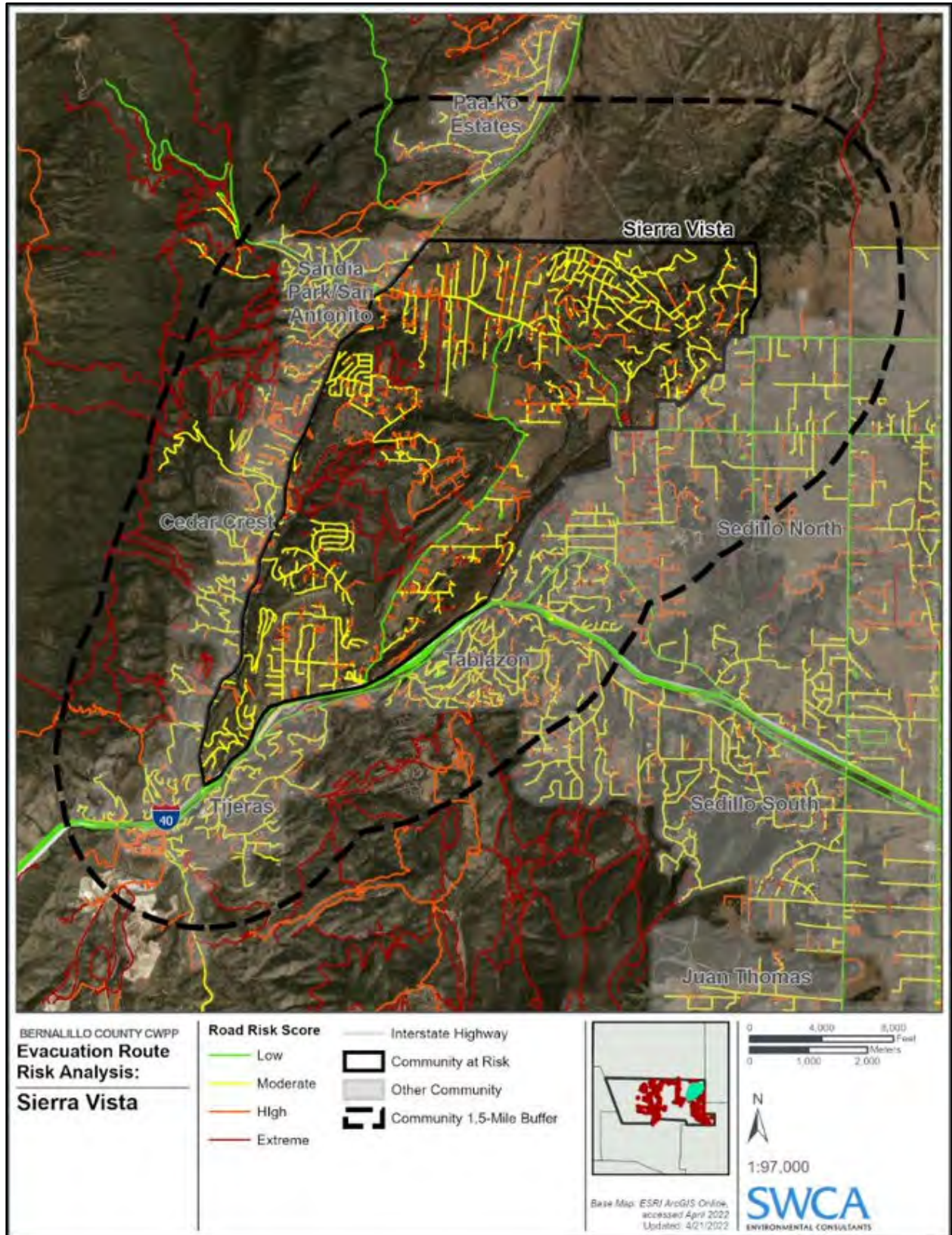


Figure D.62. Evacuation route risk analysis for Sierra Vista.

# WUI COMMUNITY # 30: WILDLAND URBAN INTERFACE COMMUNITIES

## SOUTH VALLEY POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> South Valley	<b>Total Score:</b> 92	<b>Rating:</b> High
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.3		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 495.5		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 2.2
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
46.3%	8.5%	1.8%	0.0%	1.3%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 99.7%%	0-5 minutes: 0.0%
4-8 (ft): 0.3%	5-10 minutes: 15.2%
8-12 (ft): 0.0%	10-15 minutes: 85.2%
>12 (ft): 0.0%	15+ minutes: 0.0%



<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #1 and BCFR #38				
<u>Fulltime Firefighters:</u> 42		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 7</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress points</li> <li>• Flat topographical features</li> <li>• Low grasses and shrubs</li> </ul>	<ul style="list-style-type: none"> <li>• Limited defensible space</li> <li>• Unmaintained agricultural fields</li> <li>• Connectivity to unmanaged bosque area</li> <li>• Industrial complex with exposed, combustible materials</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

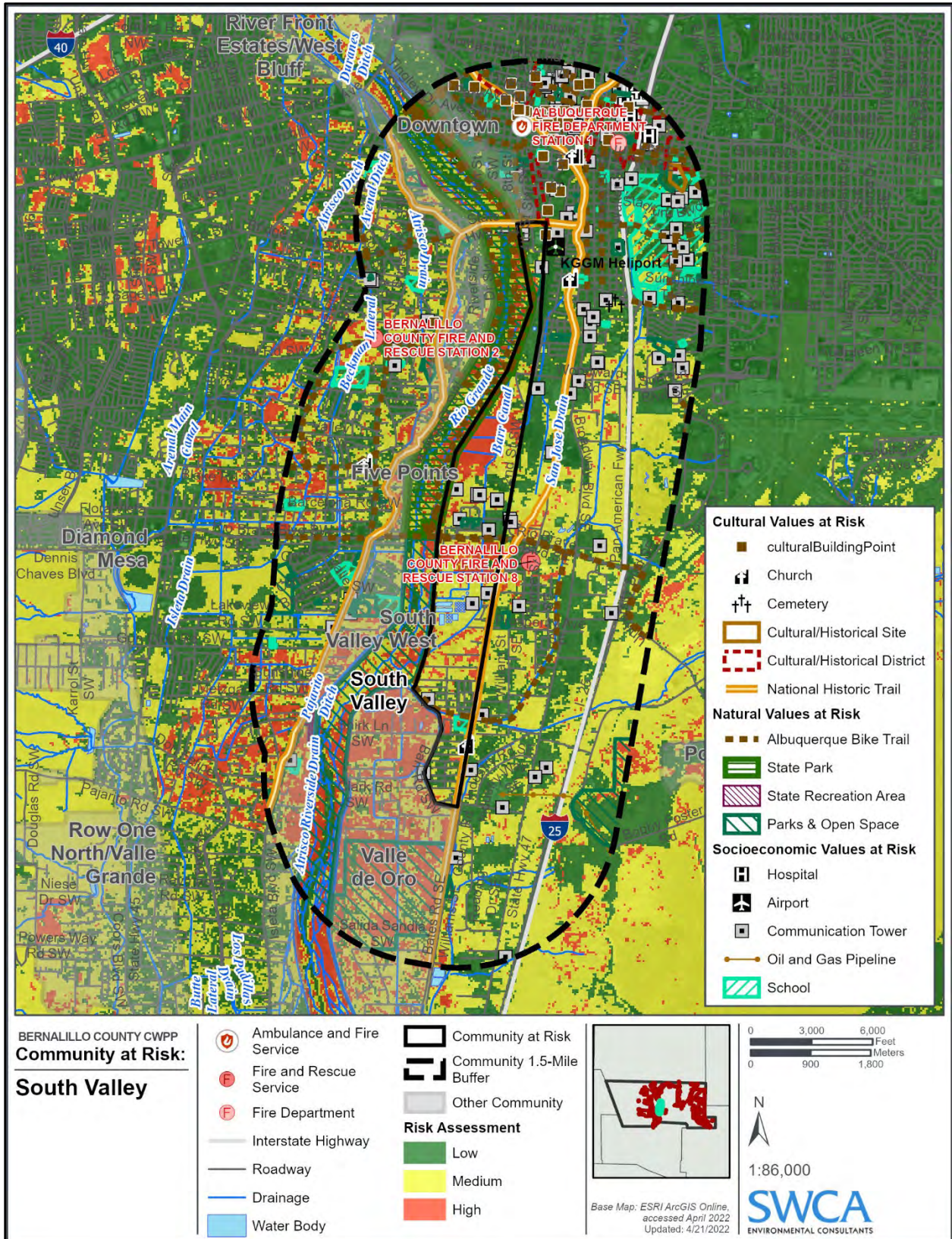


Figure D.63. South Valley polygon.



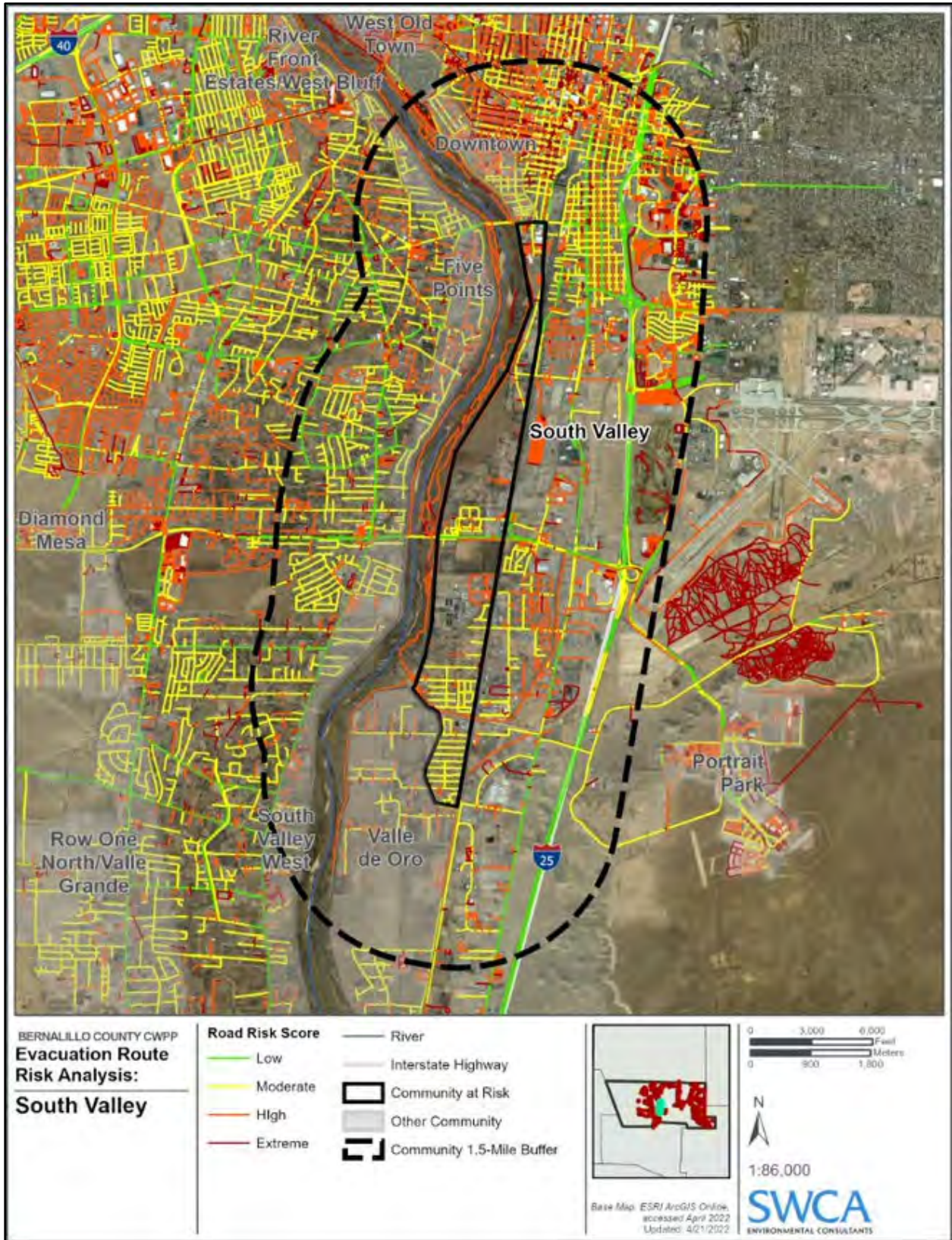


Figure D.64. Evacuation route risk analysis for South Valley.



# WUI COMMUNITY # 31: WILDLAND URBAN INTERFACE COMMUNITIES

## SOUTH VALLEY WEST POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> South Valley West	<b>Total Score:</b> 91	<b>Rating:</b> High
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.3		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 558.2		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.9
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
58.0%	3.5%	2.8%	<0.1	3.3%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 97.7%	0-5 minutes: 20.2%
4-8 (ft): 0.8%	5-10 minutes: 35.5%
8-12 (ft): 0.0%	10-15 minutes: 42.8%
>12 (ft): 0.0%	15+ minutes: 1.5%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #34 and #38				
<u>Fulltime Firefighters:</u> 30		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1: 1		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3: 1	1	
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u> 1				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 12</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Present and reflective street signs</li> <li>• Paved roads</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• Class C building materials</li> <li>• One-way ingress/egress</li> <li>• Agriculture fields connecting to bosque</li> <li>• Aboveground utilities</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

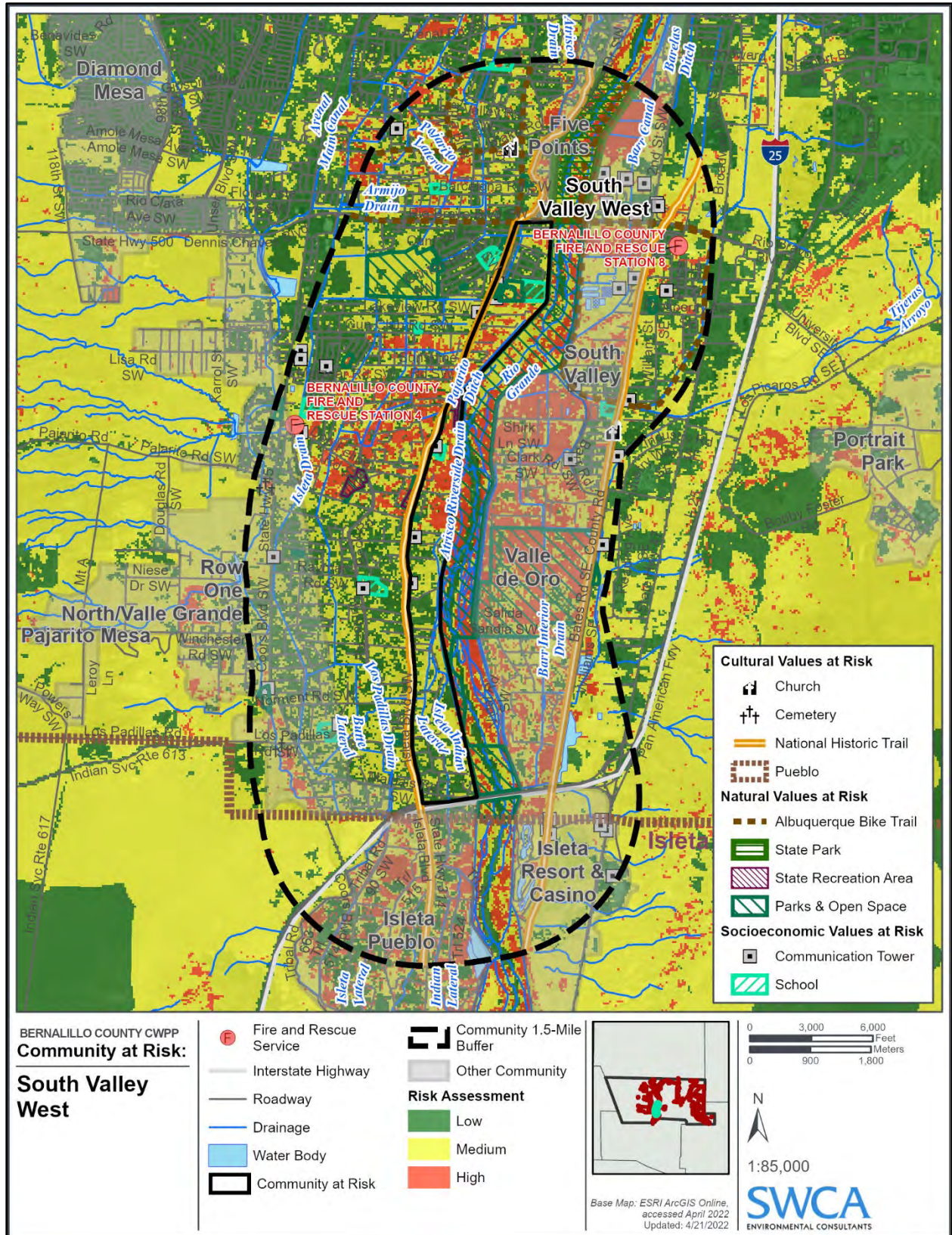


Figure D.65. South Valley West polygon.



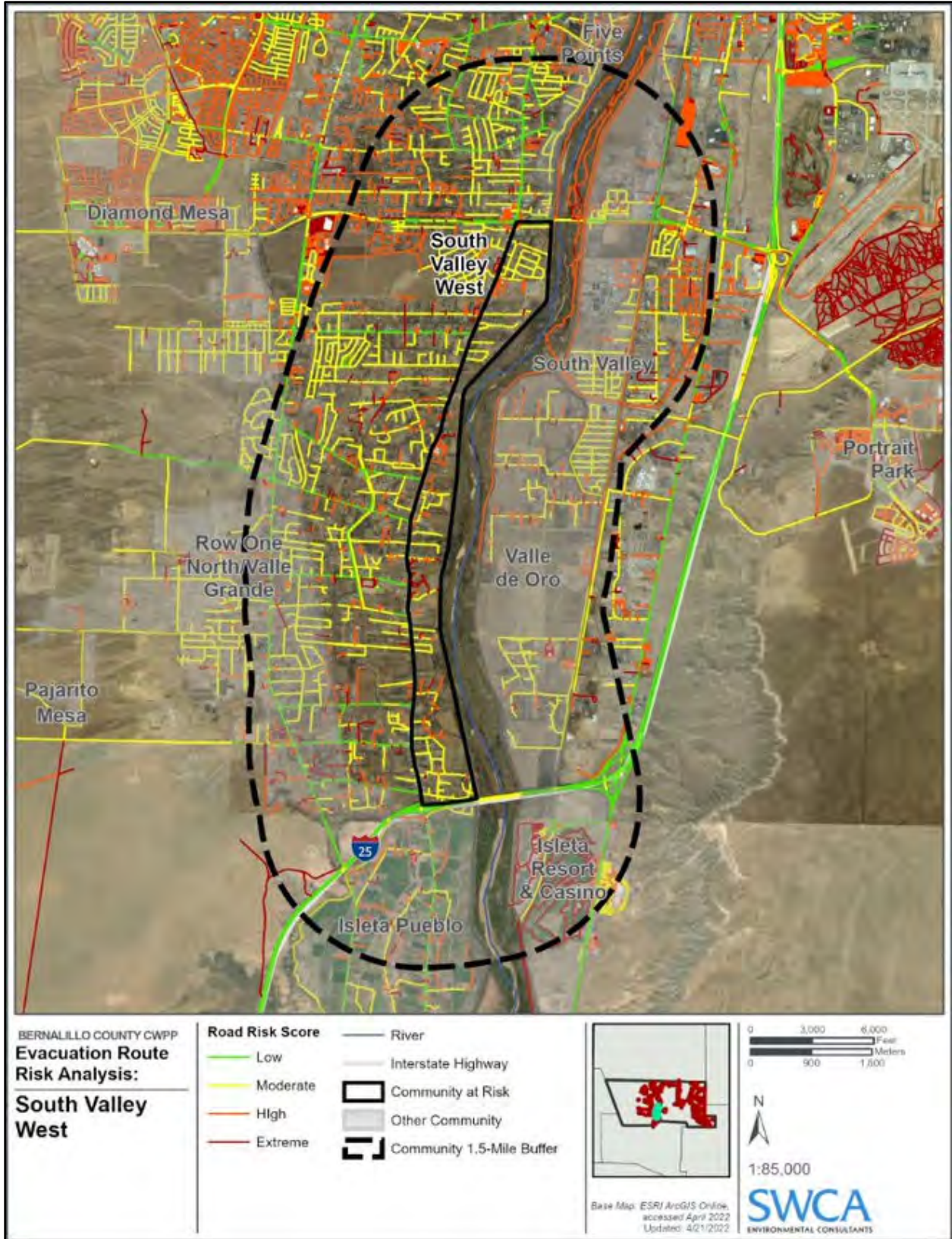


Figure D.66. Evacuation route risk analysis for South Valley West.

## WUI COMMUNITY # 32: WILDLAND URBAN INTERFACE COMMUNITIES

### TABLAZON POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Tablazon	<b><u>Total Score:</u></b> 120	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.1		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 270.7		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 1.3
<b><u>Percent:</u></b> 100

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
7.8%	18.2%	1.1%	0.2%	60.2%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 90.9%	0-5 minutes: 0.0%
4-8 (ft): 7.5%	5-10 minutes: 49.1%
8-12 (ft): 1.4%	10-15 minutes: 50.1%
>12 (ft): 0.3%	15+ minutes: 0.9%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #40 and #43				
<u>Fulltime Firefighters:</u> 30		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 2		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 1</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Fire station &lt;5 miles</li> <li>• Modern building materials</li> </ul>	<ul style="list-style-type: none"> <li>• Winding, confusing roads</li> <li>• Situated in rolling hills and canyons</li> <li>• Home built within piñon-juniper woodlands</li> <li>• One-way ingress/egress</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



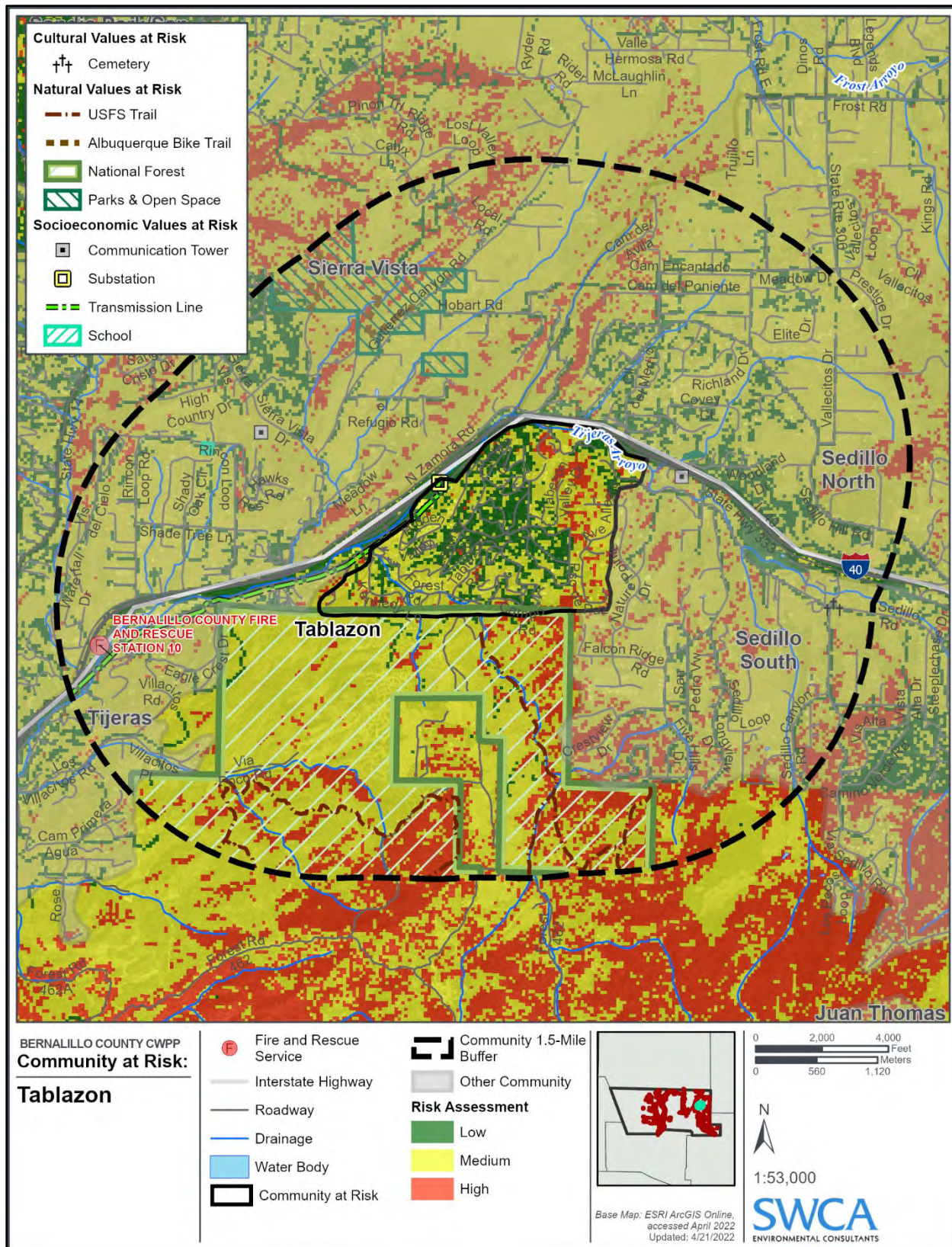


Figure D.67. Tablazon polygon.



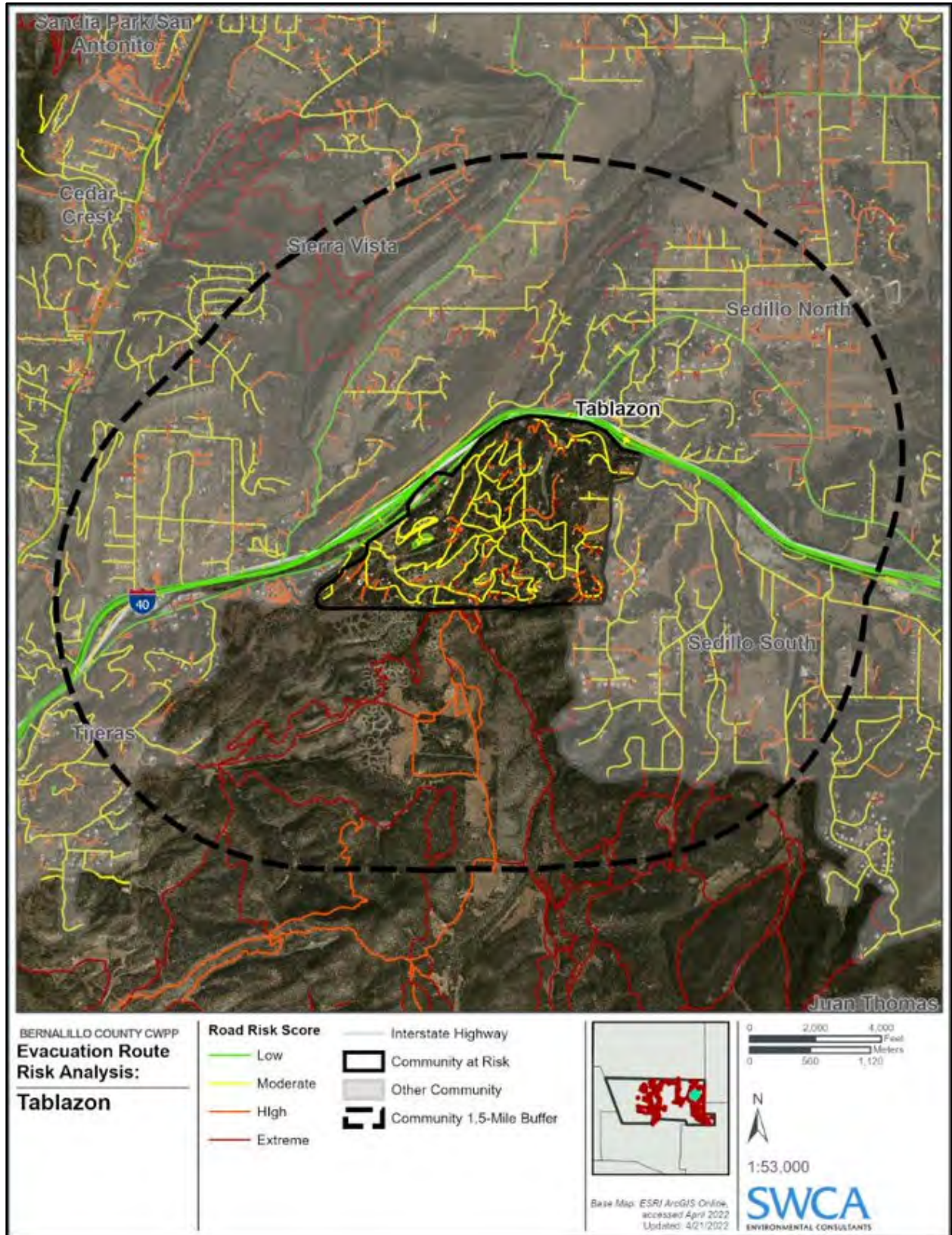


Figure D.68. Evacuation route risk analysis for Tablazon.

## WUI COMMUNITY # 33: WILDLAND URBAN INTERFACE COMMUNITIES TIJERAS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Tijeras	<b>Total Score:</b> 121	<b>Rating:</b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.7		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 234.0		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 2.1
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
16.3%	44.5%	0.2%	0.4%	21.1%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 95.9%	0-5 minutes: 0.0%
4-8 (ft): 1.3%	5-10 minutes: 10.3%
8-12 (ft): 0.2%	10-15 minutes: 86.9%
>12 (ft): 0.3%	15+ minutes: 2.8%



<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #40				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>		
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1: 1		Type 6: 1	1	
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 7</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Class A roofing</li> <li>• Fire station &lt;5 miles</li> </ul>	<ul style="list-style-type: none"> <li>• Large piñon-juniper woodland is connective and continuous within the area</li> <li>• Houses are located in depressions and in chimneys</li> <li>• One-way ingress/egress</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

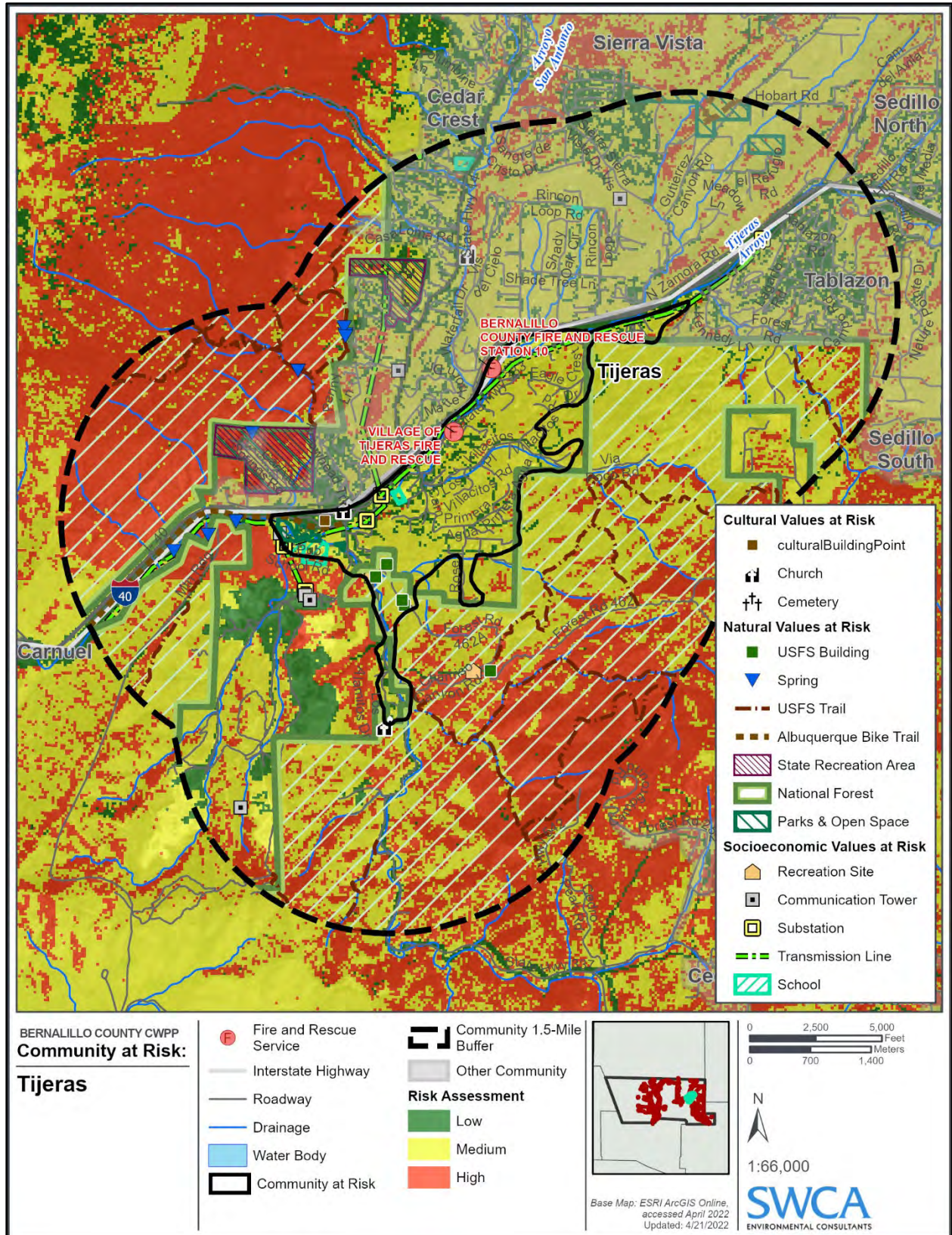


Figure D.69. Tijeras polygon.



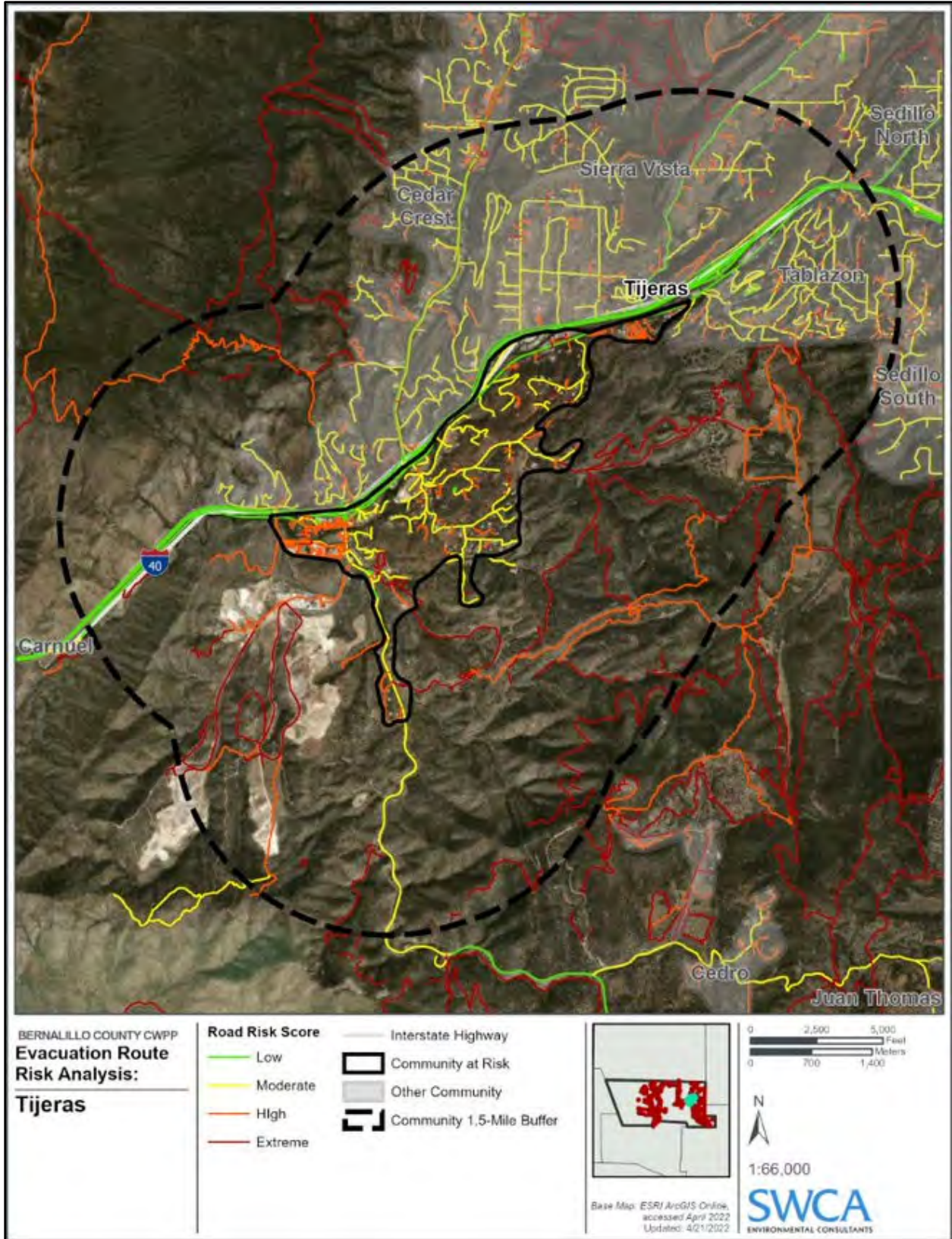


Figure D.70. Evacuation route analysis for Tijeras.



# WUI COMMUNITY # 34: WILDLAND URBAN INTERFACE COMMUNITIES

## VALLE DE ORO POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Valle de Oro	<b>Total Score:</b> 83	<b>Rating:</b> High
<b>Geographic Area:</b> South Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 2.4		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 142.4		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 3.0
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
70.3%	3.4%	3.6%	0.1%	1.0%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 99.3%	0-5 minutes: 0.0%
4-8 (ft): 0.7%	5-10 minutes: 0.0%
8-12 (ft): 0.0%	10-15 minutes: 100.0%
>12 (ft): 0.0%	15+ minutes: 0.0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #38				
<u>Fulltime Firefighters:</u> 15		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Total Number:</u>		<u>Wildland Engines</u>
Type 1:		Type 3:	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 4:		
Type 3:		Type 5:		
<u>Structure Engines:</u>		Type 6: 1	1	
Type 1: 1		Type 7:		
Type 2:				
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u> 1				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• 5</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Defensible space</li> </ul>	<ul style="list-style-type: none"> <li>• Mix of building materials</li> <li>• Connectivity with bosque</li> <li>• Area of historic fires</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

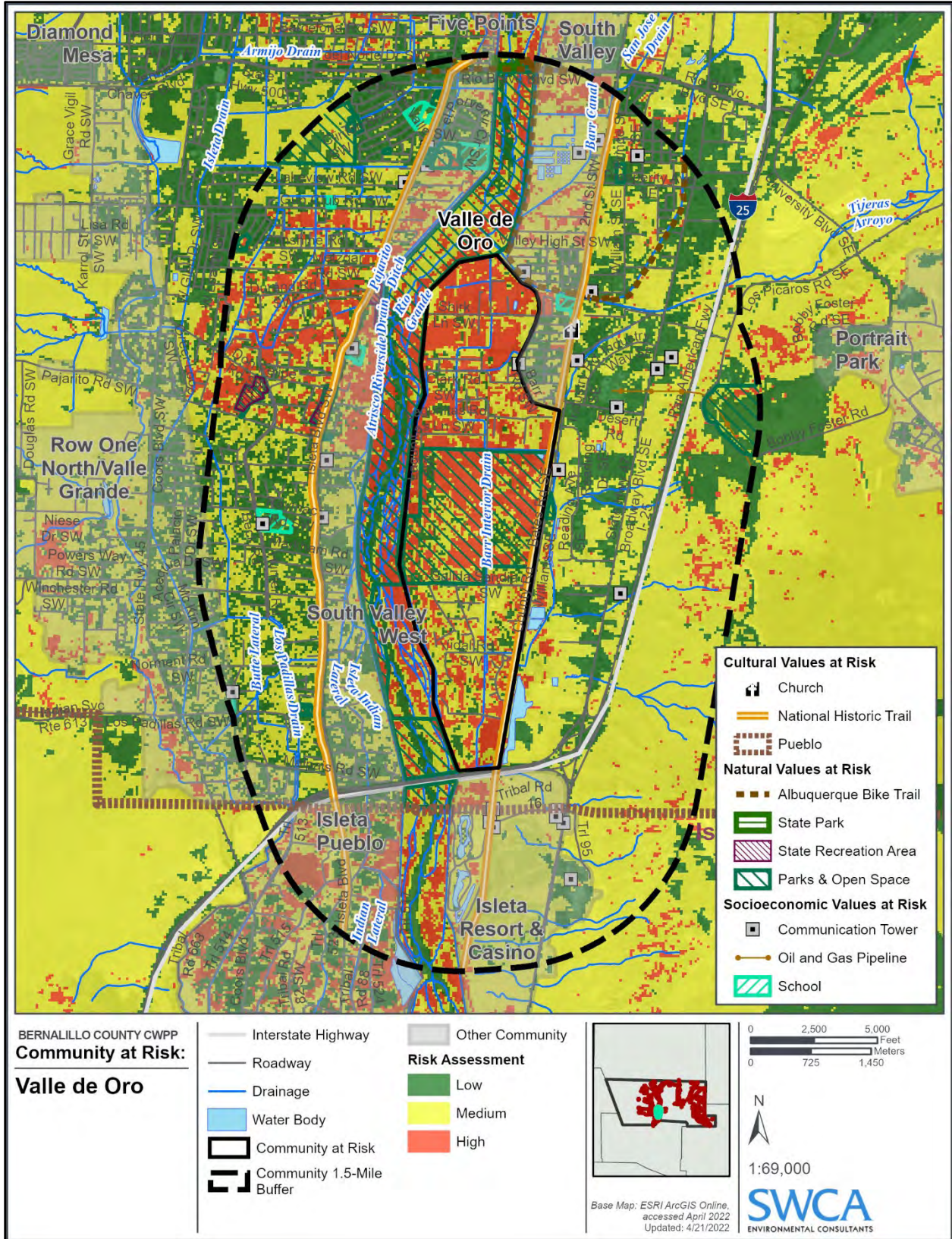


Figure D.71. Valle de Oro polygon.



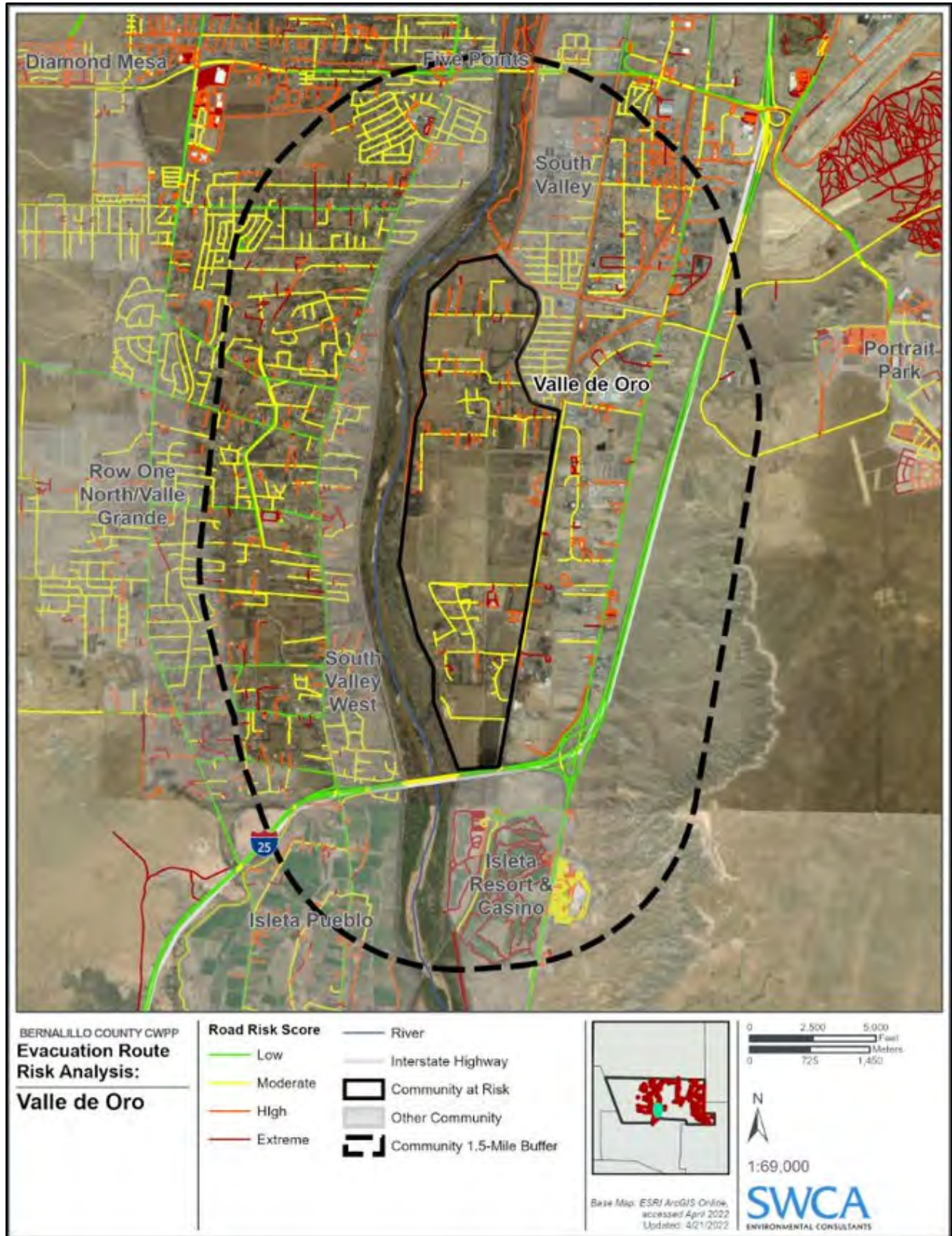


Figure D.72. Evacuation route risk analysis for Valle de Oro.

## WUI COMMUNITY # 35: WILDLAND URBAN INTERFACE COMMUNITIES

### VENTANA RANCH POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Ventana Ranch	<b>Total Score:</b> 73	<b>Rating:</b> High
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 1.3		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 1,393.1		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 3.4
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
9.8%	16.0%	5.6%	0.0%	5.1%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 100.0%	0-5 minutes: 47.1%
4-8 (ft): <0.1%	5-10 minutes: 48.6%
8-12 (ft): 0.0%	10-15 minutes: 0.4%
>12 (ft): 0.0%	15+ minutes: 4.0%

Fire Department Statistics:		
<u>Fire District:</u> AFR #22*		
<u>Fulltime Firefighters:</u>	<u>On-call Firefighters:</u>	<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>		<u>Wildland Engines</u>
Type 1:	<u>Total Number:</u>	<u>4WD/AWD:</u>
Type 2:	Type 3:	<u>Brush Breaker:</u>
Type 3:	Type 4:	
<u>Structure Engines:</u>	Type 5:	
Type 1:	Type 6:	
Type 2:	Type 7:	
<u>Port-A-Tanks:</u>		
<u>Portable Pumps:</u>		
<u>Recent fires within the Polygon:</u>		
<ul style="list-style-type: none"> <li>• None</li> </ul>		

**Current Fire and Fuel Management Programs and Plans**

- Bernalillo County Hazard Mitigation Plan

**1144 Survey Summary Highlights**

Positive Attributes (Low Scores)

- Multiple ingress/egress
- Xeriscape landscaping
- Hydrants throughout unit
- Wide streets with turnarounds

Negative Attributes (High Scores)

- Limited defensible space

**Suggested Mitigation Focus Area**

Fire Department Concerns:

- N/A\*

\* Data were not provided.



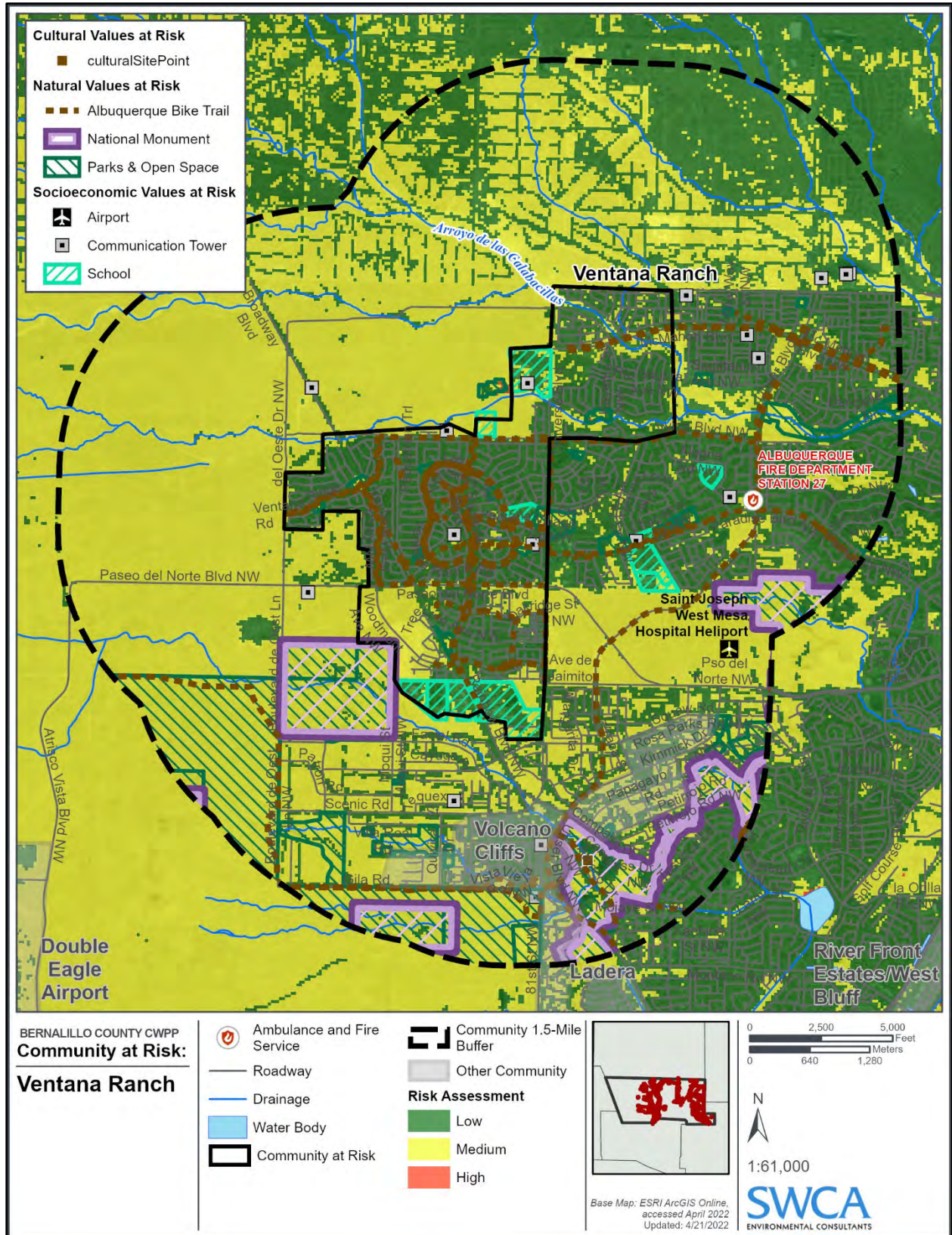


Figure D.73. Ventana Ranch polygon.



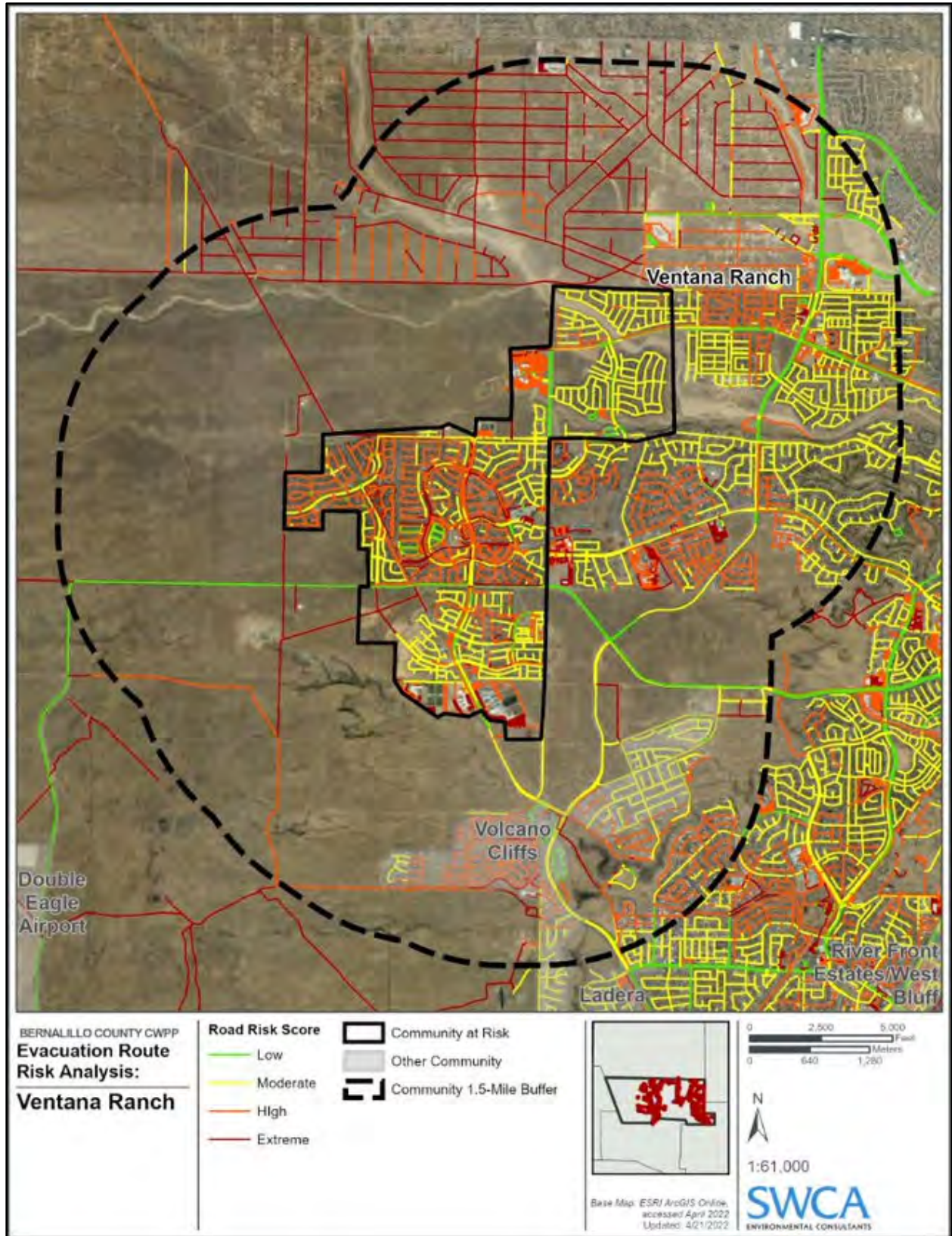


Figure D.74. Evacuation route risk analysis for Ventana Ranch.

# WUI COMMUNITY # 36: WILDLAND URBAN INTERFACE COMMUNITIES

## VOLCANO CLIFFS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Volcano Cliffs	<b><u>Total Score:</u></b> 58	<b><u>Rating:</u></b> Medium
<b>Geographic Area:</b> West Mesa		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.6		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 341.1		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 1.1
<b><u>Percent:</u></b> 100

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
14.2%	23.1%	18.7%	0.0%	2.7%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 96.5%	0-5 minutes: 7.2%
4-8 (ft): 0.0%	5-10 minutes: 88.5%
8-12 (ft): 0.0%	10-15 minutes: 0.7%
>12 (ft): 0.0%	15+ minutes: 3.6%



<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #18*				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• None</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Hydrants throughout the unit</li> <li>• New roofing and building construction</li> </ul>	<ul style="list-style-type: none"> <li>• Limited defensible space</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

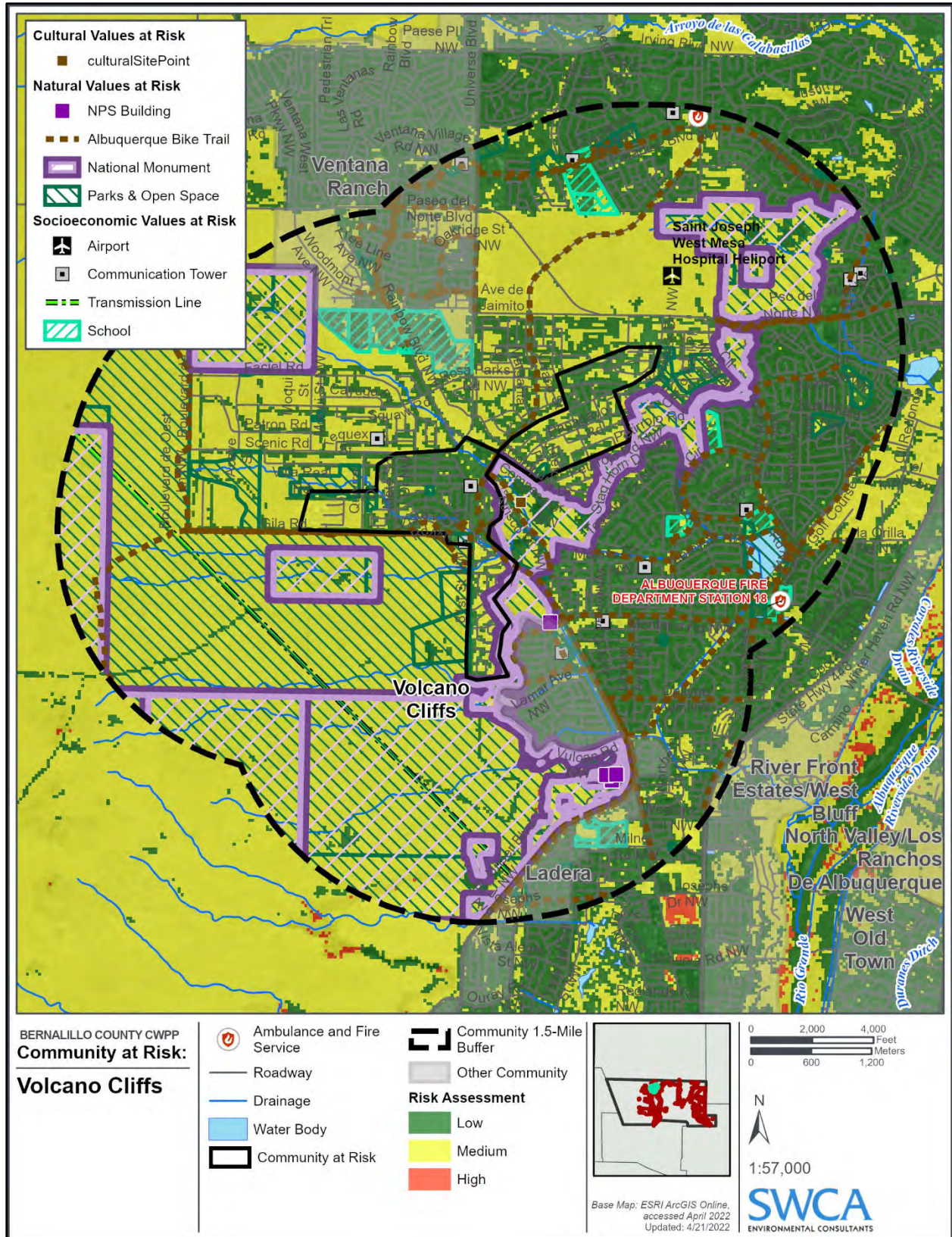


Figure D.75. Volcano Cliffs polygon.



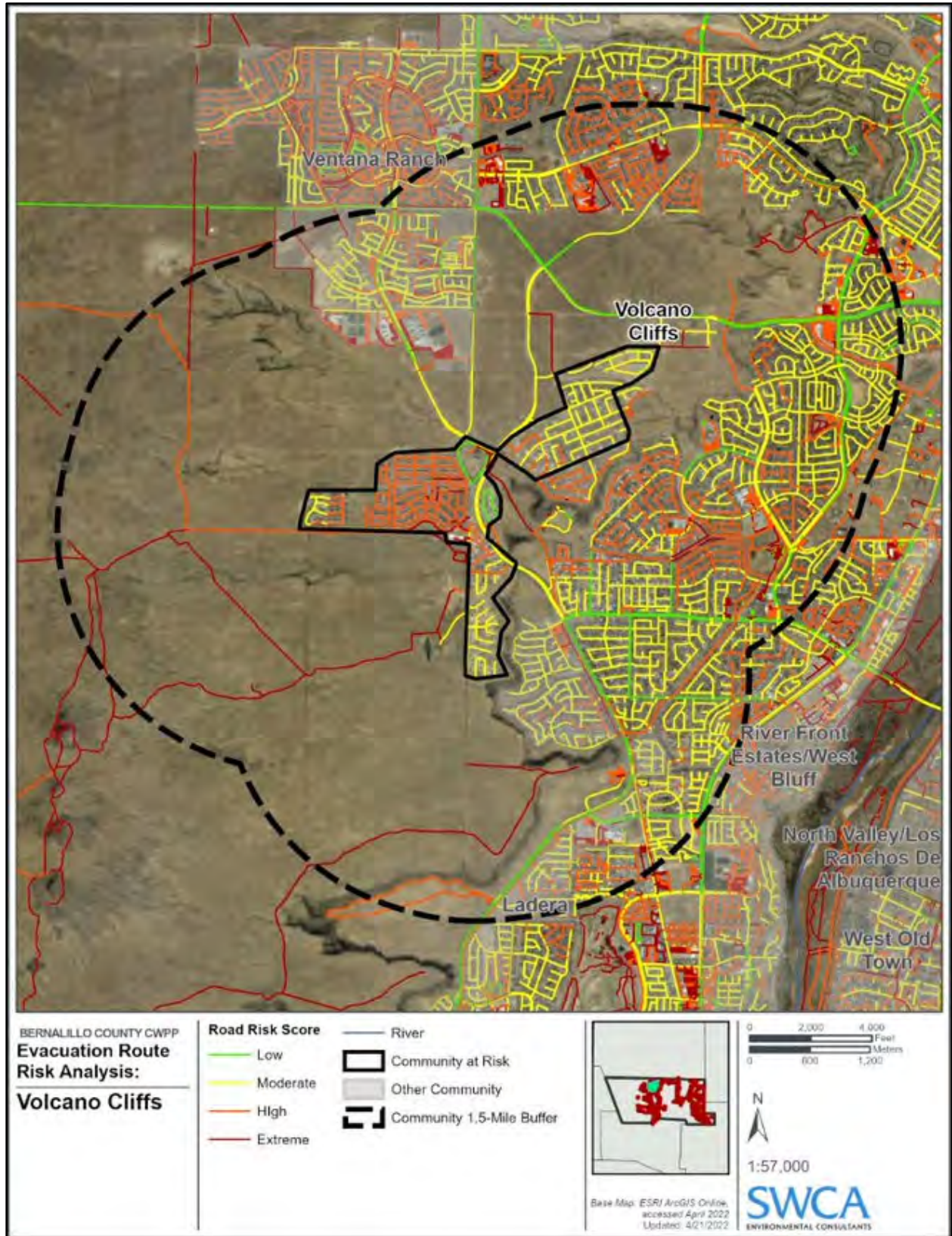


Figure D.76. Evacuation route risk analysis for Volcano Cliffs.



## WUI COMMUNITY # 37: WILDLAND URBAN INTERFACE COMMUNITIES

### WEST OLD TOWN POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> West Old Town	<b><u>Total Score:</u></b> 84	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> North Valley		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.7		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 1,343.5		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 1.6
<b><u>Percent:</u></b> 100

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
32.0%	4.3%	0.2%	<0.1%	6.6%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 99.9%	0-5 minutes: 0.00%
4-8 (ft): 0.1%	5-10 minutes: 3.2%
8-12 (ft): 0.0%	10-15 minutes: 96.8%
>12 (ft): 0.0%	15+ minutes: 0%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #15*				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• 2</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Xeriscape landscaping</li> <li>• Flat topography</li> <li>• Hydrants throughout the unit</li> </ul>	<ul style="list-style-type: none"> <li>• One-way ingress/egress</li> <li>• Limited defensible space</li> <li>• Mix of building materials</li> <li>• Dead end roads</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

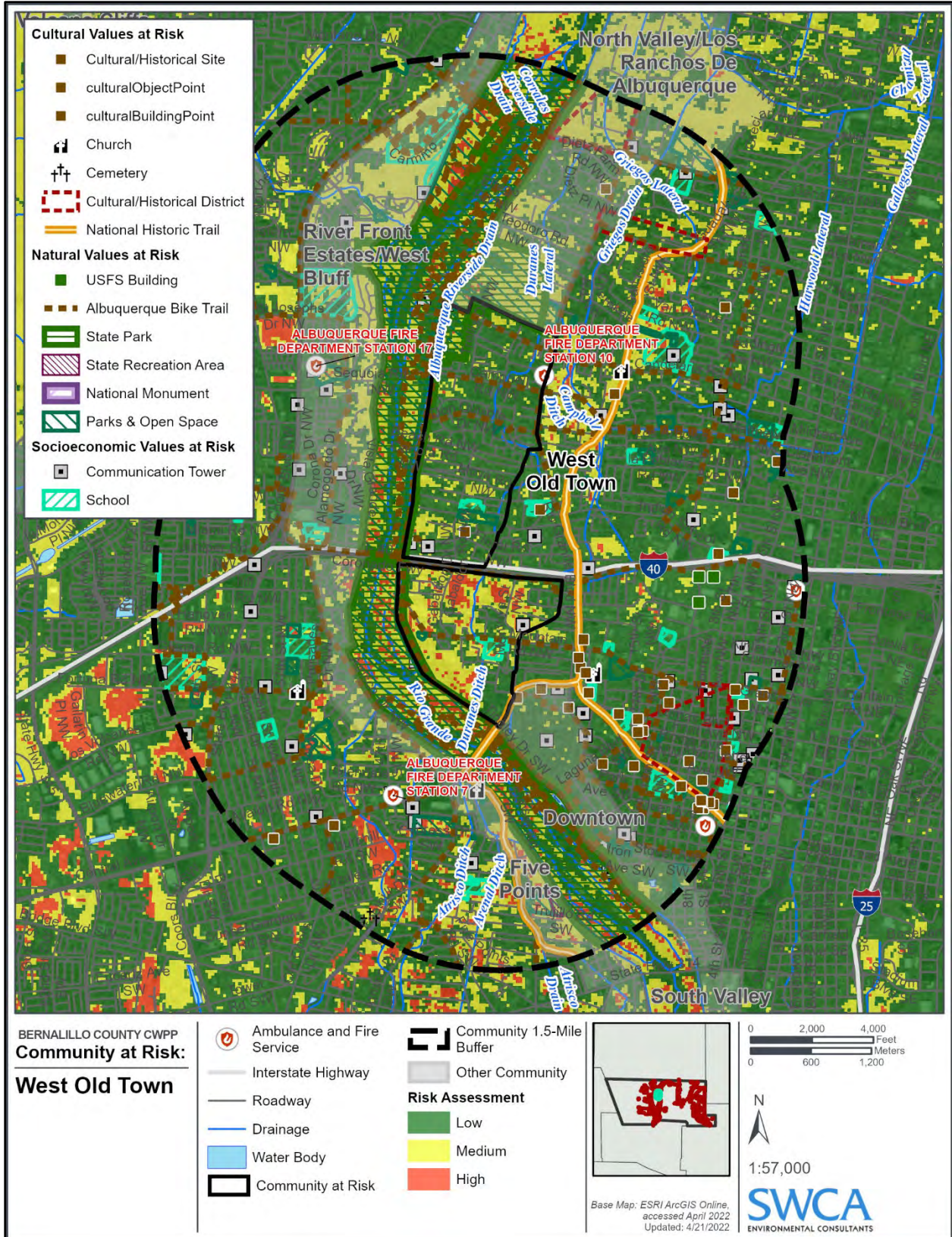


Figure D.77. West Old Town polygon.



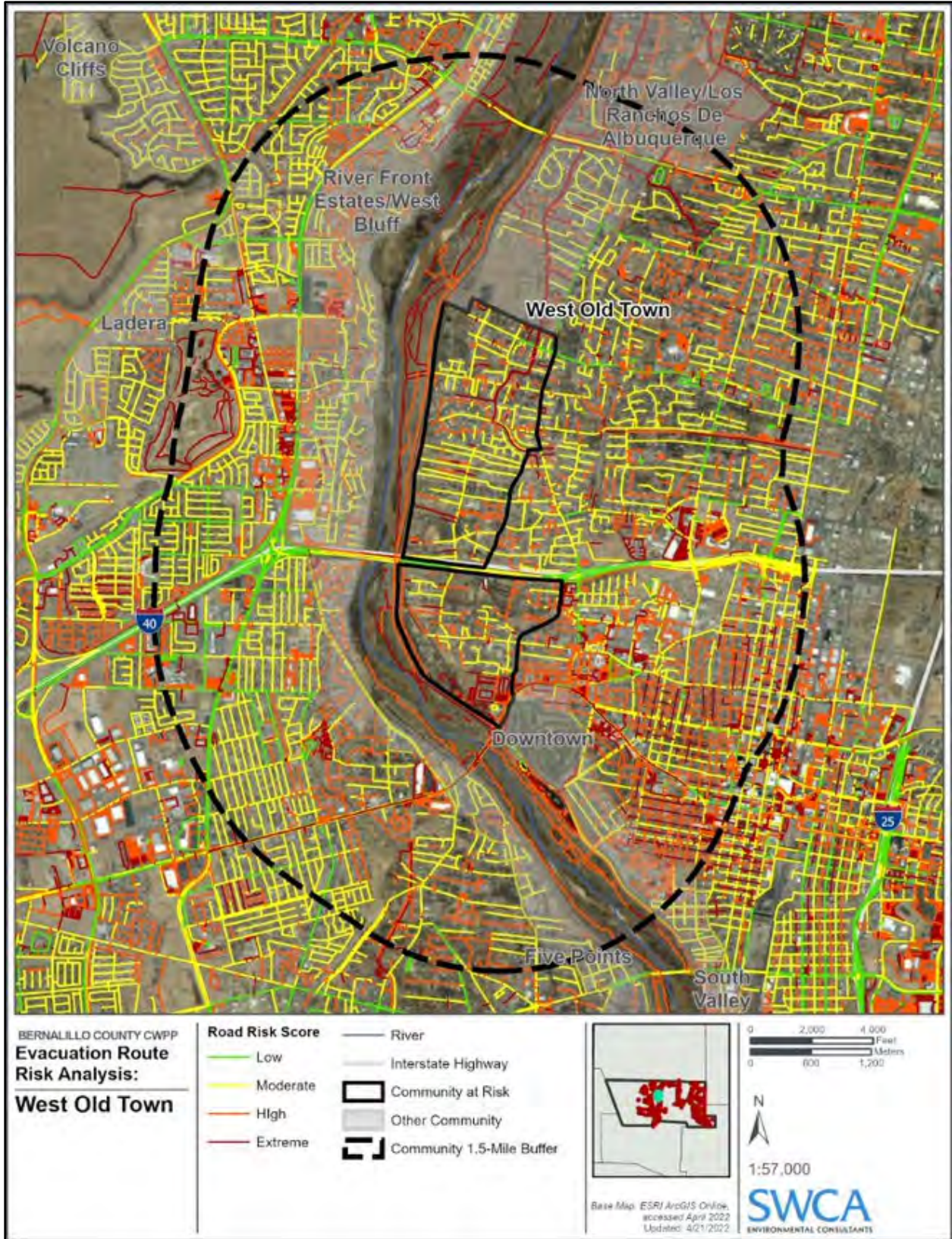


Figure D.78. Evacuation route risk analysis for West Old Town.

## WUI COMMUNITY # 38: WILDLAND URBAN INTERFACE COMMUNITIES

### WINTERWOOD PARK/JUAN TABO HILLS POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Winterwood Park/Juan Tabo Hills	<b>Total Score:</b> 71	<b>Rating:</b> High
<b>Geographic Area:</b> Sandia Foothills		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 0.6		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 633.2		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 1.6
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
8.7%	10.7%	5.3%	0.0%	11.9%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 96.8%	0-5 minutes: 0.0%
4-8 (ft): 0.1%	5-10 minutes: 0.1%
8-12 (ft): 0.0%	10-15 minutes: 96.0%
>12 (ft): 0.0%	15+ minutes: 3.9%

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> AFR #12*				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• None</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Multiple ingress/egress</li> <li>• Xeriscape landscaping</li> <li>• Modern building materials</li> </ul>	<ul style="list-style-type: none"> <li>• Proximity to Kirkland AFB and potential munitions fires</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.



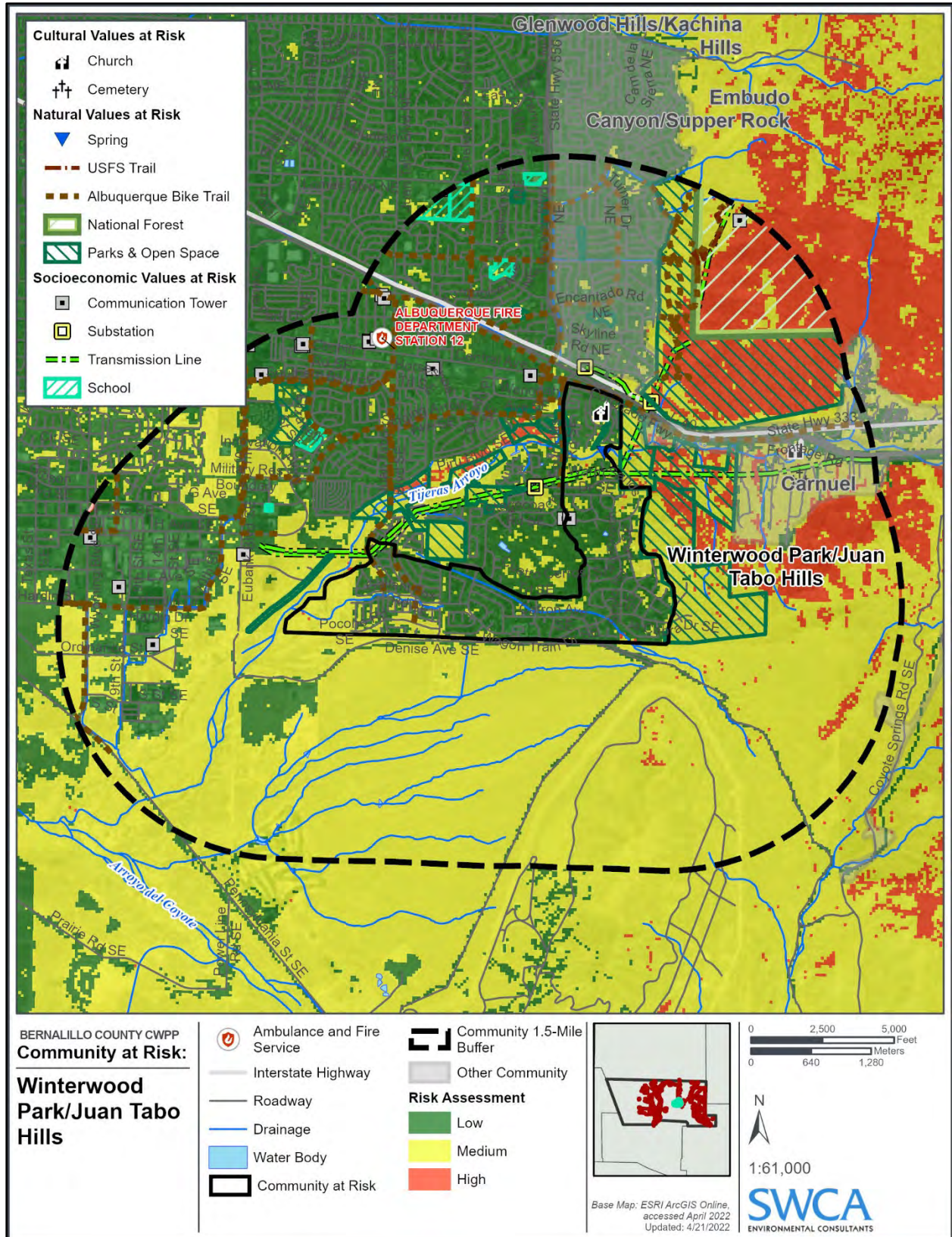


Figure D.79. Winterwood Park/Juan Tabo Hills polygon.



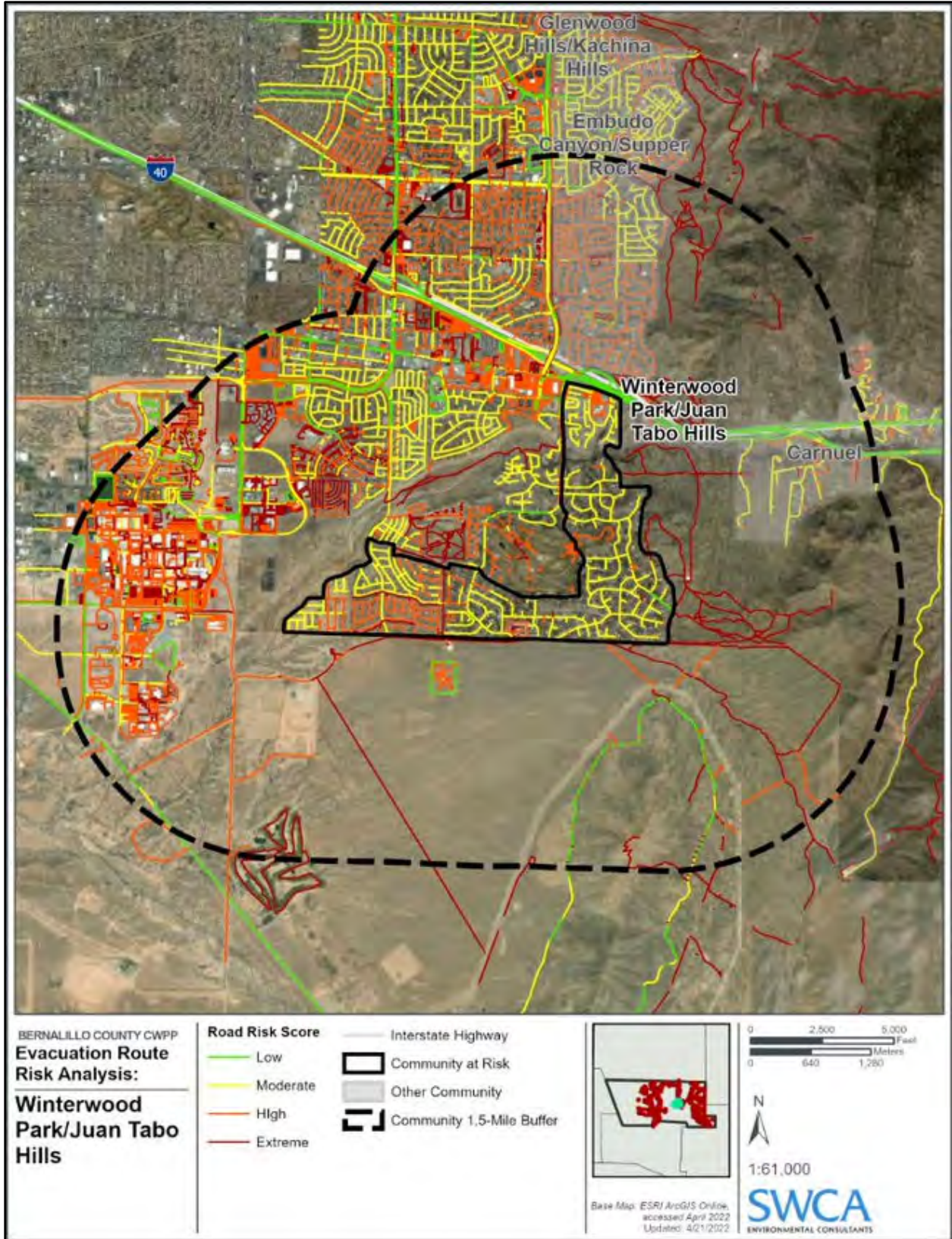


Figure D.80. Evacuation route risk for Winterwood Park/Juan Tabo Hills.

# WUI COMMUNITY # 39: WILDLAND URBAN INTERFACE COMMUNITIES

## YRISARRI EAST POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b><u>Community Polygon Name:</u></b> Yrisarri East	<b><u>Total Score:</u></b> 96	<b><u>Rating:</u></b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 12.3		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 72.9		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<b><u>WUI Land Area (mi.<sup>2</sup>):</u></b> 12.9
<b><u>Percent:</u></b> 100

Dominant Fuel Type				
<b><u>Grass</u></b>	<b><u>Grass/Shrub</u></b>	<b><u>Shrub</u></b>	<b><u>Timber Understory</u></b>	<b><u>Timber Litter</u></b>
26.1%	25.0%	1.6%	0.2	42.5%

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<b><u>Flame Length</u></b>	<b><u>Drive Time Distance</u></b>
0-4 (ft): 69.5%	0-5 minutes: 10.25%
4-8 (ft): 28.2%	5-10 minutes: 47.2%
8-12 (ft): 1.7%	10-15 minutes: 31.1%
>12 (ft): 0.3%	15+ minutes: 11.5%



<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #41*				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
Recent fires within the polygon:				
<ul style="list-style-type: none"> <li>• 3</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Class A roofs</li> <li>• Multiple ingress/egress</li> </ul>	<ul style="list-style-type: none"> <li>• Thick vegetation</li> <li>• No hydrants or waterbodies</li> <li>• An assortment of building materials</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

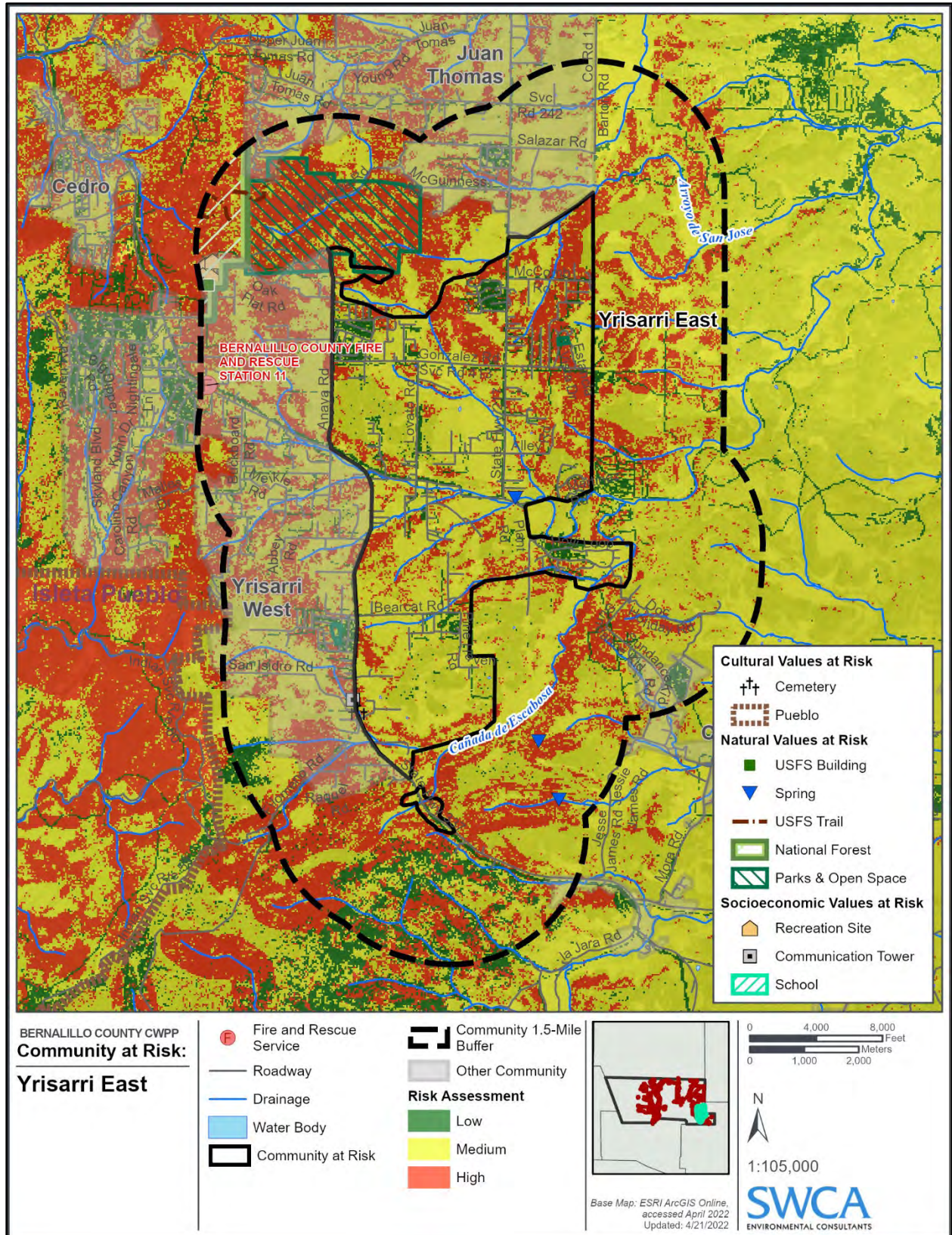


Figure D.81. Yrisarri East polygon.



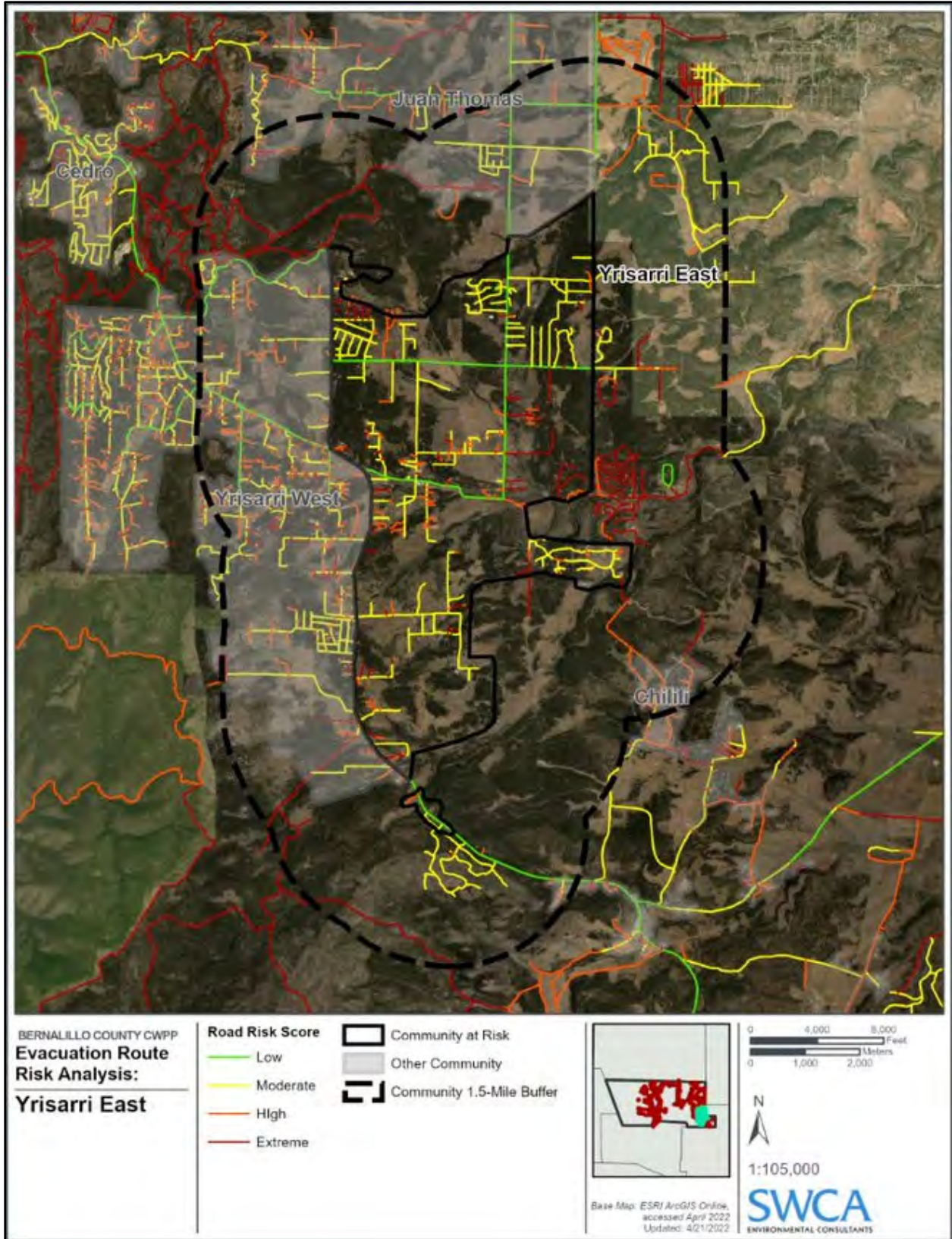


Figure D.82. Evacuation route risk analysis for Yrisarri East.



## WUI COMMUNITY # 40: WILDLAND URBAN INTERFACE COMMUNITIES

### YRISARRI WEST POLYGON SUMMARY STATISTICS

Community Polygon Background		
<b>Community Polygon Name:</b> Yrisarri West	<b>Total Score:</b> 132	<b>Rating:</b> High
<b>Geographic Area:</b> East Mountains		
<b>Undeveloped Land Area (mi.<sup>2</sup>):</b> 12.4		
<b>Home Density (housing units/ mi.<sup>2</sup>):</b> 102.4		

Percent of Community Classified by Wildland Urban Interface (WUI) Types
<u>WUI Land Area (mi.<sup>2</sup>):</u> 13.1
<u>Percent:</u> 100

Dominant Fuel Type				
<u>Grass</u>	<u>Grass/Shrub</u>	<u>Shrub</u>	<u>Timber Understory</u>	<u>Timber Litter</u>
16.4	22.4	1.9	0.1	54.3

Percent of Community by Modeled/Calculated Wildfire Risk Inputs	
<u>Flame Length</u>	<u>Drive Time Distance</u>
0-4 (ft): 60.0%	0-5 minutes: 34.8%
4-8 (ft): 35.4%	5-10 minutes: 36.1%
8-12 (ft): 3.5%	10-15 minutes: 0.3%
>12 (ft): 0.9%	15+ minutes: 28.8 %

<b>Fire Department Statistics:</b>				
<u>Fire District:</u> BCFR #41*				
<u>Fulltime Firefighters:</u>		<u>On-call Firefighters:</u>		<u>Volunteer Firefighters:</u>
<u>Water Tender:</u>				<u>Wildland Engines</u>
Type 1:		<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2:		Type 3:		
Type 3:		Type 4:		
<u>Structure Engines:</u>		Type 5:		
Type 1:		Type 6:		
Type 2:		Type 7:		
<u>Port-A-Tanks:</u>				
<u>Portable Pumps:</u>				
<u>Recent fires within the polygon:</u>				
<ul style="list-style-type: none"> <li>• 17</li> </ul>				

<b>Current Fire and Fuel Management Programs and Plans</b>
<ul style="list-style-type: none"> <li>• Bernalillo County Hazard Mitigation Plan</li> </ul>

<b>1144 Survey Summary Highlights</b>	
<u>Positive Attributes (Low Scores)</u>	<u>Negative Attributes (High Scores)</u>
<ul style="list-style-type: none"> <li>• Class B roofs</li> </ul>	<ul style="list-style-type: none"> <li>• Complicated road network</li> <li>• One-way ingress/egress</li> <li>• Heavily vegetated</li> <li>• Varied topography</li> <li>• Wood and vinyl building construction</li> </ul>

<b>Suggested Mitigation Focus Area</b>
<u>Fire Department Concerns:</u>
<ul style="list-style-type: none"> <li>• N/A*</li> </ul>

\* Data were not provided.

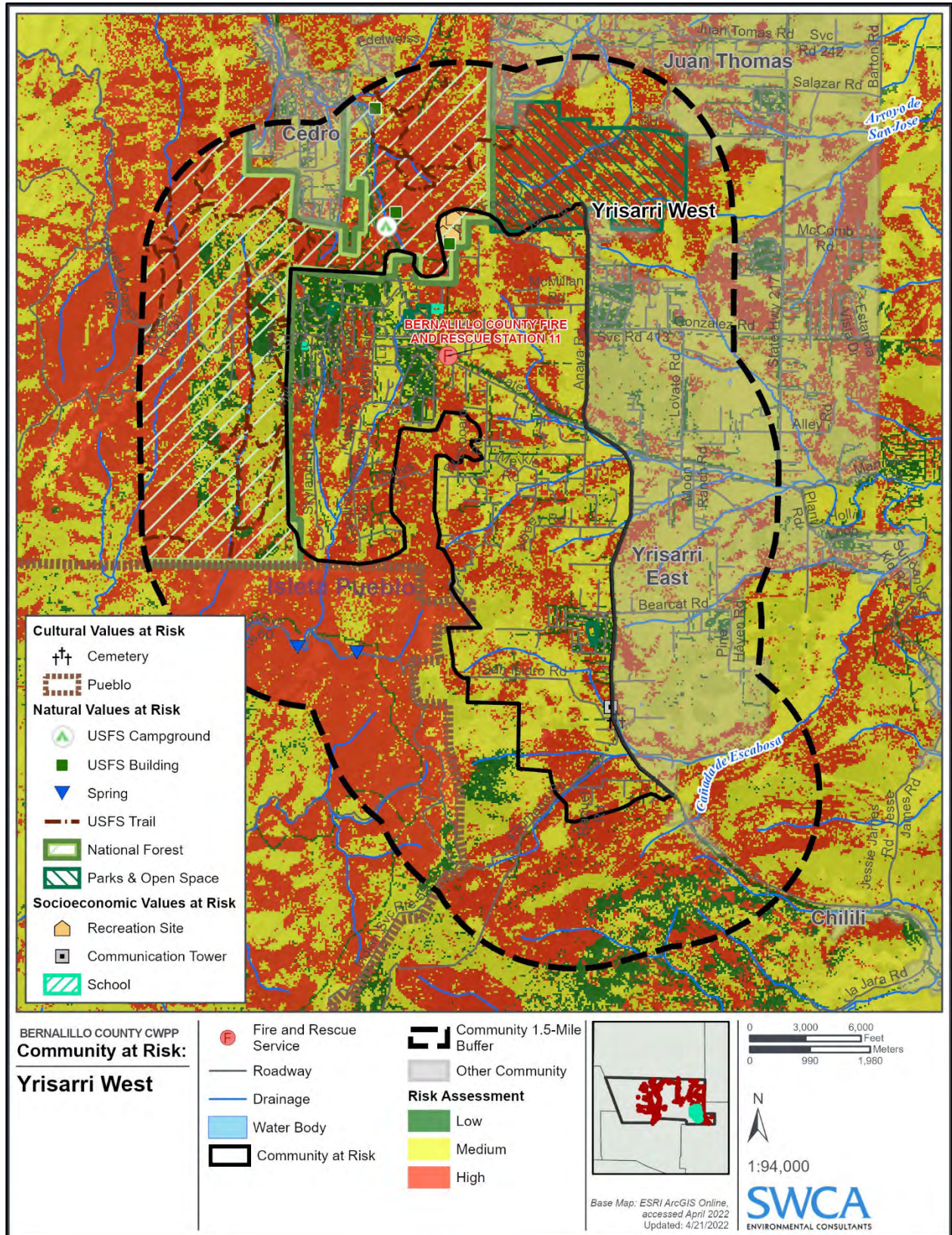


Figure D.83. Yrisarri West polygon.



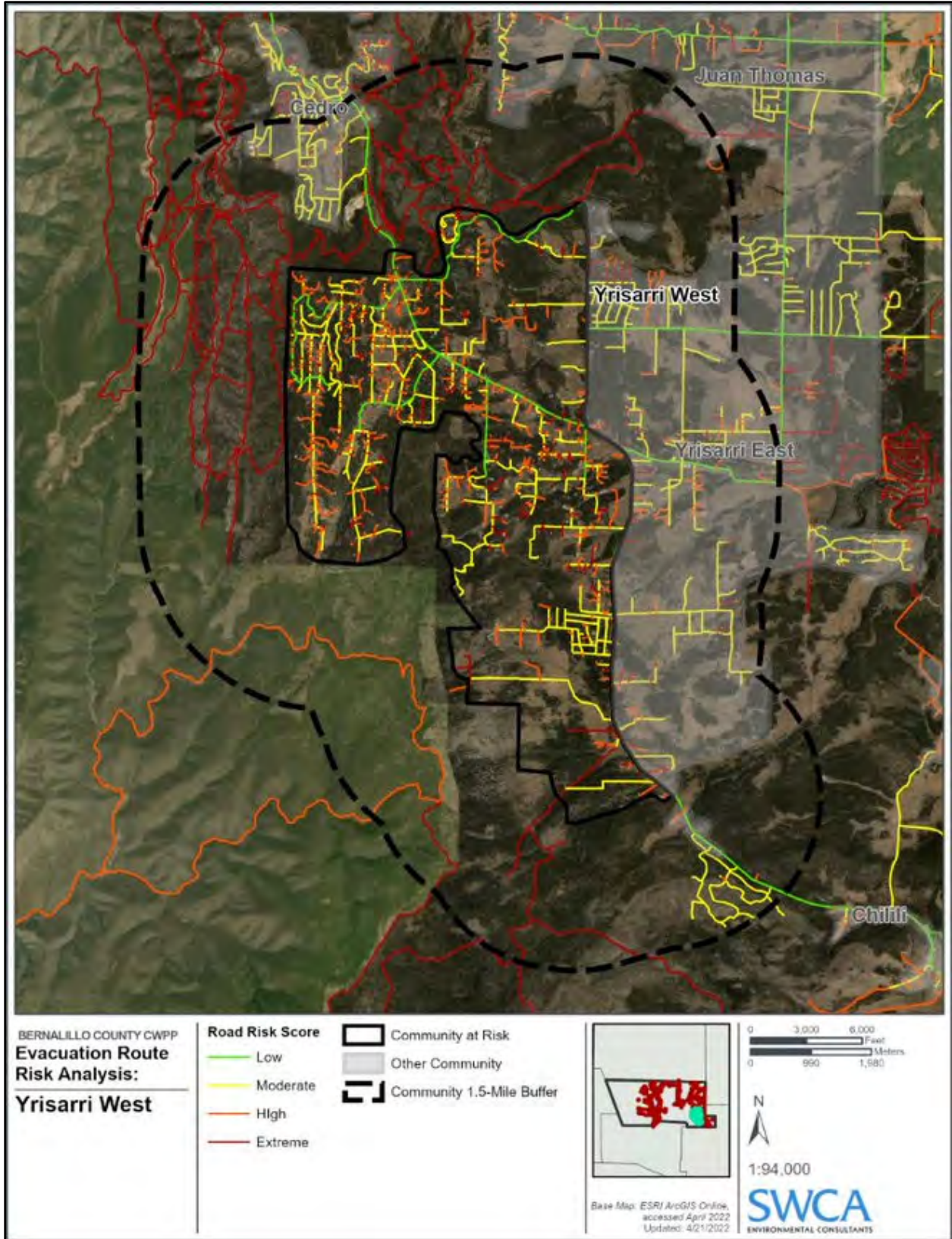


Figure D.84. Evacuation route risk analysis for Yrisarri West.

**Table D.1. Communities at Risk Ratings \***

Community	Risk Rating
Atrisco Vista North	Low
Carnuel	High
Cedar Crest	High
Cedro	High
Chilili	High
Diamon Mesa	High
Double Eagle Airport	Low
Downtown	High
Embudo Canyon/Supper	High
Five Points	High
Glenwood Hills/Kachina	High
Isleta Pueblo	High
Isleta Pueblo Resort & Casino	Medium
Juan Thomas	High
La Luz	High
La Madera	High
Ladera	High
North Albuquerque Acres/Nor Este	Medium
North Valley/Los Ranchos De Albuquerque	High
Paa-ko Estates	High
Pajarito Mesa	Medium
Portrait Park	Medium
River Front Estates/West Bluff	High
Row One North/Valle Grande	Medium
Sandia Heights/ Mountain Highlands	Medium
Sandia Park/San Antonito	High
Sedillo North	High
Sedillo South	High
Sierra Vista	High
South Valley	High
South Valley West	High
Tablazon	High
Tijeras	High
Valle de Oro	High

Community	Risk Rating
Ventana Ranch	High
Volcano Cliffs	Medium
West Old Town	High
Winterwood Park/Juan Tabo Hills	High
Yrisarri East	High
Yrisarri West	High

\* Community scores from the last CWPP (2015 East Mountain CWPP Update) were not directly compared in this 2022 Bernalillo County CWPP Update as the community delineations and assessment forms were different between the two reports, and New Mexico changed the rating scale to include low, medium, and high only. Original ratings from the 2015 CWPP can be found below.

**Table D.2. Original Community Ratings from the 2015 East Mountain CWPP Update**

Zone	Communities Included	Risk Rating
1	La Madera, Paa-ko, San Pedro Creek Estates, and San Pedro Overlook	Moderate to extreme
2	Sandia Park, Sandia Knolls, Piñon Ridge, Canoncito, Forest Park, Hobbies, Mountain Homes Estates, Cañon Estates, Sierra Vista, and Fox Hills	Moderate to high
3	Sedillo, Juan Thomas, El Tablazon, Rincón Loop, Gutierrez Canyon, El Refugio, Woodland Hills Estates, Five Hills, and Nature Pointe	Moderate
4	Barton, Sandia Mountain Ranch, Frost Road, and Mountain Valley Road	Moderate to high
5	Carnuel, Tijeras, and Primera Agua	High to extreme
6	Cedro, Alley Place, Yrisarri, Ponderosa Pines, Escabosa, Buckboard, Anaya, and Juan Tomas	High to extreme

SWCA

APPENDIX E:  
NFPA 1144 Form



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# 1144 NATIONAL FIRE PROTECTION ASSOCIATION ASSESSMENT FORM

SWCA – 1144 NFPA Assessment	
<b>Community</b>	<b>Notes:</b>
<b>Surveyor</b>	
<b>Survey Date/Time</b>	
Means of Access	
<i>Ingress and Egress</i>	
2 or more roads in and out   0	
1 road in and out   7	
<i>Road Width</i>	
> 24 ft   0	
> 20 ft < 24 ft   2	
< 20 ft   4	
<i>Road Conditions</i>	
Surfaced road, grade < 5%   0	
Surfaced road, grade > 5%   2	
Non-surfaced road, grade < 5%   2	
Non-surfaced road, grade > 5%   5	
Other than all season   7	
<i>Fire Access</i>	
< 300 ft with turnaround   0	
> 300 ft with turnaround   2	
< 300 ft with no turnaround   4	
> 300 ft with no turnaround   5	
<i>Street Signs</i>	
Present – reflective   0	
Present – non-reflective   2	
Not present   5	
<b>Notes:</b>	
Vegetation (Fuel Models)	
<i>Predominant Vegetation</i>	
<i>Primary Predominant Vegetation</i>	
Non-Burnable (NB) Score   2	
Grass (GR) Score   5	
Grass-Shrub (GS) Score   10	
Shrub (SH) Score   15	
Timber-Understory (TU) Score   20	

Timber-Litter (TL) Score   25	
Slash-Blow (TU) Score   30	
<b>Notes:</b>	
<b>Defensible Space</b>	
> 100 ft around structure   1	
> 70 ft < 100 ft around structure   3	
> 30 ft < 70 ft around structure   10	
< 30 ft around structure   25	
<b>Topography Within 300 ft of Structures</b>	
<b>Slope</b>	
< 9%   1	
10% to 20%   4	
21% to 30%   7	
31% to 40%   8	
>41%   10	
<b>Additional Rating Factors (rate all that apply)</b>	
Topographic features   1-5	
History of high fire occurrence   1-5	
Severe fire weather potential   1-5	
Separation of adjacent structures   1-5	
<b>Notes:</b>	
<b>Roofing Assembly</b>	
<b>Roofing</b>	
Class A - metal roof, clay/concrete tiles, slate, asphalt shingles   0	
Class B - pressure treated composite shakes and shingles   3	
Class C - untreated wood shingle, plywood, particle board   15	
Unrated - Extremely poor roofing conditions   25	
<b>Notes:</b>	
<b>Building Construction</b>	
<b>Siding Materials (predominant)</b>	
Non-combustible (brick/concrete)   5	
Fire Resistive (stucco/adobe)   10	
Combustible (wood or vinyl)   12	
<b>Deck and fencing (predominant)</b>	
No deck or fence/non-combustible   0	
Combustible deck and fence   5	



<b>Building Set-Back</b>			
> 30 ft to slope   1			
< 30 ft to slope   5			
<b>Notes:</b>			
<b>Available Fire Protection</b>			
<b>Water Sources</b>			
Water Source?   yes/no			
Water Source Type   hydrant, water tank, other			
Other Water Source			
Water Source Score   Hydrant = 1 Water Tank = 3			
<b>Organized Response</b>			
Station < 5 mi from community   1			
Station > 5 mi from community   3			
<b>Notes:</b>			
<b>Placement of Gas and Electric Utilities</b>			
Both underground   0			
One above, one below   3			
Both above ground   5			
<b>Values at Risk Observations</b>			
<b>Forest Health Observations</b>			
<b>Land Use Observations</b>			
<b>Misc Observations</b>			
<b>Total</b>			
<b>Hazard Rating Scale</b>	<b>&lt;40 Low</b>	<b>41-69 Moderate</b>	<b>&gt;70 High</b>

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SWCA

# APPENDIX F: Funding Sources



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## FUNDING SOURCES

The following section provides information on federal, state, and private funding opportunities for conducting wildfire mitigation projects.

### FEDERAL FUNDING INFORMATION

#### Source: 2022 Infrastructure Investments and Jobs Act

**Agency:** Multiple

**Website:** <https://www.congress.gov/bill/117th-congress/house-bill/3684>

**Description:** The Infrastructure Investments and Jobs act allocated funding through various departments for infrastructure projects including, but not limited to roads, bridges, and major projects; passenger and freight rail; highway and pedestrian safety; public transit; broadband; ports and waterways; airports; water infrastructure; power and grid reliability and resiliency; resiliency, including funding for coastal resiliency, ecosystem restoration, and weatherization; clean school buses and ferries; electric vehicle charging; addressing legacy pollution by cleaning up Brownfield and Superfund sites and reclaiming abandoned mines; and Western Water Infrastructure.

**Specifically, the Community Wildfire Defense Grant Program** is a \$1 billion program where the Department of Agriculture will provide grants to communities at risk from wildfire to develop or revise their community wildfire protection plans and carry out projects described within those plans. The program includes a mix of formula and competitive funds. Applications are expected to open early in 2023.

Section 40803 addresses wildfire risk reduction, section 40804 deals with ecosystem restoration, section 40806 handles the establishment of fuel breaks in forests and other wildland vegetation, and section 70302 addresses reforestation. To learn more about the Act, please see the guidebook located here: [https://www.whitehouse.gov/wp-content/uploads/2022/01/BUILDING-A-BETTER-AMERICA\\_FINAL.pdf?msclkid=48f8f465b51911ec85e010228d808d4d](https://www.whitehouse.gov/wp-content/uploads/2022/01/BUILDING-A-BETTER-AMERICA_FINAL.pdf?msclkid=48f8f465b51911ec85e010228d808d4d).

#### Source: Access to Ancestral Lands Grant Opportunity (AALG)

**Agency:** First Nations Development Institute

**Website:** <https://www.firstnations.org/>

**Description:** For more than 41 years, First Nations Development Institute (First Nations), a Native-led 501(c)(3) nonprofit organization, has worked to strengthen American Indian economies to support healthy Native communities by investing in and creating innovative institutions and models that strengthen asset control and support economic development for American Indian people and their communities. First Nations began its national grantmaking program in 1993. Through mid-year 2021, First Nations has successfully managed 2,276 grants totaling more than \$46 million to tribal and community institutions across Indian Country.

**Source: Building Resilient Infrastructure and Communities (BRIC) Grant Program**

**Agency:** Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA)

**Website:** <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>

**Description:** BRIC will support states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency. You can find more information on the BRIC program here: <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>

**Source: Hazard Mitigation Grant Program (HMGP)**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/mitigation/hazard-mitigation>

**Description:** The HMGP provides funding to state, local, tribal, or territorial governments (and individuals or businesses if the community applies on their behalf) to rebuild with the intentions to mitigate future losses due to potential disasters. This grant program is available after a presidentially declared disaster.

**Source: Hazard Mitigation Grant Program (HMGP) – Post Fire**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/mitigation/post-fire>

**Description:** The HMGP Post Fire grant program provides assistance to communities for the purpose of implementing hazard mitigation measures following a wildfire. Mitigation measures may include:

- Soil stabilization
- Flood diversion
- Reforestation

**Source: Flood Mitigation Assistance (FMA) Grant**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/mitigation/floods>

**Description:** The Flood Mitigation Assistance Program is a competitive grant program that provides funding to states, local communities, federally recognized tribes, and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program. FEMA chooses recipients based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project.

**Source: Emergency Management Performance Grant (EMPG)**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/preparedness/emergency-management-performance>



**Description:** The EMPG program provides funding to state, local, tribal, and territorial emergency management agencies with the overall goal of creating a safe and resilient nation. The two main objectives of the program are 1) closing capability gaps that are identified in the state or territory's most recent Stakeholder Preparedness Review (SPR); and 2) building or sustaining those capabilities that are identified as high priority through the Threat and Hazard Identification and Risk Assessment (THIRA)/SPR process and other relevant information sources. The grant recipient and Regional Administrator must come to an agreement on program priorities, which are crafted based on National, State, and regional priorities.

**Source: Fire Management Assistance Grant (FMAG)**

**Agency:** FEMA

**Website:** <https://www.fema.gov/assistance/public/fire-management-assistance>

**Description:** Fire Management Assistance is available to state, local, and tribal governments for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands, which threaten such destruction as would constitute a major disaster. The Fire Management Assistance declaration process is initiated when a state submits a request for assistance to the FEMA Regional Director at the time a "threat of major disaster" exists. The entire process is accomplished on an expedited basis and a FEMA decision is rendered in a matter of hours. Before a grant can be awarded, a state must demonstrate that total eligible costs for the declared fire meet or exceed either the individual fire cost threshold, which applies to single fires, or the cumulative fire cost threshold, which recognizes numerous smaller fires burning throughout a state.

**Source: Regional Catastrophic Preparedness (RCP) Grants**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/preparedness/regional-catastrophic>

**Description:** The Regional Catastrophic Preparedness Grant program provides funding to increase collaboration and capacity in regard to catastrophic incident response and preparation.

**Source: Emergency Forest Restoration Program (EFRP)**

**Agency:** USDA Farm Service Agency (FSA)

**Website:** <https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/emergency-forest-restoration/index>

**Description:** The Emergency Forest Restoration Program (EFRP) helps the owners of non-industrial private forests restore forest health damaged by natural disasters. The EFRP does this by authorizing payments to owners of private forests to restore disaster damaged forests. The local FSA County Committee implements EFRP for all disasters with the exceptions of drought and insect infestations. Eligible practices may include debris removal, such as down or damaged trees; site preparation, planting materials, and labor to replant forest stand; restoration of forestland roads, fire lanes, fuel breaks, or erosion-control structures; fencing, tree shelters; wildlife enhancement.

To be eligible for EFRP, the land must have existing tree cover; and be owned by any nonindustrial private individual, group, association, corporation, or other private legal entity.

**Source: Emergency Conservation Program (ECP)**

**Agency:** USDA Farm Service Agency (FSA)

**Website:** <https://www.fsa.usda.gov/programs-and-services/conservation-programs/emergency-conservation/index>

**Description:** The Emergency Conservation Program (ECP) helps farmers and ranchers to repair damage to farmlands caused by natural disasters and to help put in place methods for water conservation during severe drought. The ECP does this by giving ranchers and farmers funding and assistance to repair the damaged farmland or to install methods for water conservation. The grant could be used for restoring conservation structures (waterways, diversion ditches, buried irrigation mainlines, and permanently installed ditching system).

**Source: Environmental Quality Incentives Program (EQIP)**

**Agency:** National Resource Conservation Service (NRCS)

**Website:** <https://www.nrcs.usda.gov/wps/portal/nrcs/main/co/programs/financial/eqip/>

**Description:** The Environmental Quality Incentives Program (EQIP) is a voluntary program authorized under the Agricultural Act of 2014 (2014 Farm Bill) that helps producers install measures to protect soil, water, plant, wildlife, and other natural resources while ensuring sustainable production on their farms, ranches, and working forest lands.

**Source: Emergency Watershed Protection (EWP) Program**

**Agency:** National Resource Conservation Service (NRCS)

**Website:** <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/>

**Description:** The program offers technical and financial assistance to help local communities relieve imminent threats to life and property caused by floods, fires, windstorms, and other natural disasters that impair a watershed.

Eligible sponsors include cities, counties, towns, conservation districts, or any federally recognized Native American tribe or tribal organization. Interested public and private landowners can apply for EWP Program recovery assistance through one of those sponsors.

EWP Program covers the following activities.

- Debris removal from stream channels, road culverts, and bridges
- Reshape and protect eroded streambanks
- Correct damaged drainage facilities
- Establish vegetative cover on critically eroded lands
- Repair levees and structures
- Repair conservation practices

**Source: Funding for Fire Departments and First Responders**

**Agency:** DHS, U.S. Fire Administration

**Website:** <https://www.usfa.fema.gov/grants/>

**Description:** Includes grants and general information on financial assistance for fire departments and first responders. Programs include the Assistance to Firefighters Grant Program, Reimbursement for Firefighting on Federal Property, State Fire Training Systems Grants, and National Fire Academy Training Assistance.

**Source: Tribal Environmental General Assistance Program (GAP)**

**Agency:** Environmental Protection Agency (EPA)

**Website:** <https://www.epa.gov/tribal-pacific-sw/epa-region-9-tribal-environmental-gap-funding>

**Description:** Funding under this program is used to aid Native American tribes in establishing and implementing their own reservation-specific environmental protection programs. To find out more about this funding opportunity please contact Tribal Branch Manager, Jeremy Bauer, at [bauer.jeremy@epa.gov](mailto:bauer.jeremy@epa.gov).

**Source: Specific EPA Grant Programs**

**Agency:** Environmental Protection Agency (EPA)

**Website:** <https://www.epa.gov/tribal-pacific-sw/epa-region-9-tribal-environmental-gap-funding>

**Description:** Various grant programs are listed under this site. Listed below are examples of grants offered:

- Multipurpose Grants to States and Tribes: <https://www.epa.gov/grants/multipurpose-grants-states-and-tribes>
- Environmental Education Grants: <https://www.epa.gov/education/grants>
- Environmental Justice Grants: <https://www.epa.gov/environmentaljustice/environmental-justice-grants-funding-and-technical-assistance>

**Source: Conservation Innovation Grants (CIG)**

**Agency:** National Resource Conservation Service

**Website:** <https://www.nrcs.usda.gov/wps/portal/nrcs/site/ca/home/>

**Description:** CIG State Component. CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program (EQIP) funds are used to award competitive grants to non-federal governmental or nongovernmental organizations, tribes, or individuals. CIG enables the Natural Resources Conservation Service (NRCS) to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with federal, state, and local regulations. The NRCS administers the CIG program. The CIG requires a 50/50 match between the agency and the applicant. The CIG has two funding components: national and state. Funding sources are available for water resources, soil resources, atmospheric resources, and grazing land and forest health.



**Source: Urban and Community Forestry Program, National Urban and Community Forestry Challenge Cost Share Grant Program**

**Agency:** U.S. Forest Service

**Website:** <https://www.fs.usda.gov/managing-land/urban-forests/ucf>

**Description:** U.S. Forest Service funding will provide for Urban and Community Forestry Programs that work with local communities to establish climate-resilient tree species to promote long-term forest health. The other initiative behind this program is to promote and carry out disaster risk mitigation activities, with priority given to environmental justice communities. For more information, contact a Forest Service Regional Program Manager.

**Source: Catalog of Federal Funding Sources; Land Resources**

**Agency:** Multiple

**Website:** <https://ofmpub.epa.gov/apex/wfc/f?p=165:512:6483383318137:::512::>

**Description:** The Land Finance Clearing House is a catalogue of Federal funding sources for all things land related.

Examples of the types of grants found at this site are:

- Forest and Woodlands Resource Management Grant: [https://sam.gov/fal/a798ad78cac749639b48270db3e86fdc/view?index=cfd&page=2&organization\\_id=100011100](https://sam.gov/fal/a798ad78cac749639b48270db3e86fdc/view?index=cfd&page=2&organization_id=100011100)
- Environmental Education Grant: <https://www.epa.gov/education/grants>
- Public Assistance Grant Program: <https://www.fema.gov/assistance/public>
- Hazard Mitigation Grant: <https://www.fema.gov/grants/mitigation/hazard-mitigation>

**Source: Catalog of Federal Funding Sources; Water Resources**

**Agency:** Multiple

**Website:** <https://ofmpub.epa.gov/apex/wfc/f?p=165:12:6483383318137:::12::>

**Description:** The Water Finance Clearing House is a catalogue of Federal funding sources for all things water related.

Examples of the types of grants found at this site are:

- Water Conservation Field Services Program: <https://www.usbr.gov/waterconservation/>
- New Mexico Water Project Fund: <https://www.nmfinance.com/water-project-fund/>
- New Mexico Rural Infrastructure Fund: <https://www.env.nm.gov/construction-programs/rural-infrastructure-program/>

**Source: Firewise Communities**

**Agency:** Multiple

**Website:** <http://www.firewise.org>

**Description:** Many different Firewise Communities activities are available to help homes and whole neighborhoods become safer from wildfire without significant expense. Community cleanup days, awareness events, and other cooperative activities can often be successfully accomplished through partnerships among neighbors, local businesses, and local fire departments at little or no cost.

The kind of help you need will depend on who you are, where you are, and what you want to do. Among the different activities that individuals and neighborhoods can undertake, the following often benefit from seed funding or additional assistance from an outside source:

- Thinning/pruning/tree removal/clearing on private property—particularly on very large, densely wooded properties
- Retrofit of home roofing or siding to non-combustible materials
- Managing private forest
- Community slash pickup or chipping
- Creation or improvement of access/egress roads
- Improvement of water supply for firefighting
- Public education activities throughout the community or region

**Source: The National Fire Plan (NFP)**

**Agency:** DOI & USDA

**Website:** <http://www.forestsandrangelands.gov/>

**Description:** Many states are using funds from the NFP to provide funds through a cost-share with residents to help them reduce the wildfire risk to their private property. These actions are usually in the form of thinning or pruning trees, shrubs, and other vegetation and/or clearing the slash and debris from this kind of work. Opportunities are available for rural, state, and volunteer fire assistance.

**Source: Staffing for Adequate Fire and Emergency Response (SAFER)**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/preparedness/firefighters/safer>

**Description:** The purpose of SAFER grants is to help fire departments increase the number of frontline firefighters. The goal is for fire departments to increase their staffing and deployment capabilities and ultimately attain 24-hour staffing, thus ensuring that their communities have adequate protection from fire and fire-related hazards. The SAFER grants support two specific activities: (1) hiring of firefighters and (2) recruitment and retention of volunteer firefighters. The hiring of firefighters activity provides grants to pay for part of the salaries of newly hired firefighters over the five-year program.

**Source: The Fire Prevention and Safety Grants (FP&S)**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/preparedness/firefighters/safety-awards#:~:text=Awards%20%20%20Organization%20%20%20,%20%20%241%2C499%2C957%20%2016%20more%20rows%20>

**Description:** FP&S offers support to projects that enhance the safety of the public and firefighters who may be exposed to fire and related hazards. The primary goal is to target high risk populations and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire-prevention and public-safety education campaigns, juvenile fire-setter interventions, media campaigns, and arson prevention and awareness programs. In fiscal year 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include firefighter safety research and development.

**Source: GSA-Federal Excess Personal Property**

**Agency:** USFS

**Website:** <https://gsaccess.gov/>

**Description:** The Federal Excess Personal Property (FEPP) program refers to Forest Service-owned property that is on loan to State Foresters for the purpose of wildland and rural firefighting. Most of the property originally belonged to the Department of Defense (DoD). Once acquired by the Forest Service, it is loaned to State Cooperators for firefighting purposes. The property is then loaned to the State Forester, who may then place it with local departments to improve local fire programs. State Foresters and the USDA Forest Service have mutually participated in the FEPP program since 1956.

**Source: Assistance to Firefighters Grants (AFG)**

**Agency:** FEMA

**Website:** <https://www.fema.gov/grants/preparedness/firefighters>.

**Description:** The AFG program provides resources to assist fire departments in attaining critical resources such as training and equipment.

## STATE FUNDING INFORMATION

**Source: New Mexico Fire Protection Grant**

**Agency:** New Mexico Department of Homeland Security and Emergency Management

**Website:** <https://www.nmdhsem.org/state-firemarshal/fire-grant-council/#grant>

**Description:** The New Mexico Fire Protection Grant focuses on funding fire departments for various needs such as equipment, facilities/facility improvement, PPE, firefighting gear, apparatuses, and more. Two different grant programs are offered:

- 1) Fire departments currently certified and funded by the New Mexico State Fire Marshal's Office are eligible to apply for an **Individual Department Grant**.
- 2) County Administrative Offices having administrative responsibility for more than one district/department may apply for a **County-wide Project Grant** as long as each district within the County is compliant with the requirements of the grant application (i.e., Pump Tests, etc.). The countywide project must benefit all the departments within the County.
  - a. Note: A County Administrative Office applying for a grant does not prevent departments within the County from applying for an Individual Department Grant.



To learn more about the 2022–2023 program, see the informational fact sheet:

<https://www.nmdhsem.org/wp-content/uploads/2021/11/Eligibility-Requirements-and-Selection-Criteria-fy23-rel.pdf>

**Source: New Mexico Association of Counties: Wildfire Risk Reduction Program**

**Agency:** New Mexico Association of Counties

**Website:** <https://www.nmcounties.org/services/programs/>

**Description:** This program targets communities, tribes, counties, and non-profits who may be impacted by wildland fire initiating from, spreading from, or spreading to BLM lands. The Wildfire Risk Reduction Grant Program funds three categories of projects: development or updates of CWPPs, outreach and education, and hazardous fuels reduction. You can learn more about the 2022–2023 program here: <https://www.nmcounties.org/wp-content/uploads/2022/01/Wildfire-Risk-Reduction-Program-Information-Packet-2022-2023.pdf>

**Source: HB 266: Forest and Watershed Restoration Act (FAWRA)**

**Agency:** EMNRD Forestry Division

**Website:** <http://www.emnrd.state.nm.us/SFD/FAWRA.html>

**Description:** The Forest and Watershed Restoration Act (FAWRA) was created by House Bill 266 and signed into law by Governor Michelle Lujan Grisham on March 15, 2019. FAWRA allocates funding annually to EMNRD Forestry Division for the purpose of restoring forests and watersheds in the state of New Mexico. A Forest and Watershed Advisory Board has been established to evaluate and recommend projects, and EMNRD Forestry Division will administer, implement, and report on the projects. FAWRA funds can be used on public lands for on-the-ground restoration treatments; project planning; economic development programs to advance small diameter trees and woody biomass; and workforce development for wood utilization projects. Applicants should contact their local District Forester (Santa Fe County falls in the Bernalillo District). More information on funding is available: <http://www.emnrd.state.nm.us/SFD/documents/HB0266.pdf> and <https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/FAWRA-Guidelines-FY22-FINAL.pdf>.

## PRIVATE FUNDING INFORMATION

**Source: State Farm Good Neighbor Citizenship (GNC) Grants**

**Agency:** State Farm

**Website:** <https://www.statefarm.com/about-us/corporate-responsibility/community-grants/good-neighbor-citizenship-grants>

**Description:** State Farm funding is directed at:

- Auto and roadway safety
- Teen Driver Education
- Home safety and fire prevention
- Disaster preparedness
- Disaster recovery

**Source: The Urban Land Institute (ULI)**

**Website:** <http://www.uli.org>

**Description:** ULI is a 501(c)(3) nonprofit research and education organization supported by its members. The institute has more than 22,000 members worldwide, representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. The mission of the ULI is to provide responsible leadership in the use of land to enhance the total environment. ULI and the ULI Foundation have instituted Community Action Grants that could be used for Firewise Communities activities. Applicants must be ULI members or part of a ULI District Council. Contact [actiongrants@uli.org](mailto:actiongrants@uli.org) or review the web page to find your District Council and the application information.

**Source: Environmental Systems Research Institute (ESRI)**

**Website:** <http://www.esri.com/grants>

**Description:** ESRI is a privately held firm and the world's largest research and development organization dedicated to geographic information systems. ESRI provides free software, hardware, and training bundles under ESRI-sponsored Grants that include such activities as conservation, education, and sustainable development, and posts related non-ESRI grant opportunities under such categories as agriculture, education, environment, fire, public safety, and more. You can register on the website to receive updates on grant opportunities.

**Source: National Forest Foundation; Innovative Finance for National Forests Grant Program**

**Website:** <https://www.nationalforests.org/grant-programs/innovative-finance-for-national-forests-grant-program>

**Description:** The Innovative Finance for National Forests Grant Program aims to bring in non-USFS funds to increase forest resilience. There are three main topics for funding: Wildfire Resilience and Recovery, Sustainable Recreation Access and Infrastructure, and Watershed Health. In addition, three types of projects are funded. Pilot Programs with on-the-ground implementation, Scaling Projects to deliver backlogs of unfunded work, and Research and Development to provide to new forest information.

**Source: StEPP Foundation**

**Website:** <https://steppfoundation.org/>

**Description:** StEPP is a 501(c)(3) organization dedicated to helping organizations realize their vision of a clean and safe environment by matching projects with funders nationwide. The StEPP Foundation provides project oversight to enhance the success of projects, increasing the number of energy efficiency, clean energy, and pollution prevention projects implemented at the local, state, and national levels for the benefit of the public. The website includes an online project submittal system and a Request for Proposals page.

**Source: Matching Awards Program**

**Agency:** National Forest Foundation (NFF)

**Website:** <https://www.nationalforests.org/grant-programs/map>

**Description:** The NFF is soliciting proposals for its Matching Awards Program (MAP) to provide funds for direct on-the-ground projects benefitting America's National Forests and Grasslands.

By pairing federal funds provided through a cooperative agreement with the U.S. Forest Service with non-federal dollars raised by award recipients, MAP measurably multiplies the resources available to implement stewardship projects that benefit the National Forest System.

**Source: Patagonia Environmental Grants and Support**

**Agency:** Patagonia

**Website:** <https://www.patagonia.com/how-we-fund/>

**Description:** Patagonia supports innovative work that addresses the root causes of the environmental crisis and seeks to protect both the environment and affected communities. Patagonia focuses on places where they have built connections through outdoor recreation and through their network of retail stores, nationally and internationally.

**Source: Leonardo DiCaprio Foundation Grants**

**Agency:** Leonardo DiCaprio Foundation

**Website:** <https://www.rewild.org/>

**Description:** The foundation supports projects around the world that build climate resiliency, protect vulnerable wildlife, and restore balance to threatened ecosystems and communities.

**Source: U.S. Endowment for Forestry and Communities**

**Agency:** U.S. Environmental Protection Agency, Natural Resources Conservation Service (NRCS), U.S. Forest Service, U.S. Department of Defense, U.S. Economic Development Agency

**Website:** <https://www.usendowment.org/>

**Description:** As the nation's largest public charity dedicated to keeping our working forests working and ensuring their bounty for current and future generations, the Endowment deploys the creativity and power of markets to advance their mission: The Endowment works collaboratively with partners in the public and private sectors to advance systemic, transformative and sustainable change for the health and vitality of the nation's working forests and forest-reliant communities.

**Source: State and Private Forestry Programs**

**Agency:** National Association of State Foresters

**Website:** <https://www.stateforesters.org/appropriations/>

**Description:** The National Association of State Foresters supports both federal (USDA) and State and Private Forestry programs. Funding allocations and points of contact are clearly displayed in the program fact sheets created by the National Association of State Foresters. Programs included cover forest stewardship, fire assistance, restoration and more.

## OTHER FUNDING INFORMATION

The following resources may also provide helpful information for funding opportunities:

- Western Forestry Leadership Coalition: <https://www.thewflc.org/>
- USDA Information Center: <https://www.nal.usda.gov/main/information-centers>



- Forest Service Fire Management website: <http://www.fs.fed.us/fire/>
- Insurance Services Office Mitigation Online (town fire ratings): <http://www.isomitigation.com/>
- National Fire Protection Association: <http://www.nfpa.org>
- National Interagency Fire Center, Wildland Fire Prevention/Education: <https://www.nifc.gov/fire-information/fire-prevention-education-mitigation>
- Department of Homeland Security U.S. Fire Administration: <https://www.usfa.fema.gov/index.html>

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# APPENDIX G: Homeowner Resources

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# BERNALILLO COUNTY CWPP HOMEOWNERS GUIDE

This guide has been developed to address site-specific information on wildfire for the Bernalillo County communities. This guide 1) suggests specific measures that can be taken by homeowners to reduce structure ignitability and 2) enhances overall preparedness in the planning area by consolidating preparedness information from several local agencies and departments.

## BEFORE THE FIRE—PROTECTION AND PREVENTION

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### Reducing Structure Ignitability

#### Structural Materials

**Roofing**—The more fire-resistant the roofing material, the better. The roof is the portion of the house that is most vulnerable to ignition by falling embers, known as firebrands. Metal roofs afford the best protection against ignition from falling embers. Slate or tile roofs are also non-combustible, and Class-A asphalt shingles are recommended as well. The most dangerous type of roofing material is wood shingles. Removing debris from roof gutters and downspouts at least twice a year will help to prevent fire, along with keeping them functioning properly.

**Siding**—Non-combustible materials are ideal for the home exterior. Preferred materials include stucco, cement, block, brick, and masonry.

**Windows**—Double-pane windows are most resistant to heat and flames. Smaller windows tend to hold up better within their frames than larger windows. Tempered glass is best, particularly for skylights, because it will not melt as plastic will.

**Fencing and trellises**—Any structure attached to the house should be considered part of the house. A wood fence or trellis can carry fire to your home siding or roof. Consider using nonflammable materials or use a protective barrier such as metal or masonry between the fence and the house.

If you are designing a new home or remodeling your existing one, do it with fire safety as a primary concern. Use nonflammable or fire-resistant materials and have the exterior wood treated with UL-approved fire-retardant chemicals. More information on fire-resistant construction can be found at <http://www.firewise.org>.

### Screen Off the Area Beneath Decks and Porches

The area below an aboveground deck or porch can become a trap for burning embers or debris, increasing the chances of the fire transferring to your home. Screen off the area using screening with openings no larger than one-half inch. Keep the area behind the screen free of all leaves and debris.

## Firewood, Kindling, and Other Flammables

Although convenient, stacked firewood on or below a wooden deck adds fuel that can feed a fire close to your home. Be sure to move all wood away from the home during fire season. Stack all firewood uphill, at least 30 feet and preferably 100 feet from your home.

When storing flammable materials such as paint, solvents, or gasoline, always store them in approved safety containers away from any sources of ignition such as hot water tanks or furnaces. The fumes from highly volatile liquids can travel a great distance after they turn into a gas. If possible, store the containers in a safe, separate location away from the main house.

## Chimneys and Fireplace Flues

Inspect your chimney and damper at least twice a year and have the chimney cleaned every year before first use. Have the spark arrestor inspected and confirm that it meets the latest safety code. Your local fire department will have the latest edition of National Fire Prevention Code 211 covering spark arrestors. Make sure to clear away dead limbs from within 15 feet of chimneys and stovepipes

## Fireplace and Woodstove Ashes

Never take ashes from the fireplace and put them into the garbage or dump them on the ground. Even in winter, one hot ember can quickly start a grass fire. Instead, place ashes in a metal container, and as an extra precaution, soak them with water. Cover the container with its metal cover and place it in a safe location for a couple of days. Then either dispose of the cold ash with other garbage or bury the ash residue in the earth and cover it with at least 6 inches of mineral soil.

## Propane Tanks

Your propane tank has many hundreds of gallons of highly flammable liquid that could become an explosive incendiary source in the event of a fire. It should be located at least 30 feet from any structure. Keep all flammables at least 10 feet from your tank. Learn how to turn the tank off and on. In the event of a fire, you should turn the gas off at the tank before evacuating, if safety and time allow.

## Smoke Alarms

A functioning smoke alarm can help warn you of a fire in or around your home. Install smoke alarms on every level of your residence. Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

## Fire-safe Behavior

- If you smoke, always use an ashtray in your car and at home.
- Store and use flammable liquids properly.
- Keep doors and windows clear as escape routes in each room.

## Defensible Space

The removal of dense, flammable foliage from the area immediately surrounding the house reduces the risk of structure ignition and allows firefighters access to protect the home. Pruning and limbing trees along with the selective removal of trees and shrubs is recommended to create a minimum defensible space area of 30 feet. Steep slopes require increased defensible space because fire can travel quickly uphill.

Within the minimum 30-foot safety zone, plants should be limited to fire-resistant trees and shrubs. Focus on fuel breaks such as concrete patios, walkways, rock gardens, and irrigated garden or grass areas within this zone. Use mulch sparingly within the safety zone, and focus use in areas that will be watered regularly. In areas such as turnarounds and driveways, nonflammable materials such as gravel are much better than wood chips or pine needles.

Vegetative debris such as dead grasses or leaves provide important erosion protection for soil but also may carry a surface fire. It is simply not feasible to remove all the vegetative debris from around your property. However, it is a good idea to remove any accumulations within the safety zone and extending out as far as possible. This is particularly important if leaves tend to build up alongside your house or outbuildings. Removing dead vegetation and leaves and exposing bare mineral soil are recommended in a 2-foot-wide perimeter along the foundation of the house. Also, be sure to regularly remove all dead vegetative matter including grasses, flowers, and leaf litter surrounding your home and any debris from gutters, especially during summer months. Mow the lawn regularly and promptly dispose of the cuttings properly. If possible, maintain a green lawn for 30 feet around your home.

All trees within the safety zone should have lower limbs removed to a height of 6–10 feet. Remove any branches within 15 feet of your chimney or overhanging any part of your roof. Ladder fuels are short shrubs or trees growing under the eaves of the house or under larger trees. Ladder fuels carry fire from the ground level onto the house or into the tree canopy. Be sure to remove all ladder fuels within the safety zone first. The removal of ladder fuels within about 100 feet of the house will help to limit the risk of crown fire around your home. More information about defensible space is provided at <http://www.firewise.org>.

## Fire Retardants

For homeowners who would like home protection beyond defensible space and fire-resistant structural materials, fire-retardant gels and foams are available. These materials are sold with various types of equipment for applying the material to the home. They are like the substances applied by firefighters in advance of wildfire to prevent ignition of homes. Different products have different timelines for application and effectiveness. The amount of product needed is based on the size of the home, and prices may vary based on the application tools. Prices range from a few hundred to a few thousand dollars. An online search for "fire blocking gel" or "home firefighting" will provide a list of product vendors. Residents should research and consider environmental impacts of chemicals.

## Address Posting

Locating individual homes is one of the most difficult tasks facing emergency responders. Every home should have the address clearly posted with numbers at least three inches high. The colors of the address posting should be contrasting or reflective. The address should be posted so that it is visible to cars approaching from either direction.



## Access

Unfortunately, limited access may prevent firefighters from reaching many homes in the planning area. Many of the access problems occur at the property line and can be improved by homeowners. First, make sure that emergency responders can get in your gate. This may be important not only during a fire but also to allow access during any other type of emergency response. If you will be gone for long periods during fire season, make sure a neighbor has access, and ask them to leave your gate open in the event of a wildfire in the area.

Ideally, gates should swing inward. A chain or padlock can be easily cut with large bolt cutters, but large automatic gates can prevent entry. Special emergency access red boxes with keys are sold by many gate companies but are not recommended by emergency services. The keys are difficult to keep track of and may not be available to the specific personnel that arrive at your home. An alternative offered by some manufacturers is a device that opens the gate in response to sirens. This option is preferred by firefighters but may be difficult or expensive to obtain.

Beyond your gate, make sure your driveway is uncluttered and at least 12 feet wide. The slope should be less than 10%. Trim any overhanging branches to allow at least 13.5 feet of overhead clearance. Also make sure that any overhead lines are at least 14 feet above the ground. If any lines are hanging too low, contact the appropriate phone, cable, or power company to find out how to address the situation.

If possible, consider a turnaround within your property at least 45 feet wide. This is especially important if your driveway is more than 300 feet in length. Even small fire engines have a hard time turning around and cannot safely enter areas where the only means of escape is by backing out. Any bridges must be designed with the capacity to hold the weight of a fire engine.

## Neighborhood Communication

It is important to talk to your neighbors about the possibility of wildfire in your community. Assume that you will not be able to return home when a fire breaks out and may have to rely on your neighbors for information and assistance. Unfortunately, it sometimes takes tragedy to get people talking to each other. Don't wait for disaster to strike. Strong communication can improve the response and safety of every member of the community.

## Phone Trees

Many neighborhoods use phone trees to keep each other informed of emergencies within and around the community. The primary criticism is that the failure to reach one person high on the tree can cause a breakdown of the system. However, if you have willing and able neighbors, particularly those that are at home during the day, the creation of a well-planned phone tree can often alert residents to the occurrence of a wildfire more quickly than media channels. Talk to your neighborhood association about the possibility of designing an effective phone tree.

## Neighbors in Need of Assistance

Ask mobility-impaired neighbors if they have notified emergency responders of their specific needs. It is also a good idea for willing neighbors to commit to evacuating a mobility-impaired resident in the event of an emergency. Make sure that a line of communication is in place to verify the evacuation.

## Absentee Owners

Absentee owners are often not in communication with their neighbors. If a home near you is unoccupied for large portions of the year, try to get contact information for the owners from other neighbors or your neighborhood association. Your neighbors would probably appreciate notification in the event of an emergency. Also, you may want to contact them to suggest that they move their woodpile or make sure that the propane line to the house is turned off.

## Household Emergency Plan

A household emergency plan does not take much time to develop and will be invaluable in helping your family deal with an emergency safely and calmly. One of the fundamental issues in the event of any type of emergency is communication. Be sure to keep the phone numbers of neighbors with you rather than at home.

It is a good idea to have an out of state contact, such as a family member. When disaster strikes locally, it is often easier to make outgoing calls to a different area code than local calls. Make sure everyone in the family has the contact phone number and understands why they need to check in with that person in the event of an emergency. Also, designate a meeting place for your family. Having an established meeting site helps to ensure that family members know where to go, even if they can't communicate by phone.

## Children

Local schools have policies for evacuation of students during school hours. Contact the school to get information on how the process would take place and where the children would likely go.

The time between when the children arrive home from school and when you return home from work is the most important time frame that you must address. Fire officials must clear residential areas of occupants to protect lives and to allow access for fire engines and water drops from airplanes or helicopters. If your area is evacuated, blockades may prevent you from returning home to collect your children. It is crucial to have a plan with a neighbor for them to pick up your children if evacuation is necessary.

## Pets and Livestock

Some basic questions about pets and livestock involve whether you can evacuate the animals yourself and where you would take them. Planning for the worst-case scenario may save your animals. An estimated 90% of pets left behind in an emergency do not survive. Don't expect emergency service personnel to prioritize your pets in an emergency. Put plans in place to protect your furry family members.

### Pets

Assemble a pet disaster supply kit and keep it handy. The kit should contain a three-day supply of food and water, bowls, a litter box for cats, and a manual can opener if necessary. It is also important to have extra medication and medical records for each pet. The kit should contain a leash for each dog and a carrier for each cat. Carriers of some kind should be ready for birds and exotic pets. In case your pet must be left at a kennel or with a friend, also include an information packet that describes medical conditions, feeding instructions, and behavioral problems. A photo of each pet will help to put the right instructions with the right pet.

In the event of a wildfire you may be prevented from returning home for your animals. Talk to your neighbors and develop a buddy system in case you or your neighbors are not home when fire threatens. Make sure your neighbor has a key and understands what to do with your pets should they need to be evacuated.

If you and your pets were evacuated, where would you go? Contact friends and family in advance to ask whether they would be willing to care for your pets. Contact hotels and motels in the area to find out which ones accept pets. Boarding kennels may also be an option. Make sure your pets' vaccinations are up to date if you plan to board them.

Once you have evacuated your pets, continue to provide for their safety by keeping them cool and hydrated. Try to get your pets to an indoor location rather than leaving them in the car. Do not leave your pets in your vehicle without providing shade and water. It is not necessary to give your pets water while you are driving but be sure to offer water as soon as you reach your destination.

## Livestock

Getting livestock out of harm's way during a wildfire is not easy. You may not be able or allowed to return home to rescue your stock during a wildfire evacuation. Talk to your neighbors about how you intend to deal with an evacuation. If livestock are encountered by emergency responders, they will be released and allowed to escape the fire on their own. Make sure your livestock have some sort of identification. Ideally, your contact information should be included on a halter tag or ear tag so that you could be reached if your animal is encountered.

If you plan to evacuate your livestock, have a plan in place for a destination. Talk to other livestock owners in the area to find out whether they would be willing to board your stock in the event of an emergency. Often in large-scale emergencies, special accommodations can be made at fair and rodeo grounds, but personal arrangements may allow you to respond more quickly and efficiently.

If you do not own a trailer for your horses or other livestock, talk to a neighbor who does. Find out whether they would be willing to assist in the evacuation of your animals. If you do own a trailer, make sure it is in working condition with good, inflated tires and functioning signal lights. Keep in mind that even horses that are accustomed to a trailer may be difficult to load during an emergency. Practicing may be a good idea to make sure your animals are as comfortable as possible when being loaded into the trailer.

## House and Property

Insurance companies suggest that you make a video that scans each room of your house to help document and recall all items within your home. This video can make replacement of your property much easier in the unfortunate event of a large insurance claim. See more information on insurance claims in the "After the Fire" section below.

## Personal Items

During fire season, items you would want to take with you during an evacuation should be kept in one readily accessible location. As an extra precaution, it may be a good idea to store irreplaceable mementos or heirlooms away from your home during fire season.



It is important to make copies of all of your important household paperwork, such as birth certificates, titles, and so forth. Store them away from your home, such as in a safe deposit box. Important documents can also be protected in a designated firesafe storage box within your home.

## IN THE EVENT OF A FIRE

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### Notification

In the event of a wildfire, announcements from the local Emergency Management office will be broadcast over local radio and television stations. Media notification may be in the form of news reports or the Emergency Alert System (EAS). On television, the emergency management message will scroll across the top of the screen on local channels. The notice is not broadcast on non-local satellite and cable channels.

One good way to stay informed about wildfire is to use a National Oceanic and Atmospheric Administration weather alert radio. The radios can be purchased at most stores that carry small appliances, such as Target, Walmart, or Amazon. The radio comes with instructions for the required programming to tune the radio to your local frequency. The programming also determines the types of events for which you want to be alerted. The weather alert radio can be used for any type of large incident (weather, wildfire, hazardous materials, etc.), depending on how it is programmed. Local fire personnel can assist with programming if needed.

### When Fire Threatens

Before an evacuation order is given for your community, there are several steps you can take to make your escape easier and to provide for protection of your home. When evaluating what to do as fire threatens, the most important guideline is: **DO NOT JEOPARDIZE YOUR LIFE.**

Back your car into the garage or park it in an open space facing the direction of escape. Shut the car doors and roll up the windows. Place all valuables that you want to take with you in the vehicle. Leave the keys in the ignition or in another easily accessible location. Open your gate.

Close all windows, doors, and vents, interior doors, and your garage door. Disconnect automatic garage openers. Leave exterior doors unlocked. Move furniture away from windows and sliding glass doors. If you have lightweight curtains, remove them. Heavy curtains, drapes, and blinds should be closed. Leave a light on in each room.

Turn off the propane tank or shut off gas at the meter. Turn off pilot lights on appliances and furnaces.

Move firewood and flammable patio furniture away from the house or into the garage.

Connect garden hoses to all available outdoor faucets and make sure they are in a conspicuous place. Turn the water on to "charge," or fill your hoses and then shut off the water.

Place a ladder up against the side of the home, opposite the direction of the approaching fire, to allow firefighters easy access to your roof.

### Evacuation

When evacuation is ordered, you need to go **immediately**. Evacuation not only protects lives; it also helps to protect property. Some roads are too narrow for two-way traffic, especially with fire engines. Fire

trucks often can't get into an area until the residents are out. Also, arguably the most important tool in the WUI toolbox is aerial attack. Airplanes and helicopters can be used to drop water or retardant to help limit the spread of the fire, but these resources cannot be used until the area has been cleared of civilians.

Expect emergency managers to designate a check-out location for evacuees. This process helps to ensure that everyone is accounted for and informs emergency personnel as to who may be remaining in the community. Every resident should check out at the designated location before proceeding to any established family meeting spot.

A light-colored sheet closed in the front door serves as a signal to emergency responders that your family has safely left. This signal saves firefighters precious time, as it takes 12–15 minutes per house to knock on each door and inform residents of the evacuation.

## AFTER THE FIRE

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### Returning Home

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

Even if the fire did not damage your house, do not expect to return to business as usual immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Have the fire department or utility companies turn the utilities back on once the area is secured.

### Insurance Claims

Your insurance agent is your best source of information as to the actions you must take in order to submit a claim. Here are some things to keep in mind. Your insurance claim process will be much easier if you photographed your home (both inside and outside) and valuable possessions before the fire and kept the photographs in a safe place away from your home. Most if not all of the expenses incurred during the time you are forced to live outside your home could be reimbursable. These could include, for instance, mileage driven, lodging, and meals. Keep all records and receipts. Don't start any repairs or rebuilding without the approval of your claims adjuster. Beware of predatory contractors looking to take advantage of anxious homeowners wanting to rebuild as quickly as possible. Consider all contracts very carefully, take your time to decide, and contact your insurance agent with any questions. If it appears to be a large loss, consider whether you should hire a public adjuster that is licensed by the state department of insurance who will represent and advocate for you as the policyholder in appraising and negotiating the claimant's insurance claim to ensure you get the best outcome and recovery from your insurance company. Most public adjusters charge a small percentage of the settlement that is set by the state and primarily they appraise the damage, prepare an estimate and other claim documentation, read the policy of insurance to determine coverages, and negotiate with the insurance company's claims handler.

You can view a guide on creating a home inventory here: <https://www.iii.org/article/how-create-home-inventory>

## Post-fire Rehabilitation

Homes that may have been saved in the fire may still be at risk from flooding and debris flows. Burned Area Emergency Rehabilitation (BAER) teams are professionals who work to mitigate the effects of post-fire flooding and erosion. These teams often work with limited budgets and manpower. Homeowners can assist the process by implementing treatments on their own properties as well as volunteering on burned public lands to help reduce the threat to valuable resources. Volunteers can assist BAER team members by planting seeds or trees, hand mulching, or helping to construct straw-bale check dams in small drainages.

Volunteers can help protect roads and culverts by conducting storm patrols during storm events. These efforts dramatically reduce the costs of such work as installing trash racks, removing culverts, and re-routing roads.

Community volunteers can also help scientists to better understand the dynamics of the burned area by monitoring rain gauges and monitoring the efficacy of the installed BAER treatments.

## ADDITIONAL LINKS AND RESOURCES

### BERNALILLO COUNTY

- Sign up for emergency notifications here: <https://www.bernco.gov/health-and-public-safety/sign-up-for-emergency-notifications/>
- Wildland Urban Interface Ignition Resistant Construction Manual A guide to smart construction and wildfire mitigation in the Wildland/Urban Interface: [https://www.bernco.gov/fire/wp-content/uploads/sites/74/2021/04/Wildland\\_Urban\\_Interface\\_Manual.pdf](https://www.bernco.gov/fire/wp-content/uploads/sites/74/2021/04/Wildland_Urban_Interface_Manual.pdf)

### CITY OF ALBUQUERQUE

- City of Albuquerque Fire and Rescue; Wildfire Safety: <https://www.cabq.gov/fire/safety-information/wildfire-safety>
  - Includes defensible space, before, during, and after a wildfire, fire prevention, wildland fire action guide, and more

### BERNALILLO COUNTY FIRE & RESCUE (BCFR)

- Fire Prevention Page: <https://www.bernco.gov/fire/fire-prevention/>
  - Includes Home Fire Safety and Prevention Checklist, Fire Safety for People With Disabilities, a WUI Ignition-Resistant Construction Manual, and more.
- Fire Prevention and Safety Helpful Links: <https://www.bernco.gov/fire/helpful-links/>



## NEW MEXICO ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT (EMNRD)

### Home and Fuels Management

- Protecting Your Home From Wildfire: <https://www.emnrd.nm.gov/sfd/protecting-your-home-from-wildfire/>
- Living With Fire – A Homeowner's Guide: <https://www.emnrd.nm.gov/sfd/fire-prevention-programs/>
  - Scroll to the bottom of the page
  - Both English and Spanish versions available
- Defensible Space Guide: [https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui\\_defzone.pdf](https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui_defzone.pdf)

### Preparing for Wildfire

- Ready, Set, Go! - New Mexico Action Guide: <https://www.emnrd.nm.gov/sfd/fire-prevention-programs/>
  - Scroll to the bottom of the page
- Fire Prevention Tips: <https://www.emnrd.nm.gov/sfd/fire-prevention-tips/>

### During the Fire

- Active New Mexico Fire Information: <https://www.emnrd.nm.gov/sfd/fire-prevention-programs/>

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA):

### Protecting Your Home

- Community Wildfire Risk Assessment Tutorial: <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA/Online-learning-opportunities/Community-Wildfire-Risk-Assessment-Tutorial>
- Understanding the Wildfire Threat to Homes: <https://www.nfpa.org/News-and-Research/Publications-and-media/Blogs-Landing-Page/Fire-Break/Blog-Posts/2020/12/08/Interactive-online-resource-helps-build-understanding-of-wildfire-risks>
- Preparing Homes for Wildfire: <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire>
- If your Home Doesn't Ignite, It Can't Burn: <https://www.youtube.com/watch?v=RqKFDDBGd5o>
- How do Homes Burn in a Wildfire? <https://www.youtube.com/watch?v=3QthynXympl>
- Wildfire Community Preparedness Day Toolkit: <https://go.nfpa.org/l/14662/2022-01-11/8j6nqh>

- 5 Key Areas Around the Home You Must Examine When Assessing Wildfire Risk: <https://www.youtube.com/watch?v=MIUQVL3BvVg>
- Your Home and Wildfire, Choices That Make a Difference: <https://www.youtube.com/watch?v=pfbEcMeYFFA>
- 10 Safety Tips: [https://www.nfpa.org/-/media/Files/Public-Education/Resources/Safety-tip-sheets/WildfireRiskReductionSafetyTips.pdf?utm\\_source=hootsuite&utm\\_medium=&utm\\_term=&utm\\_content=&utm\\_campaign=](https://www.nfpa.org/-/media/Files/Public-Education/Resources/Safety-tip-sheets/WildfireRiskReductionSafetyTips.pdf?utm_source=hootsuite&utm_medium=&utm_term=&utm_content=&utm_campaign=)
- Home Hardening Fact Sheets: <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA/Firewise-USA-Resources/Research-Fact-Sheet-Series>

## Preparation and Evacuation

- Wildfire Preparedness Tips: <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Wildfire-safety-tips>
- Wildfire Preparedness for Household Pets: <https://www.nfpa.org/-/media/Files/Public-Education/Campaigns/TakeAction/TakeActionPetsChecklist.pdf>
- Wildfire Preparedness for Horses and Livestock: <https://www.nfpa.org/-/media/Files/Public-Education/Campaigns/TakeAction/TakeActionHorseChecklist.ashx>
- Backpack Emergency GO! Kit: <https://www.nfpa.org/-/media/Files/Public-Education/Campaigns/TakeAction/TakeActionBackPackGoKit.ashx>
- Outthink a Wildfire; Wildfire Action Policies: <https://www.nfpa.org/wildfirepolicy>

## INTERNATIONAL ASSOCIATION OF FIRE CHIEFS (IAFC):

- Ready, Set, Go!: [https://www.wildlandfirersg.org/s/?language=en\\_US](https://www.wildlandfirersg.org/s/?language=en_US)
- Are You Wildfire Ready? [https://www.wildlandfirersg.org/s/are-you-wildfire-ready?language=en\\_US](https://www.wildlandfirersg.org/s/are-you-wildfire-ready?language=en_US)
- What is the WUI? [https://www.wildlandfirersg.org/s/iafc2/what-is-the-wildland-urban-interface-20Y3m0000004Ee8EAE?language=en\\_US](https://www.wildlandfirersg.org/s/iafc2/what-is-the-wildland-urban-interface-20Y3m0000004Ee8EAE?language=en_US)
- Firewise Plant Materials: <https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/FireWisePlantMaterialsNMSU.pdf>
- Seed Mixes to Reduce Wildfire Hazard: [https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui\\_grassmix.pdf](https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui_grassmix.pdf)
- Creating Defensible Space Zones: [https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui\\_defzone.pdf](https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui_defzone.pdf)
- Ember Awareness Checklist: [https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Ember-Awareness-Checklist\\_NMForestryDivision.doc.pdf](https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Ember-Awareness-Checklist_NMForestryDivision.doc.pdf)

## MISCELLANEOUS

- After Wildfire; A Guide for New Mexico Communities: <https://afterwildfirenm.org/>

- A condensed PDF of the guide: <https://afterwildfirenm.org/additional-resources/site-pdfs/pdf-of-condensed-version-of-the-guide/view>
- New Mexico – After the Fire: Resources for Recovery: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nm/home/?cid=stelprdb1261654>
- New Mexico State University; New Mexico Prescribed Fire Council; Resources: <https://nmxfire.nmsu.edu/resources.html>
- Fire Adapted New Mexico; Learning Network: <https://facnm.org/>
- New Mexico Fire Information: <https://nmfireinfo.com/>
- Instructor Guide. The ability to identify, analyze, and use relevant situational information about topographic features can help predict wildland fire behavior is the responsibility of everyone on the fireline: <https://www.nwccg.gov/sites/default/files/training/docs/s-190-ig04.pdf>
- WiRē; Wildfire Research, an interdisciplinary collaboration on community adaptability to wildland fire: <https://wildfireresearchcenter.org/>
- Wildfire Ready App:
  - App Store: <https://apps.apple.com/us/app/wildfire-ready-virtual/id1540773278?msclkid=4eac0069a71411ecb26fa03c0b08eba2>
  - Google Play: <https://play.google.com/store/apps/details?id=com.BaltiVirtual.Wildfire&gl=US&msclkid=4eabc8f6a71411ecbfe27aa64cd6d835>



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# APPENDIX H: Community Outreach

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# PUBLIC OUTREACH

Table H.1 presents examples of the public outreach completed as part of the CWPP development. Due to the COVID-19 pandemic, some gatherings were not permitted, while other meetings were accessible in-person and online. Therefore, online meetings or hybrid meetings (accessible online and in-person) were used to provide information to the public and solicit feedback. Figures H.1 through H.4 show examples of public meeting forums and typical meeting materials distributed to the public.

**Table H.1. Outreach Activities for the Bernalillo County CWPP Update**

Date	Location	Meeting Type	Purpose	URL	Figure Number
11/20/2021	Zoom	Outreach with East Mountain Interagency Fire Protection Association (EMIFPA) (broadcasted to Bernalillo County)	Resident's role in the Bernalillo County CWPP Update	<a href="https://www.youtube.com/watch?app=desktop&amp;v=7bcAcltvQFQ&amp;feature=youtu.be">https://www.youtube.com/watch?app=desktop&amp;v=7bcAcltvQFQ&amp;feature=youtu.be</a>	H.1
2/23/2021	Zoom	Outreach with Bernalillo County	Planning process overview	N/A	N/A
03/18/2022	Zoom	Outreach with High Desert HOA	Describe CWPP implications and recommendations for stakeholders in the High Desert HOA	N/A	N/A
03/26/2022	Zoom	Outreach with EMIFPA (broadcasted to Bernalillo County)	Explain purpose of CWPP, implications for the EMIFPA, and describe initial results	<a href="https://www.youtube.com/watch?app=desktop&amp;v=QfeknS0Gzp8&amp;feature=youtu.be">https://www.youtube.com/watch?app=desktop&amp;v=QfeknS0Gzp8&amp;feature=youtu.be</a>	H.2
05/12/2022 This meeting was cancelled due to staff in the field on fire assignments	Bernalillo County (48 Public School Road, Tijeras)	Wildfire Preparedness Town Hall Meeting	Spring Wildfire Preparedness in the East Mountains	N/A	H.3
6/6/2022	Los Vecinos Community Center; Tijeras, NM	East Mountain Residents Emergency Preparedness RSG! Meeting	Emergency Preparedness	N/A	H.4
N/A	Bernalillo County	N/A	Interactive website where the public can view information related to the CWPP and fire risk	N/A: The Story Map is located within the Bernalillo County website	





Figure H.1. November 2021 Zoom meeting.



Figure H.2. Bernalillo County CWPP outreach with EMIFPA.

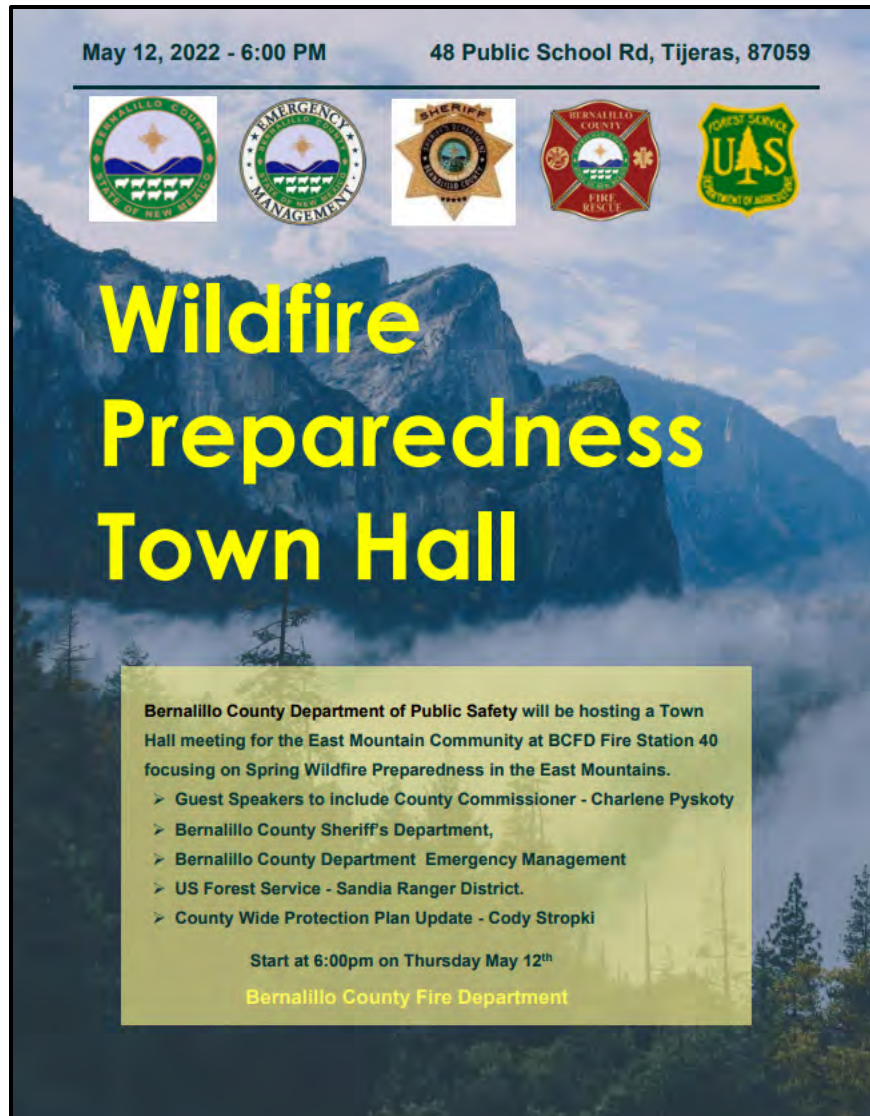


Figure H.3. Flyer for the May 12th Wildfire Preparedness event.

**East Mountain Residents Emergency Preparedness**

**Ready, Set, Go! Information Meeting**

*Los Vecinos Community Center; Tijeras, NM*  
*Monday, June 6, 2022; 5:00 pm – 7:00 pm*  
*Hosted by Bernalillo County*

**Introductions:** All participating Agencies, Departments  
**County Commissioner:** Charlene Pyskoty

**What you need to get READY:** Bernalillo County Emergency Management  
**How residents get SET:** Bernalillo County Fire Department  
**What happens when residents GO:** Bernalillo County Sheriff

These agencies and departments will have representatives to provide information and answer your questions:

- Bernalillo County Office of Emergency Management
- Bernalillo County Fire Department
- Bernalillo County Sheriff's Office
- Bernalillo County Animal Care and Resource Center
- Village of Tijeras
- Bernalillo County Parks, Recreation, and Open Space Department
- Bernalillo County Emergency Communications
- Bernalillo County Behavioral Health Services
- USDA Forest Service – Sandia Ranger District
- New Mexico State Forestry – Bernalillo District
- Ciudad Soil and Water Conservation District
- SWCA Environmental Consultants – Countywide Protection Plan
- East Mountain Interagency Fire Protection Association - EMIFPA

Figure H.4. Flyer for the June 6th emergency preparedness event.

## COMMUNITY SURVEY RESULTS

In total, 40 responses were received from the community surveys. Most of the responses came from the communities of Sandia Knolls (30%), Paa-Ko (12.5%), Sandia Heights (7.5%), and Tranquillo Pines (7.5%). Out of all respondents, only one (2.5%) rated their house as low risk from wildfire, while 23 respondents (57.5%) rated their house as high risk from wildfire. Top concerns for all respondents included fuels surrounding their property, building materials, accessibility issues, inadequate water supply, and ignition sources from neighboring areas. Half of all respondents rated their community as poorly prepared for a wildfire, while 45% of respondents rated their community as moderately prepared, and 5% of respondents rated their community as well prepared. The biggest challenges that respondents face with respect to making their homes fire safe are 1) financial burden of implementing mitigation measures and maintenance; 2) time; and 3) not knowing what to do. Lastly, respondents expressed interest in obtaining funding for the following mitigation actions: 1) green waste disposal; 2) timber/fuel treatments on private land; 3) water supply improvements; and 4) wildfire prevention education.



# STORY MAP

Bernalillo County developed the CWPP story map (online content) to accommodate engagement with the public. The story map provides opportunities for both information sharing and gathering between the public and the Core Team. The story map has several tabs, each demonstrating information from various chapters in the CWPP document. The introductory tab presents the purpose of the story map, project history, instructions for navigating the content, and the National Cohesive Wildland Fire Management Strategy framework (Figure H.5). Next, the public involvement tab invites viewers to view outreach materials and scheduled events (Figure H.6). The fire environment, values at risk, WUI hazard and Composite Risk-Hazard Assessment, mitigation strategies, and monitoring and evaluation strategies tabs present the bulk of the CWPP content (Figures H.7–H.9). These tabs introduce the WUI concept, fire regimes and fire history in the County, information regarding County fire planning and response, County values at risk from wildfire, areas with high versus low risk, wildfire mitigation actions, and monitoring strategies for applied treatments.

The story map also links the viewer to the CWPP document and contact information for the contractor planning team. Figure H.5 demonstrates the spatial information that is conveyed through the story map. Each map is interactive, with several clickable layers providing information on numerous aspects of wildfire, including but not limited to communities in high-risk areas, vegetation and fuels, current mitigation projects, and fire behavior.

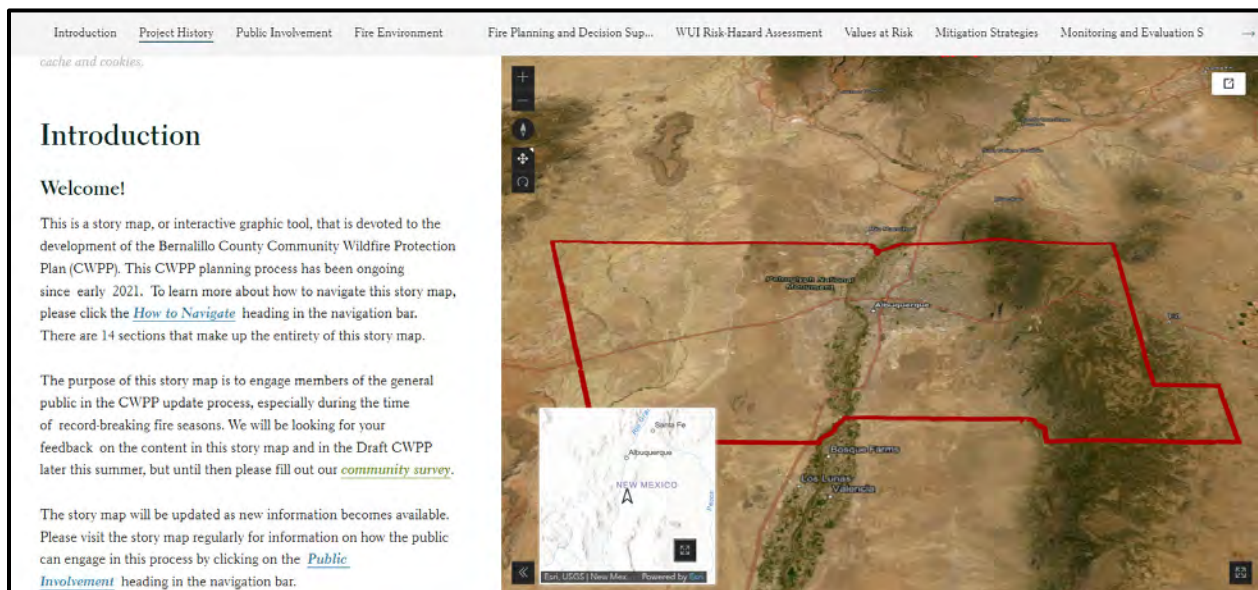


Figure H.5. CWPP story map introduction tab sample.

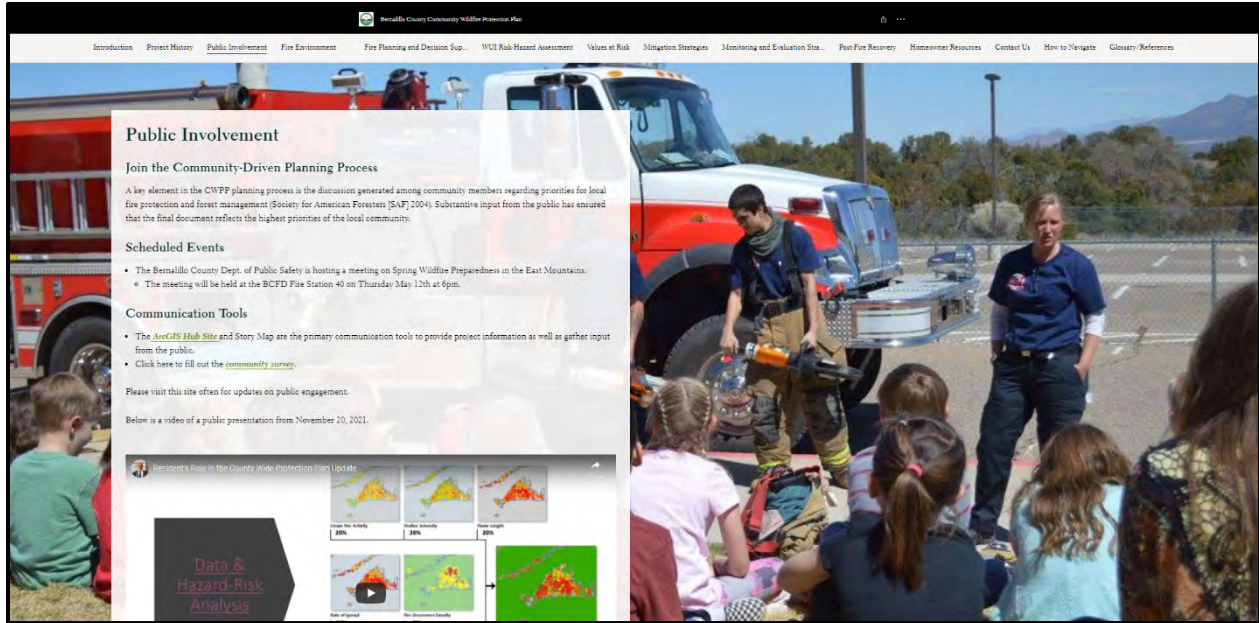


Figure H.6. Story map public involvement tab.

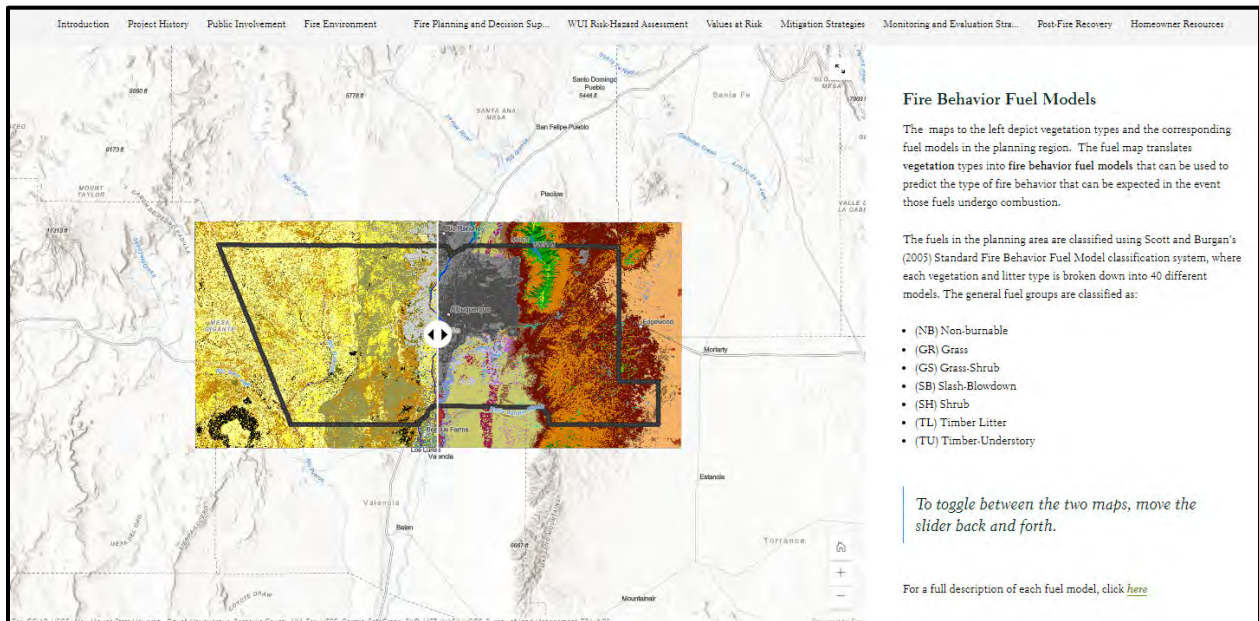


Figure H.7. Story map fire behavior fuel models sample.



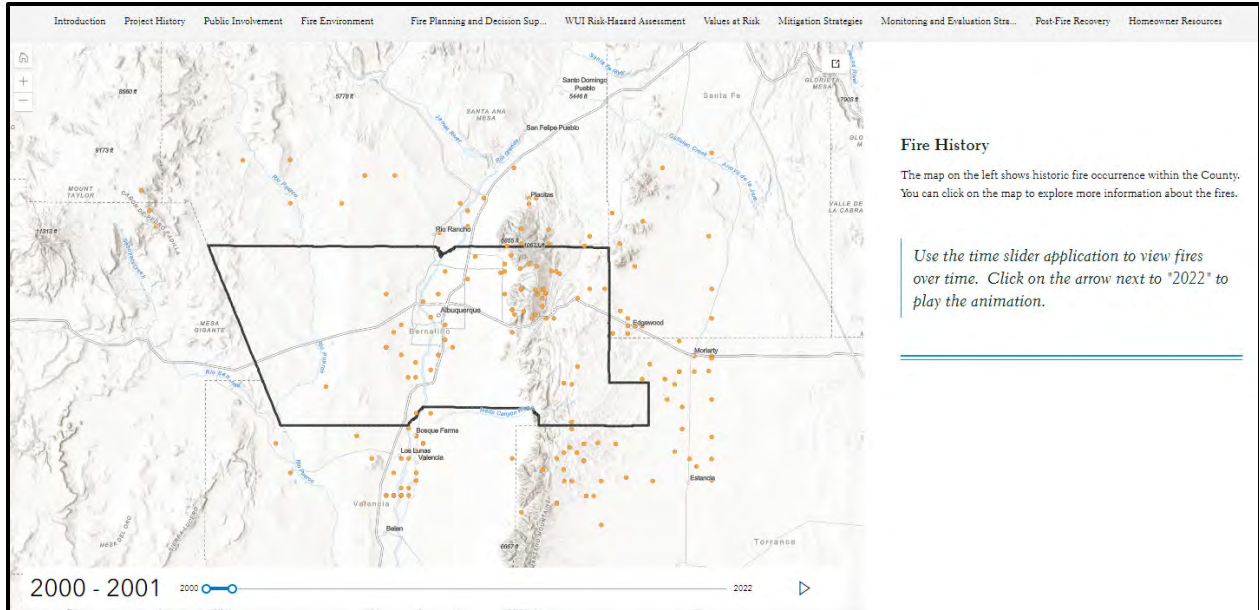


Figure H.8. Story map fire history tab sample.

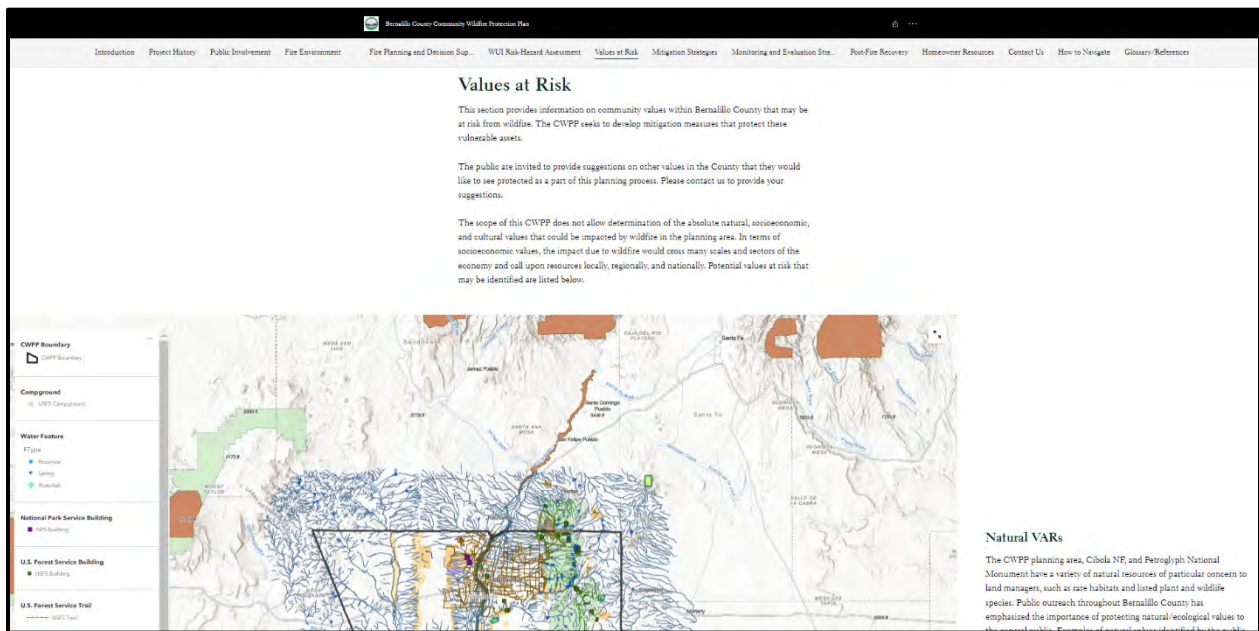


Figure H.9. Story Map Values at Risk tab.

The story map tool allowed the project team to assess the number of views per day. Figure H.10 shows the average number of views per day and related graphical information. The number of views from May 23, 2022, through June 21, 2022 (the public review period) was 416, and the average number of views per day was just over 14.



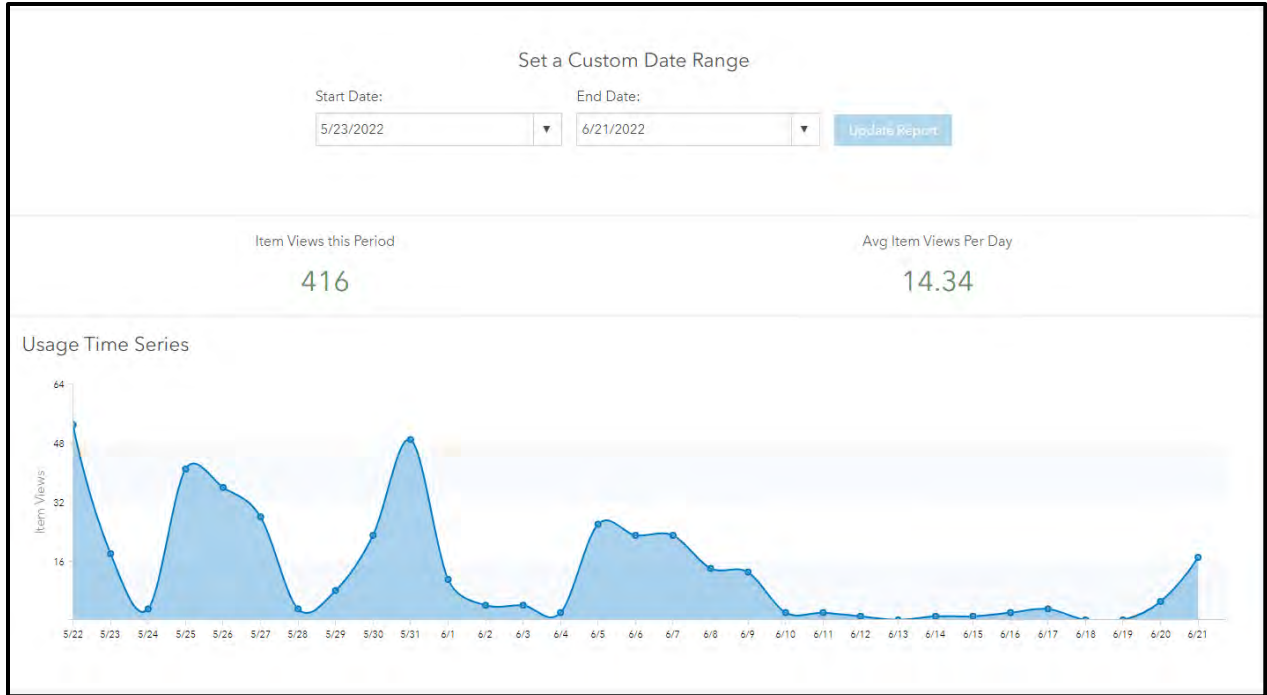


Figure H.10. Story map views from May 23, 2022, through June 21, 2022.

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# APPENDIX I: Project Recommendations

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**Table I.1. Recommendations to Create Resilient Landscapes (Fuel Treatments)**

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
1		H	Spring 2023	Identify needed road maintenance and strategic road buffers	Highest risk roadways as identified in the risk assessment Pajarita Mesa Recreation areas	County, State, Interstate	<p><u>Roadway improvements:</u></p> <ul style="list-style-type: none"> <li>While increasing roadway width may not be feasible in many locations, creation of passing areas where possible should be prioritized</li> <li>Utilize roadway improvements as recreationalist ingress/egress in case of emergency (aligns with 2020 New Mexico Forest Action Plan)</li> <li>Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing)</li> <li>Install proper signage and turn around points where appropriate.</li> </ul> <p><u>Road and Utility right-of-way vegetation improvements:</u></p> <ul style="list-style-type: none"> <li>Frequent maintenance of right-of-way/hazardous fuels reduction (aligns with 2020 New Mexico Forest Action Plan)                             <ul style="list-style-type: none"> <li>Treat surface fuels for a minimum of 10-foot buffer and up to 30 feet where possible</li> <li>Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles</li> <li>Control for invasive species that may contribute to rapid fire spread (i.e., weeds and grasses).</li> </ul> </li> <li>Establish partnership between utilities and NMFD to assist with collaborative efforts for vegetation management and other risk reduction measures along utility right-of-way (goal from 2020 New Mexico Forest Action Plan).</li> <li>Develop and implement vegetation management plans along rights-of-way (goal of 2020 New Mexico Forest Action Plan).</li> </ul>	Provides for safe and effective wildfire response capabilities. Creates a strategic fuel break along roadways to create potential fire break.	Regular maintenance needed to ensure the roads are drivable for emergency response vehicles.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Building Resilient Infrastructure and Communities (BRIC)</li> <li>Firewise Grants</li> <li>National Fire Plan (NFP) Grants</li> <li>2022 Infrastructure Investments and Jobs Act</li> </ul>
2		H	Spring 2023	Protect rare species habitats (aligns with 2020 New Mexico Forest Action Plan) and reduce invasives	County and adjacent state and federal lands (public and private)	County, State, Federal	<ul style="list-style-type: none"> <li>Work with land management agencies to ensure all fuels treatments are aligned with environmental regulations relating to protection of sensitive species.                             <ul style="list-style-type: none"> <li>When treating in the bosque, follow BMPs for preservation of SWFL and YBCC habitat including preservation of dense riparian buffer and focusing treatments on removal of ladder fuels that comprise non-native species.</li> </ul> </li> <li>Incorporate prescribed burns and/or cultural burns where appropriate to restore habitat and defend against invasives.</li> <li>Be mindful of treatment types as some (such as mowing) may increase invasive presence</li> </ul>	Balance the reduction of hazardous fuels with the protection of highly sensitive resources.	Monitor accomplishments in addressing species protections while reducing wildfire risk.	<ul style="list-style-type: none"> <li>The Forest and Watershed Restoration Act (FAWRA)</li> <li>2022 Infrastructure Investments and Jobs Act</li> <li>Environmental Quality Incentives Program (EQIP)</li> <li>Leonardo DiCaprio Foundation Grants</li> </ul>
3		H	Spring 2023	Integrate wildfire management with meeting other resource management objectives	State and Public Lands	County, Federal Agencies	<ul style="list-style-type: none"> <li>Leverage the information from the development of the CWPP and the HMP to combine fuel reduction and habitat restoration projects.</li> <li>Maximize funding sources through integrating fuel projects with other land management goals, including ecological restoration, habitat improvements and recreation. This includes water quality and erosion maintenance, in addition to maintaining wildlife corridors.</li> <li>Utilize the Good Neighbor Authority, as appropriate, to facilitate cross-boundary actions.</li> </ul>	Restore degraded landscapes to build a more resilient fire environment.	Periodically review accomplishments in reducing hazardous fuels and success at meeting other resource management objectives.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>FAWRA</li> <li>EQIP</li> <li>Leonardo DiCaprio Foundation Grants</li> </ul>
4		H	Spring 2023	Collaborate with local HOAs or community associations (aligns with New Mexico Forest Action Plan) to develop fuel break measures and associated access improvements for increased community protection	Bernalillo County (all lands) Four Hills Prioritize highest risk areas as identified in the risk assessment.	Private, County	<ul style="list-style-type: none"> <li>To ensure defensible space in WUI will be maintained, require property owners and HOAs to establish sufficient structure clearance around all structures.</li> <li>Work with HOAs to identify needed access improvements.</li> </ul>	Create resilient landscapes and address potential for extreme wildfire behavior in and around communities. Create and maintain accountability with local landowners.	Carry out a 2-year review of accomplishments in improving defensible space. Repeat NFPA1144 assessments every 2-3 years to document improvements in defensible space.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> <li>Firewise grants</li> <li>State Farm Good Neighbor Citizenship (GNC) Grants</li> <li>NFP</li> <li>Fire Management Assistance Grant (FMAG)</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
5		H	Winter 2022/ Spring 2023	Consider use of prescribed burning and/or cultural burning where appropriate	Bernalillo County Grasslands	Fire Department, Federal Agencies	<ul style="list-style-type: none"> <li>Utilize prescribed burn planning that follows agency and regulator protocols.</li> <li>Closely follow plan prescriptions.</li> <li>Utilize prescribed burn program to provide training for local fire department personnel and volunteers.</li> <li>Implement prescribed fire within the WUI where possible</li> <li>Use findings to identify priority areas to facilitate ecologically appropriate fire reintroduction (goal from 2020 New Mexico Forest Action Plan).</li> </ul>	<p>Protect communities and infrastructure by reducing fuel loads.</p> <p>Increase capacity and training for fire departments.</p> <p>Restore/maintain habitat.</p>	<p>Carry out inventory each year of number and acreage of prescribed fire completed.</p> <p>Collaboratively set goals for upcoming year.</p> <p>Establish training needs and funding.</p>	<ul style="list-style-type: none"> <li>FAWRA</li> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Access to Ancestral Lands Grant (AALG)</li> <li>RCP</li> </ul>
6		H	Fall/ Winter 2022	Identify mitigation projects within areas of high exposure potential	Bernalillo County (all lands) Prioritize highest risk areas as identified in the risk assessment and priority landscapes	County, State	<ul style="list-style-type: none"> <li>Encourage the development and implementation of long-term, cost-effective, and environmentally sound mitigation projects (Goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan)</li> <li>Utilize the fire behavior modeling to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire fighters could more safely suppress future wildfire.</li> </ul> <p>Focus on the following treatments:</p> <ul style="list-style-type: none"> <li>Remove ladder fuels to reduce the potential for surface to canopy continuity and extreme fire behavior.</li> <li>Carry out understory vegetation management to minimize horizontal continuity.</li> <li>Treat small patches of land tucked into residential areas.</li> <li>Create mosaics of vegetation types and stand ages to reduce horizontal and vertical continuity of vegetation to limit fire spread.</li> <li>Prepare to treat fine fuels that establish in fuel treatment areas.</li> <li>Preferentially treat hazardous fuel types first- e.g., cheatgrass, Russian olive, salt cedar.</li> </ul>	<p>Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential (aligns with 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</p> <p>Consider a full tool kit of mitigation measures.</p>	<p>Carry out a 2-year review of accomplishments in reducing hazardous fuels.</p> <p>Calibrate fuel model based on treatment effectiveness at altering fuel loading.</p> <p>Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.</p>	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>HMGP</li> <li>FMAG</li> <li>Regional Catastrophic Preparedness Grants (RCP)</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> </ul>
7		H	Summer/ Fall 2022	Implement fuel reduction projects within/around the WUI and high-risk communities (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan)	Bernalillo County (all lands)	All agencies	<ul style="list-style-type: none"> <li>Utilize multi-agency coordination to develop a long-term fuel reduction/vegetation management strategic plan, including monitoring and maintenance (aligns with 2020 New Mexico Forest Action Plan)</li> <li>Break down plans into focus areas/high-risk communities</li> <li>Utilize thinning and prescribed burns (where appropriate) to reduce fuel load in high-risk areas</li> <li>Implement and maintain shaded fuel breaks and reduce ladder fuels</li> <li>Aim for 300-foot shaded fuel breaks around communities</li> <li>Remove brush piles prior to fire season</li> <li>Target vacant lots with accumulating vegetation</li> <li>Reduce fuel continuity where appropriate, focusing on high-risk areas and the WUI</li> <li>Utilize the Good Neighbor Authority, as appropriate, to facilitate cross-boundary actions.</li> <li>Reduce fuel loads in riparian areas (goal from 2020 New Mexico Forest Action Plan)</li> </ul>	<p>Reduce the risk of wildfire within the built environment.</p> <p>Reduce the risk of home and structure ignitions.</p> <p>Reduce the potential for crown fires.</p>	<p>Long-term multi-agency coordination and planning.</p> <p>Regular vegetation maintenance.</p>	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> <li>Firewise grants</li> <li>U.S. Endowment for Forestry and Communities</li> <li>NFP</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
8		M	Winter 2022/ Spring 2023	Improve and maintain existing fuel breaks and potential fire containment features	Bernalillo County (all lands) Highest risk areas as identified in the risk assessment	County, State, Federal	<p>Strategic placement of fuel breaks will help to limit the spread of wildland fire and increase access to difficult areas. Fuel break prescriptions should be site specific depending on the fuel type, topography, soils, adjacent land management practices and environmental regulations (NEPA). The prescriptions will incorporate the use of best management practices for habitat protection (i.e., protection of vulnerable species and habitat and prevention of invasive species).</p> <ul style="list-style-type: none"> <li>Look for opportunities to develop and/or increase fire breaks to double as access within the WUI or difficult to access areas and look for opportunities to widen some public trails, especially those running along ridgelines, to better serve as fuel breaks/fire access roads on lands adjacent to WUI.                             <ul style="list-style-type: none"> <li>Work with Open Space to ensure road/trail widening in recreation areas have proper signage or ropes to prevent users from misusing the safety zones.</li> </ul> </li> <li>Bury all power lines in Bernalillo County to reduce the incident of a downed tree hitting a power line or ice affecting lines. New development in the City is required to bury power lines (except high-voltage lines) (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).                             <ul style="list-style-type: none"> <li>Maintain fuel breaks under high tension power lines not buried. Work must only be carried out in full coordination and conjunction with utility providers and must be within parameters established under agency right-of-way agreements.</li> <li>Trim trees along roadways to prevent interference with power lines during high winds and winter storms (The Public Service Company of New Mexico [PNM] does this through a contract) (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> </ul> </li> <li>Encourage clearance of an additional width when possible.</li> <li>Create additional buffer zones between existing development and the forest, ensuring fire suppression access. Maintain existing fire breaks and buffers (<i>Figure 4.1, map of existing and planned fuel treatments</i>).</li> <li>Work with adjacent landowners to develop internal capacity to help enhance fire access-through road and trail improvements on those lands.</li> </ul>	<p>Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures.</p> <p>Create a fuel arrangement unlikely to support crown fire.</p> <p>Ensure the protection of vulnerable ecosystems and values at risk.</p>	<p>Regular maintenance needed to ensure the fuel break remains clear of vegetation.</p> <p>Monitor for invasive species.</p> <p>Continued management of fire breaks maintained by grazing, brush breaking, controlled burns.</p>	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>National Forest Foundation (NFF); Innovative Finance for National Forests Grant Program</li> <li>BRIC</li> <li>Firewise Grants</li> <li>NFP</li> </ul>
9		M	Winter 2023	Increase capacity to complete and maintain needed hazardous fuels projects across multiple jurisdictions	County and adjacent state and federal lands (public and private)	County, State, Federal, Soil and Water Conservation Districts such as Sandia Collaborative, Estancia Basin Watershed Health, and Restoration Monitoring Group	<ul style="list-style-type: none"> <li>Collaboratively identify vegetation and fuels management needs based on the risk/hazard assessment (aligns with 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan)</li> <li>Develop equipment needs to accomplish work (including maintenance) and seek funding for purchase.</li> <li>Create an educational tool/resource for land /property owners re: various methods, techniques, and cost for various fuel treatments. Utilize Appendix G, homeowner resources (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Cultivate and support partnerships with NGOs and volunteer groups to support implementation of projects (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Collaborate with federal agencies to create long-term implementation and monitoring plans (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Utilize the Good Neighbor Authority, as appropriate, to facilitate cross-boundary actions.</li> </ul>	<p>Create resilient landscapes and address potential for extreme wildfire behavior in and around the WUI.</p> <p>Create and maintain accountability with local landowners.</p>	<p>Set up a standing multi-agency meeting every fall to review accomplishments and address future needs.</p>	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>GSA Federal Excess Personal Property (FEPP)</li> <li>Firewise Grants</li> <li>BRIC</li> <li>RCP</li> </ul>



**Table I.2. Recommendations for Creating Fire-Adapted Communities (Public Education and Reducing Structural Ignitability)**

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
1		H	Fall/winter 2022	Identify vulnerable populations located in the WUI	Bernalillo County (all lands) Prioritize high-risk areas: East mountains in general, specifically: Chilili, High Desert, Pajarita Mesa, Four Hills	Fire Department, HOA's, community leaders	<ul style="list-style-type: none"> <li>The County needs to identify vulnerable populations (elderly, disabled, low income) who may need additional help to mitigate home hazards and to evacuate during a wildfire.</li> <li>Seek grant opportunities to support assistance for vulnerable populations.</li> </ul>	Protect life and property of the most vulnerable members of the community.	Annual review of number of actions taken to address vulnerable populations	<ul style="list-style-type: none"> <li>BRIC</li> <li>Firewise grants</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> </ul>
2		H	Fall/winter 2022	Educate the public on how to mitigate risk and damage from wildfire and other natural hazards (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan)	Bernalillo County (all lands) Prioritize highest threat areas as identified in the risk assessment	Fire Department, HOA, Los Rancheros Citizen Corps Program, Private Landowners	<ul style="list-style-type: none"> <li>Increase education through community training classes as well as YouTube videos on defensible space, fire safe landscaping, structural hardening components, and WUI building construction requirements.</li> <li>Create/distribute wildfire and natural hazard education documents, including topics such as home hardening, defensible space, how wildfire spreads, impacts of disaster, mitigation opportunities, preparation needs, etc.</li> <li>Distribute a list of mitigation actions broken down by cost.</li> <li>Utilize Appendix G of the CWPP: Homeowner Resources</li> <li>Create/distribute education material on evacuations. Promote the BCFR wildfire preparedness webpage.</li> <li>Implement youth fire prevention programs (can work with camps, schools, clubs, etc.)</li> <li>Use existing signage                             <ul style="list-style-type: none"> <li>Spread seasonally adjusted fire prevention messages along highways and in public open space areas to reduce human ignitions and promote defensible space.</li> <li>Promote the use of existing electronic signs at firehouses and other locales to display fire prevention information, safety messages, and fire danger ratings linked to safety actions.</li> <li>Add signage in bosque areas that have frequent ignitions.</li> </ul> </li> <li>Increase Firewise/Ready, Set, GO! Workshops                             <ul style="list-style-type: none"> <li>Offer hands-on workshops to highlight individual home vulnerabilities and how-to techniques to reduce ignitability of common structural elements.</li> <li>Home assessments conducted in a neighborhood often include groups of neighbors participating with the assessor to learn from each other's homes. Homeowners get a better understanding by viewing a home other than their own and feel more comfortable asking questions as a group.</li> <li>Assessments and workshops can be requested by an HOA.</li> <li>Utilize a train-the-trainer model. Develop a team of trained citizens that could perform hazard assessments within their community. Seek funding to pay volunteer fire departments to assist.</li> <li>Provide educational resources during assessments.</li> </ul> </li> </ul>	Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.  Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fires.	Yearly updates to materials. Annual review of number of events implemented.  Set goals for the following year.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>The Fire Prevention and Safety Grants (FP&amp;S)</li> <li>Environmental Protection Agency (EPA) - Environmental Education Grants</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
3	Ongoing	H	Fall/winter 2022	Implement community events and foster a positive fire culture (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan)	Bernalillo County (all lands) Focus on highest threat areas as identified in the risk assessment and populations at risk	Fire Department, Community Service Groups.	<ul style="list-style-type: none"> <li>Host County chipper program or chipper days, community cleanup days, community awareness and preparation events, etc.</li> <li>A community-led day of yard cleanup with fire mitigation in mind may encourage large numbers within the community to carry out mitigation measures and implement defensible space.</li> <li>Residents should assist elderly, disabled, or vulnerable residents.</li> <li>Hold a community gardening event with volunteers – construct a firesafe demonstration garden or home landscaping for the public to view.</li> <li>Aim to draw all populations, especially those at risk. Ensure that all interactions result in follow up engagement by collecting contact information for residents interested in action.</li> </ul>	Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.	Annual review of number of events implemented. Set goals for next year.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>FP&amp;S</li> </ul>
4		H	Spring 2022	Improve/increase enforcement of Defensible Space Standards	Bernalillo County (all lands) Prioritize high-risk areas identified in the risk assessment	Fire Department, County, HOAs, Private landowners	<ul style="list-style-type: none"> <li>Defensible Space                             <ul style="list-style-type: none"> <li>A professional assessment would help identify the most critical actions that an individual could take.</li> <li>Assessments could also include marking trees and shrubs suggested for removal.</li> <li>Implement annual vegetation and defensible space inspections</li> <li>Host inspections to twice a year. Include pre-determined inspection schedule.</li> <li>Develop staffing plan to support enforcement and seek funding to implement the plan.</li> <li>Provide tax incentives for defensible space actions.</li> <li>Work with insurance companies to determine the potential to provide incentives for defensible space associated with reduced insurance premiums.</li> <li>Increase green waste pickup/disposal options.</li> </ul> </li> <li>Fire/WUI Code                             <ul style="list-style-type: none"> <li>Use education campaign to encourage WUI code actions even for those properties that are not required to adhere to it.</li> <li>Leverage recommendations in the County HMP (page 5-1) and the work of the New Mexico Fire Planning Task Force (NM-FPT) to build support to further implement regulatory mitigation measures for land use planning.</li> </ul> </li> </ul>	Reduce loss of life and structures through defensible space. Reduce wildfire risk through greater adoption of Firewise and structure hardening measures. Reduce risk of home ignitions. Empower homeowners to take the most effective actions.	Conduct on-site inspections with owners; identify and mark trees or shrubs for removal within the 100-foot safety zone. Develop a community task force to carry out assessments of properties. Annual program evaluation and updates as necessary.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Firewise grants</li> <li>EPA Environmental Education Grants</li> <li>FP&amp;S</li> </ul>
5		H	Spring 2023	Increase Structural Hardening through enforcement of the IWUI Code	Bernalillo County (all lands) Prioritize high-risk areas as identified in the Risk Assessment	Fire Department, Prevention and Community Development, HOAs	<ul style="list-style-type: none"> <li>Develop and distribute educational materials and resources on the importance of home hardening and how wildfires may ignite homes.</li> <li>Develop and distribute information regarding topography, slope, vegetation, and how it all impacts a home's risk level and defensible space needs.</li> <li>Continue to develop and adopt the latest building standards and codes.</li> <li>Retrofit existing structures, both public and private.</li> <li>Research and utilize new law to help with retrofits.</li> <li>Develop a home inspection program which includes information on risk reduction.</li> <li>Opportunities for tax breaks to harden your home.</li> <li>Send surveys to homeowners to inform the Fire Department and other groups about public perceptions of risk, as well as priority areas in which to focus efforts.</li> <li>Open up a line of dialogue between the fire department and residents regarding actions they can take to reduce their wildfire risk.</li> <li>Remove dilapidated or condemned structures.</li> </ul>	Reduce wildfire risk and loss of structures through home hardening and community education.	Annual updates to standards as necessary.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>FP&amp;S</li> <li>EPA Environmental Education Grants</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
6		H	Winter 2022	Improve agency coordination of outreach	Bernalillo County (all lands)	All agencies, Insurance Brokers	<ul style="list-style-type: none"> <li>Agency coordinated meeting to ensure a consistent message.</li> <li>Implement a platform for raising cross-boundary issues.</li> <li>Engaging insurance agency in dialogue.</li> <li>Provide incentives for mitigation actions.</li> <li>Create a one-stop-shop for landowner assistance programs in regard to mitigation (aligns with 2020 New Mexico Forest Action Plan).</li> </ul>	<p>Provides a consistent message regarding wildfire activity, fire prevention goals, actions for homeowners.</p> <p>Reduce redundancy and improve efficiency.</p>	Annual agency coordination meeting to assess priorities and action items.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Firewise grants</li> <li>Regional Catastrophic Preparedness (RCP) Grants</li> <li>Emergency Management Performance Grant (EMPG)</li> </ul>
7		H	Winter 2022/ Spring 2023	Implement strategically placed safety zones or temporary refuge areas	Communities with difficult egress, either due to large population funneling or poor road conditions	All agencies	<ul style="list-style-type: none"> <li>Utilize the CWPP risk assessment to identify areas within communities that may have lower potential for extreme fire behavior and could serve as a refuge in emergency situations.</li> <li>Develop fire-safety zones for emergency refuge/shelter.</li> <li>Utilize areas such as parking lots or school yards.</li> <li>Implement extreme defensible space, potentially including fire breaks around the safe zone.</li> <li>May utilize this area as a living example of fire-resistant landscaping.</li> </ul>	<p>Protect lives when egress routes have become blocked.</p> <p>Provide safe zones for firefighters.</p>	Regular maintenance of safe zones.	<ul style="list-style-type: none"> <li>BRIC</li> <li>Hazard Mitigation Grant Program (HMGP)</li> <li>RCP Grants</li> </ul>
8		M	Spring 2023	Identify priority ignition concerns	High risk areas	Public agencies, Fire Department, Department of Emergency Management	<p>Utilize fire history data to identify areas with frequent fire starts and develop strategy to reduce incidence of ignitions. Convene a working group to develop strategies to reduce human starts:</p> <ul style="list-style-type: none"> <li>Education campaign</li> <li>Signage</li> <li>Fire response plans</li> <li>Law enforcement</li> <li>Bosque ignitions related to homeless population</li> </ul>	<p>Reduce unnecessary ignition through unlawful or irresponsible behavior.</p>	<p>Annual evaluation of priority ignition concerns.</p> <p>5-year rerun of risk assessment to determine success in mitigating hazards.</p> <p>Review fire history data on a 2-year frequency to monitor trends.</p>	<ul style="list-style-type: none"> <li>Building Resilient Infrastructure and Communities (BRIC)</li> <li>Firewise grants</li> <li>National Urban and Community Forestry Challenge Cost Share Grant Program</li> </ul>
9		M	Spring 2024	Implement Fire Safe Campground/Tourist hubs (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan)	Bernalillo County National Forest lands	County, Federal Agencies	<ul style="list-style-type: none"> <li>Provide firesafe structures at campgrounds/recreational areas.</li> <li>Host/distribute wildfire educational resources at all major campgrounds/recreational areas.</li> <li>Provide real-life examples of defensible space around campground/recreational structures.</li> <li>Install signage identifying firesafe landscaping, construction materials, and defensible space zones.</li> <li>Educate the public on wildfire-safe recreation activities, including when it is safe to recreate and when it is not, depending on fire risk (goal from 2020 New Mexico Forest Action Plan).</li> <li>Advertise sustainable recreation activities (goal from 2020 New Mexico Forest Action Plan).</li> </ul>	<p>Reduce wildfire risk within recreation areas.</p> <p>Promote wildfire awareness and education.</p> <p>Provide tangible examples of risk reduction work.</p>	<p>Vegetation and sign maintenance.</p> <p>Yearly updates to educational materials.</p>	<ul style="list-style-type: none"> <li>Firewise grants</li> <li>FP&amp;S</li> <li>RCP</li> <li>BRIC</li> </ul>
10		M	Winter 2023 or 2024	Increase staffing to address wildfire mitigation workload	Prioritize understaffed programs that provide the most impact.	Fire Department, County Administration and Finance	<ul style="list-style-type: none"> <li>Establish fuels mitigation crew.</li> <li>Pursue continuous and repeat interactions with residents.</li> <li>Utilize inmate crews as appropriate.</li> </ul>	Reduce wildfire risk through greater capacity in the County for wildfire projects.	Annual assessment of capacity needs.	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>Funding for Fire Departments and First Responders</li> <li>RCP</li> <li>EMPG</li> <li>BRIC</li> </ul>
11		M	Spring 2023	Improve engagement and sustainability of mitigation actions by residents	Focus on highest threat areas as identified in the risk assessment	All agencies	<p>To encourage engagement in mitigation actions and sustain engagement, entities should:</p> <ul style="list-style-type: none"> <li>Provide recognition and incentives</li> <li>Assist and facilitate actions by providing services for treating and removing slash</li> <li>Identify barriers to engagement and address</li> <li>Track progress and identify areas requiring support</li> </ul>	<p>Increase sustainability for mitigation actions and combat fatigue amongst residents.</p>	<p>Annual evaluation of program effectiveness and updates as necessary.</p> <p>Accomplishment tracking through an interactive online tracking system.</p> <p>Regularly update content to keep messaging fresh and relevant.</p>	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>BRIC</li> <li>Firewise grants</li> <li>EPA Environmental Education Grants</li> <li>FP&amp;S</li> </ul>



Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
12		M	2023	Integrate CWPP components/findings into new planning documents	Bernalillo County (all lands)	Fire Department, Emergency Management Department	Review relevant existing planning documents and, where applicable, incorporate CWPP findings and components during planning document updates.	Incorporate wildfire planning into broader-scale emergency management planning for the County.	Yearly updates to materials.	<ul style="list-style-type: none"> <li>New Mexico Association of Counties: Wildfire Risk Reduction Program</li> <li>Firewise grants</li> <li>FP&amp;S</li> <li>BRIC</li> <li>HMGP</li> </ul>

**Table I.3. Recommendations for Safe and Effective Wildfire Response**

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
1		H	Spring 2023	Increase/improve water supply for fire suppression	Bernalillo County Initially focus on areas of highest wildfire hazard as determined in the risk assessment and areas with limited water pressure or no existing water supply	Fire Department, All agencies	<ul style="list-style-type: none"> <li>Install water tanks where feasible. In locations water tanks cannot be installed, have tanks filled and pre-loaded to be transported to areas of need in the event of a fire.</li> <li>Install additional tanks and standpipes</li> <li>Install helicopter dip tanks where appropriate</li> <li>Initiate a detailed study of feasible locations for water development improvements. Fire Hydrant with solid fill</li> <li>Install hand pumps or other methods independent of the grid for accessing private well water</li> <li>Ensure suppression crews have the appropriate "keys" for hydrants or standardized water fittings</li> </ul>	<p>Improve fire-fighting response if water is more readily available or closest locations could be identified on a GIS map on a tablet/computer.</p> <p>Alleviates public and agency concern for limited water supply in some WUI areas.</p>	<p>Convene annually</p> <p>Document number of meetings held</p> <p>Document number of actions taken</p>	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>Firewise grants</li> <li>BRIC</li> <li>RCP</li> </ul>
2		H	Winter 2022	Enhance emergency notification and information dissemination capabilities	Bernalillo County (all lands)	Fire Department, Emergency Management, State	<ul style="list-style-type: none"> <li>Build on current emergency notification and information dissemination capabilities to ensure redundant and alternate means of alerting the public.                             <ul style="list-style-type: none"> <li>Improve reverse 911 system</li> <li>Leverage emerging County wide system</li> <li>Ensure ability to notify all mobile devices</li> </ul> </li> <li>Install a County-wide siren system (similar to a tornado siren) to notify those the electronic system may not reach</li> </ul>	<p>Alert the public to emergencies, spread information about ongoing incidents.</p> <p>Improve situational awareness and community safety.</p>	<p>Annual review of effectiveness</p> <p>Post-incident lessons learned</p>	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>Building Resilient Infrastructure and Communities (BRIC)</li> <li>Emergency Management Performance Grant (EMPG)</li> <li>Regional Catastrophic Preparedness Grant (RCP)</li> <li>Funding for Fire Departments and First Responders</li> </ul>
3		H	Winter 2023	Identify evacuation Routes	All communities where appropriate. Prioritize high risk areas based on risk assessment. Mountain communities.	Fire Department, GIS, Maintenance Services	<ul style="list-style-type: none"> <li>Identify parcel owners along primary evacuation routes.</li> <li>Map call communities with limited ingress/egress.</li> <li>Install reflective signage along evacuation routes.</li> <li>Adopt/distribute official evacuation protocols and resources</li> <li>Encourage residents and vacationers to sign up for the emergency notification system before fire season.</li> </ul>	<p>Protect life and lessen high-risk fire behavior along important roads.</p> <p>Fuel treatments adjacent to roads can reduce fire behavior along important travel routes used for ingress by emergency vehicles and egress by residents.</p>	Annual Maintenance	<ul style="list-style-type: none"> <li>BRIC</li> <li>EMPG</li> <li>2022 Infrastructure Investments and Jobs Act</li> <li>State Farm Good Neighbor Citizenship (GNC) Grants</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
4		H	Winter 2022/ Spring 2023	Develop strategies to enhance safe wildfire response.	Areas with poor ingress and egress	Fire Department	<ul style="list-style-type: none"> <li>Address narrow access concerns for wildfire apparatus through road improvements, new egress points, or development of response plans.</li> <li>Identify alternative apparatus for access into narrow areas.</li> <li>Ensure all fire shelters are updated or replaced by 2023 to meet requirements and standards.</li> <li>Identify potential areas that threaten entrapment of response crews and develop response plans and/or safety zones.</li> <li>Map all weak bridges and develop alternative ingress/egress or response plan.</li> <li>Reduce fuel loading along ingress/egress routes. Remove fuel overhanging road and reduce fuel on both sides of road to an extent depending on potential fire behavior</li> <li>Identify and remove hazard trees that have potential to fall and block ingress/egress routes during a fire.</li> <li>Identify areas with limited all-weather access and develop response plan.</li> <li>Work with HOAs and Community Associations to address locked gates and access concerns</li> <li>Incorporate utility location data into the Wildland Fire Decision Support System (WFDSS) for fire management guidance as wildfires are occurring (goal from 2020 New Mexico Forest Action Plan).</li> <li>Utilize special data for fire season preparation (aligns with 2020 New Mexico Forest Action Plan)</li> <li>Increase access to fire training and monitoring programs (goal from 20202 New Mexico Forest Action Plan).</li> </ul>	Improve fire-fighting response if smaller, more agile vehicles are available to navigate narrow unimproved roads.	N/A	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>The Fire Prevention and Safety Grants (FP&amp;S)</li> <li>BRIC</li> <li>2022 Infrastructure Investments and Jobs Act</li> <li>RCP</li> </ul>
5		H	Winter 2022/ Spring 2023	Develop and coordinate an online comprehensive emergency preparedness, response, and recovery plan for wildfire (aligns with 2020 New Mexico Forest Action Plan and 2022 Albuquerque/ Bernalillo County Hazard Mitigation Plan).	Bernalillo County (all lands)	Fire Department, Emergency Management	<ul style="list-style-type: none"> <li>Create an online dashboard for use by <b>emergency management</b> agency decision support.</li> </ul> <p>Dashboard could be created in a Story Map or "Hub" format and would include:</p> <ul style="list-style-type: none"> <li>Break dashboard into sections of the emergency management cycle: preparedness, response, recovery</li> <li>Identify roles and responsibilities for each agency/partner under each section of the cycle</li> <li>Include BMPs for each section of the cycle</li> <li>Include coordination plan for interagency communications before, during and after an event</li> <li>Include a tracking module to track actions needed and status</li> <li>include a funding matrix to support implementation of actions</li> <li>align actions as closely as possible with the County and State HMP</li> </ul>	Improve fire response and readiness.	Would be an active and live platform, updated in real time and reviewed on an annual basis	<ul style="list-style-type: none"> <li>New Mexico Fire Protection Grant</li> <li>FP&amp;S</li> <li>BRIC</li> <li>RCP</li> <li>EMPG</li> </ul>

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
6		H	Winter 2022/ Spring 2023	Proactive in addressing future wildfire challenges with climate change.	Bernalillo County and adjacent jurisdictions	County, State, Federal	<p>Convene a working group tasked with the following:</p> <ul style="list-style-type: none"> <li>Assess impact of climate change on wildfire potential through modeling of fire behavior under various climate scenarios.</li> <li>Establish fuel treatment plans to mitigate climate related influences on wildfire risk in existing vegetation communities.</li> <li>Establish plans and build infrastructure for water supply needs to alleviate future drought emergencies.</li> <li>Install a drought indicator/early warning system. Promote and expand a system that detects levels of soil moisture and stream/river levels to determine when conditions are trending toward a drought. Develop comprehensive education process that includes drought education (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Anchor slope mesh over areas prone to landslides that threaten infrastructure and critical facilities. Areas within Bernalillo County are vulnerable to landslides due to slope erosion. Anchor heavy-gauge metal slope mesh over areas prone to landslides along transportation routes and near critical facilities in areas of high vulnerability (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> <li>Install generators at critical facilities. This project would allow for fixed diesel-powered generators or generator connections to be installed at critical facilities to ensure continuity of emergency services to the public during high hazard events (goal from 2022 Albuquerque/Bernalillo County Hazard Mitigation Plan).</li> </ul>	Enhance wildfire response as conditions change.	<p>Meet annually to review plans and assess status of wildfire risk.</p> <p>Rerun the fire behavior analysis to determine change in wildfire risk.</p>	<ul style="list-style-type: none"> <li>FAWRA</li> <li>BRIC</li> <li>National Urban and Community Forestry Challenge</li> <li>Leonardo DiCaprio Foundation Grants</li> <li>EQIP</li> </ul>



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## APPENDIX J:

Modeling/GIS Background and Methodology

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# FIRE BEHAVIOR MODELING

## FIRE BEHAVIOR MODELS

### LANDFIRE

LANDFIRE is a national remote sensing project that provides land managers a data source for all inputs needed for FARSITE, FlamMap, and other fire behavior models. The database is managed by the USFS and the USDI and is widely used throughout the United States for land management planning. More information can be obtained from <http://www.landfire.gov>.

### FARSITE

FARSITE is a computer model based on Rothermel's spread equations (Rothermel 1983); the model also incorporates crown fire models. FARSITE uses spatial data on fuels, canopy cover, crown bulk density, canopy base height, canopy height, aspect, slope, elevation, wind, and weather to model fire behavior across a landscape. FARSITE is a spatial and temporal fire behavior model. FARSITE is used to generate fuel moisture and landscape files as inputs for FlamMap. Information on fire behavior models can be obtained from <http://www.fire.org>.

### FlamMap

Like FARSITE, FlamMap uses a spatial component for its inputs but only provides fire behavior predictions for a single set of weather inputs. In essence, FlamMap gives fire behavior predictions across a landscape for a snapshot of time; however, FlamMap does not predict fire spread across the landscape. FlamMap has been used for the Bernalillo County CWPP to predict fire behavior across the landscape under extreme (97% worst case) weather scenarios. For this CWPP assessment, the model was run within the Interagency Fuel Treatment Decision Support System (IFTDSS) modeling platform.

## FIRE BEHAVIOR MODEL INPUTS

### Fuels

The fuels in the planning area are classified using Scott and Burgan's (2005) Standard Fire Behavior Fuel Model classification system. This classification system is based on the Rothermel surface fire spread equations, and each vegetation and litter type is broken down into 40 fuel models.

The general classification of fuels is by fire-carrying fuel type (Scott and Burgan 2005):

- (NB) Non-burnable
- (GR) Grass
- (GS) Grass-Shrub
- (SH) Shrub
- (TU) Timber-Understory
- (TL) Timber Litter
- (SB) Slash-Blowdown

Table J.1 provides a description of each fuel type.

Map 1 in Appendix B illustrates the fuels classification throughout the planning area.

**Table J.1. Fuel Model Classification for Bernalillo County CWPP Planning Area**

<b>1. Nearly pure grass and/or forb type (Grass)</b>	
i.	<b>GR1:</b> Grass is short, patchy, and possibly heavily grazed. Spread rate is moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (0.40 ton/acre).
ii.	<b>GR2:</b> Moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (1.10 tons/acre).
iii.	<b>GR3:</b> Very coarse grass, average depth 2 feet. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
iv.	<b>GR4:</b> Moderately coarse continuous grass, average depth 2 feet. Spread rate very high (50–150 chains/hour); flame length high (8–12 feet).
<b>2. Mixture of grass and shrub, up to about 50% shrub cover (Grass-Shrub)</b>	
i.	<b>GS1:</b> Shrubs are about 1-foot high, low grass load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (1.35 tons/acre).
ii.	<b>GS2:</b> Shrubs are 1–3 feet high, moderate grass load. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (2.1 tons/acre).
<b>3. Shrubs cover at least 50% of the site; grass sparse to non-existent (Shrub)</b>	
i.	<b>SH1:</b> Low fuel load, depth about 1 foot, some grass fuels present. Spread rate very low (0–2 chains/hour); flame length very low (0–1 feet).
ii.	<b>SH2:</b> Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuels present. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load (5.2 tons/acre).
iii.	<b>SH5:</b> Heavy shrub load. Fuel bed depth 4–6 feet. Spread rate very high (50–150 chains/hour), flame length very high (12–25 feet).
iv.	<b>SH7:</b> Very heavy shrub load, possibly with pine overstory. Fuel bed depth 4–6 feet. Spread rate high (20–50 chains/hour); flame length very high (12–25 feet).
<b>4. Grass or shrubs mixed with litter from forest canopy (Timber-Understory)</b>	
i.	<b>TU1:</b> Fuel bed is low load of grass and/or shrub with litter. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load (1.3 tons/acre).
ii.	<b>TU5:</b> Fuel bed high load conifer with shrub understory. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).

## 5. Dead and downed woody fuel (litter) beneath a forest canopy (Timber Litter)

- i. **TL1:** Low to moderate load, fuels 1–2 inches deep. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
- ii. **TL2:** Low load, compact. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
- iii. **TL3:** Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 foot); fine fuel load (0.5 ton/acre).
- iv. **TL5:** High load conifer litter. Spread rate slow (2–5 chains/hour); flame length low (1–4 foot).
- v. **TL6:** Moderate load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 foot).
- vi. **TL8:** Long needle litter; long needle fuel. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
- vii. **TL9:** Very high load fluffy dead and downed fuel litter. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).

## 6. Insufficient wildland fuel to carry wildland fire under any condition (Non-burnable)

- i. **NB1:** Urban or suburban development; insufficient wildland fuel to carry wildland fire.
- ii. **NB3:** Agricultural field, maintained in non-burnable condition.
- iii. **NB8:** Open water.
- iv. **NB9:** Bare ground.

## 7. Activity fuel (slash) or debris from wind damage (blowdown) (slash-blowdown)

- i. **SB2:** Fine fuel load is 7 to 12 tons/acre, evenly distributed across 0 to 0.25, 0.25 to 1, and 1 to 3 inch diameter classes, depth is about 1 foot. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).

**Notes:** Based on Scott and Burgan's (2005) 40 Fuel Model System.

More detailed information on fuels within the planning area can be found in Chapter 2.

## Topography

Topography is important in determining fire behavior. Steepness of slope, aspect (direction the slope faces), elevation, and landscape features can all affect fuels, local weather (by channeling winds and affecting local temperatures), and rate of spread of wildfire. There are some steep slopes in Bernalillo County that would influence fire behavior and spread.

More detailed information regarding topography can be found in Appendix A.

## Weather

Of the three fire behavior components, weather is the most likely to fluctuate. Accurately predicting fire weather remains a challenge for forecasters. As dry eastern and western winds and rising temperatures dry fuels in the spring and summer, conditions can deteriorate rapidly, creating an environment that is



susceptible to wildland fire (Figures A.1 and A.2). Fine fuels (grass and leaf litter) can cure rapidly, making them highly flammable in as little as 1 hour following light precipitation. Low live fuel moistures of shrubs and trees can significantly contribute to fire behavior in the form of crowning and torching. With a high wind, grass fires can spread rapidly, engulfing communities, often with limited warning for evacuation. The creation of defensible space is of vital importance in protecting communities from this type of fire. For instance, a carefully constructed fuel break placed in an appropriate location could protect homes or possibly an entire community from fire. This type of defensible space can also provide safer conditions for firefighters, improving their ability to suppress fire and protect life and property.

One of the critical inputs for FlamMap are the fuel moisture files. The initial run of the Composite Risk-Hazard Assessment utilized the IFTDSS Auto 97th modeling parameters, which integrate historic fire weather data from nearby RAWS. The Core Team noted that some of the fire behavior outputs did not reflect the intensity and severity of fire behavior that has been observed during recent fires. Therefore, the Composite Risk-Hazard Assessment was revised using custom extreme parameters to better align with extreme fire behavior conditions.

More detailed information regarding climate and weather can be found in Appendix A.

## FIRE BEHAVIOR MODEL OUTPUTS

The following is a discussion of the fire behavior outputs from IFTDSS.

### Flame Length

Map 2 in Appendix B illustrates the flame length classifications for the planning area. Flame lengths are determined by fuels, weather, and topography. Flame length is a particularly important component of the Composite Risk-Hazard Assessment because it relates to potential crown fire (particularly important in timber areas) and suppression tactics. Direct attack by hand lines is usually limited to flame lengths less than 4 feet. In excess of 4 feet, indirect suppression is the dominant tactic. Suppression using engines and heavy equipment will move from direct to indirect with flame lengths in excess of 8 feet.

Flame lengths across the planning area range from 0 to more than 25 feet. The highest flame lengths are associated with the timber fuels found in the higher elevations of the county.

### Fireline Intensity

Map 3 in Appendix B illustrates the predicted fireline intensity throughout the planning area. Fireline intensity describes the rate of energy released by the flaming front and is measured in British thermal units per foot, per second (Btu/ft/sec). This is a good measure of intensity and is used for planning suppression activities. The expected fireline intensity throughout the planning area is similar in pattern to predicted flame length, as fireline intensity is a function of flame length.

The pattern for fireline intensity is similar to flame length in that intensities range from low (less than 100 Btu/ft/sec) through moderate (100–500 Btu/ft/sec) high and extreme intensity (greater than 1000 Btu/ft/sec), which tend to be associated with areas dominated by tall shrub and timber fuel loads.

### Rate of Spread

Map 4 in Appendix B illustrates the rate of spread classifications for the planning area. The rates of spread in the area range from 0 chains/hour to over 150 chains/hour (one chain is approximately 66 feet

and is a common measure in wildland firefighting). Low rates of spread are associated with timber-dominated areas in riparian areas or in Cibola NF, while moderate and high rates of spread are associated with grass and shrub fuels. Agricultural areas are modeled with low rate of spread; however, these fuel types may also pose a severe hazard during certain times of the year (prior to harvest or following harvest when residual materials remain). Some areas of the WUI exhibit very steep slopes that can contribute to increased rates of spread and intense fire behavior. The rate of spread, or the speed with which fire is moving away from the point of origin, is influenced by the slope. Fire moves at a faster rate uphill than downhill, thus the steeper the slope the faster the rate of spread. Additionally, steep slopes bring the fuels above the fire closer to a growing fire, making them more susceptible to ignition. Another issue with steep slopes is the possibility of burning debris rolling down the hill and igniting fuel below the main fire. This is illustrated in Figure J.1.

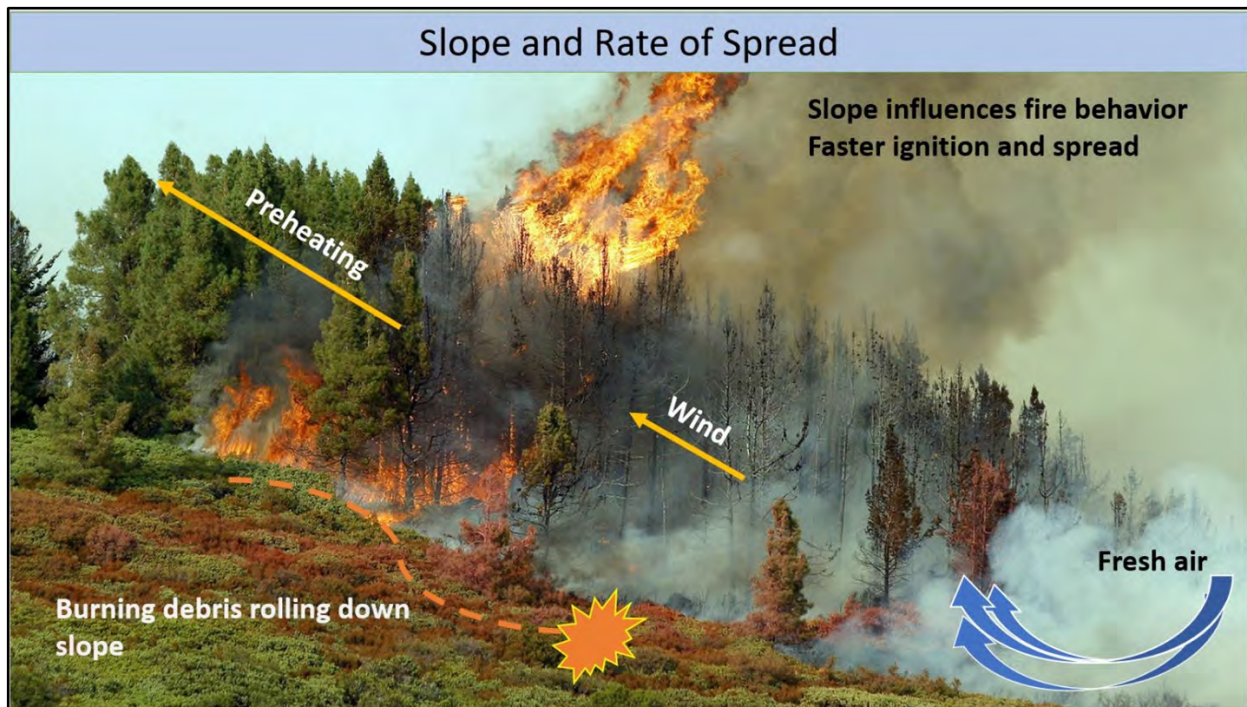


Figure J.1. Effect of topography on fire behavior.

## Crown Fire Potential

Map 5 in Appendix B illustrates the range of crown fire activity from surface fire (in grass-dominated areas) to passive and active crown fire (in timber dominated fuels).

## Fire Occurrence/Density of Starts

Figure 2.5 in Chapter 2 illustrates the fire history for the planning area. These data have been provided by the USFS, New Mexico State Forestry, and Bernalillo County, and show fires within the planning area from 2000 to 2022. Figure 2.5 (Chapter 2) reveals a cluster pattern of fires in the mountainous regions of the county, associated with forested areas, and a cluster associated with the bosque. The fire history map is used to provide information on areas where human-ignited fires are prevalent and hence could be more prone to fire in the future and where there is a higher density of lightning ignitions due to topographic conditions and receptive forest fuels.

## COMPOSITE RISK-HAZARD ASSESSMENT GIS MODEL

All data used in the Composite Risk-Hazard Assessment have been processed using ESRI ArcGIS Desktop and the ESRI Spatial Analyst Extension. Information on these programs can be found at <http://www.esri.com>. Data have been gathered from all relevant agencies, and the most current data have been used.

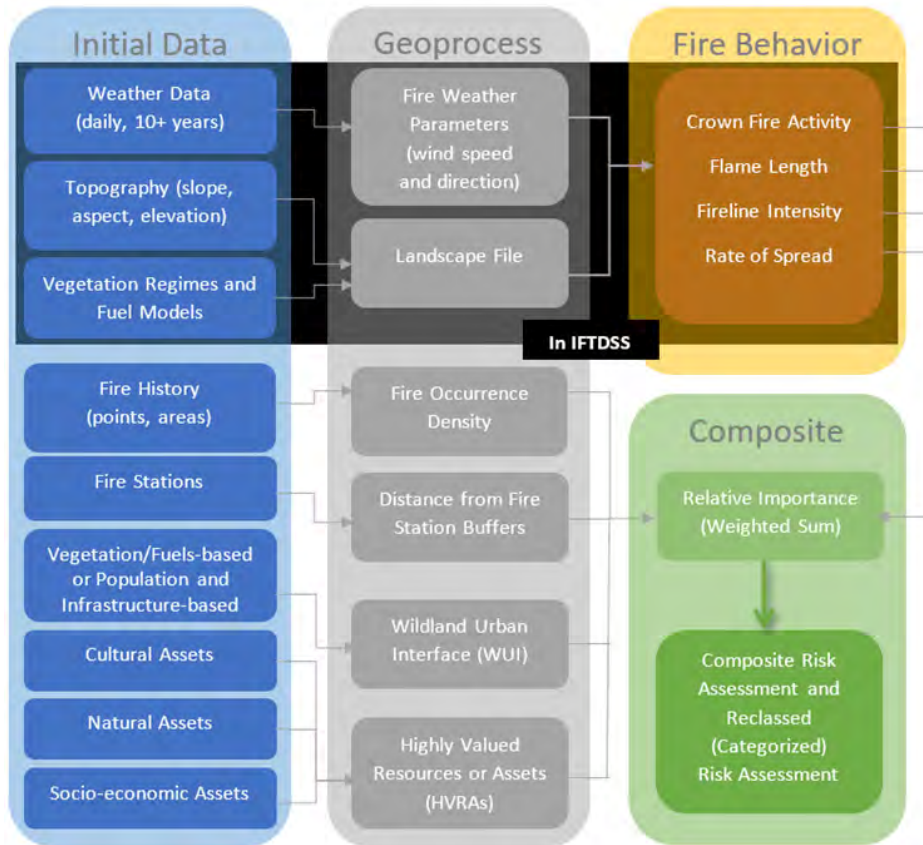
All fire parameter datasets have been converted to a raster format (a common GIS data format comprising a grid of cells or pixels, with each pixel containing a single value). The cell size for the data is 30 × 30 meters (98 × 98 feet). Each of the original cell values have been reclassified with a new value between 1 and 4, based on the significance of the data (1 = lowest, 4 = highest). Prior to running the models on the reclassified datasets, each of the input parameters have been weighted; that is, they are assigned a percentage value reflecting that parameter's importance in the model. We used the weighted sum raster overlay geoprocessing tool to stack each geographically aligned dataset and evaluate an output value derived from each cell value of the overlaid dataset in combination with the weighted assessment. In a Weighted Sum Model, the weighted values of each cell from each parameter dataset are added together so that the resulting dataset contains cells with summed values of all the parameters. This method ensures that the model resolution is maintained in the results and thus provides finer detail and range of values for denoting fire risk.

### Composite Risk-Hazard Assessment GIS Modeling Process

Our Composite Risk-Hazard Assessments comprise multiple inputs, which can be grouped into three categories: hazard, threat, and values. The result is a raster data layer that weighs and sums those inputs to determine risk. Datasets in the hazard category include historical weather data, topography, and vegetation and fuel regimes. Datasets in the threat category include fire history points and perimeters. The values category includes the WUI, distance from fire station, and natural, cultural, and socioeconomic assets datasets.

As shown in Figure J.2 with the elements in the black shaded box, we began by using the Interagency Fuel Treatment Decision Support System (IFTDSS) application to prepare a landscape file for the planning area. This landscape file compiles multiple LANDFIRE datasets, including fuels (calibrated to recent fires), slope, elevation, and aspect, into one layer that can then be used to develop fire behavior outputs. We then edited the fuels model to match the more precise local datasets and used the edited fuels and landscape file to create custom fire behavior outputs.





**Figure J.2. Composite Risk-Hazard Assessment breakdown.**

Next, in Esri ArcGIS Pro, we processed the fire history, fire station, WUI, and HVRA datasets to merge and create buffers where appropriate and converted the layers to rasters with the same spatial extent and resolution as the IFTDSS fire behavior outputs (30-meter cell size).

Last, we used ArcGIS Pro to run a weighted sum raster process to add all the inputs together. We assigned weights for input layers, based on feedback from the Core Team on the importance that each layer should contribute to the Composite Risk-Hazard Assessment (see Figure 3.11). While weighted sum composite rasters can be better for describing more detailed variations in risk, they can be overwhelming and difficult to understand, so we also created a reclassified raster from the weighted sum composite, using the natural breaks (Jenks) method, with four categories of low, medium, high, and extreme risk.