

GRANT COUNTY, NEW MEXICO

RESOLUTION NO. 25-47

**A RESOLUTION OF GRANT COUNTY ADOPTING THE GRANT COUNTY  
2025 HAZARD MITIGATION ACTION PLAN**

**WHEREAS**, Grant County recognizes the threat that natural hazards pose to people and property within Grant County; and

**WHEREAS**, the County of Grant has prepared a multi-hazard mitigation plan, hereby known as Grant County 2025 Hazard Mitigation Action Plan in accordance with the Disaster Mitigation Act of 2000; and

**WHEREAS**, the Grant County 2025 Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Grant County from the impacts of future hazards and disasters; and

**WHEREAS**, adoption by the Grant County Board of Commissioners demonstrates their commitment to hazard mitigation and achieving the goals outlined in the Grant County 2025 Mitigation Action Plan.

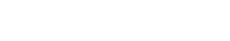
**NOW THEREFORE, BE IT RESOLVED BY THE GRANT COUNTY, NEW MEXICO,  
THAT:**

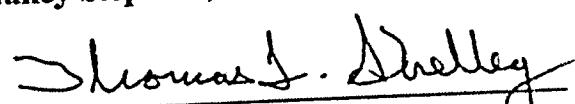
The Board of County Commissioners adopts the Grant County 2025 Hazard Mitigation Action Plan. This plan, approved by the community, may be edited or amended after submission for review, but will not require the community to re-adopt any further iterations. This only applies to this specific plan and does not absolve the community from updating the plan in 5 years.

**ADOPTED** by a vote of 5 in favor and   against, and   abstaining, this 24<sup>th</sup> day of July 2025.

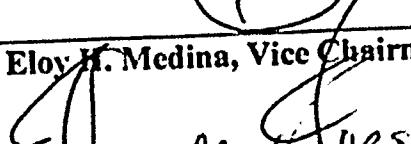
**BOARD OF GRANT COUNTY COMMISSIONERS  
GRANT COUNTY, NEW MEXICO:**

  
Chris M. Ponce, Chairman

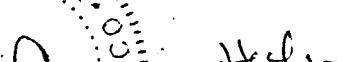
  
Nancy L. Stephens  
Nancy L. Stephens (Lnd 24, 2025 14:35:48 MOT)  
Nancy Stephens, Member

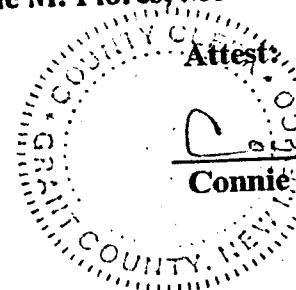
  
Thomas L. Shelley, Member

  
Eloy H. Medina, Vice Chairman

  
Eddie M. Flores, Member

Attest:

  
Connie Holguin, Clerk



# GRANT COUNTY HAZARD MITIGATION ACTION PLAN UPDATE

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## 2025 UPDATE

Mitigating Risk for a Safe, Secure, Sustainable Future



H2O  
PARTNERS

For more information, visit our website at:

<https://grantcountynam.gov/>

Written comments should be forwarded to:

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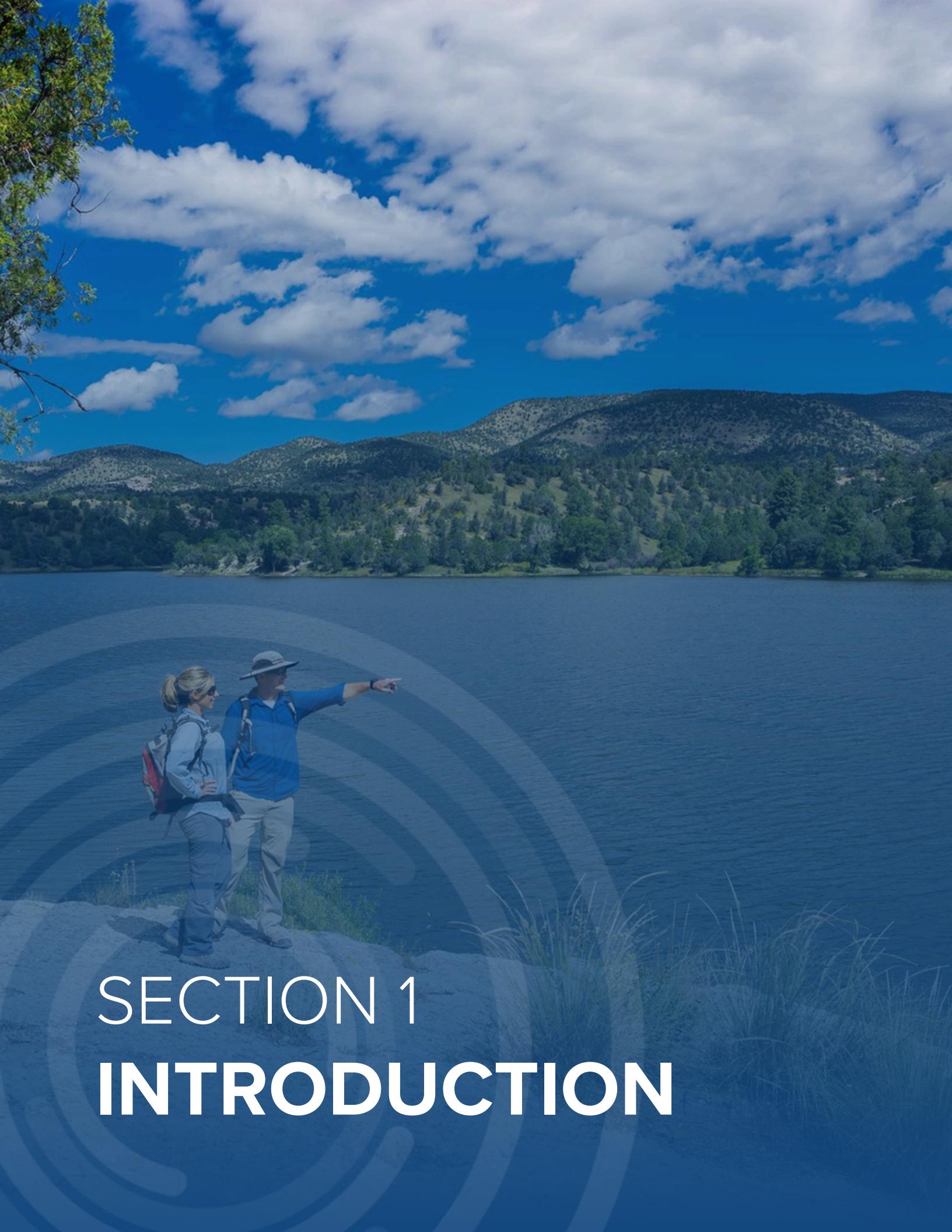
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# SECTION 1

# INTRODUCTION

## SECTION 1: INTRODUCTION

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## BACKGROUND

Grant County is located in the southwestern corner of New Mexico. The largest city and county seat is Silver City. Greenlee County, Arizona is adjacent to the west, Hidalgo County borders the southern portion of the county, Luna County is to the southeast, Sierra County is to the east, Catron County is to the north.

New Mexico is prone to large wildfires, with the second most acres burned among all states in 2022.<sup>1</sup> While wildfire is a well-known risk, Grant County is susceptible to a wide range of natural hazards, including but not limited to flood, extreme heat, lightning, high winds, and drought. These life-threatening hazards can destroy property, disrupt the economy, and lower the overall quality of life for individuals.

While it is impossible to prevent an event from occurring, the impacts from many hazards on people and property can be lessened through mitigation. The Federal Emergency Management Agency (FEMA) defines mitigation as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.*<sup>2</sup> Communities participate in hazard mitigation by developing hazard mitigation plans. The New Mexico Department of Homeland Security and Emergency Management (NM DHSEM) is required to review the plan and FEMA has the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

The Disaster Mitigation Act requires that hazard mitigation plans be reviewed and revised every five years to maintain eligibility for Hazard Mitigation Assistance (HMA) grant funding. In 2019, Grant County developed their previous Hazard Mitigation Action Plan (HMAP) to be specific to the County and the following participating jurisdictions: City of Bayard, Town of Hurley, Village of Santa Clara, and Town of Silver City.

The previous Grant County HMAP in 2019, which then was set to expire in 2024, was not formally adopted and has always remained a draft documentation. Therefore, the County began the process of developing a Hazard Mitigation Plan in order to maintain eligibility for grant funding. The HMAP planning process provided an opportunity for Grant County to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss.

Grant County selected H2O Partners, Inc. to write and develop the 2025 HMAP, hereinafter titled: "Grant County Hazard Mitigation Action Plan 2025: Maintaining a Safe, Secure, and Sustainable Community" (Plan or Plan Update). This is a multi-jurisdictional plan; the participating jurisdictions include Grant County, City of Bayard, Town of Hurley, Village of Santa Clara, and Town of Silver City.

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<sup>1</sup> National Interagency Fire Center <https://www.iii.org/table-archive/23870>

<sup>2</sup> Source: <http://www.fema.gov/hazard-mitigation-planning-resources>

## SECTION 1: INTRODUCTION

Hazard mitigation activities are an investment in a community's safety and sustainability. It is widely accepted that the most effective hazard mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive review of a hazard mitigation plan addresses vulnerabilities to hazards that exist today and in the foreseeable future. Therefore, it is essential that a plan identify projected patterns of how future development will increase or decrease a community's overall hazard vulnerability.

### SCOPE

The focus of the Plan is to identify activities to mitigate hazards classified as "high" or "moderate" risk, as determined through a detailed hazard risk assessment conducted for Grant County and the participating jurisdictions. The hazard classification enables the participating jurisdictions to prioritize mitigation actions based on hazards which can present the greatest risk to lives and property in the geographic scope.

### PURPOSE

The Plan was prepared by Grant County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan is to protect people and structures and to minimize the costs of disaster response and recovery. The goal of the Plan is to minimize or eliminate long-term risks to human life, property, operations, and the environment from known hazards by identifying risks and implementing cost-effective hazard mitigation actions. The planning process is an opportunity for participating jurisdictions within Grant County, stakeholders, and the general public to evaluate and develop successful hazard mitigation actions to reduce future risk of loss of life and damage to property resulting from a disaster in Grant County.

The Mission Statement of the Plan is, *"Maintaining a secure and sustainable future through the revision and development of targeted hazard mitigation actions to protect life and property."*

Participating jurisdictions within Grant County, and planning participants identified 11 natural hazards and 1 human-caused hazard to be addressed by the Plan. The specific goals of the Plan are to:

- Provide a comprehensive review of the 2019 Draft HMAP;
- Minimize disruption to participating jurisdictions within Grant County following a disaster;
- Streamline disaster recovery by articulating actions to be taken before a disaster strikes to reduce or eliminate future damage;
- Demonstrate a firm local commitment to hazard mitigation principles;
- Serve as a basis for future funding that may become available through grants and technical assistance programs offered by the State or Federal government. The Plan will enable participating jurisdictions within Grant County to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that participating jurisdictions within Grant County maintain eligibility for the full range of future Federal disaster relief.

## SECTION 1: INTRODUCTION

### AUTHORITY



The Plan is tailored specifically for participating jurisdictions within Grant County and plan participants including Planning Team members, stakeholders, and the general public who participated in the Plan development process. The Plan complies with all requirements promulgated by the New Mexico Department of Homeland Security and Emergency Management (NM DHSEM) and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Additionally, the Plan complies with the Interim Final Rules for the Hazard Mitigation Planning and Hazard Mitigation Grant Program (44 CFR, Part 201), which specify the criteria for approval of mitigation plans required in Section 322 of the DMA 2000 and standards found in FEMA's "Local Mitigation Policy Guide" (April 2023), and the "Local Mitigation Planning Handbook" (May 2023).

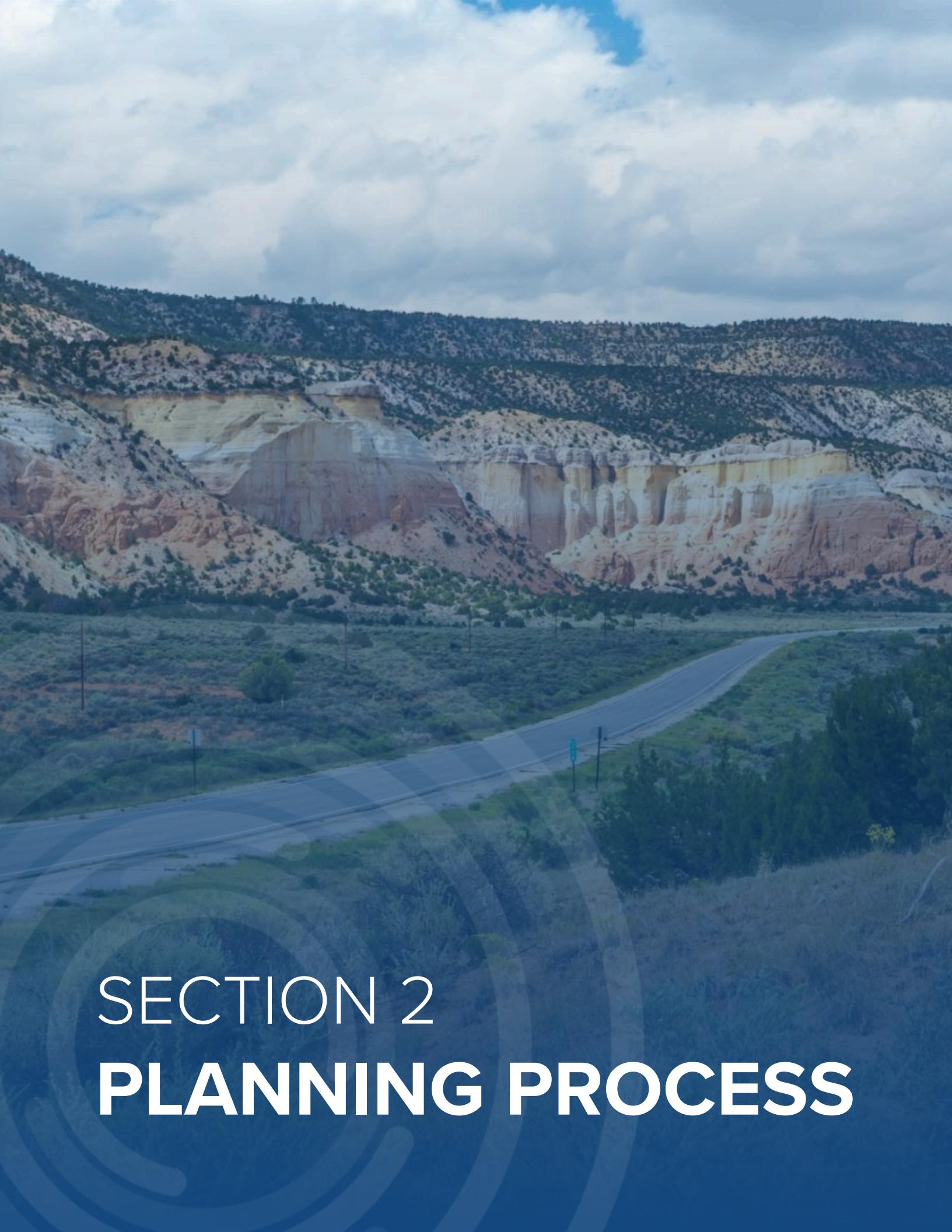
### SUMMARY OF SECTIONS

Sections 1 and 2 of the Plan outline the Plan's purpose and development, including how Planning Team members, stakeholders, and members of the general public were involved in the planning process. Section 3 profiles Grant County's population and economy.

Sections 4 through 16 present a hazard overview and information on individual natural and human-caused hazards in the planning area. For each hazard, the Plan presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 17 presents hazard mitigation goals and objectives. Section 18 presents hazard mitigation actions for Grant County and the participating jurisdictions. Section 19 identifies Plan maintenance mechanisms.

The list of planning team members and stakeholders is located in Appendix A. Public survey results are analyzed and presented in Appendix B. Appendix C contains a detailed list of critical facilities for the area. Appendix D contains information regarding dam locations within Grant County. Appendix E contains information regarding workshops and meeting documentation. Capability Assessment results for Grant County are in Appendix F. Appendix G includes State and Federal Funding Opportunities.

A scenic landscape featuring a winding asphalt road in the foreground, leading towards a vast valley. The valley is framed by towering, layered rock formations with distinct horizontal sedimentary layers in shades of tan, brown, and white. Sparse green vegetation, including small trees and shrubs, is scattered across the slopes and the valley floor. The sky above is filled with a mix of white and dark grey clouds, suggesting an overcast day. The overall scene is a blend of natural geological beauty and human-made infrastructure.

## SECTION 2

# PLANNING PROCESS

## SECTION 2: PLANNING PROCESS

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## PLAN PREPARATION AND DEVELOPMENT

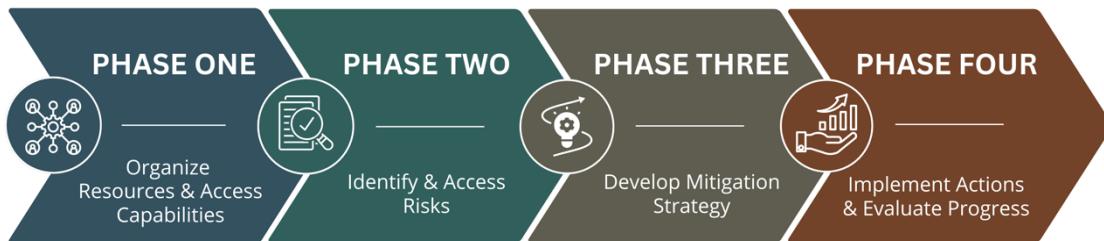
Hazard mitigation planning involves coordination with various constituents and stakeholders to develop a more disaster-resistant community. Section 2 provides an overview of the planning process including the identification of key steps and a detailed description of how stakeholders and the public were involved.

### OVERVIEW OF THE PLAN

Grant County hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Grant County Hazard Mitigation Action Plan 2025. The Consultant Team used the FEMA “Local Mitigation Planning Policy Guide” (April 2023), and the “Local Mitigation Planning Handbook” (May 2023) to develop the Plan. The overall planning process is shown in Figure 2-1 below.

## SECTION 2: PLANNING PROCESS

**Figure 2-1. Mitigation Planning Process**



Grant County, the participating jurisdictions, and the Consultant Team met in May 2024 to begin organizing resources, identify Planning Team members, and conduct a Capability Assessment.

### PLANNING TEAM

Key members of H2O Partners, Inc. developed the Plan in conjunction with the Planning Team. The Planning Team was established using a direct representation model. Some of the responsibilities of the Planning Team included: completing Capability Assessment surveys, providing input regarding the identification of hazards, identifying mitigation goals, and developing mitigation strategies. An Executive Planning Team consisting of key personnel involved in hazard mitigation activities from each of the participating jurisdictions within Grant County, shown in Table 2-1, was formed to coordinate planning efforts and request input and participation in the planning process.

Table 2-2 reflects the Advisory Planning Team, consisting of additional representatives from area organizations and departments from the participating jurisdictions within Grant County that participated throughout the planning process. All Executive and Advisory Planning Team members are involved in hazard mitigation activities; those with the authority to regulate development are identified with an asterisk next to their title.

**Table 2-1. Executive Planning Team**

ORGANIZATION / DEPARTMENT	TITLE
Grant County – Emergency Management	Emergency Management Coordinator
City of Bayard – City Council	Mayor*
Town of Hurley – Administration	Town Clerk
Village of Santa Clara – Administration	Village Administrator
Town of Silver City – Community Development	Director*
Town of Silver City – Fire	Fire Chief

## SECTION 2: PLANNING PROCESS

**Table 2-2. Advisory Planning Team**

ORGANIZATION / DEPARTMENT	TITLE
Grant County – Administration	County Manager
Grant County – Administration	Deputy County Manager
Grant County – Facilities & Grounds Maintenance	Public Works Director
Grant County – Fire	County Fire Chief
Grant County – Government	District 1 Commissioner*
Grant County – Government	District 2 Commissioner*
Grant County – Government	District 3 Commissioner*
Grant County – Government	District 4 Commissioner*
Grant County – Government	District 5 Commissioner*
Grant County – Planning & Community Development	Code Enforcement Officer*
Grant County – Planning & Community Development	GIS Mapping
Grant County – Planning & Community Development	Planning & Development Director*
Grant County – Sheriff's Office	County Sheriff
City of Bayard – Municipal Utilities	Public Works Maintenance
City of Bayard – Municipal Utilities	Wastewater
City of Bayard – Public Safety	Fire Chief
City of Bayard – Public Safety	Chief of Police
Town of Hurley – Administration	Maintenance Supervisor
Town of Hurley – Administration	Mayor*
Town of Hurley – Fire	Fire Chief
Town of Hurley – Police	Police Chief
Village of Santa Clara – Administration	Code Enforcement*
Village of Santa Clara – Administration	Mayor*
Village of Santa Clara – Administration	Public Works Administrator
Village of Santa Clara – Administration	Village Clerk

## SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
Village of Santa Clara – Fire	Fire Chief
Village of Santa Clara – Police	Police Chief
Town of Silver City – Executive	Town Manager*
Town of Silver City – Government	Mayor*
Town of Silver City – Police	Chief of Police
Town of Silver City – Public Works & Parks	Director of Public Works
Town of Silver City – Utilities	Director

Additionally, a Stakeholder Group was invited via email to participate in the planning process by attending meetings, commenting on draft versions of the plan, and/or by providing data to inform the planning process. The Consultant Team, Planning Teams, and Stakeholder Group coordinated to identify mitigation goals, and develop mitigation strategies and actions for the Plan. Appendix A provides a complete listing of all participating Planning Team members and stakeholders from participating jurisdictions within Grant County by organization, title, and stakeholder type. Stakeholder involvement is discussed further below.

Based on results of completed Capability Assessments, participating jurisdictions within Grant County described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, each jurisdiction has an opportunity to identify opportunities for cross-training or increasing the technical expertise of staff by attending free training available through FEMA and the New Mexico Department of Homeland Security and Emergency Management (DHSEM), and monitoring classes and availability through [preparingnewmexico.org](http://preparingnewmexico.org). In addition, each jurisdiction can identify Planning Team members with the authority to monitor the Plan and identify grant funding opportunities for expanding staff. Other options for improving capabilities for each jurisdiction include the following:

**Table 2-3 Opportunities for Improving and Expanding Existing Capabilities by Jurisdiction**

JURISDICTION	OPPORTUNITIES
Grant County	<ul style="list-style-type: none"><li>• Integrate risk information from HMAP into future updates to <b>Capital Improvement Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Comprehensive Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Community Wildfire Protection Plan</b>.</li><li>• Review current <b>floodplain ordinances</b> for opportunities to increase resiliency such as modifying permitting or building codes.</li><li>• Review current <b>building ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li><li>• Develop <b>land use ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li></ul>

## SECTION 2: PLANNING PROCESS

JURISDICTION	OPPORTUNITIES
City of Bayard	<ul style="list-style-type: none"><li>• Integrate risk information from HMAP into future updates to <b>Capital Improvement Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Comprehensive Plan</b>.</li><li>• Develop a <b>Community Wildfire Protection Plan</b> based on information in the risk assessment and identified mitigation projects within the HMAP.</li><li>• Review current <b>floodplain ordinances</b> for opportunities to increase resiliency such as modifying permitting or building codes.</li><li>• Review current <b>building ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li><li>• Review current <b>land use ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li></ul>
Town of Hurley	<ul style="list-style-type: none"><li>• Integrate risk information from HMAP into future updates to <b>Capital Improvement Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Comprehensive Plan</b>.</li><li>• Develop a <b>Community Wildfire Protection Plan</b> based on information in the risk assessment and identified mitigation projects within the HMAP.</li><li>• Develop <b>floodplain ordinances</b> to increase resiliency such as modifying permitting or building codes.</li><li>• Review current <b>building ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li><li>• Develop <b>land use ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li></ul>
Village of Santa Clara	<ul style="list-style-type: none"><li>• Integrate risk information from HMAP into future updates to <b>Capital Improvement Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Comprehensive Plan</b>.</li><li>• Develop a <b>Community Wildfire Protection Plan</b> based on information in the risk assessment and identified mitigation projects within the HMAP.</li><li>• Review current <b>floodplain ordinances</b> for opportunities to increase resiliency such as modifying permitting or building codes.</li><li>• Review current <b>building ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li><li>• Review current <b>land use ordinances</b> that will require all new developments to conform to the highest mitigation standards.</li></ul>

## SECTION 2: PLANNING PROCESS

JURISDICTION	OPPORTUNITIES
Town of Silver City	<ul style="list-style-type: none"><li>• Integrate risk information from HMAP into future updates to <b>Capital Improvement Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Comprehensive Plan</b>.</li><li>• Integrate risk information from HMAP into future updates to <b>Community Wildfire Protection Plan</b>.</li><li>• Review current <b>floodplain ordinances</b> for opportunities to increase resiliency such as modifying permitting or building codes.</li><li>• Review current <b>building ordinances</b> that will require all new developments to confirm to the highest mitigation standards.</li><li>• Review current <b>land use ordinances</b> that will require all new developments to confirm to the highest mitigation standards.</li></ul>

Sample hazard mitigation actions developed with similar hazard risk were shared at the meetings. These important discussions resulted in the development of multiple mitigation actions that are included in the Plan to further mitigate risk from natural hazards in the future.

The Planning Team developed hazard mitigation actions for mitigating risk from all of the hazards including potential flood, tornado, and wildfire events. These actions include but are not limited to the county and participating jurisdictions acquiring and installing generators at senior centers and fire stations in remote areas of the county and conducting vegetation management alongside county-owned roads.

### PLANNING PROCESS

The process used to prepare the Plan followed the four major steps included at Figure 2-1. After the Planning Team was organized, a capability assessment was developed and distributed at the Kick-Off Workshop. Hazards were identified and assessed, and results associated with each of the hazards were provided at the Risk Assessment Workshop. Based on Grant County's identified vulnerabilities, specific mitigation strategies were discussed and developed at the Mitigation Strategy Workshop. Finally, Plan maintenance and implementation procedures were developed and are included in Section 19. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E.

At the Plan development workshops held throughout the planning process described herein, the following factors were taken into consideration:

- The nature and magnitude of risks currently affecting the community;
- Hazard mitigation goals to address current and expected conditions;
- Whether current resources will be sufficient for implementing the Plan;
- Implementation problems, such as technical, political, legal, and coordination issues that may hinder development;
- Anticipated outcomes; and
- How participating jurisdictions within Grant County, agencies, and partners will participate in implementing the Plan.

## SECTION 2: PLANNING PROCESS

### KICKOFF WORKSHOP

The Kickoff Workshop was held on May 15, 2024, at the Grant County Administration Building in the Town of Silver City. The initial workshop informed participating officials and key department personnel about how the planning process pertained to their distinct roles and responsibilities and engaged stakeholder groups that focus on vulnerable populations and underserved communities including, but not limited to public libraries, economic development agencies, local colleges, and surrounding communities. In addition to the kickoff presentation, participants received the following information:

- Project overview regarding the planning process;
- Public survey access information;
- Hazard Ranking form; and
- Capability Assessment survey for completion.

A risk ranking exercise was conducted at the Kickoff Workshop to get input from the Planning Team and stakeholders pertaining to various risks from a list of natural and human-caused hazards affecting the planning area. Each participant at the Kickoff Workshop was provided a risk ranking sheet that asked participants to rank hazards in terms of the probability or frequency of occurrence, extent of spatial impact, and the magnitude of impact. The results of the ranking sheets identified unique perspectives on varied risks throughout the planning area. The assessments were also used to set priorities for hazard mitigation actions based on potential loss of lives and dollar losses.

### HAZARD IDENTIFICATION

At the Kickoff Workshop, and through e-mail and phone correspondence, the Planning Team conducted preliminary hazard identification. The Planning Team in coordination with the Consultant Team reviewed and considered a full range of natural hazards. Once identified, the teams narrowed the list to significant hazards by reviewing hazards affecting the area, the 2023 State of New Mexico Hazard Mitigation Plan, and initial study results from reputable sources such as federal and state agencies. Based on this initial analysis, the teams identified a total of 11 natural hazards and 1 human-caused hazard which pose a significant threat to the planning area.

### RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Grant County was completed in July 2024 and results were presented to Planning Team members at the Risk Assessment Workshop held on July 23, 2024, at the Grant County Administration Building in the Town of Silver City. At the workshop, the characteristics and consequences of each hazard were evaluated to determine the extent to which the planning area would be affected in terms of potential danger to property and citizens.

Property and crop damages were estimated by gathering data from the National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA). The assessment also examined the impact of various hazards on the built environment, including general building stock, critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events provided information on previous occurrences, estimated probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Following the risk assessment workshop past event data from NCEI is provided to the planning team for their review and assistance in identifying significant events. A hazard profile and vulnerability analysis for each of the hazards can be found in Sections 4 through 16.

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### *MITIGATION REVIEW AND DEVELOPMENT*

Developing the Mitigation Strategy for the Plan involved identifying mitigation goals and new mitigation actions. A Mitigation Workshop was held on September 17, 2024, at the Grant County Administration Building in the Town of Silver City. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. Regarding hazard mitigation actions, workshop participants emphasized the desire for drought and wildfire projects. Additionally, the participating jurisdictions were proactive in identifying mitigation actions to lessen the risk of all the identified hazards included in the Plan.

An inclusive and structured process was used to develop and prioritize new hazard mitigation actions for the Plan. The prioritization method was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, economic, and environmental considerations. As a result, each Planning Team Member assigned an overall priority to each hazard mitigation action. The overall priority of each action is reflected in the hazard mitigation actions found in Section 18.

Planning Team Members then developed action plans identifying proposed actions, costs and benefits, the responsible organization(s), effects on new and existing buildings, implementation schedules, priorities, and potential funding sources.

Specifically, the process involved:

- Listing optional hazard mitigation actions based on information collected from previous plan reviews, studies, and interviews with federal, state, and local officials. Workshop participants reviewed the optional mitigation actions and selected actions that were most applicable to their area of responsibility, cost-effective in reducing risk, easily implemented, and likely to receive institutional and community support.
- Workshop participants inventoried federal and state funding sources that could assist in implementing the proposed hazard mitigation actions. Information was collected, including the program name, authority, purpose of the program, types of assistance and eligible projects, conditions on funding, types of hazards covered, matching requirements, application deadlines, and a point of contact.
- Planning Team Members considered the benefits that would result from implementing the hazard mitigation actions compared to the cost of those projects. Although detailed cost-benefit analyses were beyond the scope of the Plan, Planning Team Members utilized economic evaluation as a determining factor between hazard mitigation actions.
- Planning Team Members then selected and prioritized mitigation actions.

Hazard mitigation actions identified in the process were made available to the Planning Team for review. The draft Plan was maintained on file by Grant County and participating jurisdictions and was made available to the general public for review.

## REVIEW AND INCORPORATION OF EXISTING PLANS

### **REVIEW**

Background information utilized during the planning process included various studies, plans, reports, and technical information from sources such as FEMA, the United States Army Corps of Engineers (USACE), the U.S. Fire Administration, National Oceanic and Atmospheric Administration (NOAA), the New Mexico Bureau of Geology and Mining Resources, the Office of

## SECTION 2: PLANNING PROCESS

the State Engineer Dam Safety Bureau, the New Mexico Forestry Division, the New Mexico Department of Homeland Security and Emergency Management (NM DHSEM), and local hazard assessments and plans. Section 4 and the hazard-specific sections of the Plan (Sections 5-16) summarize the relevant background information.

Specific background documents, including those from FEMA, provided information on hazard risk, hazard mitigation actions currently being implemented, and potential mitigation actions. Previous hazard events, occurrences, and descriptions were identified through NOAA's National Centers for Environmental Information (NCEI) Storm Events Database. Results of past hazard events were found through searching the NCEI Database. The USACE studies were reviewed for their assessment of risk and potential projects in the region. Information from the University of New Mexico Geospatial and Population Studies Department was reviewed for population and other projections and included in Section 3 of the Plan. Data from the United States Forest Service was used to appropriately rank the wildfire hazard, and to help identify potential grant opportunities. Materials from FEMA and NM DHSEM were reviewed for guidance on Plan development requirements.

### INCORPORATION OF EXISTING PLANS INTO THE HMAP PROCESS

A Capability Assessment was completed by key departments from the participating jurisdictions within Grant County which provided information pertaining to existing plans, policies, ordinances, and regulations to be integrated into the goals and objectives of the Plan. The relevant information was included in a master Capability Assessment, Appendix F.

Existing projects and studies were utilized as a starting point for discussing hazard mitigation actions among Planning and Consultant Team members. For example, the Town of Silver City developed a plan for reducing or eliminating the risk of flooding along creeks throughout the Town. The Town of Silver City also implemented regulations restricting the amount of non-drought resistant landscaping materials that can be planted in new commercial construction.

This Grant County HMP is a newly developed plan. While a plan was developed in 2019, it was never adopted. As a result, the status of actions from the 2019 plan were not provided during the development of this plan but instead were provided to the team for their review and analysis and were utilized as a guide to developing the actions identified in this plan.

The current Flood Insurance Study (FIS) as well as the current effective Flood Insurance Rate Maps (FIRMs), effective date January 6, 2011, were used in the flood hazard risk assessment (Section 9). The FIRM panels (map number 35017C panels 50-2225) show the areas throughout Grant County at greater risk of flooding. The FIS report contains detailed flood elevation data in flood profiles and data tables and is utilized in determining extent.

Additionally, policies and ordinances were reviewed as well as other plans, such as the 2020 Grant County Community Wildfire Protection Plan, Capital Improvement Plans, and Emergency Management Action Plans, to identify any additional mitigation actions. Furthermore, applicable information was included in the wildfire risk assessment from the jurisdictions' Community Wildfire Protection Plans.

Finally, the 2023 State of New Mexico Hazard Mitigation Plan, developed by NM DHSEM, was discussed in the initial planning meeting in order to develop a specific group of hazards to address in the planning effort. The 2023 State of New Mexico Hazard Mitigation Plan was also used as a

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guidance document, along with FEMA materials, in the development of the Grant County Hazard Mitigation Action Plan 2025.

### INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan with other planning mechanisms for Grant County, such as the Emergency Operations Plan. Existing plans for participating jurisdictions will be reviewed and incorporated into the Plan, as appropriate. This section discusses how the Plan will be implemented by the participating jurisdictions within Grant County. It also addresses how the Plan will be evaluated and improved over time, and how the public will continue to be involved in the hazard mitigation planning process.

Participating jurisdictions within Grant County will be responsible for implementing hazard mitigation actions contained in Section 18. Each hazard mitigation action has been assigned to a specific County, City, Town, or Village department that is responsible for tracking and implementing the action.

A funding source has been listed for each identified hazard mitigation action and may be utilized to implement the action. An implementation time period has also been assigned to each hazard mitigation action as an incentive and to determine whether actions are implemented on a timely basis.

Participating jurisdictions within Grant County will integrate hazard mitigation actions contained in the Plan with existing planning mechanisms such as ordinances, Emergency Operations or Management Plans, and other local and area planning efforts. Grant County will work closely with area organizations to coordinate implementation of hazard mitigation actions that benefit the planning area in terms of financial and economic impact.

Upon formal adoption of the Plan, Planning Team members from the participating jurisdictions will review existing plans along with building codes to guide development and ensure that hazard mitigation actions are implemented. Each of the jurisdictions will be responsible for coordinating periodic review of the Plan with members of the Advisory Planning Team to ensure integration of hazard mitigation strategies into these planning mechanisms and codes. The Planning Team will also conduct periodic reviews of various existing planning mechanisms and analyze the need for any revisions or updates in light of the approved Plan. Participating jurisdictions within Grant County will ensure that future long-term planning objectives will contribute to the goals of the Plan to reduce the long-term risk to life and property from moderate and high-risk hazards. Within one year of formal adoption of the Plan, existing planning mechanisms will be reviewed and analyzed as they pertain to the Plan.

Planning Team members will review and revise, as necessary, the long-range goals and objectives in its strategic plan and budgets to ensure that they are consistent with the Plan.

Furthermore, Grant County will work with neighboring jurisdictions to advance the goals of the Plan as it applies to ongoing, long-range planning goals and actions for mitigating risk to natural hazards throughout the planning area.

Table 2-4 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts.

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**Table 2-4. Examples of Methods of Incorporation**

Planning Mechanism	Incorporation of Plan
Annual Budget Review	Various departments and key personnel that participated in the planning process for participating jurisdictions within Grant County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.
Capital Improvement Plans	All participating jurisdictions within Grant County have a Capital Improvement Plan (CIP) in place or under development. Prior to any revisions to the CIP, County, City, Town, and Village departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Community Wildfire Protection Plan	Community Wildfire Protection Plans (CWPPs) include preventative and corrective actions to address a community's risk of damage from wildfire. Information found in Section 15 of this Plan discussing the people and property at risk to wildfire will be reviewed and revised when participating jurisdictions update their CWPP or develop new plans.
Comprehensive Plans	All participating jurisdictions within Grant County have a Comprehensive Land Use Plan in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management Plans	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 9 of this Plan discussing the people and property at risk to flood will be reviewed and revised when the county and participating jurisdictions within Grant County update their management plans or develops new plans.
Grant Applications	The HMAP will be evaluated by participating jurisdictions within Grant County when grant funding is sought for mitigation projects. If a project is not in

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Planning Mechanism	Incorporation of Plan
Regulatory Plans	the Plan, a Plan Revision may be necessary to include the action in the Plan.  Currently, several participating jurisdictions within Grant County have regulatory plans in place, such as Emergency Operations Plans, Land Use Plans, and Evacuation Plans. The Plan will be consulted when County, City, Town, and Village departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

Appendix F Capability Assessment provides an overview of Planning Team members' existing planning and regulatory capabilities. These existing capabilities provide the mechanisms to implement the mitigation strategy objectives. For example, the adoption of building codes and implementation of land use regulations have been demonstrated to help communities avoid losses from natural hazard events. Currently, all participating jurisdictions have the following codes in place: International Building Code (IBC) 2021, International Residential Code (IRC) 2021, International Energy Conservation Code (IECC) 2021, and International Fire Code (IFC) 2021, as well as zoning ordinances and land use restrictions as applicable. Please refer to Appendix F for a complete inventory of each participating jurisdiction's capabilities.

It should be noted for the purposes of the Plan development that the 2019 Grant County HMAP has been used as a reference when reviewing and updating all plans and ordinances for the entire planning area, including all participating jurisdictions. The Emergency Management Action Plans developed for City of Baynard and Town of Silver City are updated every 5 years and incorporate goals, objectives and actions identified in the mitigation plan.

### PLAN REVIEW AND PLAN DEVELOPMENT

As with the development of Plan, participating jurisdictions within Grant County will oversee the review and update process for relevance and if necessary, make adjustments. At the beginning of each fiscal year, Planning Team Members will meet to evaluate the Plan and review other planning mechanisms to ensure consistency with long-range planning efforts. In addition, planning participants will also meet once a year, by conference call or presentation, to re-evaluate prioritization of the hazard mitigation actions.

### TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

Both the Executive Planning Team (Table 2-1) and the Advisory Planning Team (Table 2-2) will engage in discussions regarding a timeframe for how and when to implement each hazard mitigation action. Considerations include when the action will be started, how existing planning mechanisms' timelines affect implementation, and when the action should be fully implemented. Timeframes may be general, and there will be short, medium, and long-term goals for implementation based on prioritization of each action, as identified on individual Hazard Mitigation Action tables included in the Plan for participating jurisdictions within Grant County.

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Both the Executive and Advisory Planning Team will evaluate and prioritize the most suitable hazard mitigation actions for the community to implement. The timeline for implementation of actions will partially be directed by participating jurisdictions' comprehensive planning process, budgetary constraints, and community needs. Participating jurisdictions within Grant County are committed to addressing and implementing hazard mitigation actions that may be aligned with and integrated into the Plan.

Overall, the Planning Team is in agreement that goals and actions of the Plan shall be aligned with the timeframe for implementation of hazard mitigation actions with respect to annual review and updates of existing plans and policies.

## PUBLIC AND STAKEHOLDER INVOLVEMENT

An important component of hazard mitigation planning is public participation and stakeholder involvement. Input from individual citizens and the community as a whole provides the Planning Team with a greater understanding of local concerns and increases the likelihood of successfully implementing hazard mitigation actions. If citizens and stakeholders, such as local businesses, non-profits, hospitals, and schools are involved, they are more likely to gain a greater appreciation of the risks that hazards may present in their community and take steps to reduce or mitigate their impact.

The public was involved in the development of the Grant County Hazard Mitigation Action Plan 2025 at different stages prior to official Plan approval and adoption. Public input was sought using three methods: (1) open public meetings; (2) survey instruments; and (3) making the draft Plan available for public review on participating jurisdictions' websites.

The draft Plan was made available to the general public for review and comment on participating jurisdictions' websites. The public was notified at the public meetings that the draft Plan would be available for review. No feedback was received on the draft Plan, although it was given on the public survey, and all relevant information was incorporated into the Plan. Public input was utilized to assist in identifying hazards that were of most concern to the citizens of the County and what actions they felt should be included and prioritized.

The Plan will be advertised and posted on Grant County and participating jurisdictions' websites upon approval from FEMA, and a copy will be kept at the Grant County Courthouse.

## UNDERSERVED COMMUNITIES / VULNERABLE POPULATIONS

A goal of the Planning Team was building equity into the planning process. Including organizations that aid underserved communities and socially vulnerable populations to participate in the plan helps ensure equitable access to the planning process and the meaningful participation of all residents. In addition, these groups can make sure that the interests of vulnerable populations are accurately represented and act as a valuable resource to share information with those vulnerable populations.

The Planning Team worked to identify local agencies, organizations and community leaders that focus on reaching vulnerable populations and underserved communities. These organizations were included in the planning process as stakeholders and were invited to participate in the planning process via email. These agencies were encouraged to post public planning meetings as well as solicit feedback via the public survey.

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All stakeholders and planning team members were invited to participate in the development of the Plan during this process, including all public meetings, and surveys. All stakeholders are listed in Table 2-5 below. Some stakeholders have been detailed below along with the agency's mission, including:

- Freeport-McMoRan (FCX) – Nation-wide mining company that is committed to supplying the world with responsibly produced copper, which means integrating sustainability in all operations. FCX recognizes that the challenges and opportunities in Southwest New Mexico are as unique as the terrain and supports various initiatives that strengthen the community and help develops the employees.
- Hidalgo Medical Services – Non-profit Healthcare Organization that provides medical, dental, behavioral health, and family support services for everyone in Hidalgo County and the Southwest.
- New Mexico Acequia Association – Private Organization whose mission is to protect water and acequias, to grow healthy food for families and communities, and to honor cultural heritage.

In addition, public notices were posted on public bulletin boards throughout the planning area, as well as posted on the participating jurisdictions' websites and social media platforms. For a sample of these postings, please see Appendix E. In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public input during the planning process from citizens and stakeholders and to obtain input and feedback on the mitigation plan. For each form of engagement, all efforts were made to reach Grant County's underserved communities and vulnerable populations throughout the planning process. Additional survey information is provided at the end of this section.

### STAKEHOLDER INVOLVEMENT

Stakeholder involvement is essential to hazard mitigation planning since a wide range of stakeholders can provide input on specific topics and from various points of view. Throughout the planning process, members of community groups, local businesses, and neighboring jurisdictions were invited to participate in development of the Plan. The Stakeholder Group (Table 2-5) included a broad range of representatives from both the public and private sector and served as a key component in Grant County's outreach efforts for development of the Plan. Documentation of stakeholder meetings is found in Appendix E. A list of organizations invited to attend via email is found in Table 2-5. Those that participated in the public meetings are identified with a plus symbol (+) next to their stakeholder type.

**Table 2-5. Stakeholder Working Group**

AGENCY	TITLE	STAKEHOLDER TYPE
American Red Cross	Area Volunteer	Non-Profit Organization +
American Red Cross	Senior Disaster Program Manager	Non-Profit Organization
Bayard Public Library	Librarian	Community Organization
Catron County	Emergency Manager	Neighboring Community

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AGENCY	TITLE	STAKEHOLDER TYPE
Cobre Consolidated Schools	Superintendent	Academia
Columbus Electric Cooperative	Executive Vice President / General Manager	Utility Provider
The Commons - Center for Food Security and Sustainability	Operations Manager	Community Organization
Emergency Food & Shelter Program	President	Community Organization
Environmental Protection Agency – Region 6	Director of Emergency Management Division	Federal Agency
FEMA – Region 6	Hazard Mitigation Branch Director	Federal Agency
Forest Stewards Guild / New Mexico State Forestry Division	Forest Health Specialist	State Agency
Freeport-McMoRan	Senior Social Performance Manager	Private Organization/HHPD Dam Owner +
Freeport-McMoRan	Social Performance Manager	Private Organization/HHPD Dam Owner
Gila Landscape Collaborative	Director	State Agency
Gila Regional Medical Center	Safety and Emergency Manager	Healthcare Agency
Grant County Airport	Airport Manager	Private Organization
Grant County Community Foundation	Founder	Community Organization
Grant Soil and Water Conservation District	Administrative Assistant	Utility Provider
Greenlee County	Emergency Manager	Neighboring Community
Habitat for Humanity	Executive Director	Non-Profit Organization
Hidalgo County	Emergency Manager / Health Department Director	Neighboring Community
Hidalgo Medical Services	Director of Senior Services	Healthcare Agency
High Desert Humane Society	General Representative	Community Organization
HMS Senior Service Program	CEO	Community Organization
Luna County	Emergency Manager	Neighboring Community
New Mexico Acequia Association	Executive Director	Private Organization

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AGENCY	TITLE	STAKEHOLDER TYPE
New Mexico Aging and Long-Term Services	Cabinet Secretary	State Agency
New Mexico Bureau of Land Management	District Fire Management Officer	State Agency
New Mexico Bureau of Land Management	Fuels Specialist	State Agency +
New Mexico Bureau of Minerals and Geology	Director and State Geologist	State Agency
New Mexico Cattle Growers Association	President	State Agency
New Mexico Department of African American Affairs	Communications and Marketing Coordinator	State Agency
New Mexico Department of African American Affairs	Deputy Director	State Agency
New Mexico Department of Agriculture	Biosecurity Program Specialist of the Southwest Boarder Food Protection and Emergency Preparedness Center	State Agency
New Mexico Department of Agriculture	Co-Director of the Southwest Boarder Food Protection and Emergency Preparedness Center	State Agency
New Mexico Department of Agriculture	Director of the Southwest Boarder Food Protection and Emergency Preparedness Center	State Agency
New Mexico Department of Energy, Minerals, and Natural Resources	Communications Coordinator	State Agency
New Mexico Department of Health	Communications Coordinator	State Agency
New Mexico Department of Health	Emergency Manager Healthcare Coalition for Region II	State Agency
New Mexico Department of Health	Preparedness and Response Section Manager	State Agency
New Mexico Department of Health	Public Information Official	State Agency
New Mexico Department of Homeland Security and Emergency Management	Response, Recovery, and Mitigation Bureau Chief	State Agency

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AGENCY	TITLE	STAKEHOLDER TYPE
New Mexico Department of Homeland Security and Emergency Management	Mitigation Specialist	State Agency
New Mexico Department of Indian Affairs	Cabinet Secretary	State Agency
New Mexico Department of Transportation	District 1 (D1) Public Information Official	State Agency
New Mexico Drought Task Force	Water Use & Conservation	State Agency
New Mexico Environmental Department	Environmental Specialist	State Agency
New Mexico Environmental Department	Incident Response Coordinator	State Agency
New Mexico Gas Company	Media Representative	Utility Provider
New Mexico Gas Company	Operations Manager	Utility Provider +
New Mexico Livestock Bureau	Deputy Director	State Agency
New Mexico Office of the State Engineer – Dam Safety	Bureau Chief	State Agency
New Mexico Office of the State Engineer – Dam Safety	Public Information Official	State Agency
New Mexico Wildlife Center	Communications Specialist	Community Organization
NOAA	Western Regional Contact	Federal Agency
NWS	Regional Office Contact	Federal Agency
PNM	Community Manager	Utility Provider
Sierra County	Emergency Manager	Neighboring Community
Silver City Natural Resource Conservation Service Center	County Representative	Community Organization
Silver City Public Library	Assistant Director	Community Organization
Silver Consolidated Schools	Superintendent	Academia
Southwest Solid Waste Authority	Manager	Utility Provider
Synergy Disaster Recovery	Director of Planning	Private Organization
Tyrone Water & Wastewater Association	President	Utility Provider
United Ways of Southwest New Mexico	Community Engagement Specialist	Community Organization

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AGENCY	TITLE	STAKEHOLDER TYPE
United Ways of Southwest New Mexico	Grant Coordinator	Community Organization
Upper Gila Valley Arroyos Watershed District	Grant Administrator	Private Organization/HHPD Dam Owner +
U.S. Army Corps of Engineers	Southwest Regional Contact	Federal Agency
U.S. Department of Agriculture / Rural Partners Network	Community Liaison	Federal Agency
U.S. Fish and Wildlife	Southwest Regional Contact	Federal Agency
U.S. Forest Service	Public Affairs Officer	Federal Agency
Western New Mexico University	Chief of Staff	Academia

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, severe storms were a concern to participants, so Grant County included an action for the planning of public and private outdoor recreation sites and events to provide adequate shelter for severe storm events.

### PUBLIC MEETINGS

A series of public meetings were held throughout the planning area to collect public and stakeholder input. Topics of discussion included the purpose of hazard mitigation, discussion of the planning process, and types of natural hazards. Each participating jurisdiction within Grant County released information regarding the public meetings in their area to increase public participation in the Plan development process, through posting on their website, on social media sources including Facebook, and/or posting the information on bulletin boards in public facilities. A sampling of these notices can be found in Appendix E, along with the documentation on the public meetings. No public feedback was provided during these meetings.

Public meetings were held on the following dates:

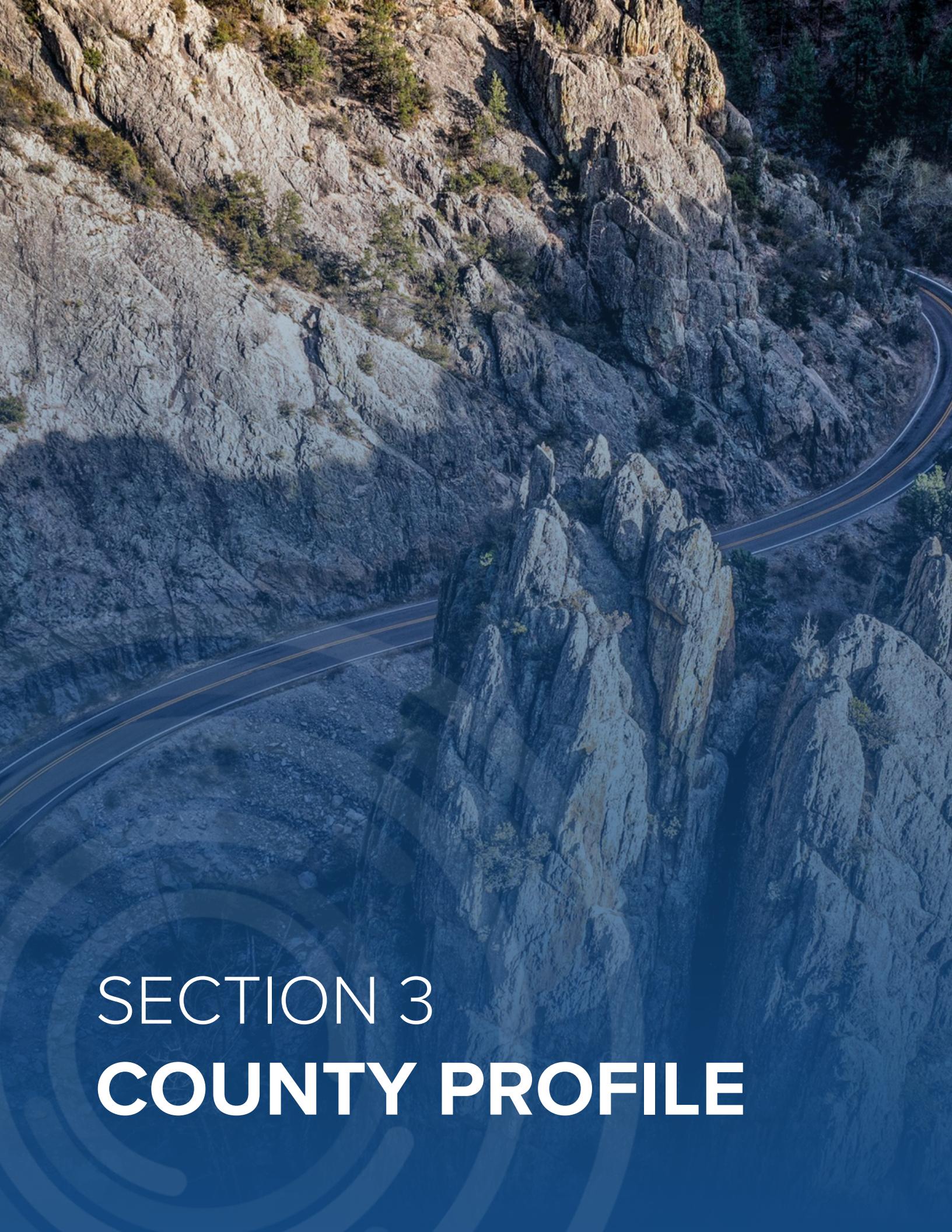
- May 15, 2024, at the Grant County Administration Building in the Town of Silver City
- July 23, 2024, at the Grant County Administration Building in the Town of Silver City
- September 17, 2024, at the Grant County Administration Building in the Town of Silver City

### PUBLIC PARTICIPATION SURVEY

In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public input during the planning process from citizens and stakeholders to obtain data regarding the identification of any potential hazard mitigation actions or problem areas. The survey was promoted by local officials and a link to the survey was posted on participating jurisdictions' websites. A total of 12 surveys were completed online. The survey results are analyzed in Appendix B. Participating jurisdictions within Grant County reviewed the input from the surveys and decided which information to incorporate into the Plan as hazard mitigation actions. For example, results indicate that drought and wildfire are the hazards of

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highest concern for the public. Protecting and improving reliability of utilities and constructing infrastructure to reduce hazard impact were the two main actions indicated that the local government should take to mitigate risk to these hazards. As a result, the Planning Team has included mitigation actions to implement education and awareness programs to reduce injuries, fatalities, and property damages as well as working with utility providers to encourage burying of powerlines and/or strengthening power poles to avoid power outages.

A wide-angle photograph of a winding asphalt road through a rugged, rocky mountain range. The mountains are composed of light-colored, layered rock with sharp, jagged peaks. Sparse green vegetation, including small trees and shrubs, is scattered across the rocky slopes. The road curves from the bottom left towards the top right, with a solid yellow line marking the center. The overall scene is one of natural, untamed beauty.

# SECTION 3 COUNTY PROFILE

## SECTION 3: COUNTY PROFILE

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### OVERVIEW

Grant County is in the extreme southwest of New Mexico, with Socorro County to the north, and Sierra and Luna Counties to the east. Grant County is 3,961.2 square miles of land, it is only exceeded by Socorro and Chaves Counties in size. The Town of Silver City was established as the county seat in 1874. Grant County was created by legislative enactment January 30, 1868. It was named for former President Ulysses S. Grant with Central City named as the seat of government. At the time Pinos Altos was then the leading town, with a larger population, more industry, and more transportation access. An act approved January 8, 1969, made Pinos Altos the county seat. Political turmoil reigned during the time of Pinos Altos being the county seat with courts not being held consistently. The turmoil led to Silver City being appointed the county seat in 1874.

The first inhabitants of the area were the Mogollon people. They lived in the Gila Wilderness in the 1280s to the early 1300s. Nomadic Apache people lived in the area prior to European and American settlers. Copper mines were established in the 1800s. Prospectors were drawn in with the promise of riches with the discovery of gold in 1860. The settlers and prospectors traveling through the area faced raids from the Apache people. Due to raids in the area Fort Bayard was established in 1866 to provide protection. The earliest settlements in Grant County can be traced to the Ralston mining camps in 1870 that were located in the town of Shakespeare, the present-day Lordsburg. The Town of Silver City was formed in 1870 and was named for the silver discovered in the area. William Bonney, also known as Billy the Kid, had his first arrest in the Town of Silver City. His family lived in the Town of Silver City for a time.

The area has always been rich with copper, gold, and other metals. The first inhabitants of the area mined flint to improve their quality of life. Ranching and irrigation farming has been prosperous in the County. In 1871 residents were irrigating corn and beans. The San Juan Dam was built in 1884, and it raised the Mimbres River three to four feet above its natural level with the water being placed in an acequia, or community based irrigation system.

Throughout the history of the County the population has fluctuated. In 1870 the census recorded a population of 1,143, by 1880 it has jumped to 4,539, an almost three hundred percent growth rate.<sup>1</sup>

Figure 3-1 shows the general location of Grant County and the communities within the county.

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<sup>1</sup> Source: [https://nmahgp.genealogyvillage.com/cty/grant\\_county\\_new\\_mexico.html](https://nmahgp.genealogyvillage.com/cty/grant_county_new_mexico.html)

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**Figure 3-1. Location of Grant County**

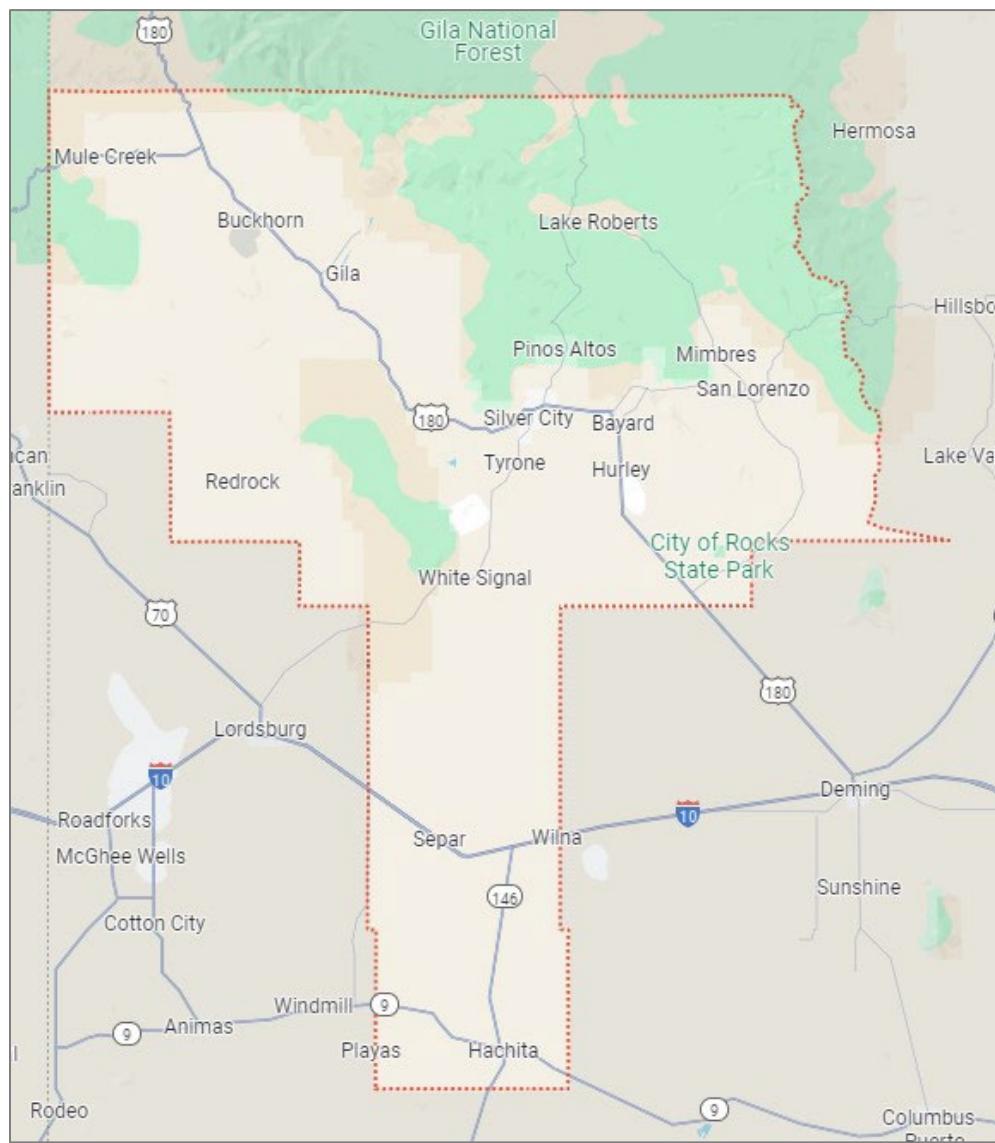


Figure 3-2 shows the Grant County jurisdictional lines that make up the planning area. The planning area refers to that which is covered in the risk assessment analysis of the Plan.

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Figure 3-2. Grant County Planning Area

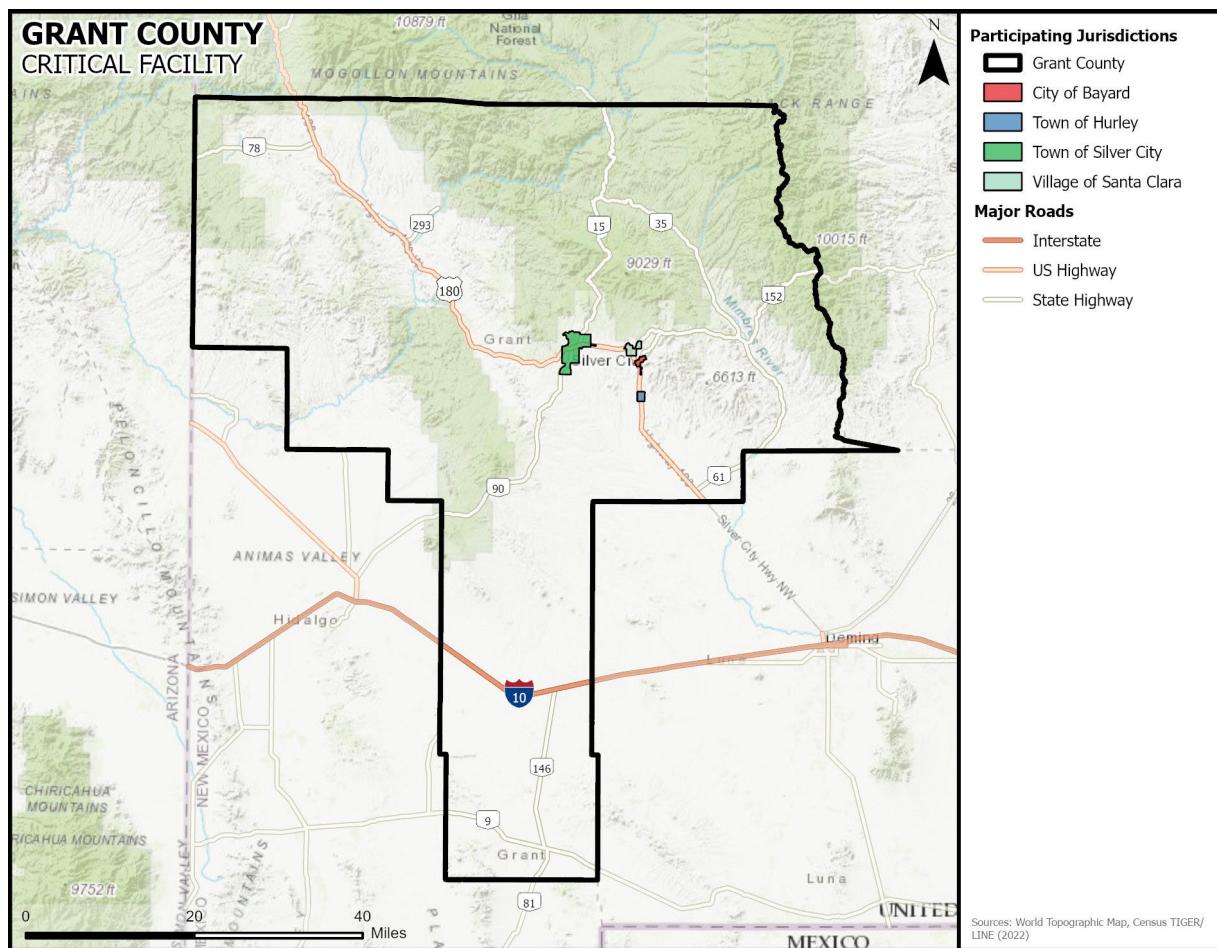


Table 3-1 below lists the jurisdictions in Grant County that participated in the Grant County Hazard Mitigation Action Plan 2025.

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS	
Grant County	
City of Bayard	Village of Santa Clara
Town of Hurley	Town of Silver City

## POPULATION AND DEMOGRAPHICS

According to the 2020 Census, Grant County has an official population of 28,185 residents, a 5% decrease since the 2010 census. Table 3-2 summarizes select characteristics of vulnerable or sensitive populations in Grant County and the participating jurisdictions using data from the U.S. Census Bureau 2022 American Community Survey (ACS) five-year estimates. Note that in some

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cases, the 2022 ACS estimates may differ from the 2020 census counts: the ACS estimates are used throughout this section for consistency.<sup>2</sup>

Between official U.S. Census population counts, the estimate uses a formula based on new residential building permits and household size. It is simply an estimate, and many variables are involved in achieving an accurate estimation of the number of people living in a given area at a given time.

**Table 3-2. Population Distribution by Jurisdiction**

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION (Census)	TOTAL 2022 POPULATION (ACS Estimates)	PERCENT CHANGE 2010-2022
Grant County	29,514	28,185	28,006	-5%
City of Bayard	2,328	2,116	2,152	-7%
Town of Hurley	1,297	1,256	1,561	20%
Village of Santa Clara	1,686	1,637	1,744	3%
Town of Silver City	10,315	9,704	9,650	-6%

**Table 3-3. Populations at Greater Risk by Jurisdiction**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County <sup>3</sup>	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

In addition to the vulnerable population counts above in Table 3-3, there are various other examined key metrics that are useful to understand the social vulnerability within Grant County. Table 3-4 lists the percentages of Grant County's 2020 population count that falls within select vulnerable populations. The table also lists Grant County's rank in each category among all counties in New Mexico, with 1<sup>st</sup> being most vulnerable and 33<sup>rd</sup> being least vulnerable.

<sup>2</sup> Source: <https://www.census.gov/en.html> and <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2022/>

<sup>3</sup> County totals include the entire population within the county lines, including unincorporated areas and non-participating jurisdictions within the County.

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**Table 3-4. Grant County Vulnerable Population Percentages, 2020<sup>4</sup>**

VULNERABLE OR SENSITIVE POPULATIONS	PERCENT OF TOTAL COUNTY POPULATION	STATEWIDE COUNTY RANKING
Children Under Age 18 Living in Poverty	26.2%	19 <sup>th</sup>
People 65 Years or Older	27.2%	7 <sup>th</sup>
Unable to Get Needed Medical Care Because of Cost	11.7%	21 <sup>st</sup>
High School Graduation Rate	14.80%	4 <sup>th</sup>
Unemployment Rate	3.4%	21 <sup>st</sup>
People With Disabilities	20.6%	12 <sup>th</sup>
Housing Units That are Mobile Homes	26.0%	14 <sup>th</sup>
Households With No Vehicle	5.7%	15 <sup>th</sup>
Households Without Broadband Internet	21.4%	25 <sup>th</sup>

## POPULATION GROWTH

The official 2020 Grant County population is 28,185. Overall, Grant County experienced a population increase of 2 percent between 1990 and 2020, or 509 residents. Between 2010 and 2020 all participating jurisdictions, including Grant County, experienced population declines. Table 3-5 provides historical growth rates in Grant County.

**Table 3-5. Population Growth by Jurisdictions 1990-2020<sup>5</sup>**

JURISDICTIONS	1990	2000	2010	2020	POP CHANGE 1990-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
Grant County	27,676	31,002	29,514	28,185	509	2%	-1,329	-5%
City of Bayard	2,598	2,534	2,328	2,116	-482	-16%	-212	-9%
Town of Hurley	1,534	1,464	1,297	1,256	-278	-17%	-41	-3%
Village of Santa Clara	1,835	1,944	1,686	1,637	-198	-10%	-49	-3%
Town of Silver City	10,683	10,545	10,315	9,704	-979	-10%	-611	-6%

<sup>4</sup> 2023 State of New Mexico Hazard Mitigation Plan. Note that in some cases the 2020 Census count may differ from the 2022 ACS estimates; unless otherwise stated, the ACS estimates are used throughout the plan for consistency.

<sup>5</sup> U.S. Census Bureau

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### ECONOMIC IMPACT

Building and maintaining infrastructure depends on the economy, and therefore, protecting infrastructure from risk due to natural hazards in the planning area is important to the participating jurisdictions within Grant County. Whether it is expanding culverts under a road that washes out during flash flooding, shuttering a fire station, or flood-proofing a wastewater facility, infrastructure must be mitigated from natural hazards in order to continue providing essential utility and emergency response services in a fast-growing planning area.

Based on the American Community Survey 2022 estimates, 35 percent of the population 16 years and over is employed in the labor force. The per capita income is \$29,123, and the median household income countywide is \$44,895. It is estimated that 56 percent of households have incomes below \$50,000. Families with incomes below the poverty level in 2022 made up 20.5 percent of all families. Of families that have children under 18 years old, 33 percent are below the poverty level.

Tables 3-6 and 3-7 show the various occupations and industries within Grant County, according to the 2022 estimates by the American Community Survey.

**Table 3-6. Occupations of Employed Population in Grant County<sup>6</sup>**

OCCUPATION	ESTIMATE	PERCENT
Civilian employed population 16 years and over	9,795	
Management, business, science, and arts occupations	3,644	37.20%
Service occupations	1,728	17.60%
Sales and office occupations	1,659	16.90%
Production, transportation, and material moving occupations	1,499	15.30%
Natural resources, construction, and maintenance occupations	1,265	12.90%

**Table 3-7. Industries of Employed Population in Grant County<sup>7</sup>**

INDUSTRY	ESTIMATE	PERCENT
Civilian employed population 16 years and over	9,795	
Wholesale trade	54	60.0%
Educational services, and health care, and social assistance	3,151	32.2%
Retail trade	1,202	12.3%

<sup>6</sup> 2022 American Community Survey 5-Year Estimates Data Profiles.

<sup>7</sup> 2022 American Community Survey 5-Year Estimates Data Profiles.

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INDUSTRY	ESTIMATE	PERCENT
Agriculture, forestry, fishing and hunting, and mining	998	10.2%
Arts, entertainment, and recreation, and accommodation and food services	991	10.1%
Construction	841	8.6%
Professional, scientific, and management, and administrative and waste management services	683	7.0%
Public administration	406	4.1%
Other services, except public administration	403	4.1%
Manufacturing	366	3.7%
Finance and insurance, and real estate and rental and leasing	321	3.3%
Transportation and warehousing, and utilities	245	2.5%
Information	134	1.4%

## NATURAL, CULTURAL, AND HISTORIC RESOURCES

Grant County is bordered by Arizona to the west. The Continental Divide runs across the County. A large portion of northern Grant County lies in the Datil section of the Colorado Plateaus, an area that consists of the Mogollon, Mule, Mimbres, and Black Tange mountains. The Gila River flows westward on the northern portion of the county. The southern section of the county has the Big Burro Mountains. The mountainous area is in the Gila National Forest with the highest sections in the Gila and Aldo Leopold wilderness. City of Rocks State Park is located in Grant County.

Residents and visitors can enjoy the trailheads by following the Boston Hill Trails and Open Space Map in the Town of Silver City. The Town of Silver City also has a museum, swimming pool, golf course, recreation center, and sixteen parks / open space for outdoor enthusiasts.

The Gila Cliff Dwellings National Monument and Gila Wilderness / Gila National Forest are popular attractions. At the site you can get a glimpse of the Mogollon Culture, the initial inhabitants who lived in the cliff side rooms while raising their families before they left the area in the 1300s. There are guided tours, hikes, wildlife, night sky views, and hot springs that can be explored.

To further understand natural resources that may be vulnerable to a hazard event and those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. A federally endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by federal law, and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

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According to the U.S. Fish and Wildlife Service, as of December 2024, there are 16 federally endangered, threatened, or candidate species in Grant County, listed in Table 3-8. This list does not include experimental population, resolved taxon, or under review species.

**Table 3-8. Endangered Species in Grant County<sup>8</sup>**

TYPE of SPECIES	COMMON NAME	SCIENTIFIC NAME	SPECIES STATUS
Fishes	Gila top minnow (inc. Yaqui)	<i>Poeciliopsis occidentalis</i>	Endangered
Mammals	Mexican long-nosed bat	<i>Leptonycteris nivalis</i>	Endangered
Fishes	Loach minnow	<i>Tiaroga cobitis</i>	Endangered
Fishes	Gila chub	<i>Gila intermedia</i>	Endangered
Fishes	Spikedace	<i>Meda fulgida</i>	Endangered
Birds	Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered
Flowering Plants	Swale paintbrush	<i>Castilleja ornata</i>	Endangered
Flowering Plants	Wright's marsh thistle	<i>Cirsium wrightii</i>	Threatened
Birds	Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Threatened
Fishes	Gila trout	<i>Oncorhynchus gilae</i>	Threatened
Birds	Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened
Reptiles	Narrow-headed gartersnake	<i>Thamnophis rufipunctatus</i>	Threatened
Reptiles	Northern Mexican gartersnake	<i>Thamnophis eques megalops</i>	Threatened
Amphibians	Chiricahua leopard frog	<i>Rana chiricahuensis</i>	Threatened
Fishes	Chihuahua chub	<i>Gila migrescens</i>	Threatened
Insects	Monarch butterfly	<i>Danaus plexippus</i>	Candidate

Grant County's designated historic buildings and sites preserve a rich history. The county has 47 entries on the National Register of Historic Places. Of those 34 are buildings and structures, 5 are sites, and 8 are historical districts. Historic buildings are vulnerable to natural hazards as their construction pre-dates modern building codes. There are also historic preservation considerations and requirements for historic structures when they are included in mitigation or recovery projects.

Additionally, there are 71 sites in the Grant County planning area listed on the New Mexico State Register of Cultural Properties.<sup>9</sup> The State Register includes sites, buildings, features, or events

<sup>8</sup> Source: <https://ecos.fws.gov/ecp/report/species-listings-by-current-range-county?fips=35017>

<sup>9</sup> <https://www.nmhistoricpreservation.org/programs/registers.html>

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that are of local significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value.

### EXISTING LAND USE AND DEVELOPMENT TRENDS

A zoning ordinance sets forth regulations and standards related to the extent of land and structure uses that are allowed in certain areas. A zoning map shows the areas within a community where the various zoning districts and standards are located and gives an overall picture of what types of development are located in a community and how a community intends to continue to grow. All participating jurisdictions within Grant County have a zoning ordinance in place.

A subdivision regulation is a municipal ordinance mandating a review of a proposed division of land into separate lots for resale against pre-determined standards. It is designed to guarantee adequate streets, utilities, drainage, vehicular egress (leaving the area), and vehicular ingress (entering the area). By governing the division of land in a jurisdiction, subdivision regulations establish rules for the creation of lots, blocks, and streets, and provide for the establishment of easements, parks, and public rights-of-way. Currently, Grant County, Town of Silver City, and Town of Hurley have subdivision regulations in place. Refer to the Capability Assessment in Appendix F for a full list of the plans, ordinances, and other resources in place for all participating jurisdictions.

**Table 3-9. Building Permits, by Jurisdiction, 2019-2023<sup>10</sup>**

JURISDICTION	2019		2020		2021		2022		2023	
	Total Buildings	Total Units								
City of Bayard*	-	-	-	-	-	-	-	-	-	-
Town of Hurley*	-	-	-	-	-	-	-	-	-	-
Town of Silver City	10	10	10	10	0	0	3	3	0	0
Village of Santa Clara*	-	-	-	-	-	-	-	-	-	-
Grant County <sup>11</sup>	0	0	0	0	0	0	0	0	0	0
<b>Planning Area Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>0</b>

\*Data for jurisdiction was not included in the database.

Certain types of housing found in the Grant County planning area are more vulnerable than typical site-built, newly constructed residential structures. This includes mobile or manufactured homes, of which 3,824 (26 percent of total housing stock) are in the planning area. Additionally, single-family residences (SFR) built before 1980 are typically built to lower or less stringent construction standards than newer construction, making these homes more susceptible to damage during hazard events. These older homes comprise 56 percent (approximately 8,208 structures) of

<sup>10</sup> U.S. Census Bureau, Building Permit Survey, 1992-2021, <https://www.census.gov/construction/bps/>

<sup>11</sup> County totals include all total building permits within the county lines, including unincorporated areas and non-participating jurisdictions within the County.

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housing stock in the planning area. Table 3-10 includes housing inventory data for the participating jurisdictions per the American Community Survey five-year estimates.

**Table 3-10. Housing Inventory and Vulnerable Structures, By Jurisdiction<sup>12</sup>**

JURISDICTION	TOTAL HOUSING UNITS	BUILT PRIOR TO 1980	MOBILE HOMES
Grant County	14,625	8,208	3,824
City of Bayard	1,183	809	164
Town of Hurley	786	631	195
Village of Santa Clara	755	518	265
Town of Silver City	4,816	3,509	730

## CHANGES IN VULNERABILITY

The Grant County planning area experienced an overall population decrease of 5 percent between 2010 and 2020. The American Community Survey estimates the 2022 total housing units for the planning area to be 14,625. Per the U.S. Census Building Permit Survey, there were twenty-three single housing building permits, or 0.17 percent, were issued from 2019 to 2023. The overall population decrease, combined with no movement in housing units, indicates no notable increase in vulnerability to all hazards in terms of populations and the built environment. Changes in vulnerability vary by jurisdiction based on each jurisdiction's trends in population and development (Table 3-11).

While the actual numbers of new structures in the floodplain and Wildland Urban Interface (WUI) are not available, decreases in population and no movement in building inventory suggest that vulnerability has not increased and has likely remained the same, even within these specific geographic areas.

**Table 3-11. Changes in Vulnerability, by Jurisdiction**

JURISDICTION	POPULATION TREND	HOUSING TREND	OVERALL VULNERABILITY CHANGES
Grant County	Decreasing	No Change	No Change
City of Bayard	Decreasing	Increasing	Slight Increase
Town of Hurley	Decreasing	No Change	No Change
Village of Santa Clara	Decreasing	No Change	No Change
Town of Silver City	Decreasing	No Change	No Change

<sup>12</sup> The Housing Inventory and Vulnerable Structures are based off the 2022 American Community Survey 5-Year Estimates Data Profiles.

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### FUTURE GROWTH AND DEVELOPMENT

To better understand how future growth and development in Grant County might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. This section includes an analysis of the projected population change and economic impacts.

Population projections from 2010 to 2040 are listed in Table 3-11, provided by the University of New Mexico Geospatial and Population Studies. Population projections are based on a 0.5 scenario growth rate, which is 50 percent of the population growth rate from 2000-2010. This information is only available at the county level; however, the population projection shows an overall decrease in population and population density for the county.

**Table 3-11. Grant County Population Projections<sup>13</sup>**

LAND AREA (SQ MI)	2010		2020		2030		2040	
	Population							
	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
3961	29,514	7.45	28,185	7.11	26,599	6.71	24,077	6.07

Comprehensive Plans are guiding documents in a community that set forth a vision, goals, policies, and guidelines to direct future physical, social, and economic development within a jurisdiction. They are part of a continuous process to provide an environment for citizens and consider the general desire of the community to conserve, preserve, and protect the natural environment of their jurisdiction. These plans guide staff, decision-makers, and citizens in making decisions that affect the community with an understanding of the long-term effects. The following is a summary of a sample of Comprehensive Plans participating jurisdictions in Grant County have in place. Refer to Appendix F Capability Assessment for a complete list of participating jurisdictions with Comprehensive Plans.

Grant County has a comprehensive plan that was adopted in June 2017. This Comprehensive Plan will assist the County in preparing for the future by anticipating change, maximizing strengths, and minimizing weaknesses. The plan provides a vision for Grant County's future with recommendations on topics such as land use, community character, economic development, housing, transportation, utilities and water, and hazard mitigation.

In addition to the County, all of the participating jurisdictions have a comprehensive plan in place. The City of Bayard adopted theirs in February 2021, the Town of Hurley adopted theirs in June 2023, the Village of Santa Clara adopted theirs in 2013, and the Town of Silver City adopted theirs in September 2017 with the long-term focus and proposed actions of the plan continuing to strengthen the growth and resilience in the communities. The plans contain recommendations on growth and community character, updated infrastructure and critical services, land use and development, economic development, zoning opportunities, mobility, and community facilities and services.

<sup>13</sup> Source: <https://gps.unm.edu/pop/population-projections.html>



# SECTION 4

# RISK OVERVIEW

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### HAZARD DESCRIPTION

Section 4 is the first phase of the Risk Assessment, providing background information for the hazard identification process and descriptions for the hazards identified. The Risk Assessment continues with Sections 5 through 16, which include hazard descriptions and vulnerability assessments.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, participating jurisdictions identified 11 natural hazards and 1 human-caused hazard that are addressed in the Hazard Mitigation Action Plan and were identified as significant, as shown in Table 4-1. The hazards were identified through input from Planning Team members and a review of the current 2023 State of New Mexico Hazard Mitigation Plan (State Plan). Readily available online information from reputable sources such as federal and state agencies were also evaluated and utilized to supplement information as needed.

There are five main categories of natural hazards: atmospheric, geologic, hydrologic, technological, and human-caused. Atmospheric hazards are events or incidents associated with weather-generated phenomena. The following are significant for the planning area: extreme cold, extreme heat, hail, high wind, lightning, severe winter storm, and tornado (Table 4-1).

Hydrologic hazards are events or incidents associated with water-related damage and account for over 75 percent of federal disaster declarations in the United States. Hydrologic hazards identified as significant for the planning area include flood and drought.

Technological hazards refer to the origins of incidents that can arise from human activities, such as the construction and maintenance of dams. They are distinct from natural hazards primarily because they originate from human activity. The risks presented by natural hazards may be increased or decreased due to human activity. However, they are not inherently human-induced. Therefore, dam failure is classified as a quasi-technological hazard and referred to as “technological” in Table 4-1 for description purposes.

For the Risk Assessment, the wildfire hazard is considered “other,” since it is not considered atmospheric, hydrologic, geologic, nor technological.

Human-caused hazards are events or incidents caused by human intent, human error, or failed systems. They can be caused or exacerbated by either accidental or intentional human actions that result in the loss of life or property. The human-caused hazard identified as significant for the county is hazardous materials.

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**Table 4-1. Hazard Descriptions**

HAZARD	DESCRIPTION
<b>ATMOSPHERIC</b>	
<b>Extreme Cold</b>	Extreme cold refers to temperatures that are significantly lower than what is normal for a particular region or season. Extreme cold may also result in a freeze, which occurs when the temperature drops below 32°F for a significant period of time.
<b>Extreme Heat</b>	Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period of time.
<b>Hail</b>	Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass.
<b>High Wind</b>	Wind is defined as the motion of air relative to the earth's surface, and the hazard of high wind is commonly associated with severe thunderstorm winds, tornadoes, hurricanes, and tropical storms. High winds can also occur in the absence of other definable hazard conditions, occurring in forms such as straight-line winds or microbursts.
<b>Lightning</b>	Lightning is a sudden electrostatic discharge that occurs during an electrical storm. This discharge occurs between electrically charged regions of a cloud, between two clouds, or between a cloud and the ground.
<b>Severe Winter Storm</b>	Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 mph, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
<b>Tornado</b>	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. The destruction caused by tornadoes ranges from light to catastrophic, depending on the location, intensity, size, and duration of the storm.
<b>HYDROLOGIC</b>	
<b>Drought</b>	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality.

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HAZARD	DESCRIPTION
Flood	The accumulation of water within a body of water, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, and shallow flooding.
<b>OTHER</b>	
Wildfire	A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
<b>TECHNOLOGICAL</b>	
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.
<b>HUMAN-CAUSED</b>	
Hazardous Materials	Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.

All profiled hazards for Grant County are listed in Table 4-1 and are consistent with hazards profiled in the 2023 New Mexico State Hazard Mitigation Plan. Hazards that were not considered significant and were not included in the Plan are located in Table 4-2, along with the evaluation process used for determining the significance of each of these hazards. Hazards not identified for inclusion this time may be addressed during future evaluations and updated.

**Table 4-2. Other Hazards Deferred**

HAZARD CONSIDERED	REASON FOR DETERMINATION
Earthquake	Earthquake occurrence for the planning area is considered exceedingly rare and is not considered to pose a risk to the planning area. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of earthquakes, and impact is not expected in the future.

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HAZARD CONSIDERED	REASON FOR DETERMINATION
<b>Expansive Soils</b>	There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of expansive soils and none is expected in the future.
<b>Landslide and Rockfall</b>	There are no historical occurrences of landslide and rockfall for the planning area. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of landslide and rockfall and none is expected in the future.
<b>Land Subsidence</b>	There are no historical occurrences of land subsidence for the planning area and it is located in an area where occurrences are considered rare. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of land subsidence and none is expected in the future.
<b>Volcano</b>	Although there is potential for volcanic activity in the planning area, the State of New Mexico has not experienced volcanic activity for approximately 3,900 years and the probability of new occurrences within the foreseeable future are exceedingly low.

## DISASTER DECLARATION HISTORY

One method of understanding hazards that pose a risk to the planning area is to identify past hazard events that triggered federal or state disaster declarations. Federal and state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. Table 4-3 lists state and federal disaster declarations received by Grant County. Many of the disaster events were regional or statewide.

Between 1953 and 2024, Grant County received 12 federal disaster declarations. The largest share (5) was related to floods, followed by declarations for fire (3), biological (2), impacts from the Hurricane Katrina evacuation (1), and severe storm (1).

In addition to the 12 federally declared disaster there have been 30 U.S. Department of Agriculture (USDA) Secretarial disaster designations between 2012 and 2024. The Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans available to producers suffering losses in those counties and in counties that are contiguous to a designated county.<sup>1</sup> Of the 30 USDA designations for Grant County, many listed multiple factors as having caused the disaster area designation. The leading cause was drought, which was included in all 30 designations. Other factors listed include excessive heat (13 designations), high wind (13), fire / wildfire (13), and insects (13).

<sup>1</sup> United States Department of Agriculture [https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/emergency\\_disaster\\_designation\\_declaration\\_process-factsheet.pdf](https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/emergency_disaster_designation_declaration_process-factsheet.pdf)

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**Table 4-3. Disaster Declaration History in Grant County, 1953-2024**

YEAR	DECLARATION TITLE	HAZARD	DECLARATION TYPE	DISASTER No.
1972	Heavy Rains, Flooding	Flood	DR	DR-361
1979	Flooding	Flood	DR	DR-571
1983	Severe Storms, Flooding	Flood	DR	DR-692
1985	Severe Storms, Flooding	Flood	DR	DR-731
1993	Flooding, Severe Storm	Flood	DR	DR-992
2000	New Mexico Fire	Fire	EM	EM-3154
2005	Hurricane Katrina Evacuation	Hurricane	EM	EM-3229
2006	Severe Storms and Flooding	Severe Storm	DR	DR-1659
2011	Quail Ridge Fire	Fire	FM	FM-2866
2012	Whitewater-Baldy Fire Complex	Fire	FM	FM-2978
2020	Covid-19	Biological	EM	EM-3460
2020	Covid-19 Pandemic	Biological	DR	DR-4529

## NATURAL HAZARDS AND CLIMATE CHANGE

Climate change is defined as a long-term shift in temperature and weather patterns. These shifts can increase or decrease the risk of natural hazards. Global climate change is expected to exacerbate the risks of certain types of natural hazards impacted through rising sea levels, warmer ocean temperatures, higher humidity, the possibility of stronger storms, and an increase in wind and flood damages due to storm surges. New Mexico is considered particularly vulnerable to climate change as atmospheric warming and its cascading effects may result in greater severity and frequency of hazard events such as wildfires, extreme heat, and flooding.

Climate change is expected to lead to an increase in average temperatures as well as an increase in frequency, duration, and intensity of extreme heat events. With no reductions in emissions worldwide, the state of New Mexico is expected to experience an increase in average temperature by 5°F to 7°F over the next 50 years.

The New Mexico Bureau of Geology and Mineral Resources published *Climate Change in New Mexico Over the Next 50 Years: Impacts on Water Resources* in 2022, which identifies ongoing and likely future climate trends over the next 50 years in New Mexico based on historical observations and studies conducted at regional, national, and global scales. Table 4-4 highlights New Mexico's future trends in extreme weather from the report.

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**Table 4-4. Future Trends in Extreme Weather in New Mexico<sup>2</sup>**

HAZARDS	EXPECTED TRENDS
Extreme Temperatures	<ul style="list-style-type: none"> <li>Over the next 50 years, statewide temperatures are projected to increase by 5°F to 7°F.</li> <li>Climate warming will greatly increase the frequency of extreme temperature days and heat waves.</li> <li>Forest stress and tree mortality will increase as atmospheric warming continues.</li> <li>The coolest days of the summer are expected to continue becoming warmer.</li> <li>The number of frost days per year are expected to decrease.</li> <li>The coolest days of the summer are expected to continue becoming warmer.</li> </ul>
Precipitation	<ul style="list-style-type: none"> <li>Across the state, models do not consistently project a significant change in average annual precipitation. However, some seasonal precipitations may emerge, such as more winter precipitation in the northern mountains, and drier seasons in the southern parts of New Mexico.</li> <li>Spring precipitation, critical for snowmelt runoff and ecosystems, may decline.</li> <li>Somewhat stronger monsoonal activity may result in more summer precipitation in southern New Mexico.</li> </ul>
Drought	<ul style="list-style-type: none"> <li>Increasing temperatures and no clear increasing trend in precipitation lead to a projection of increasingly arid conditions, decreased soil moisture, stressed vegetation, and more severe droughts.</li> <li>Substantial declines in snowpack and associated water runoff by 2070 will lead to diminished headwater streamflow, negatively impacting water supply.</li> <li>Warmer temperatures will also lead to lower river flows due to increasing evaporation.</li> </ul>
Flood	<ul style="list-style-type: none"> <li>A warming climate could increase the magnitude of future storms, leading to more extreme precipitation events that result in flooding.</li> <li>Data suggests that the most severe storms New Mexico experiences may not increase beyond current estimated values, however less severe (but still high intensity) storms may occur more frequently.</li> <li>Increases in the frequency and severity of wildfires may dramatically increase the probability and magnitude of flooding and debris flows.</li> </ul>

<sup>2</sup> Dunbar, N.W., Gutzler, D.S., Pearthree, K.S., Phillips, F.M., Bauer, P.W., Allen, C.D., DuBois, D., Harvey, M.D., King, J.P., McFadden, L.D., Thomson, B.M., and Tillery, A.C., 2022, Climate change in New Mexico over the next 50 years: Impacts on water resources: New Mexico Bureau of Geology and Mineral Resources, Bulletin 164, 218 p. <https://doi.org/10.58799/B-164>

## SECTION 4: RISK OVERVIEW

HAZARDS	EXPECTED TRENDS
Winter Weather	<ul style="list-style-type: none"><li>As the climate warms, the likelihood of winter weather decreases.</li><li>Both extreme cold and snowfall either become less frequent or are expected to do so.</li><li>Fewer cold spells are projected to occur per year, but the length of cold spells will be longer when they do occur.</li></ul>
Thunderstorms (Wind, Hail, Lightning)	<ul style="list-style-type: none"><li>Projection suggests little change in the frequency of extreme storm events over the next few decades, however an increase in summer storm events is predicted after 2050.</li><li>Though New Mexico may experience more thunderstorms in the future, it is not clear that they will result in an increased risk of flooding due, in part, to typically short storm durations.</li><li>Even less severe storms could result in and exacerbate debris flows following wildfires (which are expected to increase in frequency.).</li><li>Generally, there is a high level of scientific uncertainty with future extreme precipitation events, meaning continuing future research is needed to reveal potential trends.</li></ul>
Wildfire	<ul style="list-style-type: none"><li>Weather and climate drivers of wildfire risk are projected to increase the burn area, severity, frequency, and overall risk of wildfires throughout the state.</li><li>Other climate trends that will exacerbate wildfire risk include warmer temperatures, decreased water supply, lower soil moisture levels, and a general trend toward more arid conditions.</li><li>Increased amounts of runoff from a greater number of wildfires may degrade water quality.</li><li>Plant communities stressed by higher temperatures and greater aridity will result in more extreme wildfires.</li><li>Coupled with a rise in rainfall intensities, post-wildfire erosion will increase and become more widespread.</li></ul>

## OVERVIEW OF HAZARD ANALYSIS

The methodologies utilized to develop the Risk Assessment are a historical analysis and a statistical approach. Both methodologies provide an estimate of potential impact by using a common, systematic framework for evaluation.

Records retrieved from the National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA) were reported for Grant County. Remaining records identifying the occurrence of hazard events in the planning area and the maximum recorded magnitude of each event were also evaluated.

The use of geographic information system (GIS) technology to identify and assess risks for Grant County and evaluate community assets and their vulnerability to the hazards.

The four general parameters that are described for each hazard in the Risk Assessment include frequency of return, approximate annualized losses, a description of general vulnerability, and a statement of the hazard's impact.

## SECTION 4: RISK OVERVIEW

Frequency of return was calculated by dividing the number of events in the recorded time period for each hazard by the overall time period that the resource database was recording events. Frequency of return statements are defined in Table 4-5, and impact statements are defined in Table 4-6 below.

**Table 4-5. Frequency of Return Statements**

PROBABILITY	DESCRIPTION
<b>Highly Likely</b>	Event is probable in the next year.
<b>Likely</b>	Event is probable in the next three years.
<b>Occasional</b>	Event is probable in the next five years.
<b>Unlikely</b>	Event is probable in the next ten years.

**Table 4-6. Impact Statements**

POTENTIAL SEVERITY	DESCRIPTION
<b>Substantial</b>	Multiple deaths. Complete shutdown of facilities for 30 days or more. More than 50 percent of property destroyed or with major damage.
<b>Major</b>	Injuries and illnesses resulting in permanent disability. Complete shutdown of critical facilities between one and four weeks. More than 25 percent of property destroyed or with major damage.
<b>Minor</b>	Injuries and illnesses do not result in permanent disability. Complete shutdown of critical facilities for up to one week. More than 10 percent of property destroyed or with major damage.
<b>Limited</b>	Injuries and illnesses are treatable with first aid. Shutdown of critical facilities and services for 24 hours or less. Less than 10 percent of property destroyed or with major damage.

Each of the hazard profiles includes a description of a general Vulnerability Assessment. Vulnerability is the total of assets that are subject to damages from a hazard, based on historic recorded damages. Assets in the region were inventoried and defined in hazard zones where appropriate. The total amount of damages, including property and crop damages, for each hazard is divided by the total number of assets (building value totals) in that community to determine the percentage of damage that each hazard can cause to the community. Risk and consequences will be addressed and covered within each hazard profile under the Vulnerability and Impact section as well as under the Assessment of Impact sections, where applicable.

To better understand how future growth and development in the Grant County region might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management

## SECTION 4: RISK OVERVIEW

efforts. Hazard vulnerability for all participating jurisdictions within Grant County was reviewed based on recent development changes that occurred throughout the planning area. The overall population of Grant County has decreased by 5 percent between 2010 and 2020, according to the U.S. Census Bureau, therefore the vulnerability to the population, infrastructure, and buildings has remained essentially unchanged for hazards that do not have a geographical boundary.

Once loss estimates and vulnerability were known, an impact statement was applied to relate the potential impact of the hazard on the assets within the area of impact.

### HAZARD RANKING

During the 2025 planning process, the Planning Team conducted a risk ranking exercise to get input from the Planning Team and stakeholders. Table 4-7 portrays the results of the risk assessment analysis including the frequency of occurrence and potential severity and the Planning Team's self-assessment for hazard ranking, based on local knowledge of past hazard events and impacts for each of the identified hazards. The definitions for frequency of occurrence and potential severity can be found in Table 4-5 and Table 4-6.

**Table 4-6. Hazard Risk Ranking**

HAZARD	FREQUENCY OF OCCURRENCE	POTENTIAL SEVERITY	RANKING
<b>NATURAL HAZARDS</b>			
Drought	Highly Likely	Limited	High
Flood	Highly Likely	Substantial	High
Wildfire	Highly Likely	Substantial	High
Extreme Cold	Highly Likely	Limited	Moderate
Extreme Heat	Highly Likely	Limited	Moderate
High Wind	Highly Likely	Limited	Moderate
Dam Failure	Unlikely	Limited	Low
Hail	Highly Likely	Limited	Low
Lightning	Highly Likely	Limited	Low
Severe Winter Storm	Highly Likely	Limited	Low
Tornado	Occasional	Limited	Low
<b>HUMAN-CAUSED HAZARDS</b>			
Hazardous Materials	Occasional	Major	Moderate

## SECTION 4: RISK OVERVIEW

### RISK ASSESSMENT RESOURCES AND DATA LIMITATIONS

The risk and vulnerability assessment relies heavily on the content of the National Oceanic and Atmospheric Administration (NOAA) National Center for Environmental Information (NCEI) Storm Events Database. This database covers weather-related hazards that affect the planning area and that are profiled in this plan including severe winter weather (winter storm), drought, hail, lightning, high wind, flood, extreme cold, extreme heat, and tornado. Other hazards were analyzed using databases containing more comprehensive historical data specific to New Mexico such as the New Mexico Forestry Division of the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) for wildfires. Historical dam incidents, including failures, were researched through the Association of State Dam Safety Officials database which provides historical dam incidents.

The NCEI Storm Events Database is a rich centralized repository of nationwide weather-related hazard events. Among other things, it is the source used by NOAA to populate its monthly storm data publication. The database contains recorded weather events of significance based on a range of potential criteria including intensity, duration, damages, injuries, or other otherwise notable events. The history of data available in the NCEI database allows the study of impacts of individual hazards over an extended period of time. This data contributes to the framework for understanding relative risks over time.

While the NCEI is considered as one of the most comprehensive national historical event databases it is not without limitations. Records of historical occurrences in the state shows significant variations in the number of events recorded from one county to the next. Further research shows that the variations are more attributable to under-reporting of events than variations in weather occurrences. Only the events that have been reported or recorded in the database are factored into the risk assessment when no other reliable resources are available. It is accurate to assume that additional natural hazard occurrences have gone unreported or have been underreported. The risk assessment in this plan is considered the baseline for estimating potential future losses and frequency of events, which are assumed to be the minimum the planning area can anticipate. Additionally, significant events may be reported by both the county and local jurisdictions. This is due to reports from various locations impacted by a given event.

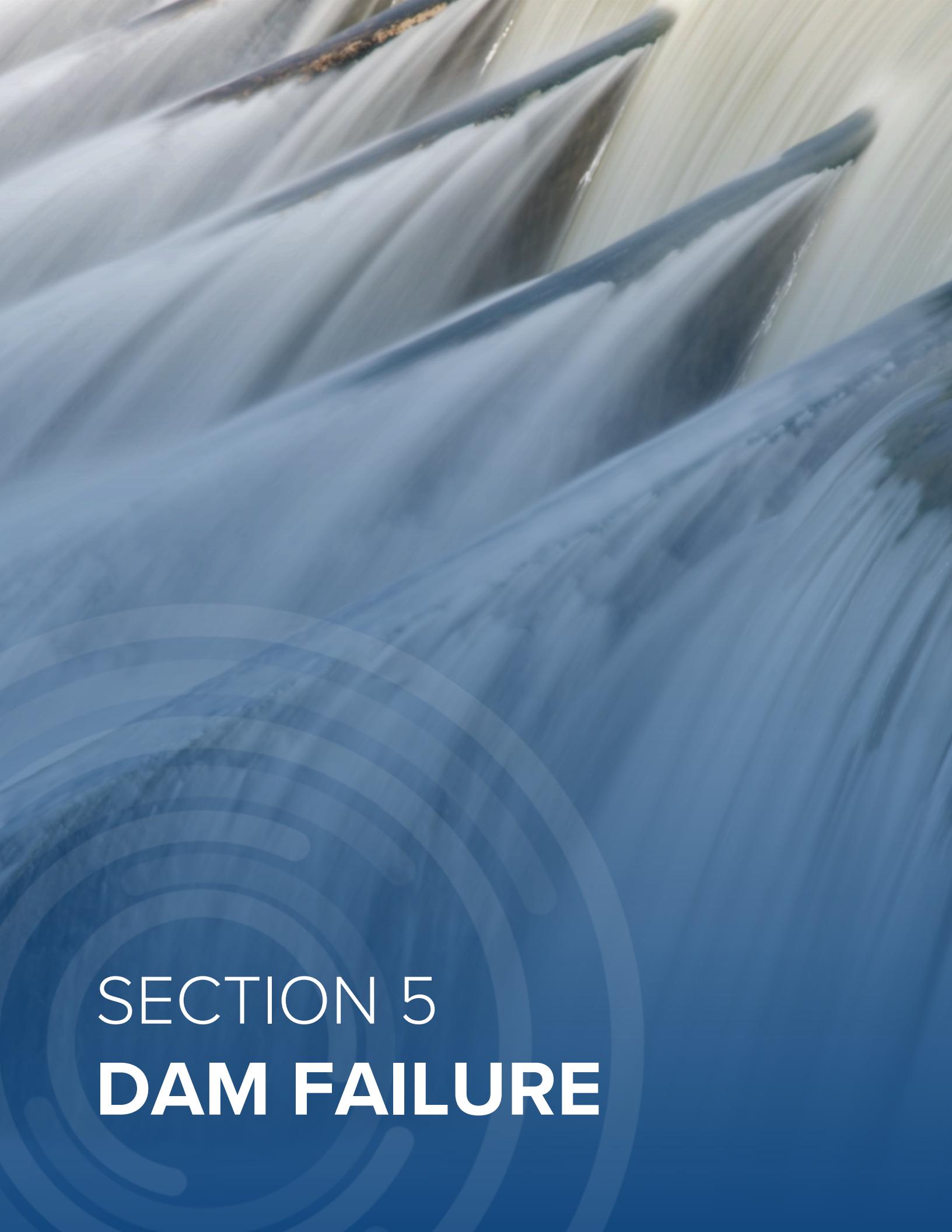
Finally, damages are not reported for the majority of events recorded in the NCEI as property damage estimates are not always available. Natural hazard event damages are often covered by private insurance and statistical insurance data is not readily available in the public domain. The NWS regional forecast coordinators utilize the resources available to them to describe damages or impacts of events. However, local input is key to assigning damages to historical events.

### ASSUMPTIONS

Event data is often reported at the county level only. This is primarily due to the nature of most natural hazards impacting areas larger than a single municipality. Winter storms or extreme heat, for example, impact large regions and are not confined to a single location. NWS regional coordinators typically gather event data from countywide or regional reporting and record it accordingly. Some exceptional events are captured by NWS regional coordinators when the impact of the event is severe or catastrophic. However, most events recorded at the municipality level are conveyed by local officials. Event data at the municipality level is often limited as a result. Due to the more robust reporting at the county level and limited reporting at the local level, summary vulnerability statements are formulated using both local and countywide event data.

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These vulnerability assessments assume that events impacting the county similarly impact the jurisdictions within that county. Therefore, the countywide assessment is considered similar for all participating jurisdictions unless stated otherwise. Future risk and vulnerability assessments at the local, county and state level will benefit significantly from increased, detailed event reporting.



# SECTION 5

# DAM FAILURE

## SECTION 5: DAM FAILURE

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### HAZARD DESCRIPTION

Dams are water storage, control, or diversion structures that impound water upstream in reservoirs. Dam failure can take several forms, including a collapse of or breach in the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping of the embankment;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components;
- Improper design or use of improper construction materials;
- Failure of upstream dams in the same drainage basin;
- High winds, which can cause significant wave action and result in substantial erosion;
- Destructive acts of terrorism; and,
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.

Benefits provided by dams include water supplies for drinking; irrigation and industrial uses; flood control; hydroelectric power; recreation; and navigation. Dams in New Mexico serve many purposes, some of which include recreation, flood mitigation, irrigation, water supply, and fire protection. Most dams in New Mexico are earthen and used for flood control.

While dams serve a role in helping communities' function, dams also represent a risk to public safety. Dams require ongoing maintenance, monitoring, safety inspections, and sometimes even rehabilitation to continue safe service.

In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and substantial property damage. A devastating effect on water supply and power generation could be expected as well. The terrorist attacks of September 11, 2001, generated increased focus on protecting the country's infrastructure, including ensuring the safety of dams.

## SECTION 5: DAM FAILURE

One major issue with the safety of dams is their age. The average age of the United States' more than 90,000 dams is 57 years.<sup>1</sup> According to estimates released in 2022 by the Association of State Dam Safety Officials, the total cost of rehabilitating non-federal dams is \$75.69 billion. Of non-federal dams, the high-hazard potential dams are estimated at a total of \$24.04 billion for rehabilitation.<sup>2</sup> In addition to the continual aging of dams, there have not been significant increases in the number of safety inspectors resulting in haphazard maintenance and inspection. The current maintenance budget does not match the scale of the United States' long-term modifications of its watersheds. Worse still, more people are moving into risky areas. As the population grows, dams that once could have failed without major repercussions are now upstream of cities and development.



## LOCATION

The Office of the State Engineer Dam Safety Bureau regulates all dams that equal or exceed 25 feet in height, which exceed 15 acre-feet of storage or dams that equal or exceed 50 acre-feet storage, which equal or exceed 6 feet in height. Of the more than 600 dams in the state, nearly 300 dams have jurisdictional status.<sup>3</sup> The National Dam Safety Review Board (in coordination with FEMA) and the National Inventory of Dams (NID) list a total of 20 dams in the entire Grant

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<sup>1</sup> American Society of Civil Engineers. "2021 Report Card for America's Infrastructure." 2021. <https://infrastructurereportcard.org/>

<sup>2</sup> Association of State Dam Safety Officials, "The Cost of Rehabilitating Our Nation's Dams". March 2022. [https://damsafety-stag.s3.amazonaws.com/s3fs-public/files/Cost%20of%20Rehab%20Report-2022%20FINAL\\_0.pdf](https://damsafety-stag.s3.amazonaws.com/s3fs-public/files/Cost%20of%20Rehab%20Report-2022%20FINAL_0.pdf)

<sup>3</sup> Office of the State Engineer. Dam Safety Bureau. <https://www.ose.nm.gov/dams/>

## SECTION 5: DAM FAILURE

County planning area. Each of these dams were analyzed individually by location, volume, elevation, and condition (where available) when determining the risk, if any, for each dam. Each dam site was further analyzed for potential risks utilizing FEMA's National Flood Hazard Layer to map locations and fully understand development near the dam and topographical variations that may increase risk. There are no known high or significant hazard dams outside of the county with the potential to impact the planning area in the event of a breach.

Most of the dams listed were embankments for typically dry detention drainage areas or shored up stream embankments. These types of structures are utilized for flood control and do not pose a dam failure risk. Other dams in the planning area feature such limited storage capacity that they pose no risk to structures, infrastructure, or citizens. Dams that were deemed to pose no past, current, or future risk to the planning area are not profiled in the plan as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. Based on this detailed analysis, the planning team was able to determine that 12 of the 20 dams identified pose a potential risk to the planning area. These dams are listed in Table 5-1 with regulation information and are profiled in detail in the Extent section of this hazard profile.

Figure 5-1 illustrates the general location for the critical dams in the planning area. An estimated inundation radius has been included on the location map for each profiled dam (indicated by the red circle). For dams with a maximum storage capacity of 100,000 acre-feet or more, all structures within five miles are considered to be at risk to potential dam or levee failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all structures within three miles are considered to be at risk to potential dam or levee failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all structures within one mile are considered to be at risk of potential dam failure hazards.

The only jurisdiction profiling dam failure is Grant County. The City of Bayard, Town of Hurley, Village of Santa Clara, and Town of Silver City are not profiling dam failure, even if they may experience localized flooding due to a dam breach, as flood is addressed as a separate hazard in this plan.

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Figure 5-1. Planning Area Dams with Potential Risk

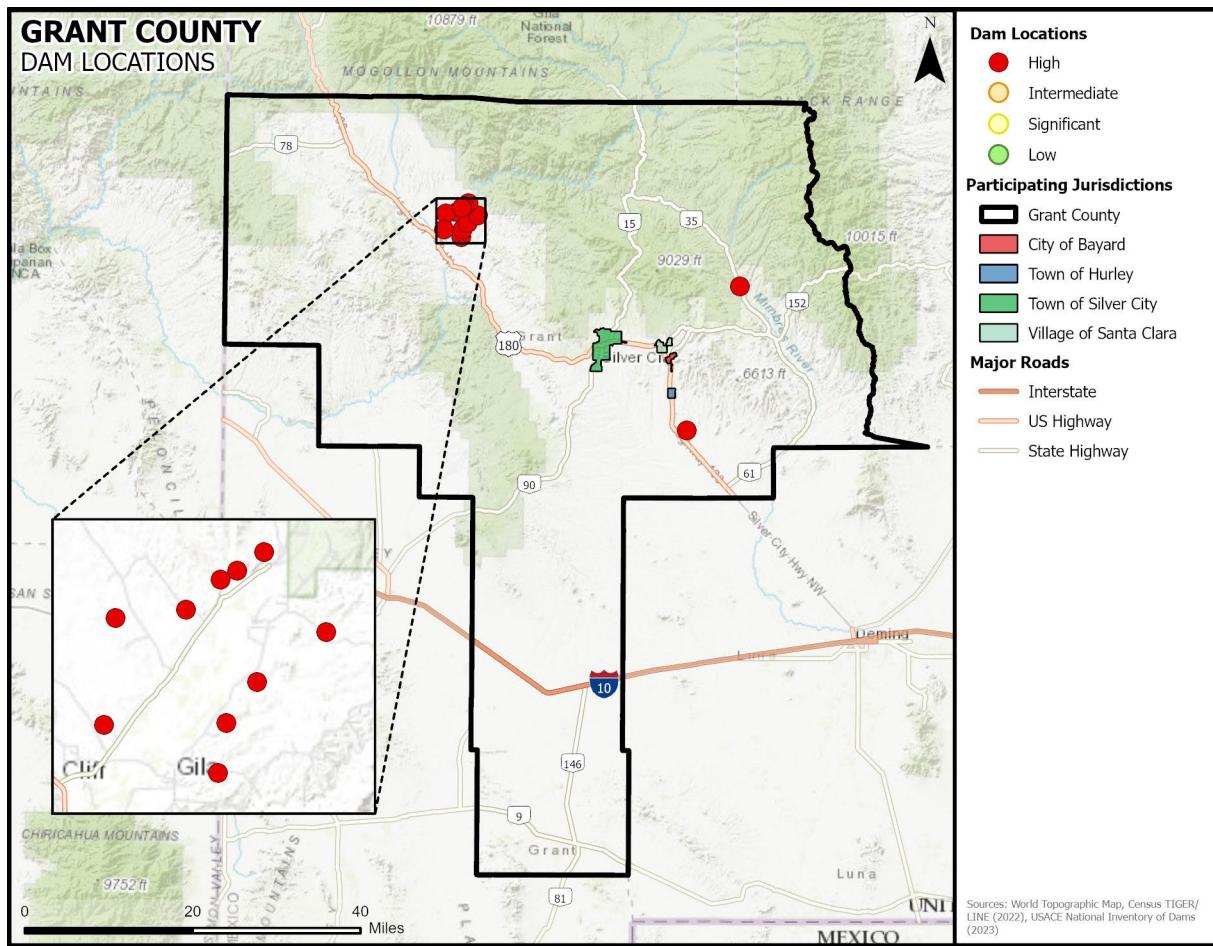


Table 5-1. Grant County Dam Survey

JURISDICTION	DAM NAME	HEIGHT (feet)	STORAGE (acre feet)	CONDITION	HAZARD CLASSIFICATION	EAP
Grant County <sup>4</sup>	Bear Canyon Dam	99	1,483	Poor	High	Yes
Grant County	Upper Gila Valley Site No. 10 Dam	50	982	Poor	High	No
Grant County	Upper Gila Valley Site No. 11 Dam	32	341	Poor	High	No
Grant County	Upper Gila Valley Site No. 4 Dam	34.5	224	Poor	High	No
Grant County	Upper Gila Valley Site No. 6 Dam	37	203	Poor	High	No

<sup>4</sup> This dam is owned by New Mexico Department of Game and Fish and would be covered under the State plan for HHPD requirements.

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JURISDICTION	DAM NAME	HEIGHT (feet)	STORAGE (acre feet)	CONDITION	HAZARD CLASSIFICATION	EAP
Grant County	Upper Gila Valley Site No. 12 Dam	41	118.8	Poor	High	No
Grant County	Upper Gila Valley Site No. 1 Dam	36	107	Poor	High	No
Grant County	Upper Gila Valley Site No. 7 Dam	38	94	Poor	High	No
Grant County	Upper Gila Valley Site No. 9 Dam	33	87	Poor	High	No
Grant County	Upper Gila Valley Site No. 8 Dam	35	82	Poor	High	No
Grant County	Upper Gila Valley Site No. 3 Dam	28.8	48	Poor	High	No
Grant County	Chino Mines Tailings Dam No. 7	230	19,800	Satisfactory	High	Yes

### EXTENT

A common practice among federal and state dam safety offices is to classify a dam according to the potential impact a dam failure would have on upstream and/or downstream areas or at locations near the dam. The Hazard Potential Classification System for Dams established by FEMA is a system that categorizes dams according to the degree of potential consequences of a dam failure or breach event. According to FEMA, the hazard potential classification does not reflect in any way the current condition of the dam (e.g., safety, structural integrity, flood routing capacity).

The Office of the State Engineer (OSE) Dam Safety Bureau regulates the design, construction, reconstruction, modification, removal, abandonment, inspection, operation, and maintenance of jurisdictional dams in the State of New Mexico. The classifications in the table below are utilized by OSE to determine safety and potential loss of life for dams. Table 5-2 describes the extent of damages that can be anticipated at each classification level in regard to loss of the environment, economy, and human life. The Grant County Planning Team identified 12 dams that could reach the full extent of damages (Table 5-2). Additional extent details are provided below for each profiled dam.

High Hazard Potential Dams (HHPDs) pose significant risks for failure, which can lead to loss of life, extensive property damage, and environmental harm, as described in the Vulnerability and Impact section. HHPDs are at a higher risk of failure or breach due to aging infrastructure, design flaws, or inadequate maintenance. These dams are more susceptible to natural hazards and extreme weather conditions, especially heavy rainfall and localized flooding, which can lead to dam failure if the infrastructure is not designed to handle such extreme water flow conditions. In addition, drought conditions can make dams more susceptible to erosion and failure by drying out and cracking soil and embankments, which weakens their structural integrity. Droughts conditions can significantly increase wildfire risks by drying out vegetation, making it more flammable and providing ample fuel for fires. Wildfires can directly damage the surface of dams and spillways, particularly vegetation on embankment slopes and grass lining in spillway channels, making them

## SECTION 5: DAM FAILURE

more vulnerable to erosion. Wildfires change the speed at which water moves through a watershed and how vulnerable the land surface is to erosion. The altered watershed conditions, including increased sediment and debris flows, can reduce reservoir capacity and increase the risk of overtopping, potentially leading to dam failure. The Grant County planning area currently has 11 High Hazard Potential Dams (HHPDs).

**Table 5-2. Hazard Potential Classification System for Dams**

HAZARD POTENTIAL CLASSIFICATION	EXTENT OF DAMAGES
Low	No probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
Significant	No probable loss of human life but can cause economic loss, environmental damage, disruption of critical facilities. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be in areas with higher populations and significant infrastructure.
High	Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life along with damages to significant infrastructure.

In addition, the extent or magnitude of a dam failure event is described in terms of the classification of damages that could result from a dam's failure, not the probability of failure. For dams with a maximum storage capacity of 100,000 acre-feet or more, all census blocks within five miles are at risk of potential dam failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all census blocks within three miles are at risk of potential dam failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all census blocks within one mile are at risk of potential dam or levee failure hazards. Each profiled dam describes the structures or infrastructure considered to be at risk in the event of a breach based on each estimated inundation zone. An estimated depth for dam breach is indicated for each profiled dam.<sup>5</sup>

It is important to note several limitations in the accessibility of data regarding local dams. While Emergency Action Plans are required for all high hazard classified dams, these plans contain highly sensitive data and are not readily available to the public. EAP's and/or inundation maps are requested during the planning process but are typically not provided, especially for dams not owned by the County, such as the Bear Canyon Dam. To address this deficiency the planning team created illustration maps that show the estimated inundation area for each of the identified dams utilizing acceptable industry standards. In addition, the limitations in modeling the flow of water for a hypothetical dam breach are very complex and often rely on assumptions such as breach size and failure mode and may not reflect possible breach conditions accurately.

Information from local dam owners, such as EAPs, inundation maps, and areas at risk, have been incorporated into this assessment as applicable. An EAP was provided for the Chino Mines Tailings Dam No. 7. A detailed inspection report has been provided for all of the dams owned by

<sup>5</sup> Dam breach depth is an estimate based on best available data, not statistical data.

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the Upper Gila Valley Arroyos Watershed District (Upper Gila Valley Site No. 1, 3, 4, 6, 7, 8, 9, 10, 11, and 12 Dams) which provides information regarding overall dam conditions, flood inundation areas, and required actions for the dam owner. The inundation maps provided in the inspection reports are created by the New Mexico Office of the State Engineer Dam Safety Bureau using the DSS-WISE Lite program and are provided in Figures 5-3 through 5-13.

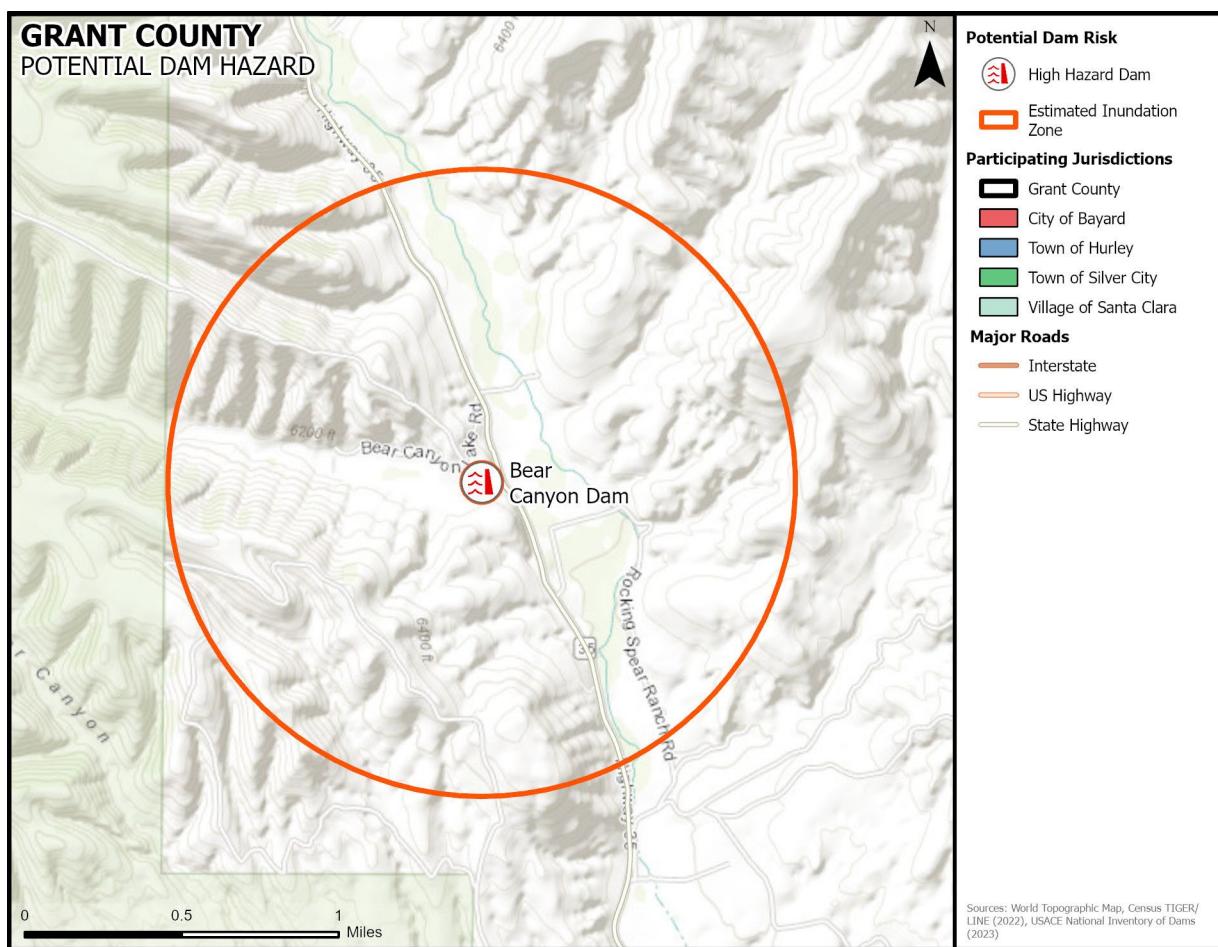
Finally, changes in land use and increasing development may lead to the overestimation or underestimation of the potential impact of a dam failure event. To address this, the plan uses best available data and local insight to gauge vulnerability and impact, however, changes in population density and/or vulnerable populations can be difficult to fully understand.

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### Bear Canyon Dam

The Bear Canyon Dam is located in Grant County near Mimbres and San Lorenzo on Bear Canyon Creek. The dam was constructed in 1937 for irrigation purposes and is owned by the New Mexico Department of Game and Fish. It has an Emergency Action Plan (EAP) in place, which was most recently revised on January 14, 2016. There are an estimated 15 structures within one mile of the dam. Extensive damage is not anticipated in the event of a breach due to the capacity of the dam but the structures closest may be impacted. In the event of a breach, it is estimated that the average breach width would be 186 feet with a maximum breach flow of 64,367 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 15 feet, with the highest depth in the immediate area of the dam.

Figure 5-2. Bear Canyon Dam

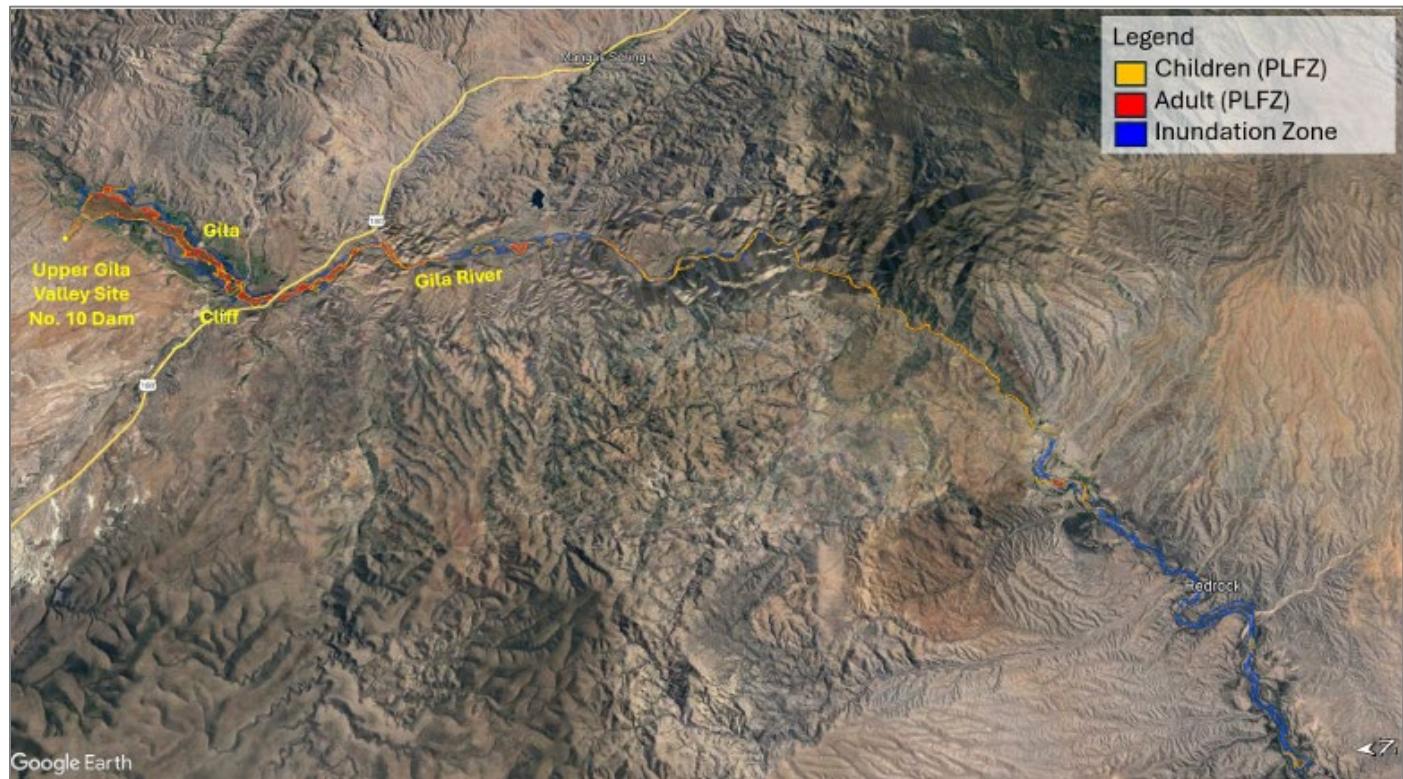


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### Upper Gila Valley Site No. 10 Dam

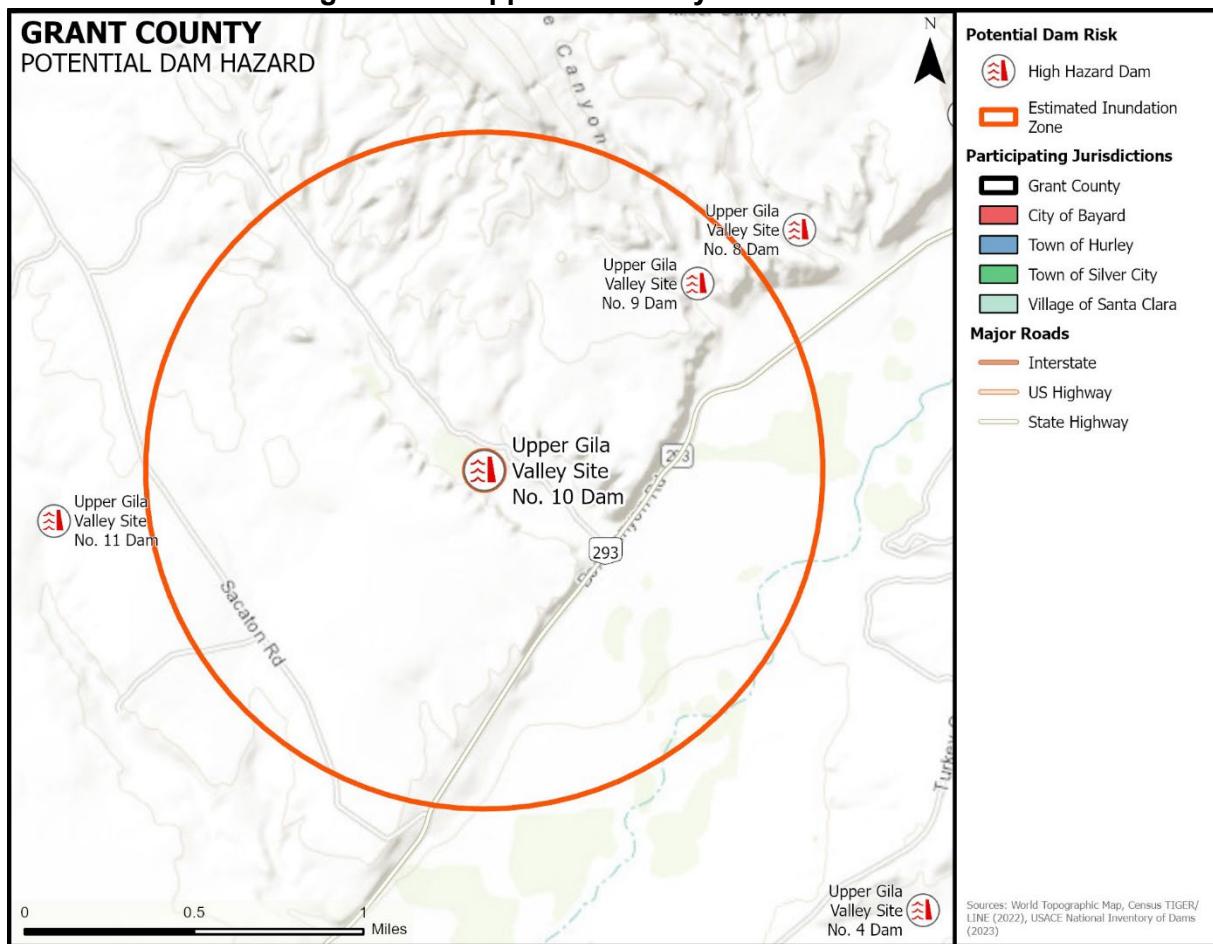
The Upper Gila Valley Site No. 10 Dam is in an unincorporated area of Grant County on Winn Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1963 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and no surrounding development or structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 141 feet with a maximum breach flow of 27,755 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

Figure 5-3a. Upper Gila Valley Site No. 10 Dam



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Figure 5-3b. Upper Gila Valley Site No. 10 Dam



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### Upper Gila Valley Site No. 11 Dam

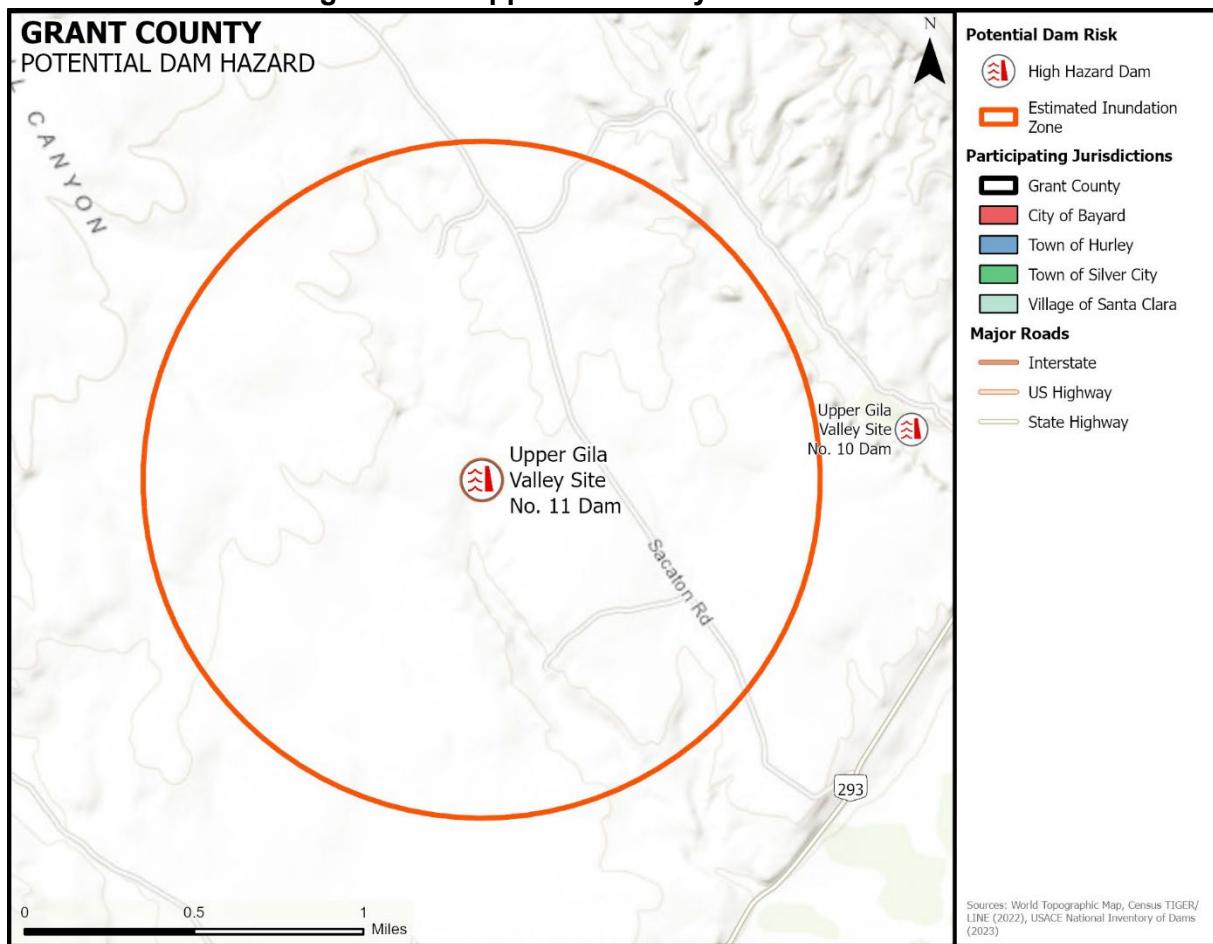
The Upper Gila Valley Site No.11 Dam is in an unincorporated area of Grant County on Bell Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1963 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and no surrounding development or structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 97 feet with a maximum breach flow of 10,564 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

Figure 5-4a. Upper Gila Valley Site No. 11 Dam



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Figure 5-4b. Upper Gila Valley Site No. 11 Dam

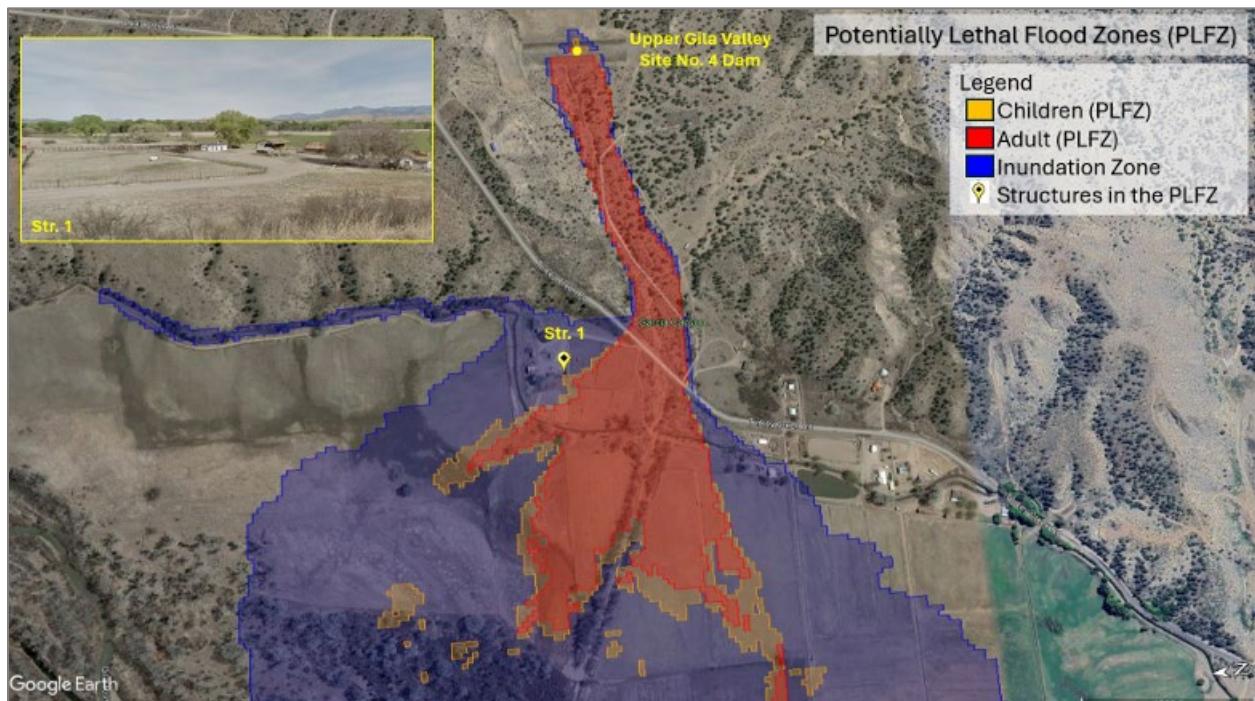


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### Upper Gila Valley Site No. 4 Dam

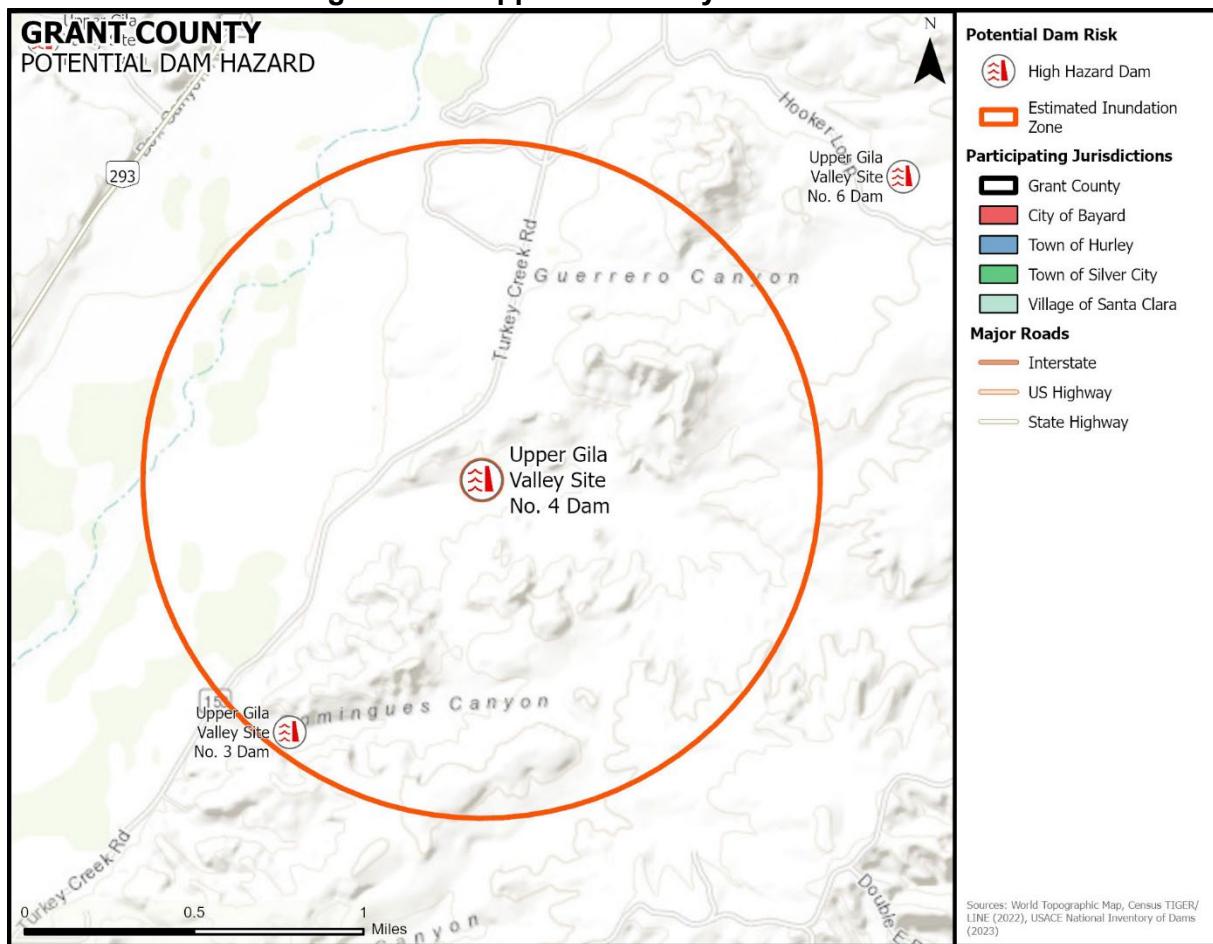
The Upper Gila Valley Site No. 4 Dam is in an unincorporated area of Grant County on Garcia Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1962 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 10 residential structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. An inundation map for Upper Gila Valley Site No. 4 Dam is unavailable so a Potentially Lethal Flood Zone (PLFZ) map was used instead. In the event of a breach, it is estimated that the average breach width would be 90 feet with a maximum breach flow of 9,652 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-5a. Upper Gila Valley Site No. 4 Dam**



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Figure 5-5b. Upper Gila Valley Site No. 4 Dam

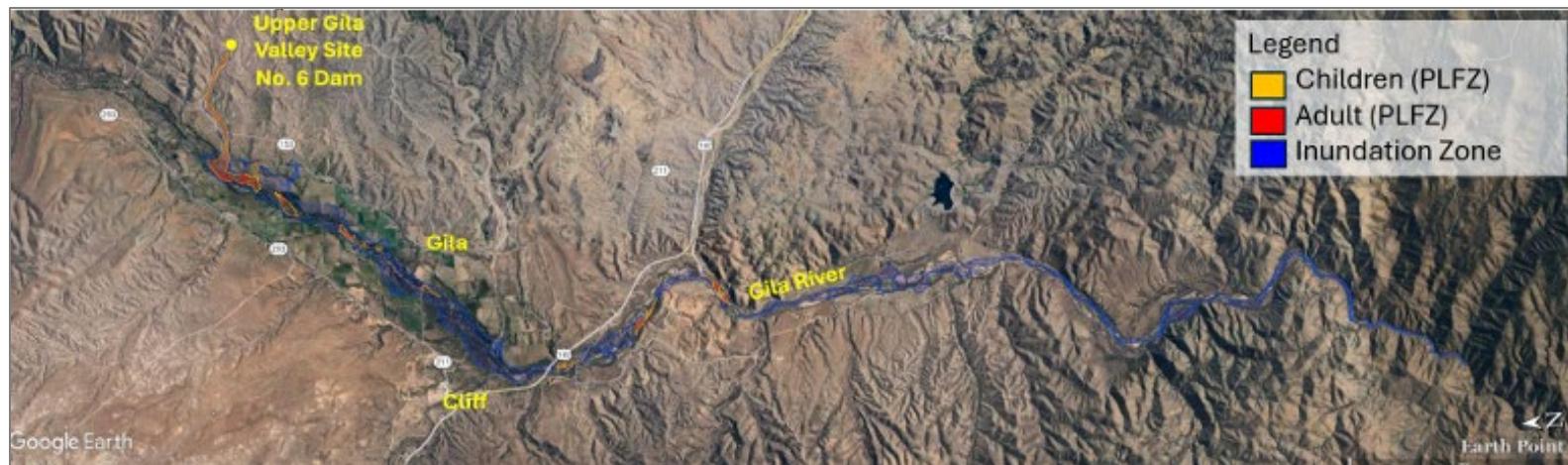


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### Upper Gila Valley Site No. 6 Dam

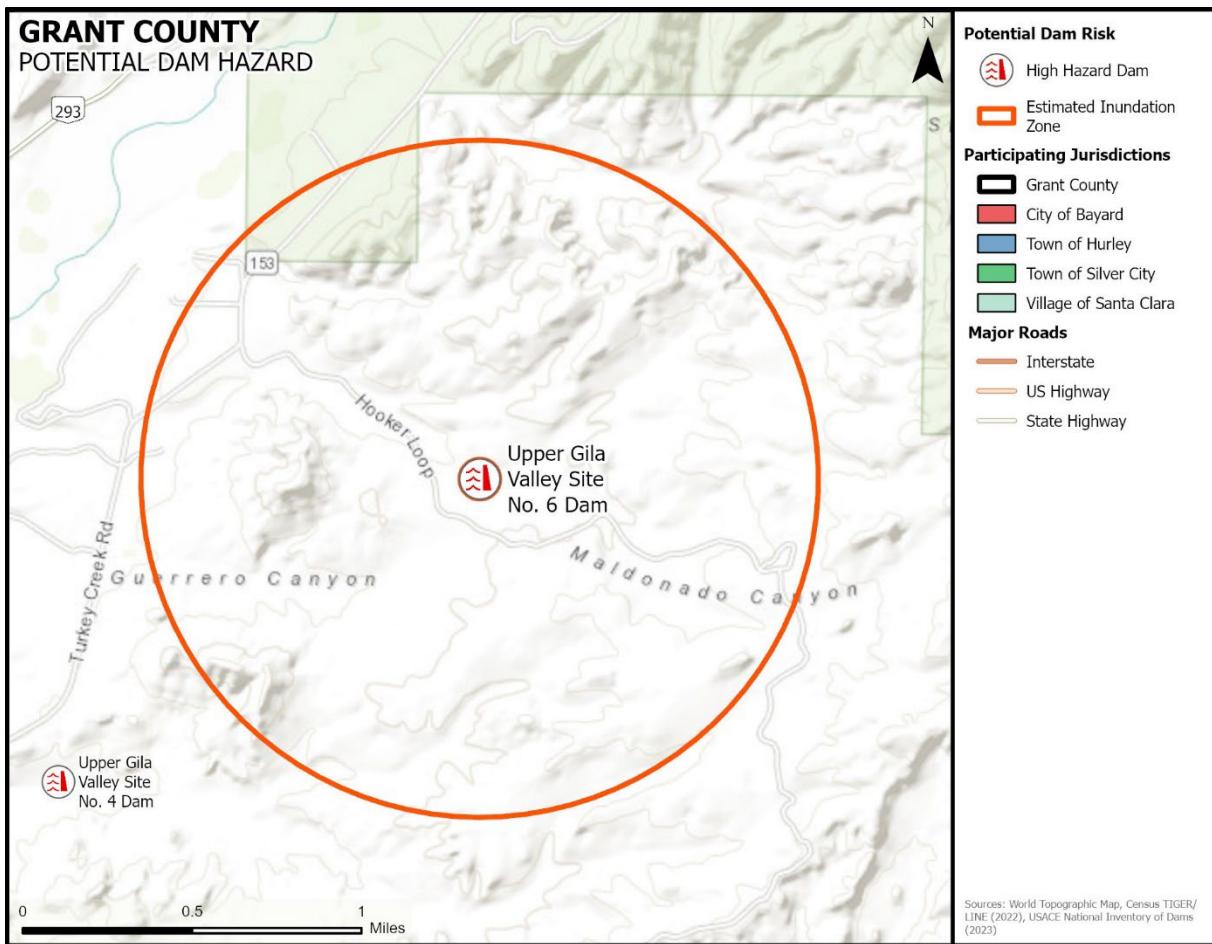
The Upper Gila Valley Site No. 6 Dam is in an unincorporated area of Grant County on Maldonado Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1963 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and no surrounding development or structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 88 feet with a maximum breach flow of 9,162 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

Figure 5-6a. Upper Gila Valley Site No. 6 Dam



## SECTION 5: DAM FAILURE

Figure 5-6b. Upper Gila Valley Site No. 6 Dam



## SECTION 5: DAM FAILURE

### Upper Gila Valley Site No. 12 Dam

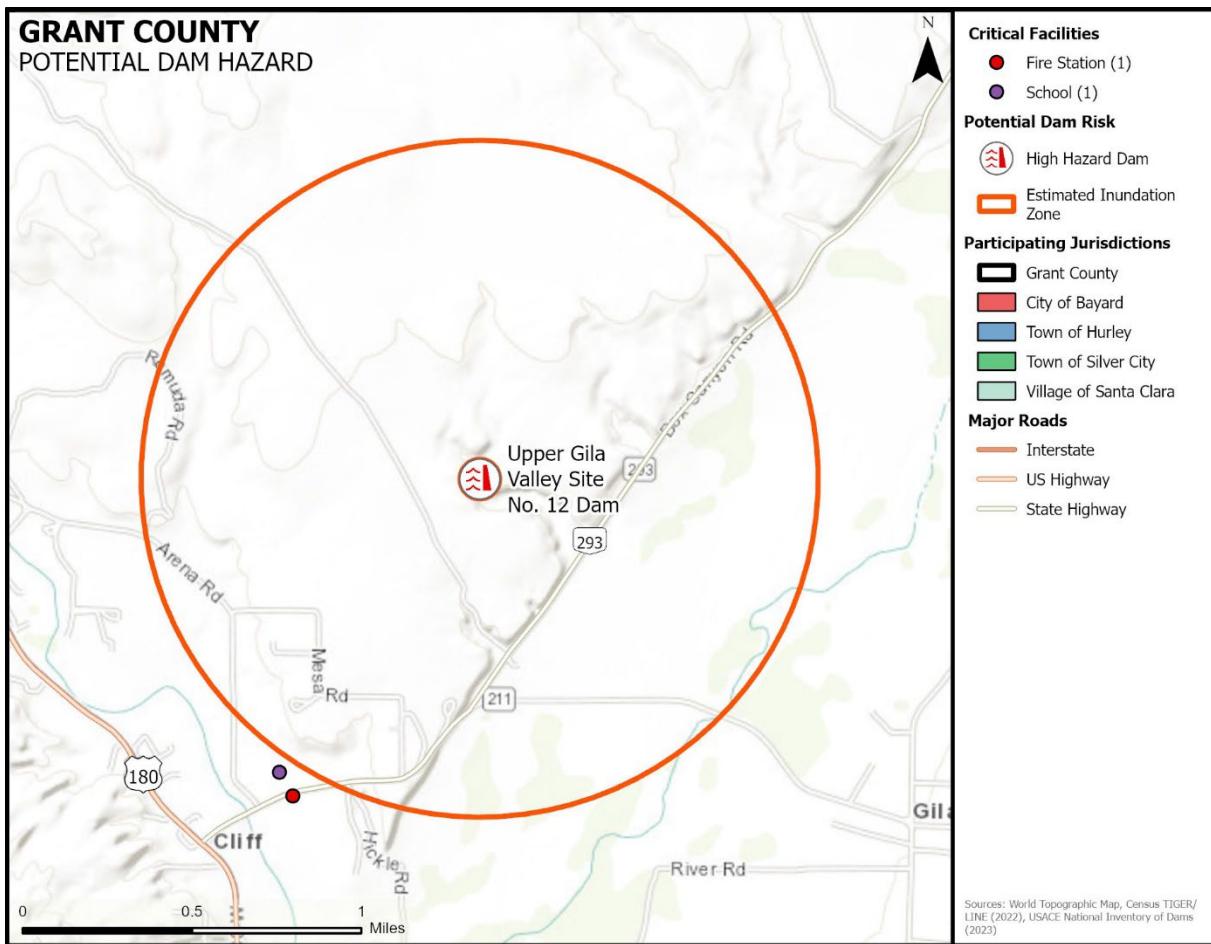
The Upper Gila Valley Site No. 12 Dam is in an unincorporated area of Grant County on Kartchner Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1963 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 10 residential structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 79 feet with a maximum breach flow of 7,579 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-7a. Upper Gila Valley Site No. 12 Dam**



## SECTION 5: DAM FAILURE

Figure 5-7b. Upper Gila Valley Site No. 12 Dam



## SECTION 5: DAM FAILURE

### Upper Gila Valley Site No. 1 Dam

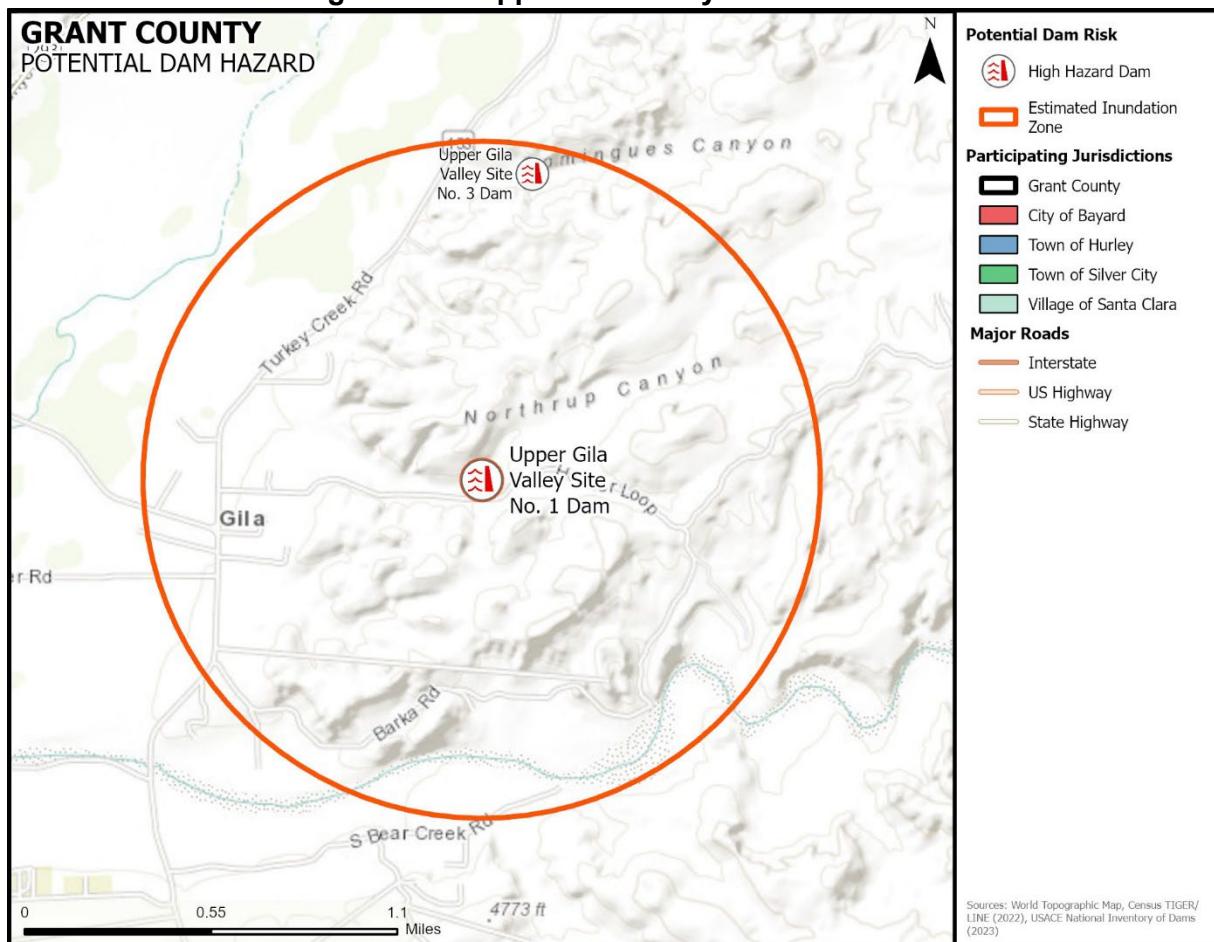
The Upper Gila Valley Site No. 1 Dam is in Grant County on Northrup Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1962 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and no surrounding development or structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 75 feet with a maximum breach flow of 6,364 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-8a. Upper Gila Valley Site No. 1 Dam**



## SECTION 5: DAM FAILURE

Figure 5-8b. Upper Gila Valley Site No. 1 Dam

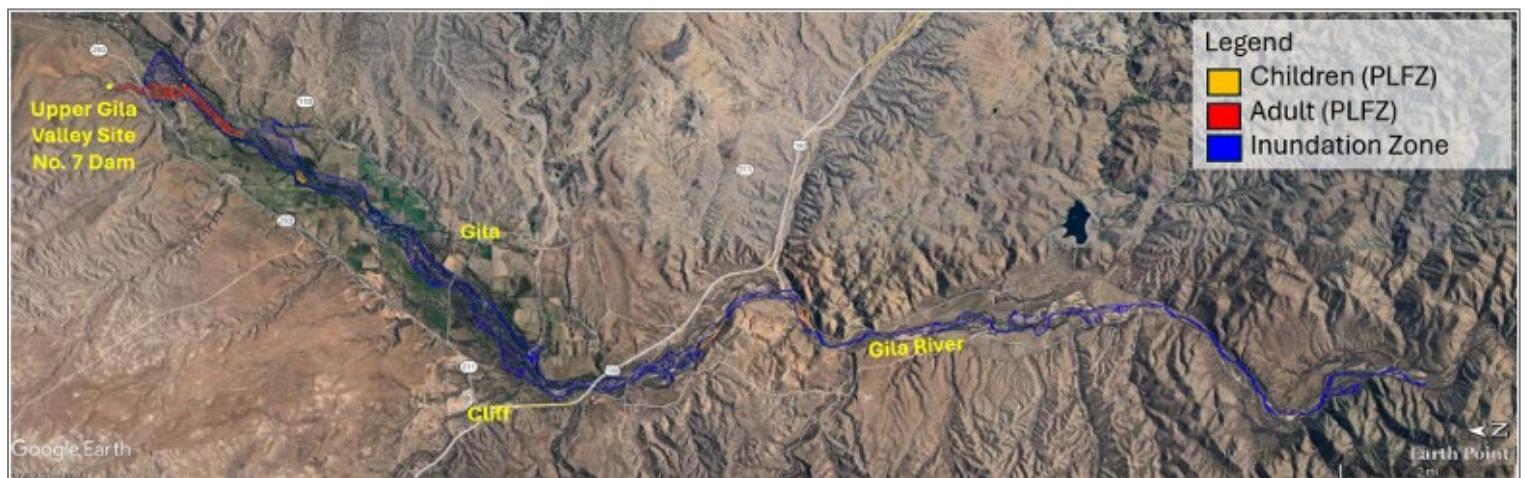


## SECTION 5: DAM FAILURE

### Upper Gila Valley Site No. 7 Dam

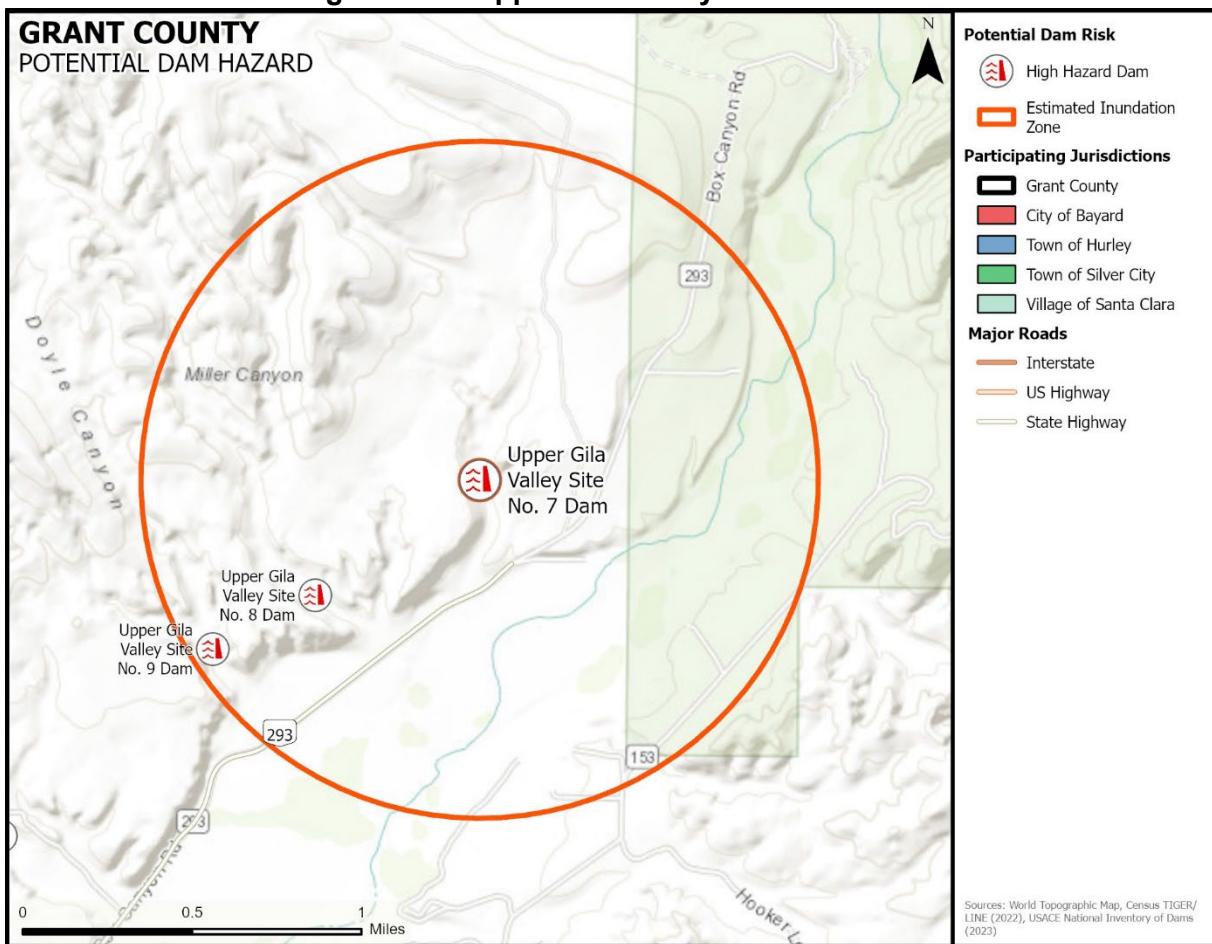
The Upper Gila Valley Site No. 7 Dam is in an unincorporated area of Grant County on Woodrow Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1962 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 5 structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 73 feet with a maximum breach flow of 6,242 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-9a. Upper Gila Valley Site No. 7 Dam**



## SECTION 5: DAM FAILURE

Figure 5-9b. Upper Gila Valley Site No. 7 Dam



## SECTION 5: DAM FAILURE

### Upper Gila Valley Site No. 9 Dam

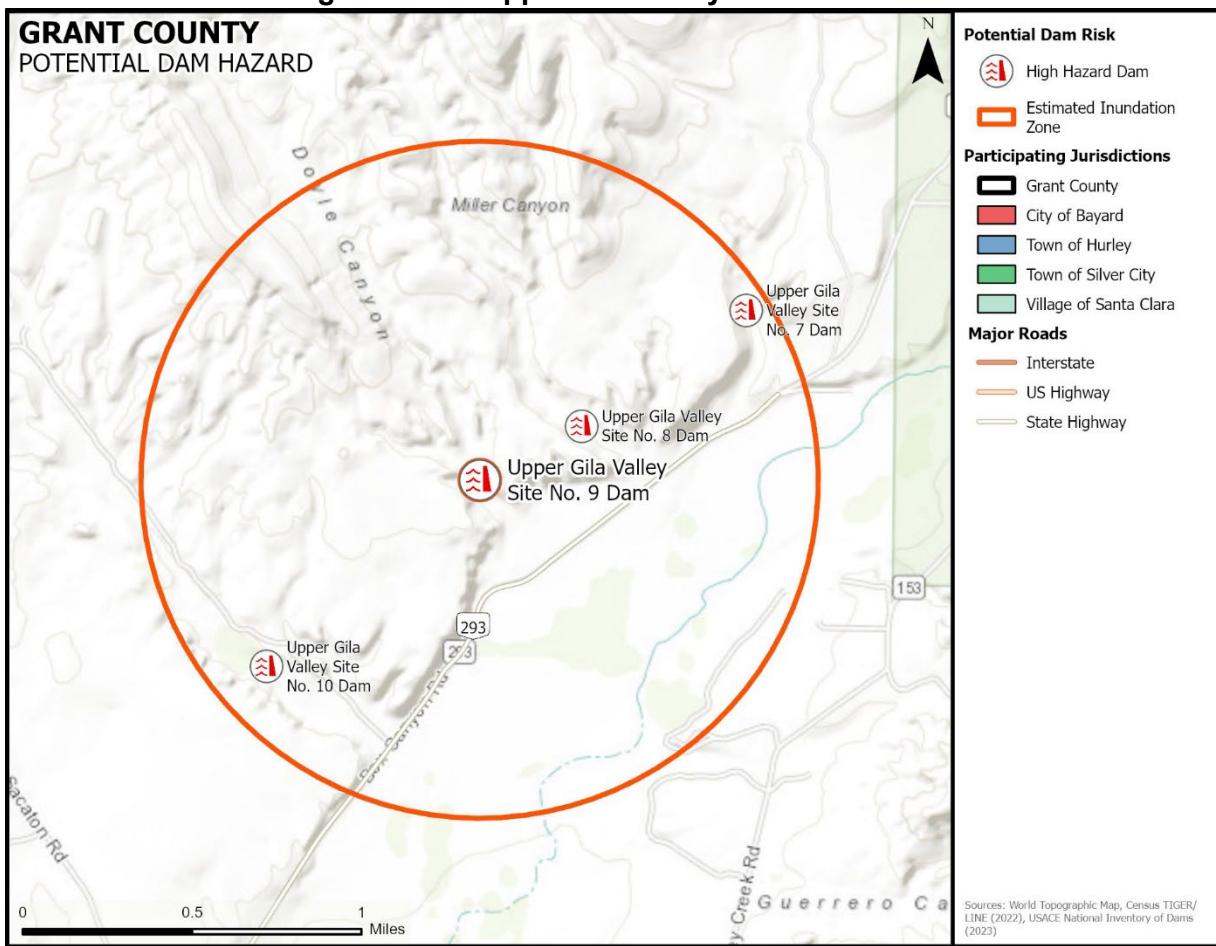
The Upper Gila Valley Site No. 9 Dam is in an unincorporated area of Grant County on Pacific Western Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1962 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 5 structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 70 feet with a maximum breach flow of 5,269 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-10a. Upper Gila Valley Site No. 9 Dam**



## SECTION 5: DAM FAILURE

Figure 5-10b. Upper Gila Valley Site No. 9 Dam



## SECTION 5: DAM FAILURE

### Upper Gila Valley Site No. 8 Dam

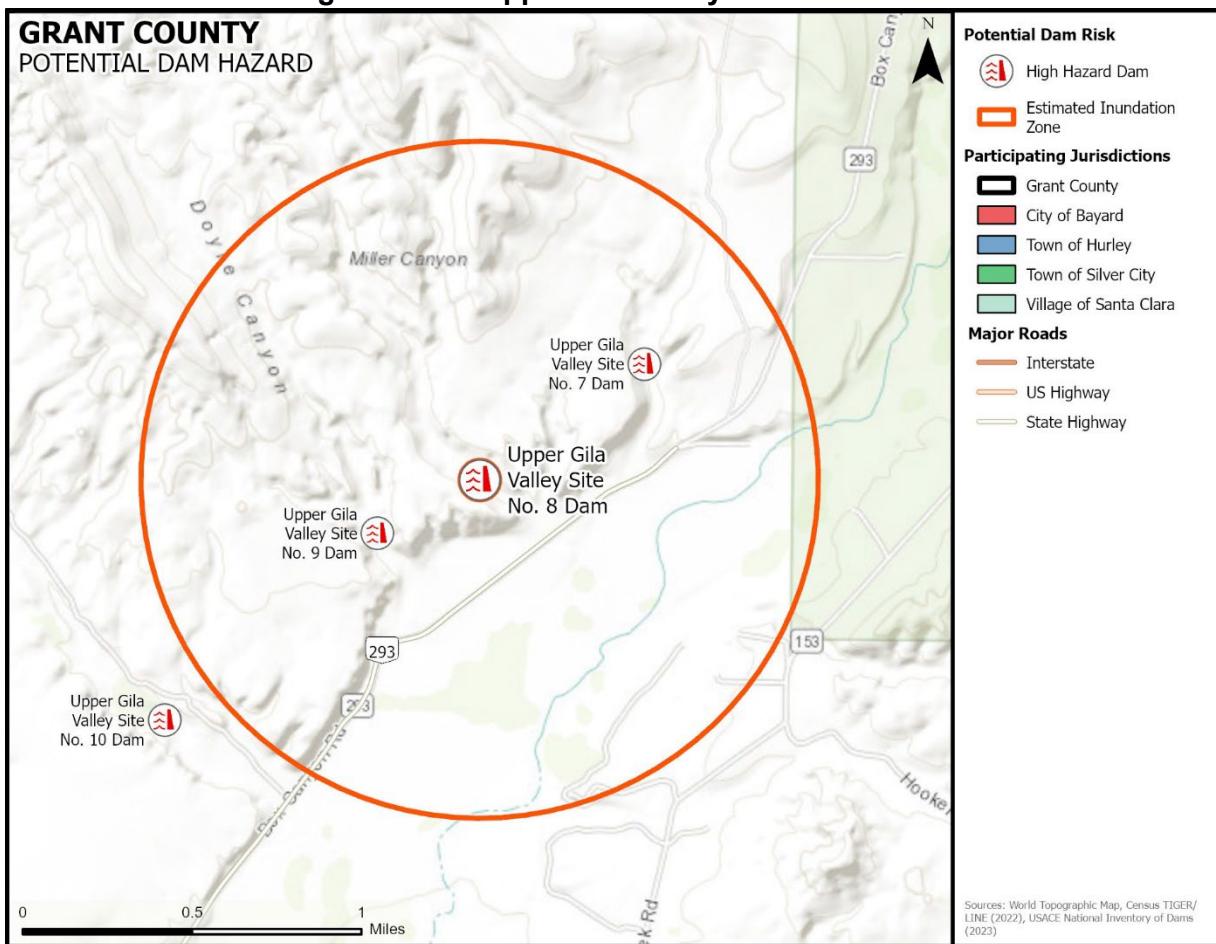
The Upper Gila Valley Site No. 8 Dam is in an unincorporated area of Grant County on Clark Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1963 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 5 structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 70 feet with a maximum breach flow of 5,387 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-11a. Upper Gila Valley Site No. 8 Dam**



## SECTION 5: DAM FAILURE

Figure 5-11b. Upper Gila Valley Site No. 8 Dam



## SECTION 5: DAM FAILURE

### Upper Gila Valley Site No. 3 Dam

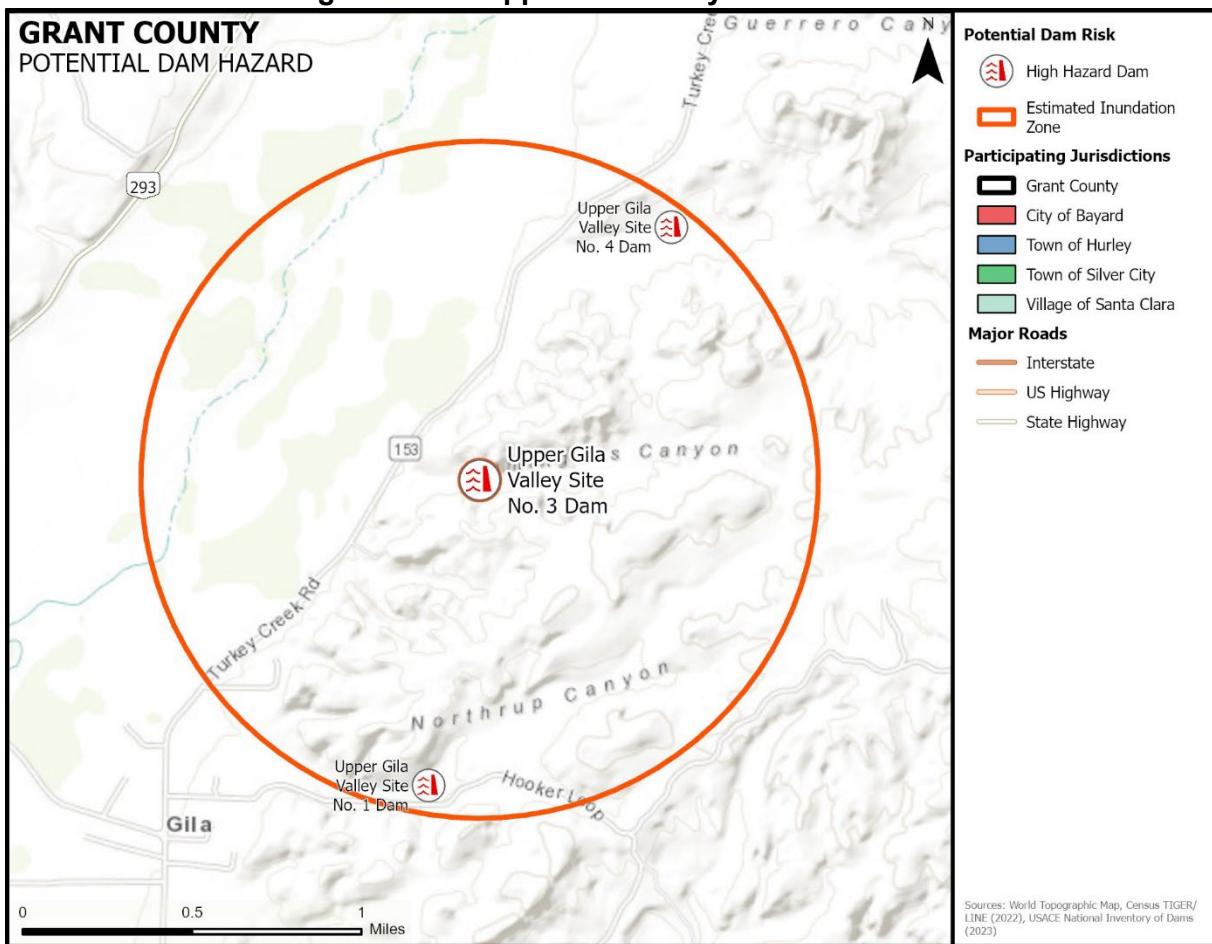
The Upper Gila Valley Site No. 3 Dam is in an unincorporated area of Grant County on Dominguez Canyon. The earthen dam is owned by the Upper Gila Valley Arroyos Watershed District and was constructed in 1962 for flood risk reduction purposes. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 5 structures within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the location and limited capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 58 feet with a maximum breach flow of 3,418 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam.

**Figure 5-12a. Upper Gila Valley Site No. 3 Dam**



## SECTION 5: DAM FAILURE

Figure 5-12b. Upper Gila Valley Site No. 3 Dam

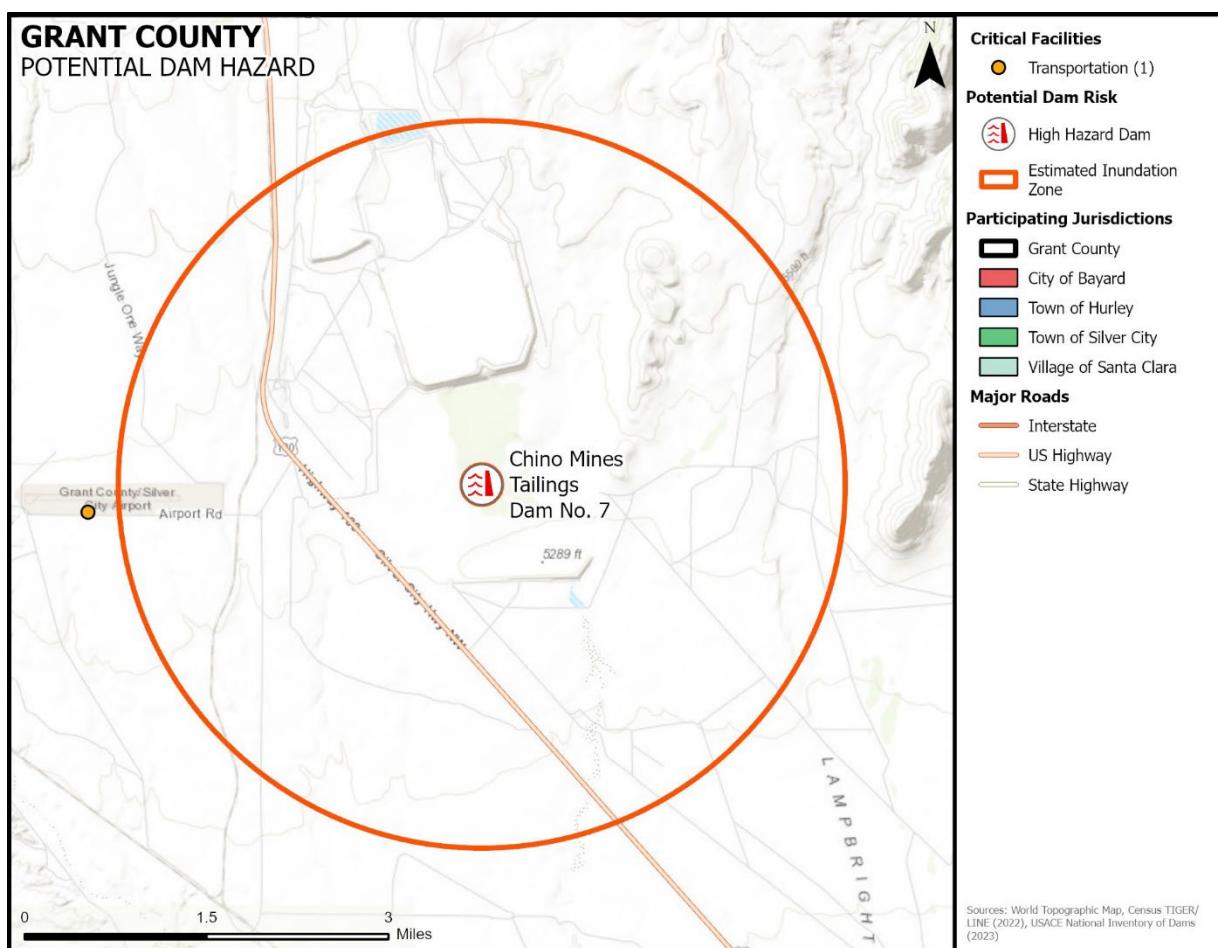


## SECTION 5: DAM FAILURE

### Chino Mines Tailings Dam No. 7

The Chino Mines Tailings Dam No. 7 is located in Deming on Whitewater Creek. The dam was constructed in 1988 and is owned by the Freeport McMoran Corporation. It has an Emergency Action Plan (EAP) in place, which was provided by the planning team. According to the EAP, areas that may be inundated include, but are not limited to, potentially occupied buildings located between the dam, Mimbres River, and the San Vicente Arroyo. One flood scenario was modeled for the dam and the EAP states that a portion of NM State Highway 180 and a portion of the Southwestern Railroad may be impacted. The area located near the dam is rural with lots of open land and little to no surrounding development. There are an estimated 10 structures within three miles of the dam including a portion of the Grant County Airport. Extensive damage is not anticipated in the event of a breach due to the location of the dam but nearby roads and the structures closest may be impacted. In the event of a breach, it is estimated that the average breach width would be 439 feet with a maximum breach flow of 547,442 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 25 feet, with the highest depth in the immediate area of the dam.

Figure 5-13. Chino Mines Tailings Dam No. 7



## SECTION 5: DAM FAILURE

Table 5-3 represents the extent or magnitude of a dam failure event that could be expected for the Grant County planning area, per profiled dam.

**Table 5-3. Extent for the Grant County Planning Area per Profiled Dam**

PROFILED DAM	EXTENT (flow depth)	LEVEL OF INTENSITY TO MITIGATE
Bear Canyon Dam	0-15 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 10 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 11 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 4 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 6 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 12 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 1 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 7 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.

## SECTION 5: DAM FAILURE

PROFILED DAM	EXTENT (flow depth)	LEVEL OF INTENSITY TO MITIGATE
Upper Gila Valley Site No. 9 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 8 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Upper Gila Valley Site No. 3 Dam	0-10 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Chino Mines Tailings Dam No. 7	0-25 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.

## HISTORICAL OCCURRENCES

In the State of New Mexico there have been 43 dam incidents and only 18 dam failures since 1890. Of the 18 dam failure events, 13 of those dams had a high hazard ranking.<sup>6</sup> There may be some incidents that are not reported, and the actual number of incidents is possibly greater. There have been no reported dam failure events in the Grant County planning area.

## PROBABILITY OF FUTURE EVENTS

Based on historical occurrences of dam failures, the probability for future events is “Unlikely” for the Grant County planning area, meaning an event is possible in the next ten years.

## CLIMATE CHANGE CONSIDERATIONS

A direct connection between climate change and dam failure events is unclear. As air temperatures increase, so does the amount of moisture the atmosphere can hold leading to more frequent and intense rain and flooding. Additionally, the aging dams increase the possibility of dam failure and the risk of catastrophic flooding inside estimated dam inundation zones. Safety features, known as spillways, are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events can result in increased discharges downstream and increased flooding potential. Climate change is likely to increase the probability of spillway overflows.

<sup>6</sup> 2023 New Mexico State Hazard Mitigation Plan

## SECTION 5: DAM FAILURE

### VULNERABILITY AND IMPACT

There are 20 dams in the Grant County planning area. All dams were evaluated in-depth to determine the risk, if any, associated with each dam. This analysis indicated 12 high hazard dams in the planning area that present a potential risk to structures or infrastructure in the planning area.

Flooding is the most prominent effect of dam failure. If the dam failure is extensive, a large amount of water would enter the downstream waterways, forcing them out of their banks. There may be significant environmental effects, resulting in flooding that could disperse debris and hazardous materials downstream that can damage local ecosystems. If the event is severe, debris carried downstream can block traffic flow, cause power outages, and disrupt local utilities, such as water and wastewater, which could result in school closures. For specific vulnerability, please refer to the narrative for each dam under the Extent section of this profile.

The Grant County planning area identified the following critical facilities (Table 5-4) as assets that are considered the most important to the planning area and are susceptible to a range of potential impacts caused by dam failure events. For a detailed list see Appendix C.

**Table 5-4. Critical Facilities Vulnerable to Dam Failure Events**

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	N/A	<ul style="list-style-type: none"><li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li><li>Structures, and emergency vehicles, including critical equipment, can be damaged by rising flood waters and floating debris.</li><li>Power outages could disrupt communications, delaying emergency response times. Power outages could disrupt critical care.</li><li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>Debris can impede emergency response vehicle access to areas.</li><li>Washed out roads and bridges can impede emergency response vehicle access to areas.</li><li>Flood-related rescues may be necessary at swift and low water crossing or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.</li><li>Evacuations may be required for entire neighborhoods because of rise of floodwaters, or at hospitals due to extended power outages, gas line ruptures, or structural damages to facilities, further taxing limited response capabilities and increasing sheltering needs for displaced residents.</li><li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li></ul>

## SECTION 5: DAM FAILURE

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		<ul style="list-style-type: none"> <li>First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.</li> <li>Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	Grant County: 1 Airport	<ul style="list-style-type: none"> <li>Structures can be damaged by rising flood waters.</li> <li>Power outages could disrupt critical care.</li> <li>Backup power sources could be damaged, inundated or otherwise inoperable.</li> <li>Critical staff may be impacted and unable to report for duty, limiting response capabilities.</li> <li>Evacuations may be necessary due to extended power outages, gas line ruptures, or inundation of facilities.</li> <li>Additional emergency responders and critical aid workers may not be able to reach the area for days.</li> <li>Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.</li> <li>Temporary break in operations may significantly inhibit post event evacuations.</li> <li>Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.</li> </ul>
Commercial Supplier (food, fuel, etc.)	N/A	<ul style="list-style-type: none"> <li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li> <li>Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.</li> </ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	N/A	<ul style="list-style-type: none"> <li>Emergency operations and critical services may be significantly impacted due to damaged facilities and/or loss of communications.</li> <li>Emergency service vehicles can be damaged by rising flood waters.</li> <li>Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing emergency service workers in harm's way.</li> <li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li> <li>Service responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions.</li> </ul>

## SECTION 5: DAM FAILURE

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		<ul style="list-style-type: none"><li>Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li></ul>

Annualized loss-estimates for dam failure are not available; neither is there a breakdown of potential dollar losses for critical facilities, infrastructure and lifelines, or hazardous-materials facilities.

Historically, the overall severity of impact from a dam breach would be considered “Limited,” meaning it could result in injuries that can be treated with first-aid, critical facilities being shut down for 24-hours or less and less than 10 percent of the property in the estimated breach inundation area destroyed or with major damage.

### ASSESSMENT OF IMPACTS

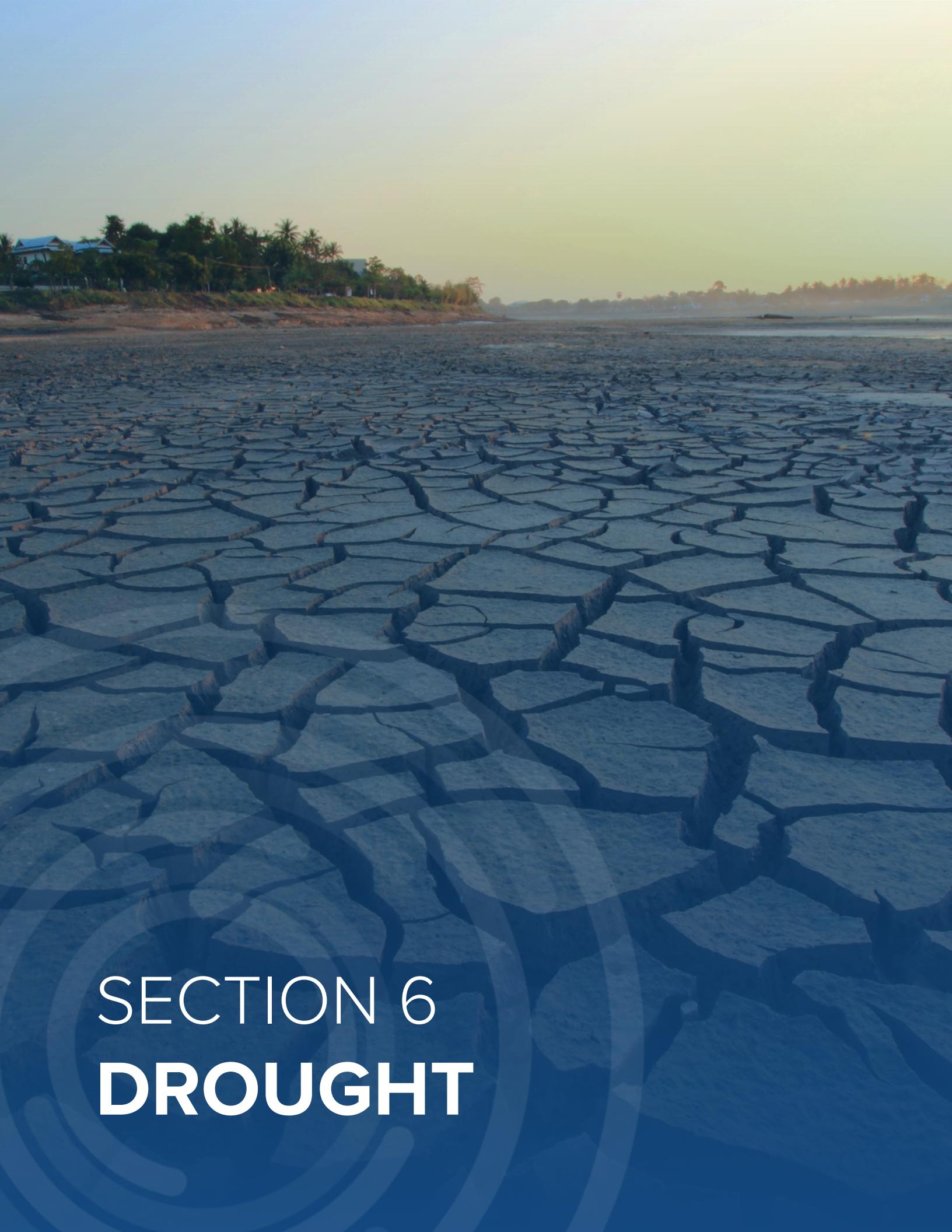
Any individual dam has a very specific area that will be impacted by a catastrophic failure. Dams identified with potential risk can directly threaten the lives of individuals living or working in the inundation zone below the dam. The impact from any catastrophic failure would be similar to that of a flash flood. Potential impacts for the planning area include:

- Lives could be lost.
- There could be injuries from impacts with debris carried by the flood.
- Swift-water rescue of individuals trapped by the water puts the immediate responders at risk for their own lives.
- Individuals involved in the cleanup may be at risk from the debris left behind.
- Continuity of operations for any jurisdiction outside the direct impact area could be very limited.
- Roads and bridges could be destroyed.
- Homes and businesses could be damaged or destroyed.
- Emergency services may be temporarily unavailable.
- Disruption of operations and the delivery of services in the impacted area.
- A large dam with a high head of water could effectively scour the terrain below it for miles, taking out all buildings, and other infrastructure.
- Scouring force could erode soil and any buried pipelines.
- Scouring action of a large dam will destroy all vegetation in its path.
- Wildlife and wildlife habitat caught in the flow will likely be destroyed.
- Fish habitat will likely be destroyed.
- Topsoil will erode, slowing the return of natural vegetation.
- The destructive high velocity water flow may include substantial debris and hazardous materials, significantly increasing the risks to life and property in its path.
- Debris and hazardous material deposited downstream may cause further pollution of areas far greater than the inundation zone.
- Destroyed businesses and homes may not be rebuilt, reducing the tax base and impacting long term economic recovery.
- Historical or cultural resources may be damaged or destroyed.

## SECTION 5: DAM FAILURE

- Recreational activities and tourism may be temporarily unavailable or unappealing, slowing economic recovery.

The economic and financial impacts of dam failure on the area will depend entirely on the location of the dam, scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any dam failure event.



## SECTION 6

# DROUGHT

## SECTION 6: DROUGHT

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### HAZARD DESCRIPTION

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 6-1 presents definitions for these different types of droughts.

Droughts are one of the most complex of all natural hazards as it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants, and even in severe cases, trees. A secondary hazard to drought is wildfire because dying vegetation serves as a prime ignition source. Therefore, a heat wave combined with a drought is a very dangerous situation.

**Table 6-1. Drought Classification Definitions<sup>1</sup>**

<b>METEOROLOGICAL DROUGHT</b>	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
<b>HYDROLOGIC DROUGHT</b>	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
<b>AGRICULTURAL DROUGHT</b>	Soil moisture deficiencies relative to water demands of plant life, usually crops.
<b>SOCIOECONOMIC DROUGHT</b>	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

### LOCATION

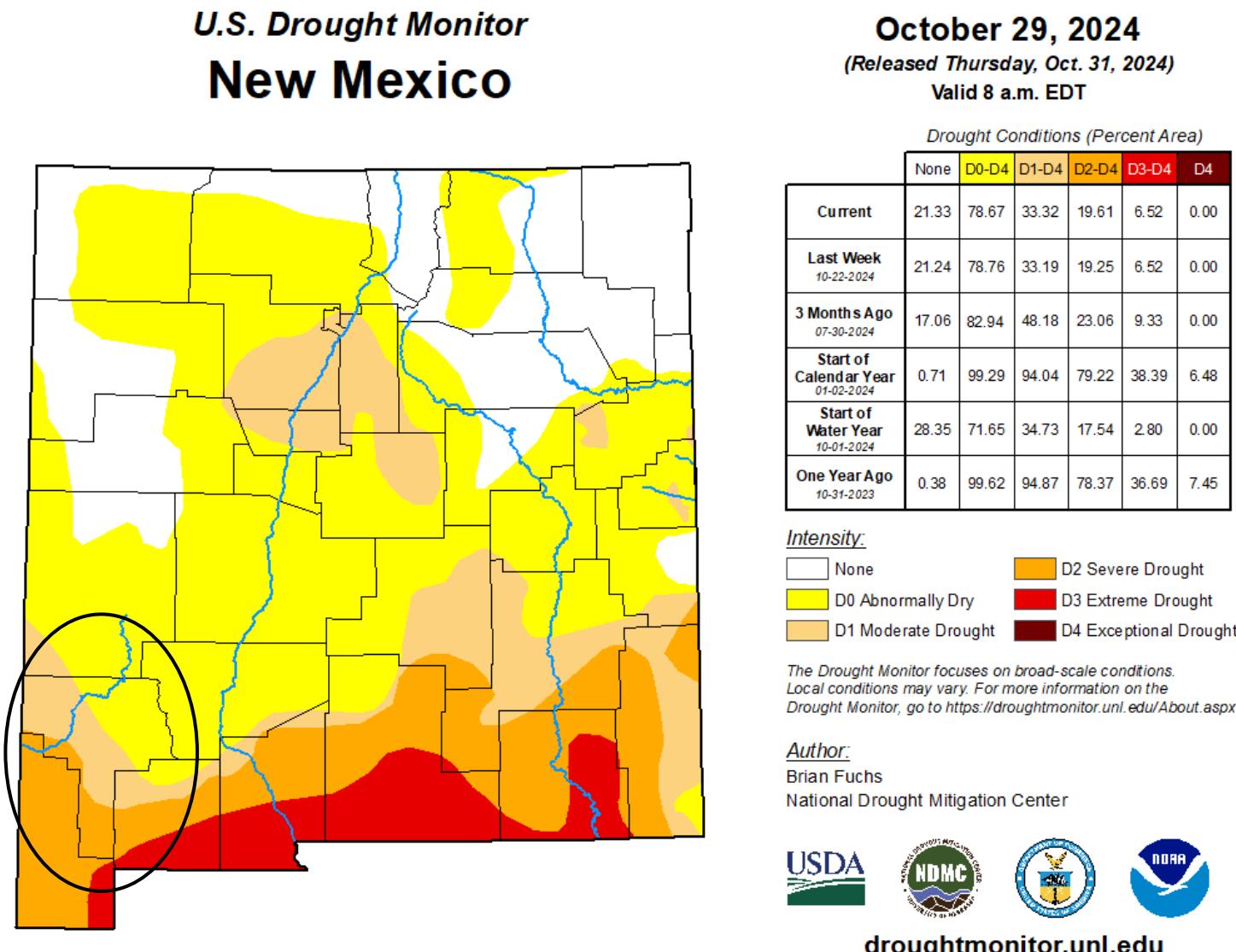
Droughts occur regularly throughout New Mexico and the Grant County planning area and are considered a normal condition. However, they can vary greatly in their intensity and duration. The U.S. Drought Monitor, produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, U.S. Department of Agriculture and the National

<sup>1</sup> Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

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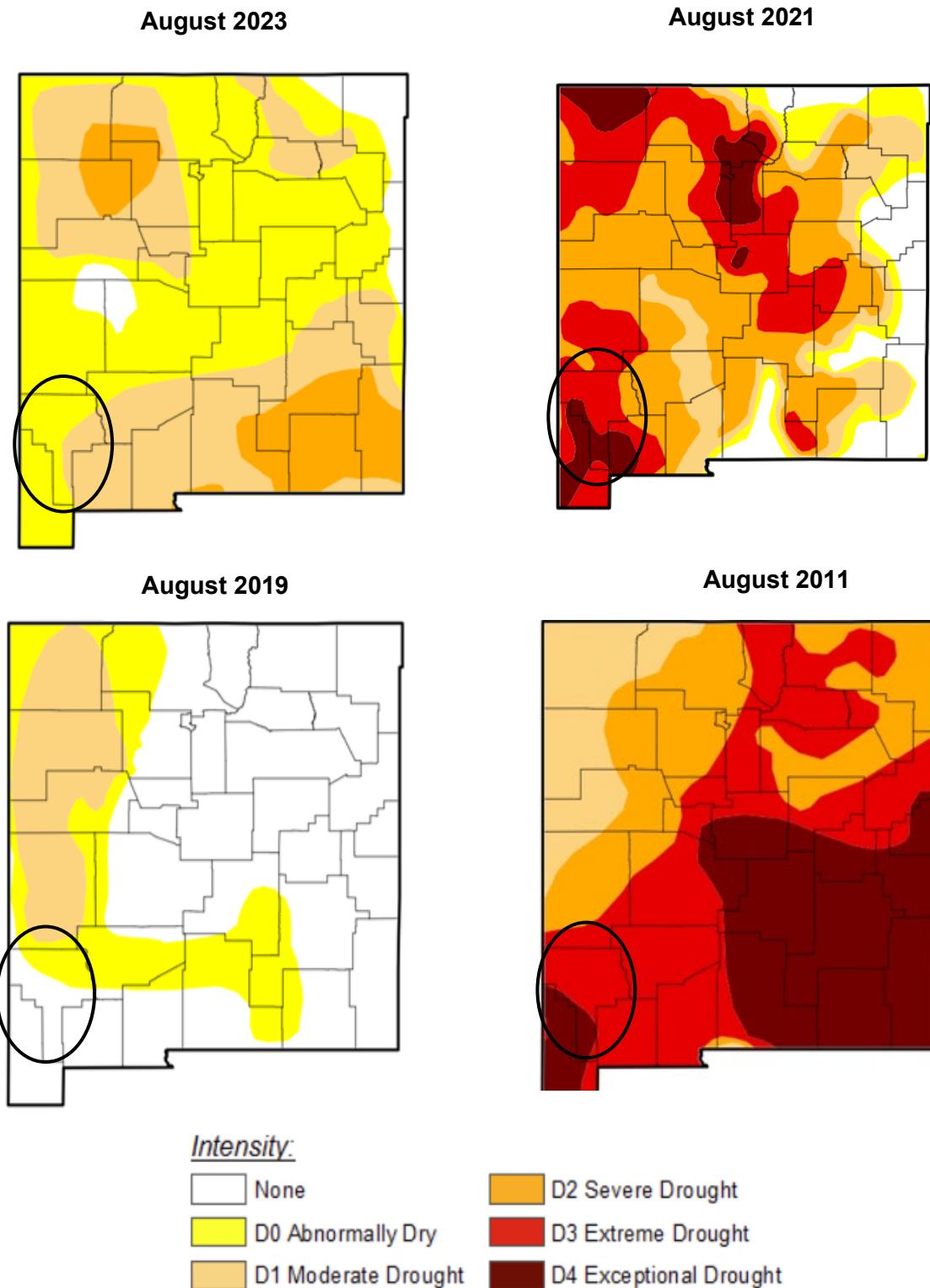
Oceanic and Atmospheric Administration, shows the planning area is currently experiencing from abnormally dry to severe drought conditions (Figure 6-1) but has experienced a range of conditions from none (D0) to exceptional (D4) drought conditions over the last decade (Figure 6-2). There is no distinct geographic boundary to drought; therefore, it can occur anywhere throughout the Grant County planning area.

**Figure 6-1. U.S. Drought Monitor, October 2024**



## SECTION 6: DROUGHT

Figure 6-2. U.S. Drought Monitor, August 2011, August 2019, August 2021, August 2023



## SECTION 6: DROUGHT

### EXTENT

The Palmer Drought Index is used to measure the extent of drought by measuring the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop. Table 6-2 depicts magnitude of drought, while Table 6-3 describes the classification descriptions.

**Table 6-2. Palmer Drought Index**

DROUGHT INDEX	DROUGHT CONDITION CLASSIFICATIONS						
	Extreme	Severe	Moderate	Normal	Moderately Moist	Very Moist	Extremely Moist
Z Index	-2.75 and below	-2.00 to -2.74	-1.25 to -1.99	-1.24 to +.99	+1.00 to +2.49	+2.50 to +3.49	n/a
Meteorological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above
Hydrological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

**Table 6-3. Palmer Drought Category Descriptions<sup>2</sup>**

CATEGORY	DESCRIPTION	POSSIBLE IMPACTS	PALMER DROUGHT INDEX
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies.	-5.0 or less

<sup>2</sup> Source: National Drought Mitigation Center

## SECTION 6: DROUGHT

Drought is monitored nationwide by the National Drought Mitigation Center (NDMC). Indicators are used to describe broad scale drought conditions across the U.S. and correspond to the intensity of drought.

Based on the historical occurrences for drought and the location of the Grant County planning area, the area can anticipate the full range of drought from abnormally dry to exceptional drought, or D0 to D4, based on the Palmer Drought Category. The entire planning area has experienced exceptional drought conditions. This is the highest level of drought severity and the most extreme drought conditions the planning area can anticipate in the future.

### HISTORICAL OCCURRENCES

The Grant County planning area may experience an extreme drought in any given year. According to the U.S. Drought Monitor, between January 2000 and June 2024, the Grant County planning area spent 1,055 weeks (83%) in some level of drought as defined as Abnormally Dry (D0) or worse conditions. Grant County has received 30 USDA disaster declarations for drought from 2012 through 2024.

**Figure 6-3. Grant County Drought Intensity, 2000-2024<sup>3</sup>**

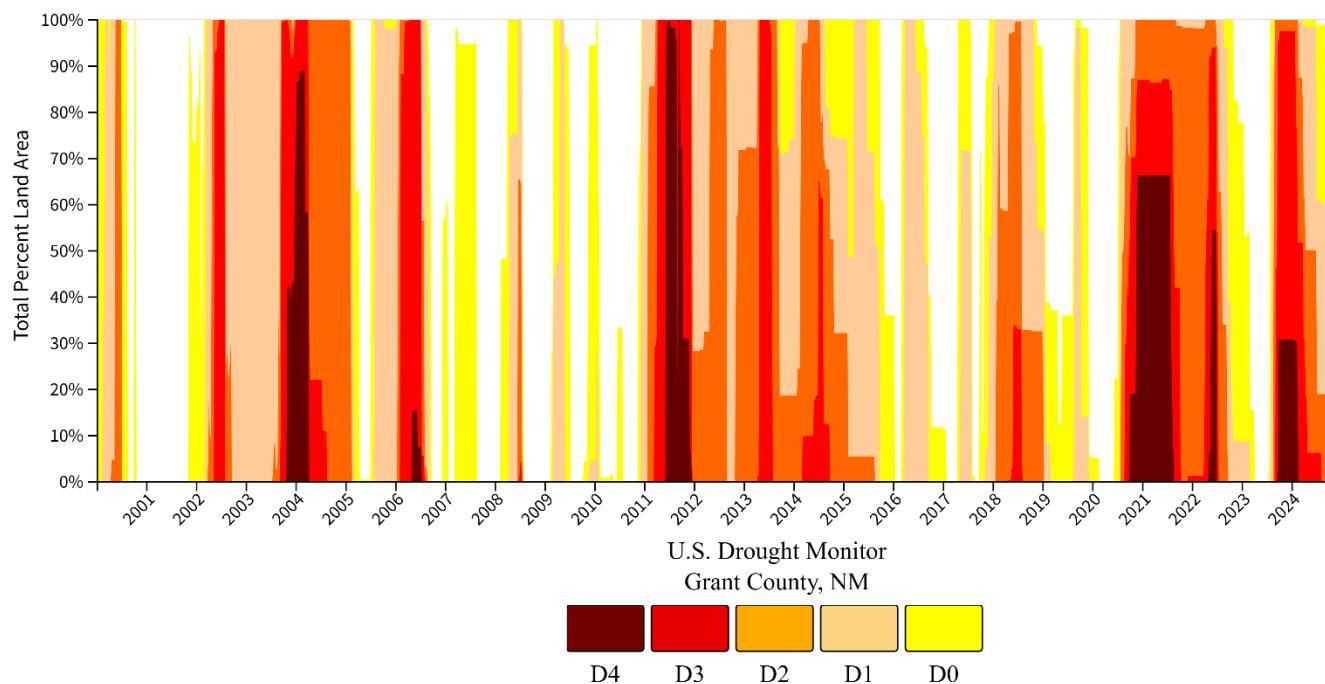


Table 6-4 provides a historical summary of the drought events that have occurred in Grant County as reported in the National Centers for Environmental Information Storm Events Database (NCEI). A total of 522 drought impacts were reported in the NCEI over 15 unique drought periods

<sup>3</sup> U.S. Drought Monitor

## SECTION 6: DROUGHT

impacting Grant County from January 2000 through June 2024<sup>4</sup>. There are no injuries, fatalities, or damages reported from drought in Grant County. It is noted that some damages are likely to have occurred over the reporting period but simply have not been reported in the NCEI.

Historical drought information shows drought activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event. Historical drought data is provided on a county-wide basis per the NCEI Storm Events database.

**Table 6-4. Historical Drought Events Summary, 2000-2024<sup>5</sup>**

JURISDICTION	DROUGHT IMPACTS	DROUGHT PERIODS	INJURIES & FATALITIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	522	15	0	\$0	\$0

### SIGNIFICANT EVENTS

#### November 2010 – January 2016

According to the U.S. Drought Monitor, continuous drought conditions were recorded for the Grant County planning area between November 2010 and January 2016, making it the longest drought period on record for the county. Above average temperatures and dry conditions persisted for a long time, contributing to the drought. The planning area experienced everything from D0 (abnormally dry) to D4 (exceptional drought) levels of drought.

According to the National Oceanic and Atmospheric Administration (NOAA), this multiyear drought event (2011 to 2014 specifically) was the second worst statewide drought, following a drought period in the early 1950's. This drought resulted in near record low levels of water in statewide and local reservoirs.<sup>6</sup> The NOAA also reports devastating impacts during this drought period to the agriculture sector across the entire southwest region.

### PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 15 drought periods within a 24.5-year reporting period, which provides a probability of approximately one event every year. This frequency supports a “Highly Likely” probability of future events for the Grant County planning area, including all participating jurisdictions. The impact of climate change could produce longer, more severe droughts, exacerbating the current drought impacts.

### CLIMATE CHANGE CONSIDERATIONS

According to the Fifth National Climate Assessment, climate change is threatening water resources and compromising human health and safety in the Southwestern United States region through drought. Annual rainfall in New Mexico is more likely to decrease than increase, so

<sup>4</sup> Reporting includes events recorded across regional zones inclusive of Grant County, as determined by the NCEI. Duplicate reporting may occur across similar zones.

<sup>5</sup> A full list of events with dates and details is available upon request and can be found in the NCEI.

<sup>6</sup> National Oceanic and Atmospheric Administration/ State Climate Summaries, New Mexico. 2022.

<https://statesummaries.ncics.org/downloads/NewMexico-StateClimateSummary2022.pdf>

## SECTION 6: DROUGHT

periods without rain are likely to become longer, increasing drought risk and severity.<sup>7</sup> Warmer temperatures and less rainfall will increase the demand for water but also reduce the water supply, resulting in potential shortages. Increased drought risk due to climate change will also exacerbate impacts on local agriculture and increase wildfire risk.

The U.S. Climate Explorer indicates that drought risk for Grant County may increase due to increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in average extreme heat temperatures. Historically, extreme temperatures averaged 95°F in Grant County, but between 2035 and 2064 the average will be 101°F. With the full range of projections, average temperatures could increase up to 20°F higher but the severity is dependent on overall future emissions.

## VULNERABILITY AND IMPACT

Loss estimates were based on 24.5 years of statistical data from the NCEI and the U.S. Drought Monitor. A drought event frequency-impact was then developed to determine an impact profile on agriculture products and estimate potential losses due to drought in the area. All existing and future buildings, facilities, and populations are exposed to this hazard and could potentially be impacted.

The Grant County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by drought events. For a detailed list see Appendix C.

**Table 6-5. Critical Facilities Vulnerable to Drought Events**

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	<ul style="list-style-type: none"><li>Increased law enforcement activities may be required to enforce water restrictions.</li><li>Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.</li><li>Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding.</li></ul>
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	<ul style="list-style-type: none"><li>Strain on staff as drought may cause health problems related to low water flows and poor water quality.</li><li>Operations dependent on water supply may be adversely impacted.</li></ul>
Commercial Suppliers (food, gas, etc.)	<ul style="list-style-type: none"><li>Operations dependent on water supply may be adversely impacted.</li></ul>

<sup>7</sup> Environmental Protection Agency. 2016. What Climate Change Means for New Mexico. <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nm.pdf>.

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CRITICAL FACILITIES	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"><li>• Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding.</li><li>• Operations dependent on water supply may be adversely impacted.</li></ul>

New Mexico is no stranger to drought, and as part of the desert southwest, drought can have particularly severe impacts. New Mexico has the lowest water to land ratio than any other state in the nation and water shortages during drought periods is a huge concern.<sup>8</sup>

Most water in the state comes from ground water wells and surface waters. High demand can deplete these resources during extreme drought conditions. As resources are depleted, potable water is in short supply and overall water quality can suffer, elevating health concerns for all residents but especially vulnerable populations – typically children, the elderly, and the ill. In addition, potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities.

The average person will survive only a few days without water, and this timeframe can be drastically shortened for those people with more fragile health – typically children, the elderly, and people with disabilities. During summer drought, or hot and dry conditions, elderly persons, small children, infants, those with disabilities, or who do not have adequate cooling units in their homes may become more vulnerable to injury and/or death. In addition, people who speak English 'less than very well' may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Grant County planning area is estimated at 28 percent of the total population and children under the age of 5 are estimated at 4 percent. The population with a disability is estimated at 22 percent of the total population. An estimated 21 percent of the planning area population live below the poverty level and 3 percent of the populations speak English 'less than very well' (Table 6-6).

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<sup>8</sup> New Mexico Environmental Public Health Tracking. Drought. <https://nmtracking.doh.nm.gov/environment/climate/Drought.html>.

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**Table 6-6. Populations at Greater Risk of Drought Impacts<sup>9</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

The planning area is also vulnerable to food shortages when drought conditions exist, and potable water is in short supply. Potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities. All residents in the Grant County planning area could be adversely affected by drought conditions, which could limit water supplies and present health threats.

The economic impact of droughts can be significant as they produce a complex web of impacts that spans many sectors of the economy and reach well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services. If droughts extend over several years, the direct and indirect economic impact can be significant.

Crop production can also suffer greatly during extreme drought conditions, limiting fresh local food supplies, driving up costs, and negatively impacting the local economy. Drought conditions could adversely affect the agricultural industry throughout the Grant County planning area. According to the USDA 2022 Census of Agriculture, there are 334 farms over a total of 794,499 acres in size throughout the Grant County planning area. The average value of agricultural products sold in Grant County is \$15,602,000.

Drought can have severe impacts on the environment, leading to reduced water availability, potentially harming plants and animals, and resulting in habitat degradation. It also increases the risk of wildfires by drying out vegetation making it more flammable and prone to ignition. Wildfires destroy vegetation and burn the ground, meaning the soil is no longer able to absorb rainwater. The lack of natural vegetation and damage to the soil makes the area more susceptible to flooding and erosion. This creates a cascading impact where drought leads to wildfires, which then increases the risk of floods. Additionally, drought alone dries the ground, making the soil hard and less permeable, which reduces its ability to absorb water. When heavy rains follow a drought, the hardened soil leads to increased surface runoff, increasing the risk of flood events.

Impacts of past droughts experienced in the Grant County planning area, including all participating jurisdictions, have not resulted in injuries or fatalities supporting a “Limited” severity of impact

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<sup>9</sup> U.S. Census Bureau, American Community Survey, 2022

## SECTION 6: DROUGHT

meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for possibly 24 hours or less and less than ten percent of property impacted.

### ASSESSMENT OF IMPACTS

The Drought Impact Reporter was developed in 2005 by the University of Nebraska-Lincoln to provide a national database of drought impacts. Droughts can have an impact on agriculture; business and industry; energy; fire; plants and wildlife; relief, response, and restrictions; society and public health; tourism and recreation; and water supply and quality. The reports are submitted from individuals from Federal, State, and local agencies, as well as the general public. Table 6-7 lists the drought impacts to Grant County from 2005 through 2024 based on reports received by the Drought Impact Reporter.

**Table 6-7. Drought Impacts, 2005-2024**

DROUGHT IMPACTS	
Agriculture	9
Business & Industry	2
Energy	0
Fire	20
Plants & Wildlife	6
Relief, Response & Restrictions	19
Society & Public Health	0
Tourism & Recreation	0
Water Supply & Quality	0

Droughts can have an impact on agriculture, business and industry; energy; fire; plants and wildlife; relief, response, and restrictions; society and public health; tourism and recreation; and water supply and quality. Drought has the potential to also impact people in the Grant County planning area. While it is rare that drought, in and of itself, leads to a direct risk to the health and safety of people in the U.S., severe water shortages could result in inadequate supply for human needs.

Severe drought conditions can be frequently associated with a variety of impacts, including:

- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, and cross-connection contamination) will increase as the drought intensifies.
- Public safety from forest / range / wildfires will increase as water availability and/or pressure decreases.
- Respiratory ailments may increase as the air quality decreases.
- There may be an increase in disease due to wildlife concentrations (e.g., rabies, Rocky Mountain spotted fever, Lyme disease).
- Residents may disagree with the County over water use / water rights, creating conflict.

## SECTION 6: DROUGHT

- Political conflicts may increase between municipalities, counties, states, and regions.
- Water management conflicts may arise between competing interests.
- Increased law enforcement activities may be required to enforce water restrictions.
- Severe water shortages could result in inadequate supply for human needs as well as lower quality of water for consumption.
- Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.
- During drought there is an increased risk for wildfires and dust storms.
- The community may need increased operational costs to enforce water restriction or rationing.
- Prolonged drought can lead to increases in illness and disease related to drought.
- Utility providers can see decreases in revenue as water supplies diminish.
- Utilities providers may cut back energy generation and service to their customers to prioritize critical service needs.
- Hydroelectric power generation facilities and infrastructure would have significantly diminished generation capability. Dams simply cannot produce as much electricity from low water levels as they can from high water levels.
- Fish and wildlife food and habitat will be reduced or degraded over time during a drought and disease will increase, especially for aquatic life.
- Wildlife will move to more sustainable locations creating higher concentrations of wildlife in smaller areas, increasing vulnerability, and further depleting limited natural resources.
- There are 16 federally endangered, threatened or candidate species in Grant County. Severe and prolonged drought can result in the reduction of a species or cause the extinction of a species altogether.
- Plant life will suffer from long-term drought. Wind and erosion will also pose a threat to plant life as soil quality will decline. The urban tree canopy, including county and city parks, are vulnerable to the impacts of prolonged drought.
- Dry and dead vegetation will increase the risk of wildfire.
- Drought poses a significant risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Drought-related declines in production may lead to an increase in unemployment.
- Drought may limit livestock grazing resulting in decreased livestock weight, potential increased livestock mortality, and increased cost for feed.
- Negatively impacted water suppliers may face increased costs resulting from the transport water or develop supplemental water resources.
- Long term drought may negatively impact future economic development.

The overall extent of damage caused by periods of drought is dependent on its extent and duration. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a drought event.



## SECTION 7

# EXTREME COLD

## SECTION 7: EXTREME COLD

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### HAZARD DESCRIPTION



Extreme cold refers to temperatures that are significantly lower than what is normal for a particular region or season. Extreme cold temperatures occur every winter in at least part of the country and affects millions of people across the United States. The arctic air can be dangerous and when combined with brisk winds, the planning area may experience dangerously cold wind chill values. Extreme cold may also result in a freeze, which according to the National Weather Service, occurs when the temperature

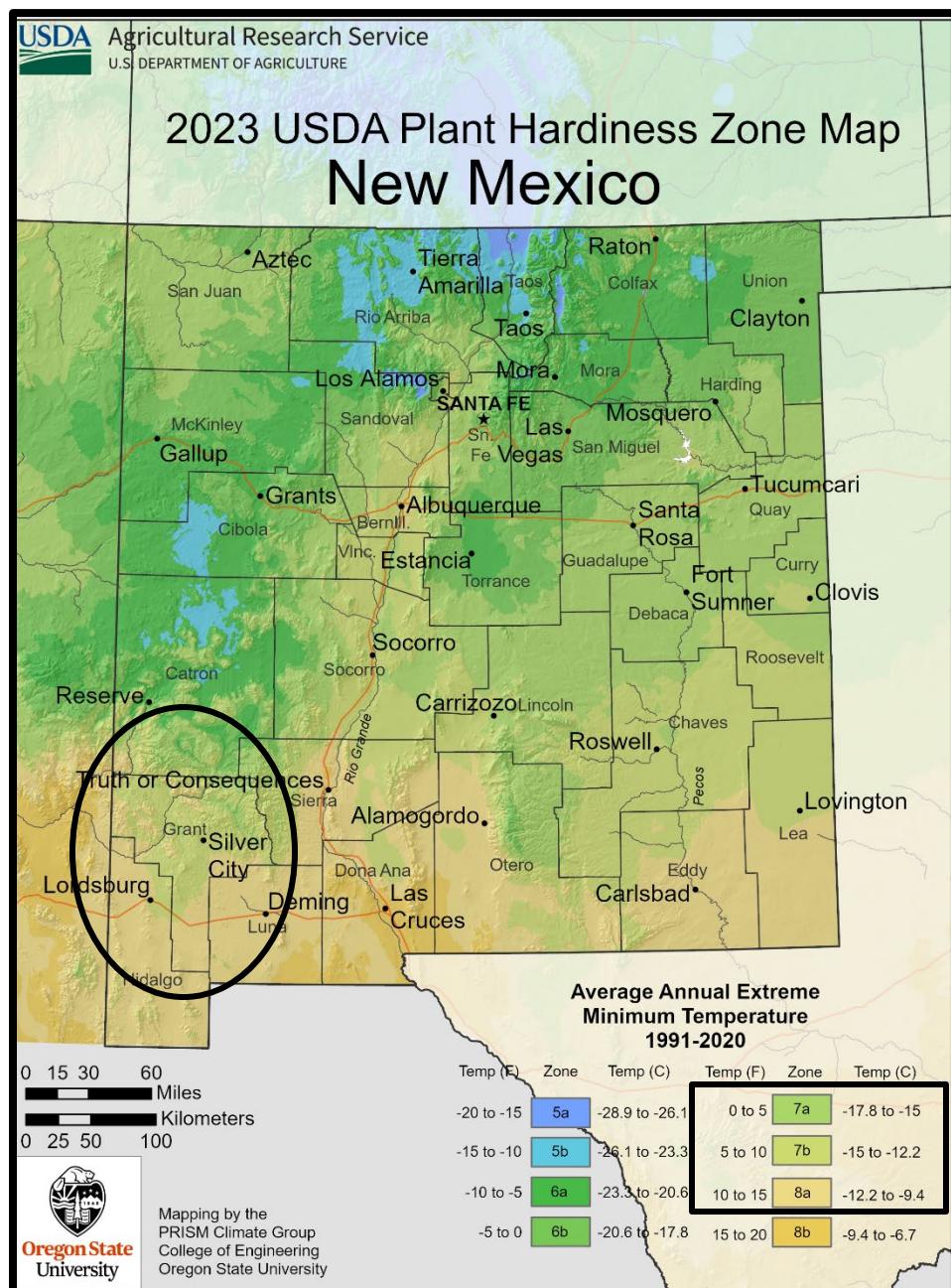
drops below 32°F for a significant period of time.

People exposed to extreme cold are susceptible to frostbite and can succumb to hypothermia in a matter of minutes. Extreme Cold temperatures can also affect crops. In late spring or early fall, cold air outbreaks can damage or kill produce for farmers, as well as residential plants and flowers. Freezes and their effects are significant during the growing season. Extreme cold may also impact or damage roads, bridges, buildings, and critical infrastructure.

As indicated in Figure 7-1, the Grant County planning area is in USDA Hardiness Zones 7a, 7b, and 8a, with annual minimum temperatures between 0°F and 15°F.

## SECTION 7: EXTREME COLD

Figure 7-1. Annual Minimum Temperature<sup>1</sup>



## LOCATION

Extreme cold events are not confined to specific geographic boundaries. Therefore, the entire Grant County planning area, including all participating jurisdictions, is exposed to extreme cold temperatures and may be impacted.

<sup>1</sup> Source: USDA

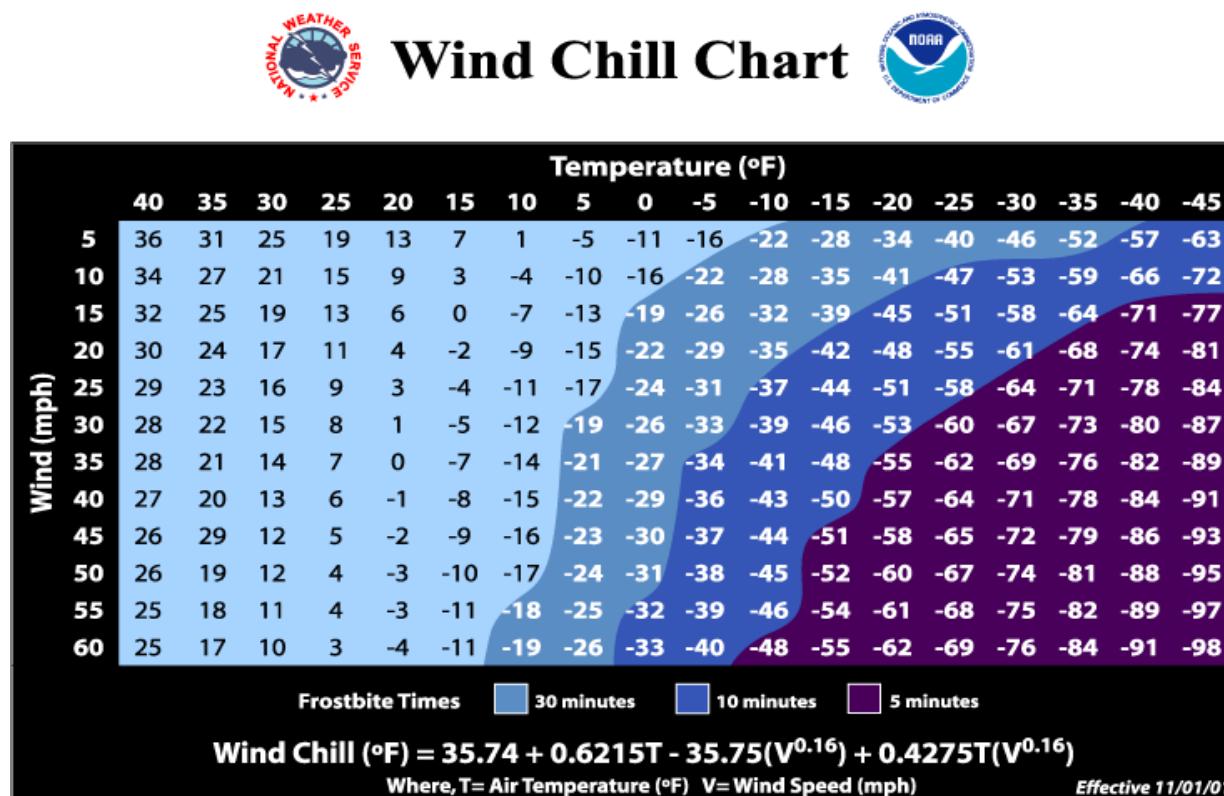
## SECTION 7: EXTREME COLD

### EXTENT

The extent of extreme cold is measured by wind chill, which is the temperature of the atmosphere in relation to wind speed. Wind chill describes what the air temperature *feels* like to the human skin. In simple terms, the colder the air temperature and the higher the wind speeds the colder it will feel on your skin if you're outside. So even if it remains the same temperature, but the wind speed increases, it will actually feel colder to your skin. This is because as wind blows across our bodies it takes our heat and blows it away. The faster the wind speeds, the faster our body heat is taken away and the colder it feels. It is important to understand the full extent of extreme cold temperatures because it can cause significant effects on the human body.

Figure 7-2 presents the National Weather Service Wind Chill Temperature Index. This chart represents wind chill based on the temperature and wind speed. The colors represent a frostbite indicator, showing the points where temperature, wind speed and exposure time will cause frostbite on an individual exposed to the elements. For example, a temperature of 20°F and a wind speed of 10mph will produce a wind chill temperature of 9°F. Under these conditions, exposed skin can freeze in 30 minutes.

Figure 7-2. Wind Chill Temperature Index



As described in Figure 7-1, the Grant County planning area has an average annual minimum cold temperature of 0°F to 15°F. The NCEI Storm Events Database provides historical records of extreme cold, frost, and freeze events since 1996, however no extreme cold events have been reported for the Grant County planning area, including participating jurisdictions during this reporting period. Based on the Grant County's annual minimum temperatures, taken with the wind

## SECTION 7: EXTREME COLD

chill chart (Figure 7-2), it can be anticipated that the planning area will experience conditions cold enough to cause frostbite in 30 minutes or less each year.

### HISTORICAL OCCURRENCES

Since January 1996, there have been no recorded extreme cold events for the Grant County planning area, including participating jurisdictions, based upon NCEI records. It is highly likely multiple extreme cold occurrences have gone unreported before and during the recording period. The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration and considered a reliable resource for hazards. However, the annual minimum temperatures for the planning area along with input from local team members indicates regular extreme cold occurrences across the planning area that simply have not been reported.

### PROBABILITY OF FUTURE EVENTS

According to input from the planning team and annual low temperatures, the Grant County planning area is expected to experience one or more extreme cold events annually. The probability of a future extreme cold event affecting the Grant County planning area, including participating jurisdictions, is considered “Highly Likely”, with an extreme cold event likely to occur within the next year.

### CLIMATE CHANGE CONSIDERATIONS

Climate change may slightly decrease the risk of extreme cold events in the planning area. According to the New Mexico Bureau of Geology and Mineral Resources, both extreme cold and snowfall are expected to become less frequent in the coming decades. By the middle of this century, winters are projected to be milder, with fewer cold extremes, with fewer frost days per year. This will likely result in a shorter and less pronounced cold season. Fewer cold spells are projected to occur per year, but the length of cold spells will be longer when they do occur.<sup>2</sup>

While this assessment states that New Mexico will experience fewer cold extremes, data on future impacts is limited and these projections are subject to change as the research evolves.

### VULNERABILITY AND IMPACT

Extreme cold can be very dangerous and may cause fatalities, especially for people experiencing homelessness or for those who live below the poverty level and are unable to pay for heating systems or utility bills. Power outages are common during extreme cold events which can also lead to the inability to heat homes safely. This can lead to people using unsafe practices such as running a generator or gas stove inside their home.

During periods of extreme cold, aging critical infrastructure and utility systems, such as electrical and water systems, may fail. Freezing temperatures can cause water pipes to freeze and crack. In addition, ice may gather along electrical lines which can impact the electrical infrastructure and cause widespread outages for potentially long periods of time.

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<sup>2</sup> Dunbar, N.W., Gutzler, D.S., Pearthree, K.S., Phillips, F.M., Bauer, P.W., Allen, C.D., DuBois, D., Harvey, M.D., King, J.P., McFadden, L.D., Thomson, B.M., and Tillery, A.C., 2022, Climate change in New Mexico over the next 50 years: Impacts on water resources: New Mexico Bureau of Geology and Mineral Resources, Bulletin 164, 218 p. <https://doi.org/10.58799/B-164>

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Grant County is a rich and diverse agricultural area. With more than 334 farms and ranches, agriculture is a vital part of the economy in the planning area. The average value of agricultural products sold in Grant County is \$15,602,000.<sup>3</sup> Extreme cold events may severely damage crops and may even cause low crop yields by restricting stem growth. The most dangerous time for an extreme cold event to occur is during the spring months, when crops are the most vulnerable to damage. An extreme cold event in the planning area may impact the County's agricultural assets causing severe economic loss.

The Grant County Planning Team identified the following critical facilities (Table 7-1) as assets that are considered the most important to the planning area and susceptible to a range of impacts caused by extreme cold events. For a comprehensive list by participating jurisdiction, see Appendix C.

**Table 7-1. Critical Facilities Vulnerable to Extreme Cold Events**

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Departments (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"><li>Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.</li><li>Exposure to extreme cold can cause injury in first responders if exposed for a period of time.</li><li>Roads may become impassable due to snow and/or ice impacting response times by emergency services.</li><li>Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li></ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"><li>Power outages due to increased usage could disrupt critical care.</li><li>Backup power sources could be damaged.</li><li>Increased number of patients due to exposure to cold temperatures could lead to a strain on staff.</li><li>Water pipes can freeze and burst leading to flooding within facilities.</li><li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li><li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li><li>Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.</li><li>Exposure risks to outdoor workers.</li></ul>
Commercial Supplier (food, gas/fuel, etc.)	<ul style="list-style-type: none"><li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li><li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li></ul>

<sup>3</sup> USDA 2022 Census of Agriculture

## SECTION 7: EXTREME COLD

CRITICAL FACILITIES	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> <li>Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.</li> <li>Roads may become impassable due to snow and/or ice impacting response times by emergency services.</li> <li>Power outages due to increased usage could disrupt critical care.</li> <li>Backup power sources could be damaged.</li> <li>Water pipes can freeze and burst leading to flooding within facilities.</li> </ul>

People and animals are subject to health risks from extended exposure to cold air. Elderly people are at greater risk of death from hypothermia during these events, especially in the neighborhoods with older housing stock. According to the U.S. Center for Disease Control, every year hypothermia kills about 600 Americans, half of whom are 65 years of age or older. In addition, populations living below the poverty level may not be able to afford to run heat on a regular basis or for an extended period of time.

The population over 65 and under the age of 5 in the Grant County planning area is estimated at 32 percent of the total population or an estimated total of 9,210 potentially vulnerable residents in the planning area based on age. An estimated 21 percent of the planning area population live below the poverty level. Table 7-2 lists population data for several vulnerable population categories throughout the Grant County planning area.

Another segment of the population at risk are those who are experiencing homelessness. While reliable data at the county-level is limited, estimates show that 19,000-20,000 individuals experienced homelessness statewide throughout the year in 2022. HUD's Annual Homeless Assessment Report estimated 2,560 people were homeless one night in January 2022.<sup>4</sup>

**Table 7-2. Populations at Greater Risk of Extreme Cold Events<sup>5</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

Older homes tend to be more vulnerable to the impacts of extreme cold events. Approximately 8,208 housing units (56 percent) in the planning area were built before 1980 (Table 7-3).

<sup>4</sup> 2023 New Mexico Affordable Housing Needs Assessment, July 7, 2023

<sup>5</sup> U.S. Census Bureau, American Community Survey, 2022

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**Table 7-3. Structures at Greater Risk of Extreme Cold Events<sup>6</sup>**

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Grant County	8,208
City of Bayard	809
Town of Hurley	631
Village of Santa Clara	518
Town of Silver City	3,509

There are no recorded fatalities or injuries within the Grant County planning area due to extreme cold events. Additionally, there are no recorded extreme cold events in the planning area, and therefore total monetary losses or annual loss estimates due to extreme cold are difficult to determine. The limited recorded impacts on the Grant County planning area, including participating jurisdictions, indicate a “Limited” severity of impact, meaning minimal quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed.

### ASSESSMENT OF IMPACTS

The greatest risk from an extreme cold event is to public health and safety. The impact of climate change could produce more frequent and intense extreme cold events, exacerbating the current winter storm impacts. Extreme cold conditions are associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (28 percent of total population) and children under 5 (4 percent of total population), can face serious or life-threatening health problems from exposure to extreme cold including hypothermia and frostbite.
- Loss of electric power or other heat source can result in increased potential for fire injuries or hazardous gas inhalation because residents burn candles for light or use fires or generators to stay warm.
- Response personnel, including utility workers, public works personnel, debris removal staff, tow truck operators, and other first responders, are subject to injury resulting from exposure to extreme cold temperatures.
- Response personnel would be required to travel in potentially hazardous conditions, elevating the life safety risk due to accidents and potential contact with downed power lines.
- Operations or service delivery may experience impacts from electricity blackouts due to ice and extreme cold related damages.
- Power outages are possible throughout the planning area due to downed trees and power lines and/or rolling blackouts. Outages are also possible due to an increase in electricity usage and demand when using electric heating systems.

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<sup>6</sup> U.S. Census Bureau, American Community Survey, 2022

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- Critical facilities without emergency backup power may not be operational during power outages.
- Severe cold could significantly damage vegetation and crops.
- Exposed water pipes may freeze and break when exposed to extreme cold temperatures, both residential and commercial structures are vulnerable, causing significant damages.

The economic and financial impacts of extreme cold events on the community will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of an extreme cold event.



# SECTION 8

# EXTREME HEAT

## SECTION 8: EXTREME HEAT

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### HAZARD DESCRIPTION

Extreme heat is a prolonged period of excessively high temperatures and exceptionally humid conditions. Extreme heat during the summer months is a common occurrence throughout the State of New Mexico, and the Grant County planning area is no exception. The County typically experiences extended heat waves or an extended period of extreme heat and is often accompanied by high humidity.



Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with extreme heat include heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and even heat stroke. The most vulnerable population to heat casualties are children and the elderly or infirmed who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being.

Critical infrastructure can also be damaged or impacted by extreme heat. High temperatures may cause a rise in electricity consumption as homes, schools, and businesses try to regulate the temperature. This may lead to energy shortages and possible blackouts.

### LOCATION

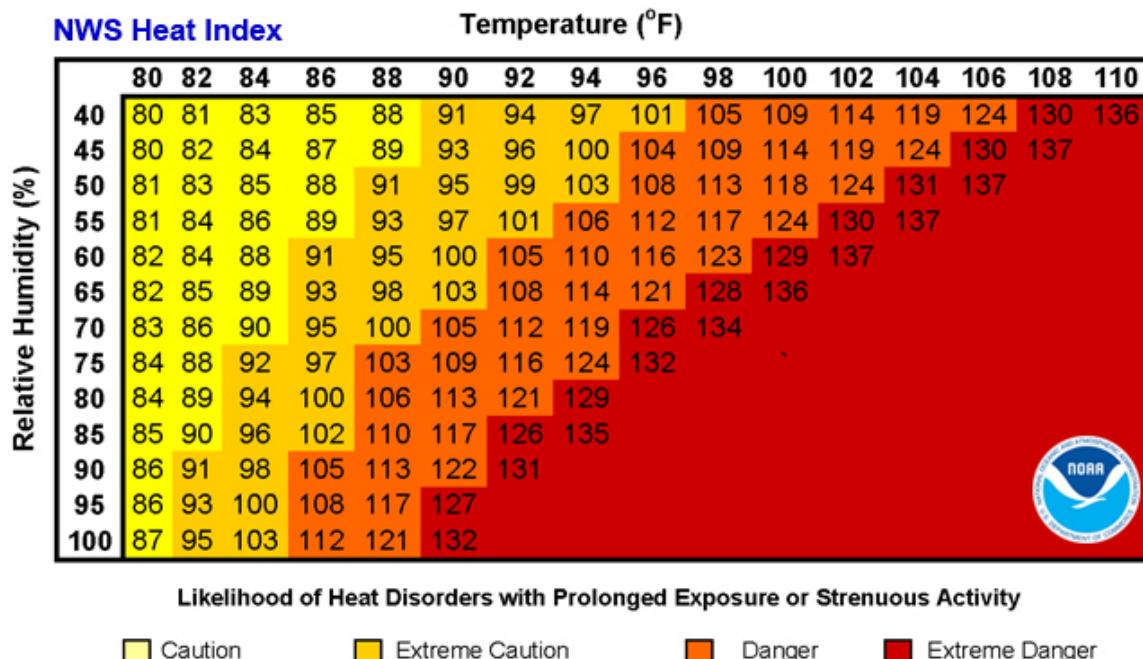
Extreme heat events can occur throughout the Grant County planning area as there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Grant County planning area, including all participating jurisdictions.

### EXTENT

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the "Heat Index" and is depicted in Figure 8-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

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Figure 8-1. Extent Scale for Extreme Heat<sup>1</sup>



The index in Figure 8-1 displays varying categories of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit (°F) or lower, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. “Caution” is the first category of intensity, and it indicates when fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps, or heat exhaustion are possible, and a “Danger” level means that these symptoms are likely. “Extreme Danger” indicates that heat stroke is likely. The National Weather Service (NWS) initiates alerts based on the Heat Index as shown in Table 8-1.

Table 8-1. Heat Index and Warnings

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Danger	125°F and higher	Heat stroke or sun stroke likely.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.
Danger	103 – 124°F	Sunstroke, muscle cramps, and/or heat exhaustion are likely. Heatstroke possible with prolonged exposure and/or physical activity.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.

<sup>1</sup> Source: NOAA

## SECTION 8: EXTREME HEAT

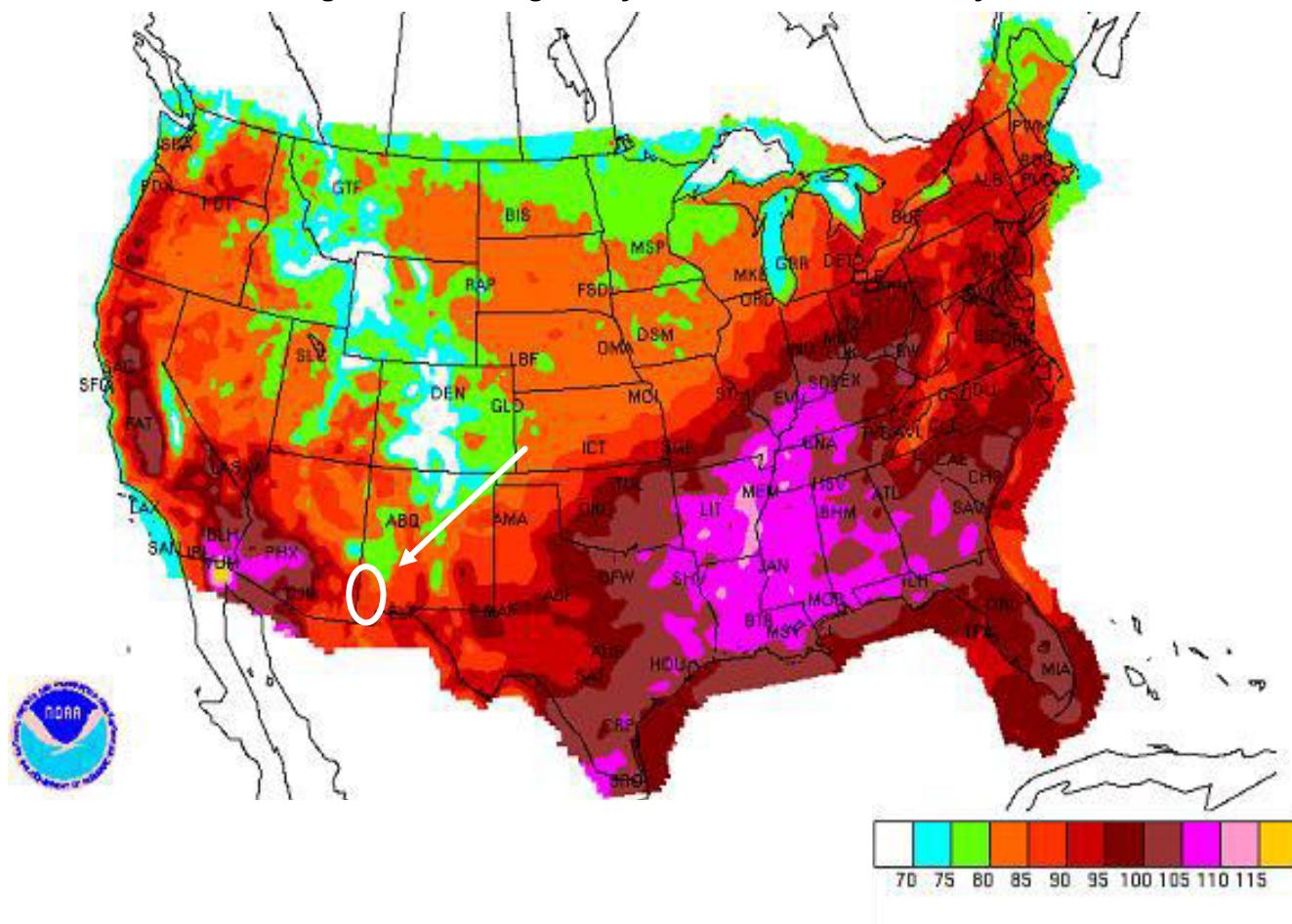
CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Caution	90 – 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.	A Heat Advisory will be issued to warn that the Heat Index may exceed 105°F.
Caution	80 – 90°F	Fatigue is possible with prolonged exposure and/or physical activity.	A Heat Advisory will be issued to warn that the Heat Index may exceed 105°F.

Due to its geography and its dry, arid, and sunny climate, the Grant County planning area can expect an extreme heat event each summer. Citizens, especially children and the elderly should exercise caution by staying out of the heat for prolonged periods when a heat advisory or excessive heat warning is issued. In addition, those working or remaining outdoors for extended periods of time are at greater risk.

Figure 8-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Grant County planning area. The planning area is represented in dark orange across the County. The dark orange color indicates an average daily heat index of between 85°F to 90°F. Therefore, Grant County could experience dangerous heat from 90°F or more and should mitigate to the extent of “Extreme Caution” which can include sunstroke, muscle cramps, and potential heat exhaustion. This is the average maximum temperature the planning area can anticipate based on historical events.

## SECTION 8: EXTREME HEAT

Figure 8-2. Average Daily Maximum Heat Index Days<sup>2</sup>



## HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA). The NCEI is the largest archive available for historic storm events data. Previous occurrences for extreme heat are derived from the NCEI database, which identifies extreme heat events at the county level for each event. According to heat related incidents located solely within Grant County, there have been four extreme heat events on record for the planning area (Table 8-2). Historical extreme heat information, as provided by the NCEI, shows extreme heat activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event.

<sup>2</sup> NRDC and the white circle indicates the Grant County planning area.

## SECTION 8: EXTREME HEAT

Historical extreme heat data for the Grant County planning area is provided on the NCEI database from January 1996 through June 2024. No deaths, injuries, or damages were reported. It is highly likely additional extreme heat occurrences have gone unreported before and during the recording period. Due to the limited number of reported events, average high temperatures have been analyzed in order to determine the probability of future events.

**Table 8-2. Historical Extreme Heat Events, January 1996 – June 2024<sup>3</sup>**

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	7/1/2023	0	0	\$0	\$0
Grant County	7/1/2023	0	0	\$0	\$0
Grant County	7/1/2023	0	0	\$0	\$0
Grant County	7/1/2023	0	0	\$0	\$0
<b>TOTALS</b>		<b>0</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>

## SIGNIFICANT EVENTS

### July 1, 2023

July was the hottest month on record for Southern New Mexico, with a persistent upper ridge over the Borderland. At New Mexico State University, temperatures exceeded 100°F on 28 out of 31 days, averaging 88°F. The NMSU Cooperative Observer station reported an average temperature of 82°F, breaking the previous 2016 record by 1.9°F. High temperatures surpassed 95°F daily, and the area received just 0.03 inches of rain.

## PROBABILITY OF FUTURE EVENTS

According to historical records, the Grant County planning area, including all participating jurisdictions, has experienced four events in a 28.5-year reporting period. It can be assumed that events have gone unreported due to the average daily temperatures throughout the summer. Historical records in combination with an analysis of maximum average temperatures provides a probability of at least one event every year. This frequency supports a “Highly Likely” probability of future events.

## CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to lead to an increase in average temperatures as well as an increase in frequency, duration, and intensity of extreme heat events. The Fifth National Climate Assessment states that increasing temperatures are leading to hotter extreme heat events that will increase animal and ecosystem stress, reduce crop quality and yield, and increase wildfire risk across the southwestern United States.

It is projected that future changes to Grant County will include increased temperatures, which according to the U.S. Climate Explorer, the conservative projections show the planning area may

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<sup>3</sup> NOAA, NCEI Storm Events Database

## SECTION 8: EXTREME HEAT

experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 95°F in Grant County, but between 2035 and 2064 the average will be 101°F, increasing the severity and frequency of drought events. With the full range of projections, average temperatures could increase up to 20°F higher, which would have detrimental consequences, but the severity is dependent on overall future emissions.

## VULNERABILITY AND IMPACT

While the entirety of the Grant County planning area is exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not likely to sustain significant damage from extreme heat events. Therefore, any estimated property losses associated with the extreme heat hazard are anticipated to be minimal across the area.

According to the USDA 2022 Census of Agriculture, there are 334 farms over a total of 794,499 acres in size throughout the Grant County planning area. The average value of agricultural products sold in Grant County is \$15,602,000. Extreme heat events may severely damage crops and negatively impact the crop yield if the higher temperature exceeds a crop's optimum temperature. The most dangerous time for an extreme heat event to occur is during the spring months, when crops are the most vulnerable to damage. An extreme heat event in the planning area may impact the planning area's agricultural assets causing severe economic loss.

Every summer, the hazard of heat-related illness becomes a significant public health issue throughout much of the United States. Mortality rates increase during heat waves, and excessive heat is an important contributing factor to deaths from other causes, particularly among the elderly. Extreme temperatures present a significant threat to life and safety for the population of the County as a whole. Heat casualties, for example, are typically caused by a lack of adequate air-conditioning or heat exhaustion. The most vulnerable population to heat casualties are the elderly or infirmed who frequently live on fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being. Children may also be more vulnerable if left unattended in vehicles. Populations living below the poverty level are often unable to run air-conditioning on a regular basis and are limited in their ability to seek medical treatment.

The population over 65 in the Grant County planning area is estimated at 28 percent of the total population and children under the age of 5 are estimated at 4 percent. The population with a disability is estimated at 22 percent of the total population. An estimated 21 percent of the planning area population live below the poverty level and 3 percent of the populations speak English 'less than very well' (Table 8-3).

Vulnerable and underserved populations are disproportionately impacted by extreme heat events as they may be more susceptible to health risks. The population below the poverty level are less likely to be able to afford air conditioning during the hot summer months as well as less likely to have access to medical care. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

## SECTION 8: EXTREME HEAT

**Table 8-3. Populations Vulnerable to Extreme Heat**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

Extremely high temperatures can have significant secondary impacts, leading to droughts, water shortages, increased fire danger, and prompt excessive demands for energy. The possibility of water shortages and power outages increases with unseasonably high temperatures in what is a normally mild month with low power demands. Typically, more than 12 hours of warning time would be given before the onset of an extreme heat event.

In terms of vulnerability to structures, the impact from extreme heat is considered negligible. It is possible that critical facilities and infrastructure could be shut down for 24 hours if cooling units are running constantly, leading to a temporary power outage (Table 8-4). Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires. Based on available historical records, annualized property and crop losses for the Grant County planning area, including all participating jurisdictions, are negligible. The number of historical injuries and fatalities also indicates a “Limited” level of impact, meaning injuries or illness can be treated with first aid.

The Grant County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by extreme heat events. The following critical facilities would be vulnerable to extreme heat events in the Grant County planning area. For a detailed list see Appendix C.

**Table 8-4. Critical Facilities Vulnerable to Extreme Heat Events**

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	<ul style="list-style-type: none"> <li>Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.</li> <li>Exposure to heat can cause heat illnesses in first responders, especially for those in heavy equipment.</li> <li>Roads may become impassable due to excessive heat causing asphalt roads to soften and concrete roads to shift or buckle impacting response times by emergency services.</li> <li>Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>

## SECTION 8: EXTREME HEAT

CRITICAL FACILITIES	POTENTIAL IMPACTS
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	<ul style="list-style-type: none"><li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li><li>Power outages due to increased usage could disrupt critical care.</li><li>Backup power sources could be damaged.</li><li>Evacuations may be necessary due to extended power outages, breaks in water main lines or other associated damage to facilities.</li><li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li><li>Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.</li></ul>
Commercial Suppliers (food, gas, etc.)	<ul style="list-style-type: none"><li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li><li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li></ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"><li>Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.</li><li>Roads may become impassable due to excessive heat causing asphalt roads to soften and concrete roads to shift or buckle impacting response times by emergency services.</li><li>Breaks in water main lines or other associated damage to facilities.</li></ul>

### ASSESSMENT OF IMPACTS

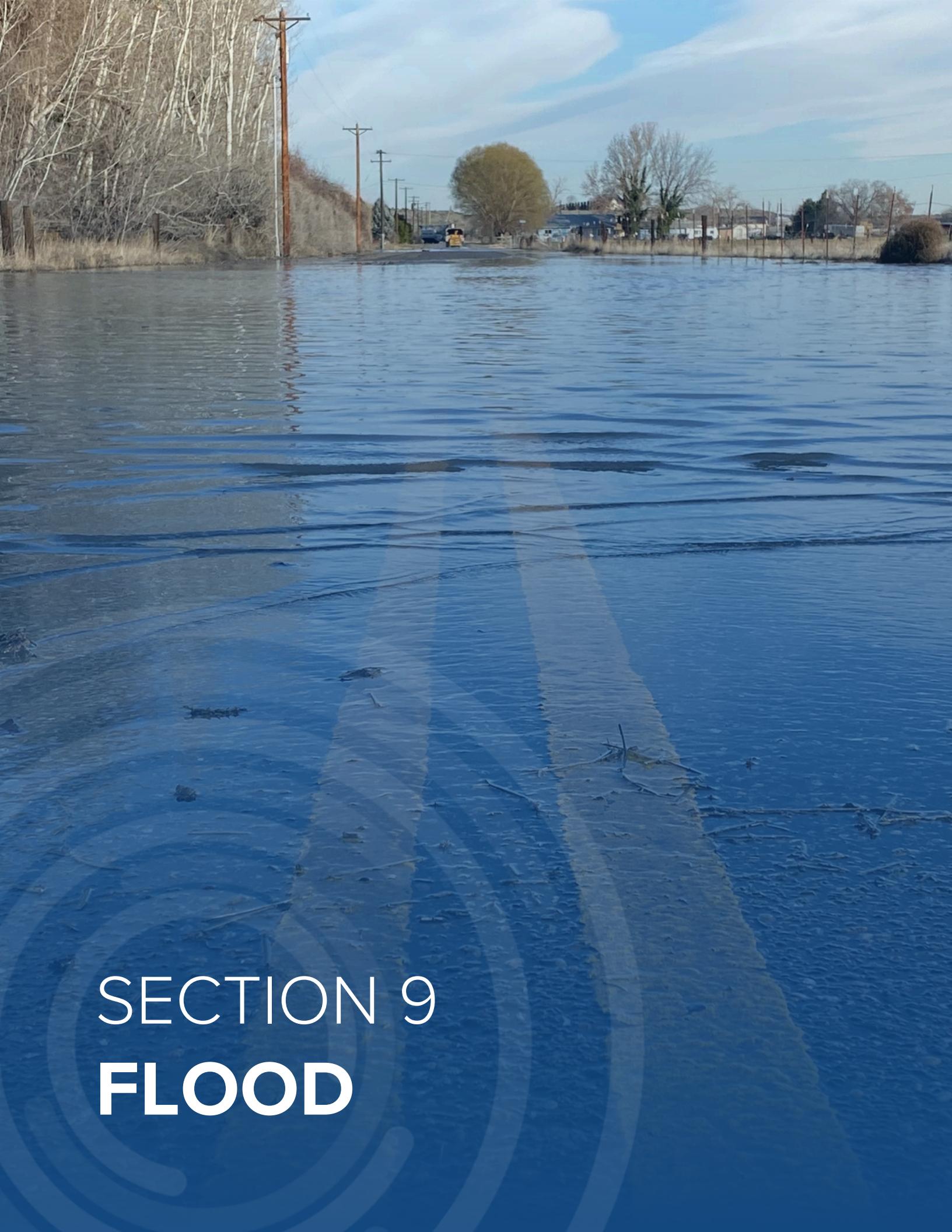
The greatest risk from extreme heat is to public health and safety. Extreme heat conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (28 percent of total population), children under 5 (4 percent of total population), and those with a disability (22 percent of total population) can face serious or life-threatening health problems from exposure to extreme heat including hyperthermia, heat cramps, heat exhaustion, and heat stroke (or sunstroke).
- Response personnel, including utility workers, public works personnel, and any other professions where individuals are required to work outside, are more subject to extreme heat related illnesses since their exposure would typically be greater.
- High energy demand periods can outpace the supply of energy, potentially creating the need for rolling brownouts which would elevate the risk of illness to vulnerable residents.
- Highways and roads may be damaged by excessive heat causing asphalt roads to soften and concrete roads to shift or buckle.
- Vehicle engines and cooling systems typically run harder during extreme heat events resulting in increases in mechanical failures.

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- Extreme heat events during times of drought can exacerbate the environmental impacts associated with drought, decreasing water and air quality and further degrading wildlife habitat.
- Extreme heat increases ground-level ozone (smog), increasing the risk of respiratory illnesses.
- Negatively impacted water suppliers may face increased costs resulting from the transport of water resources or development of supplemental water resources.
- Tourism and recreational activities at places may be negatively impacted during extreme heat events, reducing seasonal revenue.
- Outdoor activities may see an increase in school injury or illness during extreme heat events.

The economic and financial impacts of extreme heat on the community will depend on the duration of the event, demand for energy, drought associated with extreme heat, and many other factors. The level of preparedness and the amount of planning done by the community, local businesses, and citizens will impact the overall economic and financial conditions before, during, and after an extreme heat event.

A photograph of a flooded street. The water is high, covering the lower half of utility poles and surrounding vegetation. In the background, houses and trees are visible across the water. The sky is overcast.

# SECTION 9

# FLOOD

## SECTION 9: FLOOD

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### HAZARD DESCRIPTION

Floods generally result from excessive precipitation. The severity of a flood event is determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surfaces. Typically, floods are long-term events that may last for several days.

Inland or riverine flooding is a result of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Inland or riverine flooding is overbank flooding of rivers and streams, typically resulting from large-scale weather systems that generate prolonged rainfall over a wide geographic area. Therefore, it is a naturally occurring and inevitable event. Some river floods occur seasonally when winter or spring rainfalls fill river basins with too much water, too quickly.

Flash flooding is the result of excessive rainfall in a short period of time, usually within three to six hours of rainfall. Flash flooding is most commonly caused by heavy rainfall from thunderstorms but can also occur due to dam breaks or debris flow. Urban areas are more prone to flash flooding as impervious surfaces in these areas do not allow water to infiltrate the ground and soil. The varied terrain of New Mexico can carry water into areas that did not receive rain, also causing flash flooding. Storms that produce large amounts of runoff typically occur during monsoon season which begins in June and ends in October. In addition, Grant County has several arroyos, which is a water-carved gully or a normally dry creek bed. These arroyos can fill with fast moving water very quickly during flash flood events and become very dangerous.

The Grant County planning area is subject to extreme rainfall events, often in short durations, leading to dangerous flash flooding events. Historically, portions of Grant County have always been at risk to flooding because of monsoon rainfall, topography, and the location of development adjacent to flood-prone areas. Flooding events generally impact the entire planning area and have caused significant damage in the populated areas of the County. Flooding has occurred both within mapped floodplains and in other localized areas. Floods are a natural and recurrent event and can take place any time of the year.

## SECTION 9: FLOOD

Wildfire events can also have long-term cascading impacts and can create an increased risk of flooding, even many years after an event occurs. A burn scar is the barren or destroyed part of land after a wildfire, where extreme soil damage occurs, creating hydrophobic, or water repellent, soil. Rainfall that would normally be absorbed by the landscape will instead quickly run off, and because of this, much less rainfall is required to produce a flash flood. Grant County faces an increased risk of flooding due to damaged and burned landscapes.

### LOCATION

The Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide an overview of flood risk but can also be used to identify the areas of the County that are vulnerable to flooding. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings. Flood Insurance Studies (FIS) are often developed in conjunction with FIRMs. The FIS typically contains a narrative of the flood history of a community and discusses the engineering methods used to develop the FIRMs. The FIS also contains flood profiles for studying flooding sources and can be used to determine Base Flood Elevations (BFEs) for some areas.

The FIS for Grant County is dated January 6, 2011. This FIS is composed of nine volumes and compiles all previous flood information including data collected on numerous waterways. The study indicates that the principal flood problems are due to rainstorms and snowmelt. Flooding typically occurs during the months of June, July, and August due to prolonged heavy rainfall over tributary areas and is characterized by high peak flows of moderate duration. Flooding is more severe when rain has resulted in saturated ground conditions, or when the ground is frozen, and infiltration is minimal. The principal flood-prone area in Silver City is located near the east bank of Silva Creek and the west bank of Pinos Altos Creek within a half mile upstream of their confluence at the beginning of San Vicente Arroyo.

The current effective FIRMs (map ID 35017C, panels 50-2225, dated January 6, 2011) provided by FEMA for Grant County show the following flood hazard areas:

- Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- Zone AE: Areas subject to inundation by 1-percent-annual-chance shallow flooding. It is the base floodplain where BFEs are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.
- Zone AH: Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
- Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone.
- Zone X: Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square

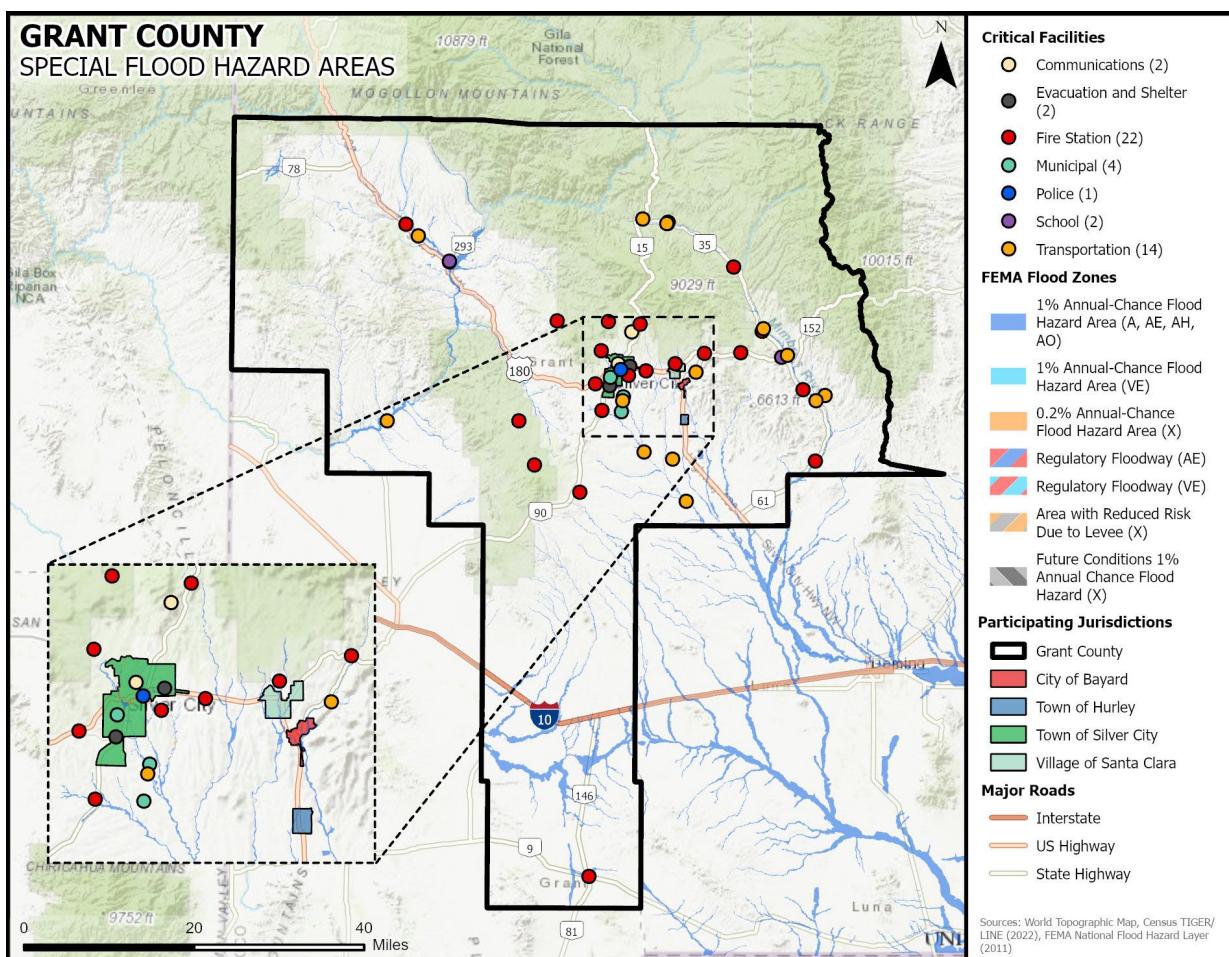
## SECTION 9: FLOOD

mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Locations of flood zones in Grant County based on the Flood Insurance Rate Map (FIRM) from FEMA are illustrated in Figures 9-1 to 9-5.

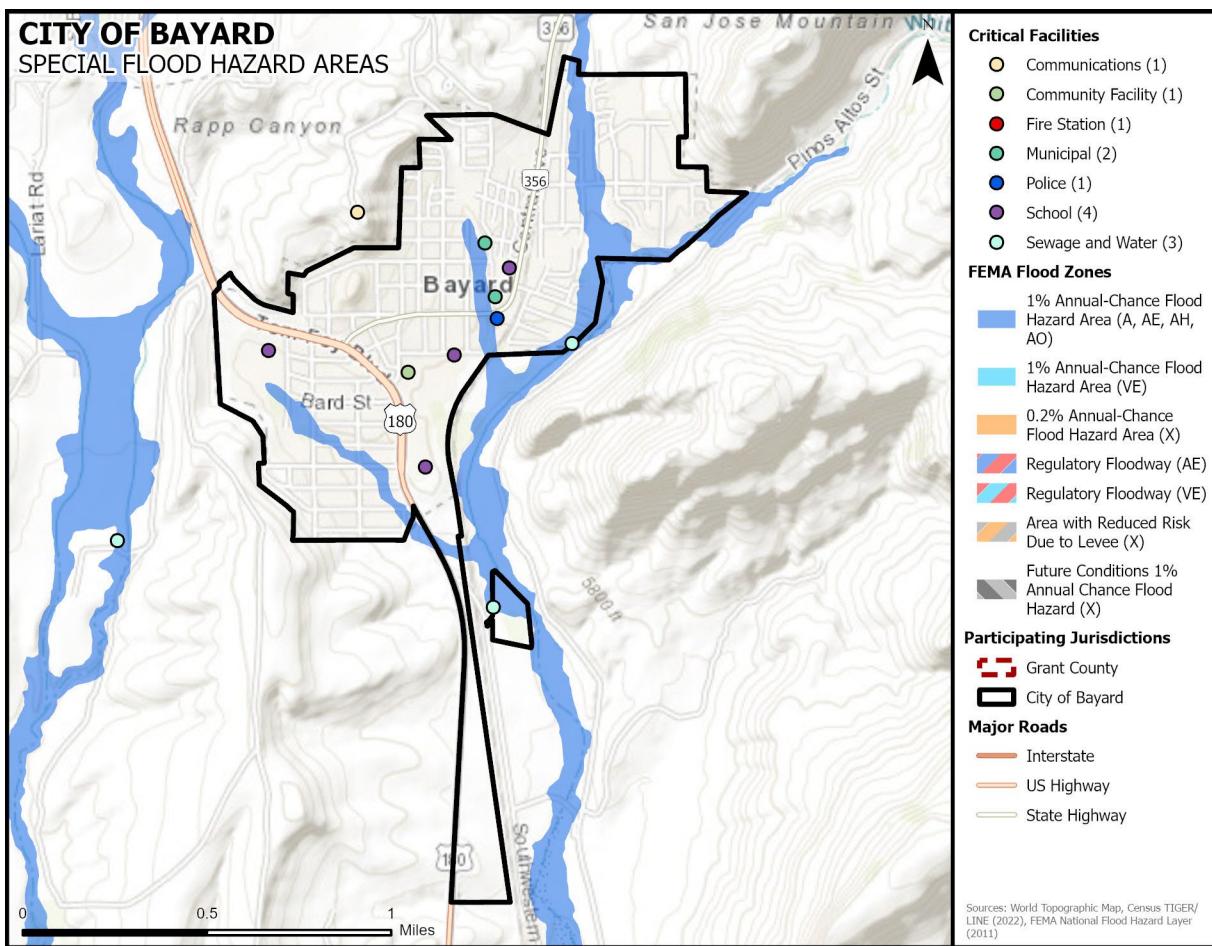
It is also important to note that areas that are downhill or downstream from burn scars are highly susceptible to localized flash flooding, especially near deep terrain. Some areas in the Grant County planning area are at higher risk of flash flooding from heavy rains including the Silver Fire and Black Fire burn scar areas.

**Figure 9-1. Estimated Flood Zones in Grant County**



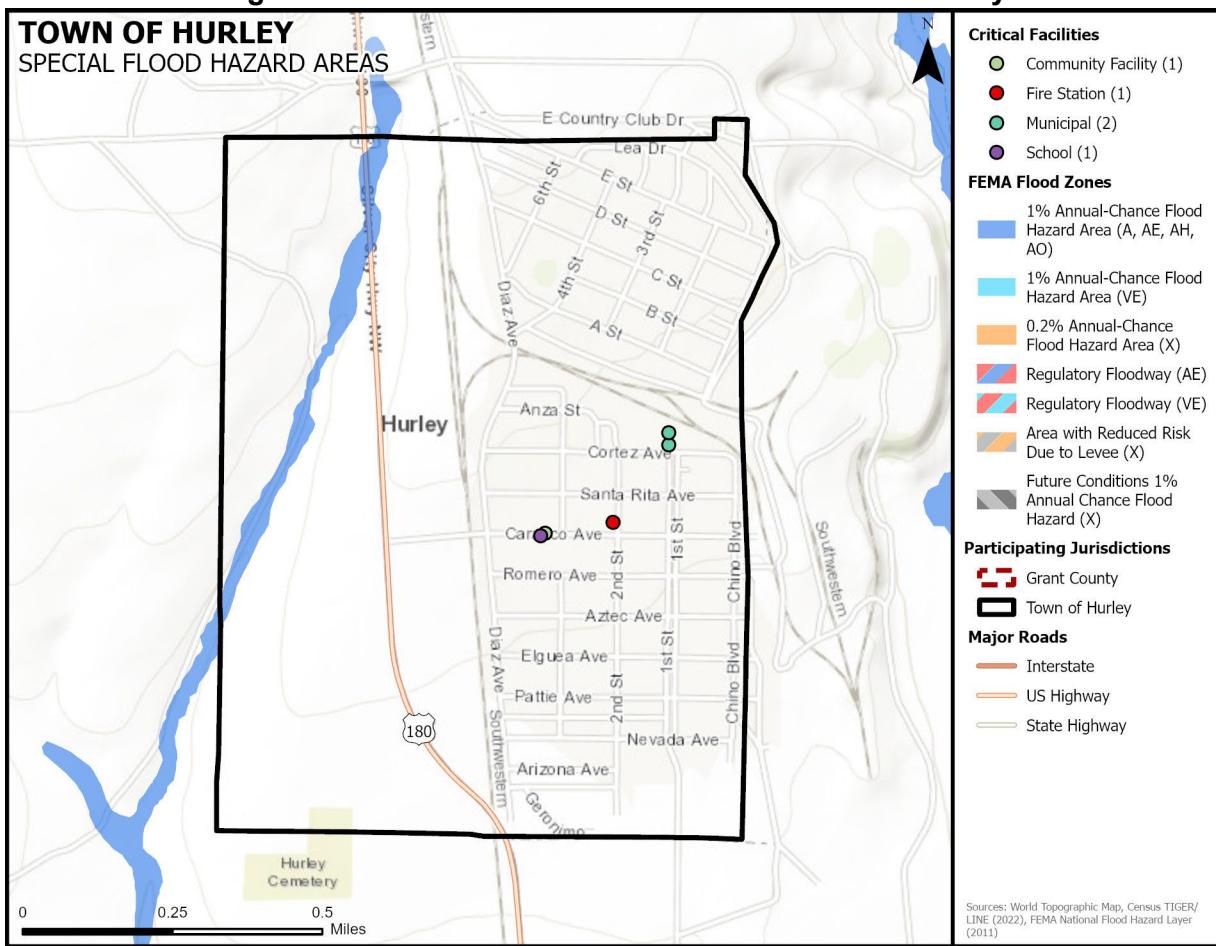
## SECTION 9: FLOOD

Figure 9-2. Estimated Flood Zones in the City of Bayard



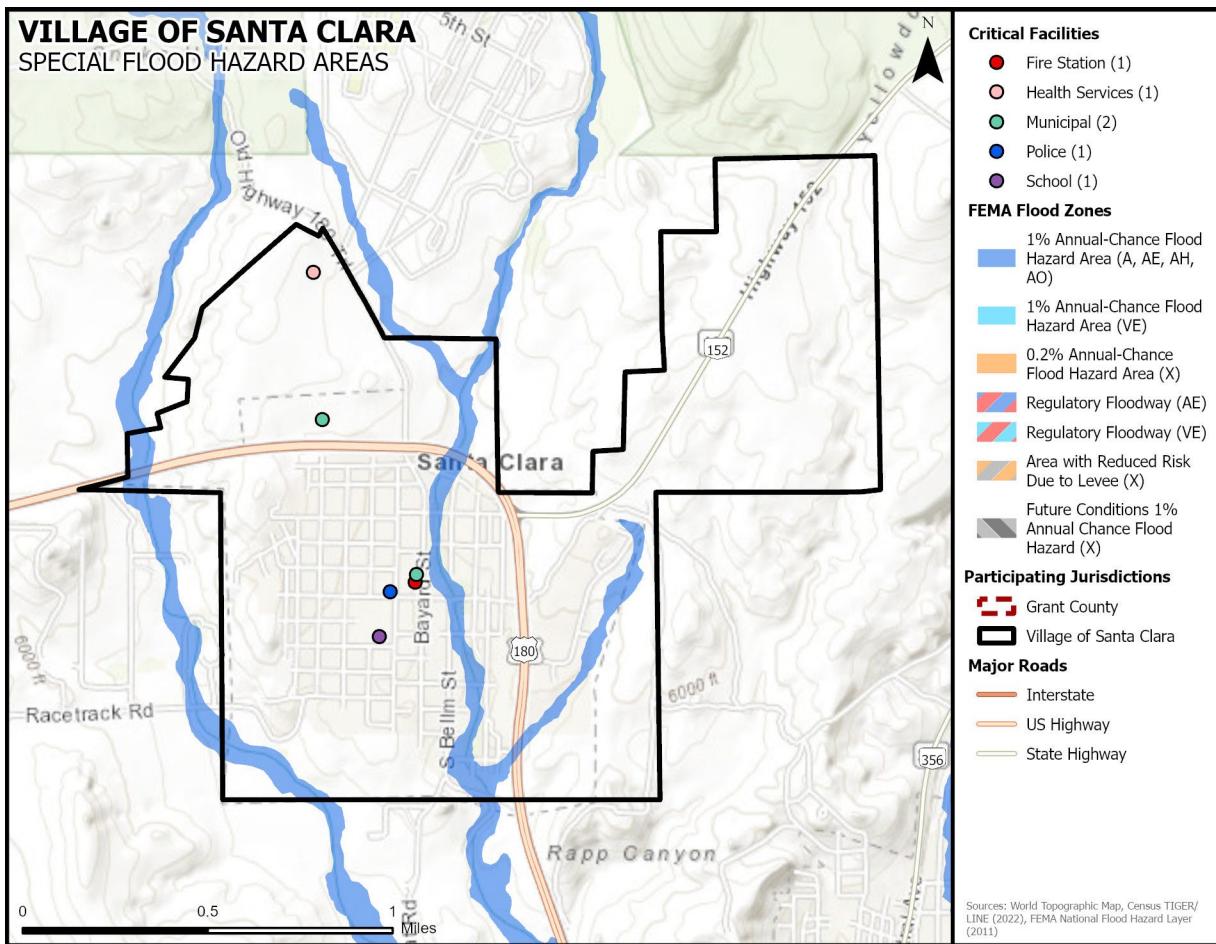
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Figure 9-3. Estimated Flood Zones in the Town of Hurley



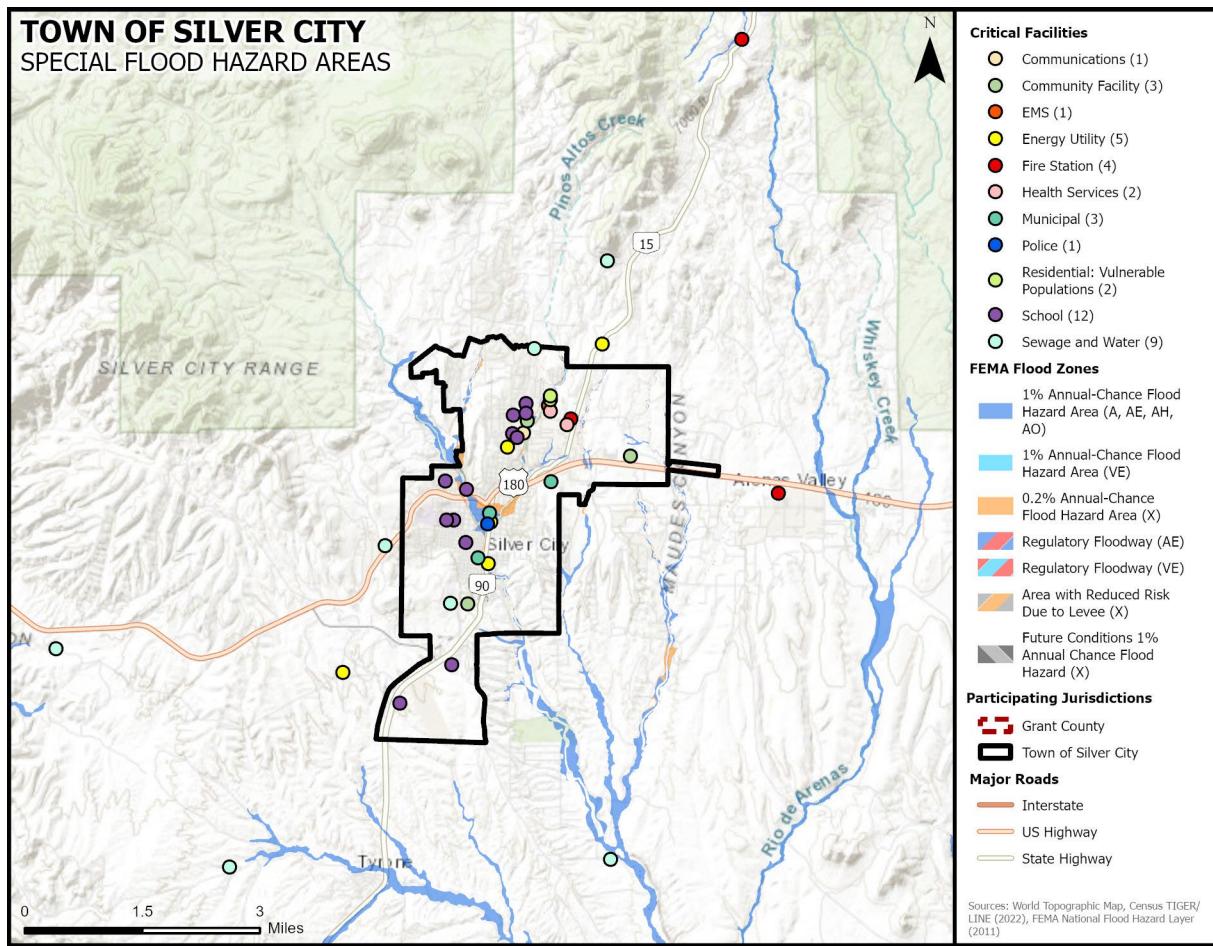
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Figure 9-4. Estimated Flood Zones in the Village of Santa Clara



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Figure 9-5. Estimated Flood Zones in the Town of Silver City



### EXTENT

The severity of a flood event is determined by a combination of several major factors, including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surfaces. Typically, floods are long-term events that may last for several days.

Determining the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area in addition to the depths of flood waters. The extent of flood damages can be expected to be more damaging in the areas that will convey a base flood. FEMA categorizes areas on the terrain according to how the area will convey flood water. Flood zones are the categories that are mapped on FIRM's. Table 9-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A are the hazard areas mapped in the region. Figure 9-1 and 9-2 should be read in conjunction with the extent for flooding in Tables 9-1 and 9-2 to determine the intensity of a potential flood event.

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**Table 9-1. Flood Zones**

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a 1-percent-annual-chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
	ZONE A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a Base Flood Elevation (BFE) (old format).
	ZONE AE	The base floodplain where BFEs are provided. AE Zones are now used on the new format FIRMs instead of A1-A30 Zones.
	ZONE AO	River or stream flood hazard areas and areas with a 1-percent-annual-chance or greater of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
	ZONE AH	Areas with a 1-percent-annual-chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. BFEs derived from detailed analyses are shown at selected intervals within these zones.
	ZONE A99	Areas with a 1-percent-annual-chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or BFEs are shown within these zones.
	ZONE AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
MODERATE to LOW	ZONE X 500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

Zone A is interchangeably referred to as the 100-year flood, the 1-percent-annual-chance flood, the Special Flood Hazard Area (SFHA), or more commonly, the base flood. This is the area that will convey the base flood and constitutes a threat to the planning area. The impact from a flood event can be more damaging in areas that will convey a base flood.

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Structures built in the SFHA are subject to damage by rising waters and floating debris. Moving flood water exerts pressure on everything in its path and causes erosion of soil and solid objects. If not elevated above Base Flood Elevation, utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, may also be damaged.

The intensity and magnitude of a flood event is also determined by the depth of flood water. Table 9-2 describes the stream gauge data provided by the United States Geological Survey (USGS). Peak flood data at the locations available in the planning area indicate a peak flood depth range of 0 to 18 feet above average peak flows.

**Table 9-2. Extent for Grant County<sup>1</sup>**

<b>SITE NAME<sup>2</sup></b>	<b>PEAK FLOOD EVENT</b>
Gila River Near Redrock, NM	Gila River near Red Rock in Grant County, New Mexico reached an overflow elevation of 31 feet in 1941. The average peak flow for the Gila River is 12.63 feet at this site. This indicates a maximum flood depth of 18.37 feet above the average peak flow at this site.
Mogollon Creek Near Cliff, NM	Mogollon Creek near Cliff in Grant County, New Mexico reached an overflow elevation of 13.7 feet in 1967. The average peak flow for the Mogollon Creek is 5.28 at this site. This indicates a maximum flood depth of 8.42 feet above the average peak flow at this site.
Duck Creek At Cliff, NM	Duck Creek near Cliff in Grant County, New Mexico reached an overflow elevation of 11.76 feet in 1993. The average peak flow for Duck Creek is 6.08 at this site. This indicates a maximum flood depth of 5.68 feet above the average peak flow at this site.
Silva Creek At Silver City, NM	Silva Creek at Silver City, Grant County, New Mexico reached an overflow elevation of 6.01 in 1960. The average peak flow for Silva Creek is 2.9 at this site. This indicates a maximum flood depth of 3.11 feet above the average peak flow at this site.
Cameron Creek At Central, NM	Cameron Creek near Central in Grant County, New Mexico reached an overflow elevation of 7.44 feet in 2013. The average peak flow for Cameron Creek is 3.69 feet at this site. This indicates a maximum flood depth of 3.75 feet above the average peak flow at this site.

<sup>1</sup> Severity estimated by averaging floods at certain stage level over the history of flood events. Severity and peak events are based on USGS data.

<sup>2</sup> Severity is provided where peak data was provided throughout for the County.

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SITE NAME <sup>2</sup>	PEAK FLOOD EVENT
Mimbres River At Mimbres, NM	Mimbres River near Mimbres, Grant County New Mexico reached on overflow elevation of 9 feet in 1979. The average peak flow for the Mimbres River is 3.58 feet at this site. This indicates a maximum flood depth of 5.42 feet above the average peak flow at this site.

The range of flood intensity that the planning area can experience is high, or Zone A. Based on historical occurrences, the planning area could expect to experience approximately 2 to 3 inches of rain within a 1-hour period, resulting in flash flooding.

The data described in Tables 9-1 and 9-2, together with Figures 9-1 through 9-5, and historical occurrences for the area, provides an estimated potential magnitude and severity for the Grant County planning area, including all participating jurisdictions.

## HISTORICAL OCCURRENCES

Historical evidence indicates that areas within the planning area are susceptible to flooding, especially in the form of flash flooding. It is important to note that only flood events that have been reported have been factored into this risk assessment, therefore it is likely that additional flood occurrences have gone unreported before and during the recording period. Table 9-3 identifies historical flood events that resulted in damages, injuries, or fatalities within the Grant County planning area. Table 9-4 provides a historical flood event summary for Grant County and participating jurisdictions. Historical Data is provided by the Storm Prediction Center (NOAA), National Centers for Environmental Information (NCEI) database. There have been 77 total recorded flood events in the Grant County planning area.

**Table 9-3. Historical Flood Events, January 1996 – June 2024<sup>3</sup>**

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	7/20/1999	0	0	\$188,100	\$0
Grant County	7/1/2000	0	0	\$90,800	\$0
Grant County	2/11/2005	0	0	\$817,400	\$0
Grant County	7/26/2006	0	0	\$77,100	\$0
Town of Silver City	7/28/2006	0	0	\$123,300	\$0
City of Bayard	8/3/2006	0	0	\$7,700	\$0
Town of Hurley	8/17/2006	0	0	\$30,800	\$0
Town of Silver City	5/18/2007	0	0	\$3,100	\$0

<sup>3</sup> Values are in 2024 dollars.

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JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Bayard	7/29/2007	0	0	\$75,300	\$0
Grant County	8/6/2007	0	0	\$30,200	\$0
Town of Silver City	1/28/2008	0	0	\$74,300	\$0
Town of Silver City	7/27/2008	0	0	\$7,200	\$0
Grant County	8/20/2008	0	0	\$2,900	\$0
Town of Silver City	8/20/2008	0	0	\$7,200	\$0
Grant County	8/31/2008	0	0	\$2,900	\$0
Grant County	9/22/2014	0	0	\$6,600	\$0
Town of Silver City	9/30/2017	2	0	\$0	\$0
Grant County	8/19/2022	0	0	\$10,252,700	\$0
<b>Total Losses</b>		<b>2</b>	<b>0</b>	<b>\$11,797,600</b>	

**Table 9-4. Summary of Historical Flood Events, January 1996 – June 2024**

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	53	0	0	\$11,468,700	\$0
City of Bayard	2	0	0	\$83,000	\$0
Town of Hurley	2	0	0	\$30,800	\$0
Village of Santa Clara	0	0	0	0	\$0
Town of Silver City	20	2	0	\$215,100	\$0
<b>Total Losses</b>	<b>77</b>	<b>2</b>	<b>0</b>	<b>\$11,797,600</b>	

### SIGNIFICANT EVENTS

#### **Flash Flood on September 30, 2017 – Town of Silver City**

Widespread rainfall amounts of up to 3.5 inches fell around the Town of Silver City in the early morning of September 30, 2017. A water rescue was necessary when one vehicle was swept away in the Pinos Altos Creek low water crossing on East 19<sup>th</sup> Street. The vehicle became wedged in a culvert running under U.S. 18, but the driver and occupant were washed downstream. One body was recovered about 1 mile downstream near the confluence with Silva Creek. A second body was recovered about 1.2 miles downstream in the Silver City big ditch reach of San Vicente Arroyo near the Broadway Street bridge. This event resulted in two fatalities for the planning area.

#### **Flood on August 19, 2022 – Grant County**

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The Grant County planning area was severely impacted by flooding as the result of a monsoon rain event. The Black Fire occurred just a few months prior to this monsoon event, in June of 2022. The Black Fire burn scar area created an environment that, when combined with monsoon rain, resulted in damaging flood waters. U.S. Highway 180 West, several county roads, and public and private properties were damaged and washed out. This event resulted in a state emergency declaration (Executive Order 2022-128) and \$10,252,700 (2024 dollars) in property damages for Grant County.

## PROBABILITY OF FUTURE EVENTS

Based on 77 recorded historical occurrences within a 28.5-year reporting period within the Grant County planning area, flooding is considered “Highly Likely,” meaning an event is probable within the next year.

## CLIMATE CHANGE CONSIDERATIONS

According to FEMA, flooding is the most common and costly disaster in the United States and this risk is constantly increasing due to increased wildfire risk and changes in precipitation patterns.

Even though the southwestern United States region is becoming more arid and annual rainfall is more likely to decrease than increase, precipitation events may actually increase in severity, when they do occur. This means that rain may fall faster in shorter periods of time, contributing to flash flood risk. Due to climate change, snowmelt-driven flooding is expected to occur earlier in the year.<sup>4</sup> When rain falls on snow, it can result in more intense runoff and greater flood conditions during the spring months.

Wildfire risk is also expected to increase with climate change which can directly increase the risk of flooding in areas that have been burned. Wildfire destroys vegetation and burns the ground, meaning the soil is no longer able to absorb rainwater. It can take years for vegetation to be restored, increasing long term flood risk.

## VULNERABILITY AND IMPACT

Grant County is at an increased level of flood risk due to the cascading impacts of wildfire events. The loss of vegetation, such as trees, shrubs, and soil, increases the speed and volume of stormwater runoff. Grant County may experience more extreme flooding with greater impacts to the safety of people, structures, and the environment. A recent example of flood damage in a burn scar area includes the series of flash flooding events in August of 2022 in the Black Fire burn scar area which caused significant property damages.

A property's vulnerability to a flood depends on its location and proximity to the floodplain. Structures that lie along banks of a waterway are the most vulnerable and can often be repetitive loss structures. Grant County encourages development outside of the floodplain. The impact for flood for the Grant County planning area is considered Limited in terms of structure and infrastructure damages with facilities and services potentially shut down for 24 hours or less, and less than ten percent of properties destroyed or with major damage. However, with two fatalities

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<sup>4</sup> Fifth National Climate Assessment. Southwest. <https://nca2023.globalchange.gov/chapter/28/>

## SECTION 9: FLOOD

reported from historical flood events, the flood impact for the Grant County planning area would be considered “Substantial”, with multiple deaths and injuries possible depending on the size of the event.

Table 9-5 includes the critical facilities identified by the planning team that were considered the most important to the planning area and are susceptible to a range of impacts from flooding. Table 9-5 includes only those facilities located in the regulatory floodplain. For a detailed list of identified critical facilities for Grant County and participating jurisdictions, see Appendix C.

**Table 9-5. Critical Facilities in the Floodplain**

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Departments (EOC, Fire, Police, EMS), Hospitals	City of Bayard: 1 Fire Station, 1 Police Station  Town of Silver City: 1 Fire Station, 1 Police Station	<ul style="list-style-type: none"><li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li><li>Emergency vehicles can be damaged by rising flood waters.</li><li>Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.</li><li>Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents.</li><li>Power outages could disrupt communications, delaying emergency response times.</li><li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>Washed out roads and bridges can impede emergency response vehicle access to areas.</li><li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li><li>First responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions.</li><li>Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li></ul>
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters,	Grant County: 1 Municipal, 10 Transportation  Town of Silver City: 1 Municipal, 1 School	<ul style="list-style-type: none"><li>Structures can be damaged by rising flood waters.</li><li>Power outages could disrupt critical care.</li><li>Backup power sources could be damaged, inundated or otherwise inoperable.</li><li>Critical staff may be impacted and unable to report for duty, limiting response capabilities.</li><li>Evacuations may be necessary due to extended power outages, gas line ruptures, or inundation of facilities.</li></ul>

## SECTION 9: FLOOD

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Governmental Facilities		<ul style="list-style-type: none"> <li>Additional emergency responders and critical aid workers may not be able to reach the area for days.</li> <li>Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.</li> <li>Temporary break in operations may significantly inhibit post event evacuations.</li> <li>Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.</li> </ul>
Commercial Suppliers (food, gas, etc.)	N/A	<ul style="list-style-type: none"> <li>Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.</li> </ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	City of Bayard: 3 Sewage and Water Facilities  Town of Silver City: 1 Energy Utility Facility, 1 Sewage and Water	<ul style="list-style-type: none"> <li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li> <li>Emergency service vehicles can be damaged by rising flood waters.</li> <li>Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing emergency service workers in harm's way.</li> <li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li> <li>Service responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions.</li> <li>Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>

Historic loss estimates due to flood are presented in Table 9-6 below. Considering 77 flood events over a 28.5-year period, the frequency is approximately two to three events every year.

**Table 9-6. Average Annualized Losses, 1996-2023**

JURISDICTION	NUMBER OF EVENTS	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Grant County	53	\$11,468,700	\$402,400
City of Bayard	2	\$83,000	\$2,900
Town of Hurley	2	\$30,800	\$1,100
Village of Santa Clara	0	\$0	\$0

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JURISDICTION	NUMBER OF EVENTS	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Town of Silver City	20	\$215,100	\$7,500
<b>Total Losses</b>	<b>77</b>	<b>\$11,797,600</b>	<b>\$413,900</b>

While all citizens are at risk of the impacts of a flood, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. In addition, due to factors like limited mobility, communication difficulties, medical needs, reliance on support services, transportation challenges, housing accessibility issues, and possible shortages in emergency shelter accommodations, the elderly, children, and people with disabilities are also disproportionately affected by flooding events. People who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Grant County planning area is estimated at 28 percent of the total population and children under the age of 5 are estimated at 4 percent. The population with a disability is estimated at 22 percent of the total population. An estimated 21 percent of the planning area population live below the poverty level and 3 percent of the populations speak English 'less than very well'.

**Table 9-7. Populations Vulnerable to Flood Events<sup>5</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

The Center for Disease Control (CDC) created a Social Vulnerability Index (SVI) which includes a database and mapping application that identifies and quantifies communities experiencing social vulnerability. The current CDC SVI uses 16 U.S. census variables from the 5-year American Community Survey (ACS) to identify communities that may need support before, during, or after disasters. All 16 variables fall under four broad categories including socioeconomic status (population in poverty, unemployment, etc.), household characteristics (age, disability status, etc.), racial and ethnic minority status, and housing type and transportation (mobile homes, no vehicles, etc.). Populations experiencing social vulnerability may be adversely impacted by natural hazards, disasters, and other community-level stressors. Figure 9-6 identifies areas of

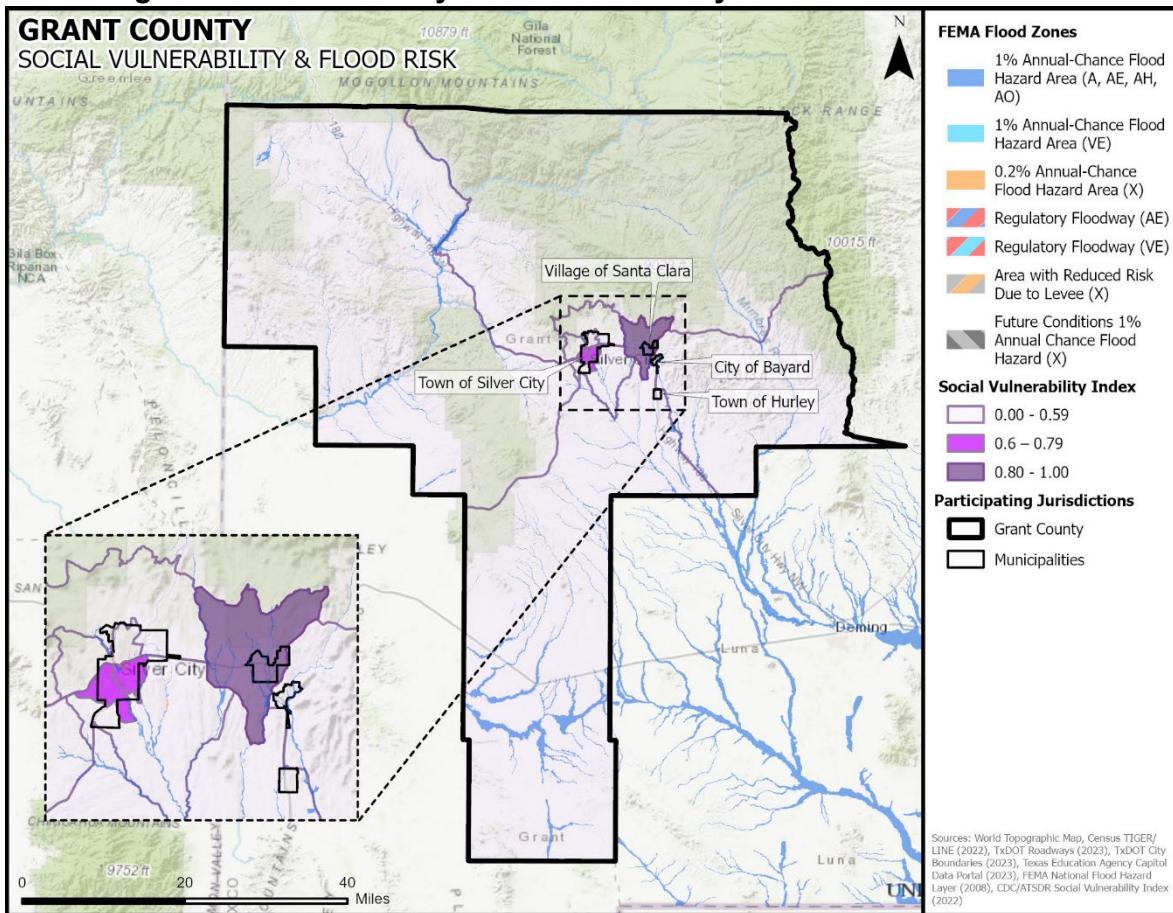
<sup>5</sup> U.S. Census Bureau Five-Year estimates

## SECTION 9: FLOOD

social vulnerability using the CDC's SVI and where these areas overlap Grant County's flood hazard areas.

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**Figure 9-6. Grant County Social Vulnerability and Flood Hazard Areas**



## ASSESSMENT OF IMPACTS

Flooding is the deadliest natural disaster that occurs in the U.S. each year, and it poses a constant and significant threat to the health and safety of the people in the Grant County planning area. Impacts to the planning area can include:

- Flood-related rescues may be necessary at swift water and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.
- Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents.
- Health risks and threats to residents are elevated after the flood waters have receded due to contaminated flood waters (untreated sewage and hazardous chemicals) and mold growth typical in flooded buildings and homes.
- Significant flood events often result in widespread power outages, increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.

## SECTION 9: FLOOD

- Floods can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders are exposed to downed power lines, contaminated and potentially unstable debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities.
- Significant flooding can result in the inability of emergency response vehicles to access areas of the community.
- Critical staff may suffer personal losses or otherwise be impacted by a flood event and be unable to report for duty, limiting response capabilities.
- County departments may be flooded, delaying response and recovery efforts for the entire community.
- Private sector entities that the planning area and its residents rely on, such as utility providers, financial institutions, and medical care providers, may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the flood may be negatively impacted while utilities are being restored or water recedes, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures substantially damaged by a flood may not be rebuilt for years and uninsured or underinsured residential structures may never be rebuilt, reducing the tax base for the community.
- Large floods may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impacting economic recovery.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psychosocial effects on flood victims and their families can traumatize them for long periods of time, creating long term increases in medical treatment and services.
- Extensive or repetitive flooding can lead to decreases in property value for the affected community.

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- Flood poses a potential catastrophic risk to annual and perennial crop production and overall crop quality, leading to higher food costs.
- Flood related declines in production may lead to an increase in unemployment.
- Large floods may result in loss of livestock, potential increased livestock mortality due to stress and water borne disease, and increased cost for feed.

The overall extent of damage caused by floods is dependent on the extent, depth, and duration of flooding, in addition to the velocities of flows in the flooded areas. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a flood event.

## NATIONAL FLOOD INSURANCE PROGRAM (NFIP) PARTICIPATION

Flood insurance offered through the National Flood Insurance Program (NFIP) is the best way for home and business owners to protect themselves financially against the flood hazard. Grant County, the City of Bayard, the Village of Santa Clara, and the Town of Silver City are participating in the NFIP and are in good standing. The Town of Hurley does not have the capacity to administer and participate in the NFIP at this time.

As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Currently Grant County and participating jurisdictions do not participate in the CRS.

Grant County, the City of Bayard, the Village of Santa Clara, and the Town of Silver City currently have standard flood damage prevention ordinances in place which include minimum NFIP standards for new construction and substantial improvements of structures. However, all jurisdictions are considering adopting higher regulatory NFIP standards to limit or further regulate floodplain development.

The flood hazard areas throughout Grant County are subject to periodic inundation, which may adversely affect public safety, resulting in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief. Flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities. In addition, occupancy in flood hazard areas creates an increase in vulnerabilities to flood hazards as they typically are inadequately elevated, flood-proofed, or otherwise protected from flood damage. Mitigation actions are included to address flood maintenance issues as well, including routinely clearing debris from roadside ditches and bridges, and expanding drainage culverts and storm water structures to convey flood water more adequately.

It is the purpose of Grant County to continue to promote public health, safety, and general welfare by minimizing public and private losses due to flood conditions in specific areas. Grant County is guided by their local Flood Damage Prevention Ordinance. The planning area will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction. Further, the NFIP program promotes sound development in floodplain areas and includes provisions designed to:

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- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in floodplains;
- Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; and
- Ensure that potential buyers are notified that property is in a flood area.

In order to accomplish these tasks, Grant County seeks to observe the following guidelines in order to achieve flood mitigation:

- Restrict or prohibit uses that are dangerous to health, safety, or property in times of flood, such as filling or dumping, that may cause excessive increases in flood heights or velocities;
- Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction, as a method of reducing flood losses;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;
- Control filling, grading, dredging, and other development, which may increase flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

## NFIP COMPLIANCE AND MAINTENANCE

Grant County and all participating jurisdictions have developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 19.

Flooding was identified as a high-risk hazard during hazard ranking activities at the Risk Assessment Workshop by the majority of the planning team. As such, many of the mitigation actions were developed with flood mitigation in mind. A majority of these flood actions address compliance with the NFIP and implementing flood awareness programs. The planning area recognizes the need and are working towards adopting higher NFIP regulatory standards to further minimize flood risk in their community. In addition, the county is focusing on public flood awareness activities. This includes promoting the availability of flood insurance by placing NFIP brochures and flyers in public libraries or public meeting places.

All NFIP participating jurisdictions have a designated floodplain administrator. The floodplain administrator will continue to maintain compliance with the NFIP, including continued floodplain administration, zoning ordinances, and development regulation. The floodplain ordinance adopted by Grant County outlines the minimum requirements for development in Special Flood Hazard Areas.

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All NFIP participating jurisdictions have a permitting process in place and the local floodplain administrator is responsible for coordinating inspections of damaged homes located in the floodplain. Following a flood event, local officials inspect damaged homes to make a substantial damage determination. Substantially damaged homes must be brought into compliance. Similarly, proposed improvements to homes located in the floodplain are reviewed by the local building official to determine if a substantial improvement is proposed. The floodplain administrator oversees permitted repairs and improvements to ensure compliance during the rebuilding or improvement process.

## REPETITIVE LOSS

The Flood Mitigation Assistance (FMA) Grant Program under FEMA provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to buildings that are insured under the National Flood Insurance Program. The New Mexico Department of Homeland Security and Emergency Management administers the FMA grant program for the State of New Mexico. One of the goals of the FMA program is to reduce the burden of repetitive loss and severe repetitive loss properties on the NFIP through mitigation activities that significantly reduce or eliminate the threat of future flood damages.

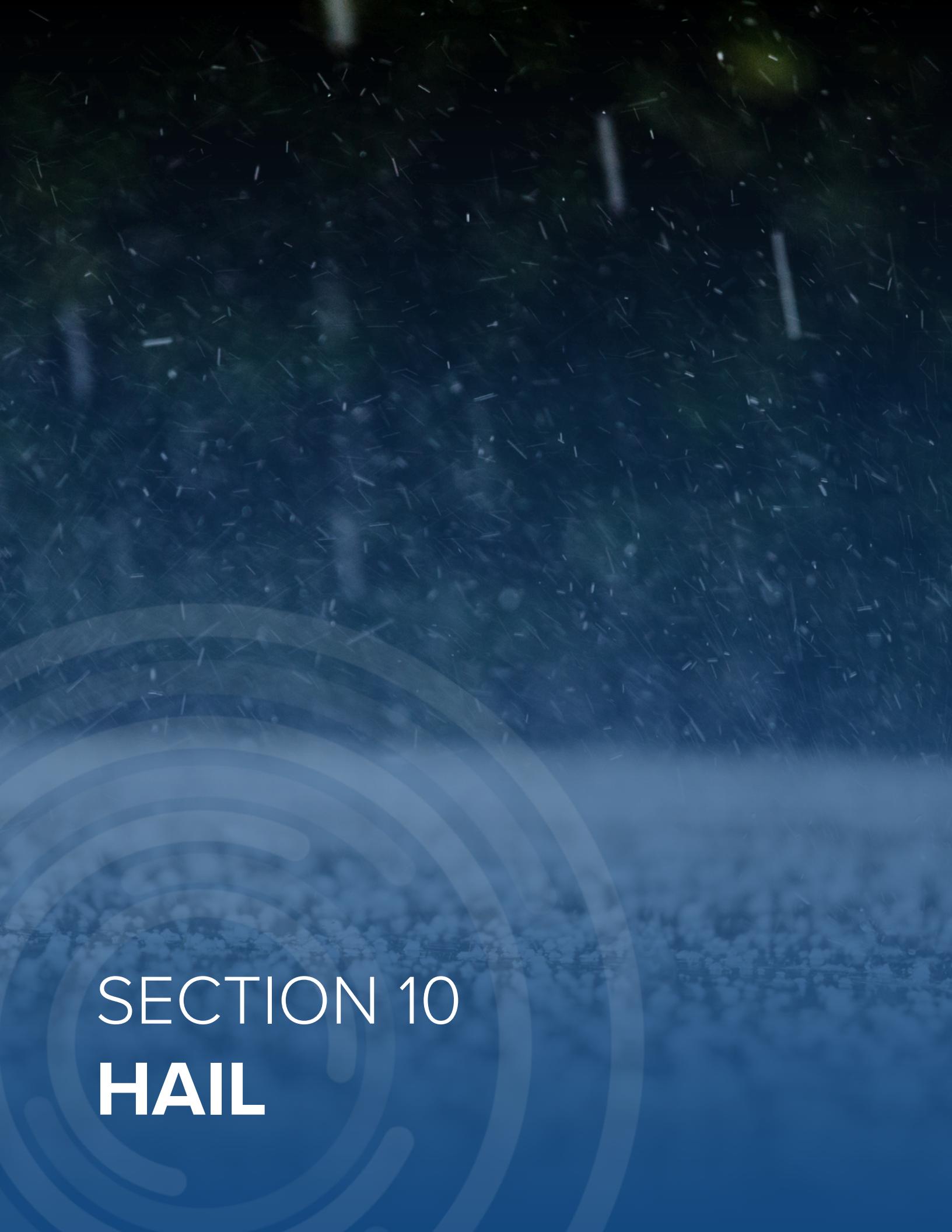
Repetitive Loss properties are defined as structures that are:

- Any insurable building for which 2 or more claims of more than \$1,000 each, paid by the National Flood Insurance Program (NFIP) within any 9-year period, since 1978;
- May or may not be currently insured under the NFIP.

Severe Repetitive Loss properties are defined as structures that are:

- Covered under the NFIP and have at least 4 flood related damage claim payments (building and contents) over \$5,000.00 each, and the cumulative amount of such claims payments exceed \$20,000; or
- At least 2 separate claim payments (building payments only) have been made, with the cumulative amount of the building portion of such claims exceeding the market value of the building.

Grant County, the City of Bayard, the Towns of Hurley and Silver City, and the Village of Santa Clara have no Repetitive Loss or Severe Repetitive Loss properties.



# SECTION 10

# HAIL

## SECTION 10: HAIL

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### HAZARD DESCRIPTION

Hail is precipitation in the form of round masses and irregular lumps consisting of layers of ice and compact snow. Hail is formed inside of thunderstorm updrafts and can be particularly damaging to the built environment and infrastructure.

During the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere, and the subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice typically greater than 0.75 inches in diameter. The size of hailstones is a direct result of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a by-product of heating on the Earth's surface. Higher temperature gradients above Earth's surface result in increased suspension time and hailstone size.



Hail falls when it becomes heavy enough to overcome the strength of the thunderstorm updraft and is pulled toward the earth by gravity. Smaller hailstones can be blown away from the updraft by horizontal winds, so larger hail typically falls closer to the updraft than smaller hail. If the winds near the surface are strong enough, hail can fall at an angle or even nearly sideways. Wind-driven hail can tear up siding on houses, break windows and blow into houses, break side windows on cars, and cause severe injury or death to people and animals.

There is no clear distinction between storms that do and do not produce hailstones. Nearly all severe thunderstorms probably produce hail aloft, though it may melt before reaching the ground. In all cases, the hail falls when the thunderstorm's updraft can no longer support the weight of the ice. The stronger the updraft, the larger the hailstone can grow, and the greater the potential for loss or damage.<sup>1</sup>

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<sup>1</sup> National Oceanic and Atmospheric Administration, National Severe Storms Laboratory, Severe Weather 101.

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### LOCATION

Hailstorms are an extension of severe thunderstorms that could potentially cause severe damage. In New Mexico, hail most commonly occurs during monsoon season between June and the end of September. Hail events are not confined to any specific geographic location and can vary greatly in size, location, intensity, and duration. Therefore, the entire Grant County planning area, including all participating jurisdictions, is equally at risk to the hazard of hail. Refer to Figure 10-1 for the location of past hail events in the planning area.

### EXTENT

The National Weather Service (NWS) classifies a storm as “severe” if there is hail three-quarters of an inch in diameter (approximately the size of a penny) or greater, based on radar intensity or as seen by observers. The intensity category of a hailstorm depends on hail size and the potential damage it could cause, as depicted in the National Centers for Environmental Information (NCEI) Intensity Scale in Table 10-1.

**Table 10-1. Hail Intensity and Magnitude<sup>2</sup>**

SIZE CODE	INTENSITY CATEGORY	SIZE (diameter inches)	DESCRIPTIVE TERM	TYPICAL DAMAGE
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33 – 0.60	Marble	Slight damage to plants and crops
H2	Potentially Damaging	0.60 – 0.80	Dime	Significant damage to plants and crops
H3	Severe	0.80 – 1.20	Nickel	Severe damage to plants and crops
H4	Severe	1.2 – 1.6	Quarter	Widespread glass and auto damage
H5	Destructive	1.6 – 2.0	Half Dollar	Widespread destruction of glass, roofs, and risk of injuries
H6	Destructive	2.0 – 2.4	Ping Pong Ball	Aircraft bodywork dented and brick walls pitted
H7	Very Destructive	2.4 – 3.0	Golf Ball	Severe roof damage and risk of serious injuries
H8	Very Destructive	3.0 – 3.5	Hen Egg	Severe damage to all structures
H9	Super Hailstorms	3.5 – 4.0	Tennis Ball	Extensive structural damage, could cause fatal injuries
H10	Super Hailstorms	4.0 +	Baseball	Extensive structural damage, could cause fatal injuries

<sup>2</sup> NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

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The intensity scale in Table 10-1 ranges from H0 to H10, with increments of intensity or damage potential in relation to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind. Based on the best available data regarding the previous occurrences for the area, the Grant County planning area may experience hailstorms ranging from an H0 (pea size) to an H6 (ping pong ball size). The largest size hail to be reported was 2.0 inches in diameter, or an H6, which is considered a destructive hailstorm that can cause roof damage to structures, break glass, damage brick walls, and cause injuries. This is likely the greatest extent the planning area can anticipate in the future, based on historical records. Events with this magnitude of hail have occurred on multiple occasions, in 1971 and 2016, but resulted in no reported monetary damages or injuries. Refer to the Historical Occurrences section below for more details damaging hail events in the Grant County planning area.

### HISTORICAL OCCURRENCES

Historical evidence shown in Figure 10-1 demonstrates that the planning area is vulnerable to hail events overall. Historical events with reported damages, injuries, or fatalities are shown in Table 10-2. A total of 56 reported historical hail events impacted the Grant County planning area between January 1964 and June 2024; these events were reported to NCEI and NOAA databases and may not represent all hail events to have occurred during the past 60.5 years. Only those events for the Grant County planning area with latitude and longitude available were plotted (Figure 10-1).

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Figure 10-1. Spatial Historical Hail Events, January 1964 – June 2024

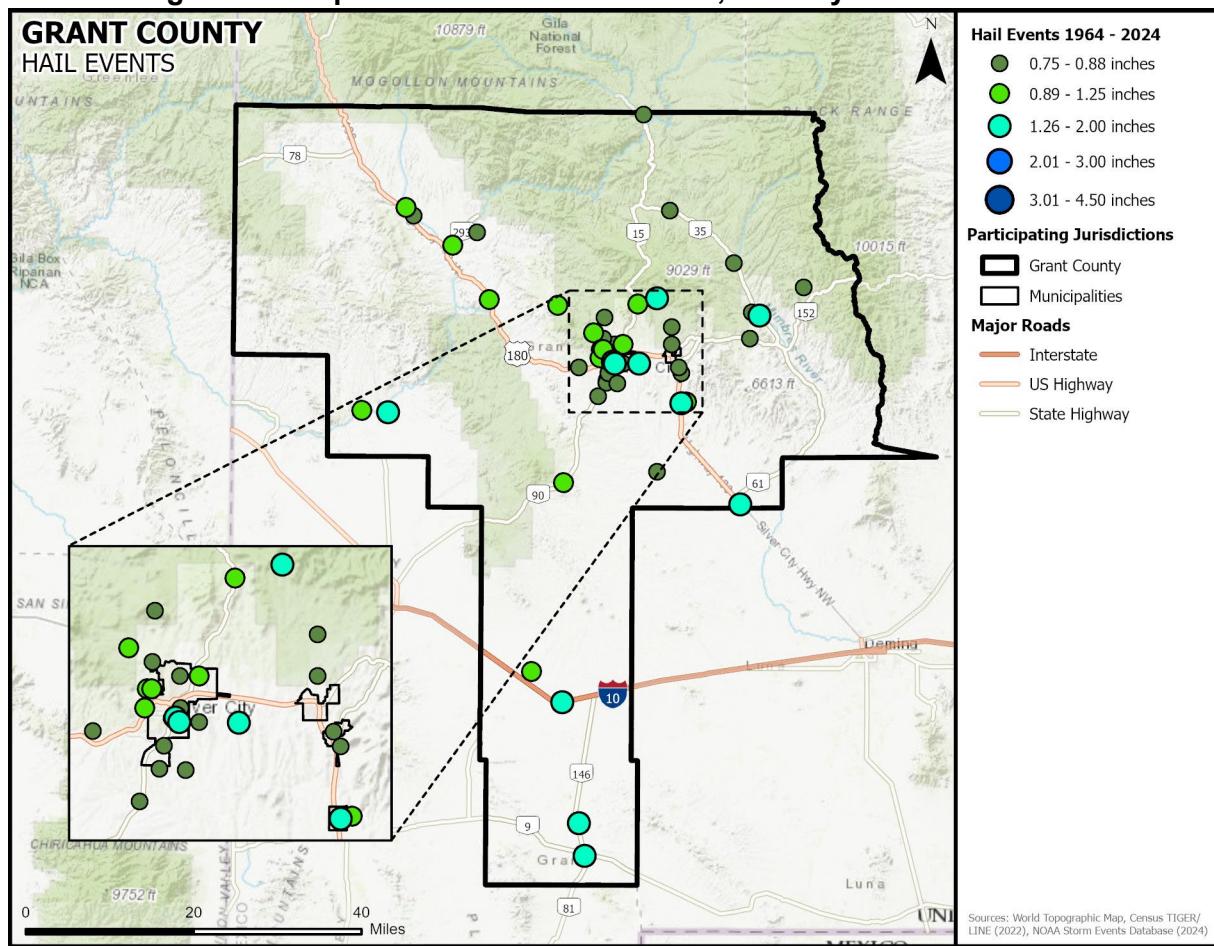


Table 10-2. Damaging Historical Hail Events, January 1964 – June 2024<sup>3</sup>

JURISDICTION	DATE	MAGNITUDE (inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Silver City	8/28/2001	1	0	0	\$212,000	\$70,700
Town of Silver City	9/11/2002	1.75	0	0	\$1,732,400	\$173,300
Town of Silver City	9/11/2002	1.75	0	0	\$34,700	\$0
Grant County	5/17/2007	1.5	0	0	\$30,200	\$0
Town of Silver City	5/25/2007	1.25	0	0	\$7,600	\$0
Town of Hurley	7/23/2013	1	0	0	\$400	\$0
Grant County	9/28/2017	1.75	0	0	\$6,400	\$0
<b>TOTALS</b>		(Max Extent)	<b>0</b>	<b>0</b>	<b>\$2,023,700</b>	<b>\$244,000</b>

<sup>3</sup> Only recorded events with damages are listed. Monetary damages have been inflated to their 2024 value. No reports of injuries or fatalities were recorded in the NCEI database.

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**Table 10-3. Historical Hail Events Summary, January 1964 – June 2024<sup>4</sup>**

JURISDICTION	NUMBER of EVENTS	MAX MAGNITUDE (inches)	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Grant County	29	2	0	0	\$36,600	\$0
City of Bayard	3	0.88	0	0	\$0	\$0
Town of Hurley	3	1.75	0	0	\$400	\$0
Village of Santa Clara	0	-	-	-	-	-
Town of Silver City	21	1.75	0	0	\$1,986,700	\$244,000
<b>TOTAL LOSSES</b>	<b>56</b>	<b>(Max Extent)</b>	<b>0</b>	<b>0</b>		<b>\$2,267,700</b>

### SIGNIFICANT EVENTS

#### August 28, 2001 – Town of Silver City

A slow-moving severe thunderstorm formed just north of the Town of Silver City, gradually moving south across the western half of town and into neighboring Tyrone. Hail, mainly 0.75 inches in diameter, fell for 40 minutes and accumulated up to 6 inches. Within this time, hailstones up to 1.25 inches in diameter fell briefly. Vegetation was stripped, skylights were broken, and numerous roofs suffered damage. Automobiles were also left with small dents. Snowplows were required to clear the two major highways in western Silver City. Property damage was estimated at \$212,000 (2024 dollars); damage to crops was estimated at \$70,700 (2024 dollars).

#### September 11, 2002 – Town of Silver City

Two severe multicell thunderstorms moved into the Lower Gila Region of southwest New Mexico, the stronger storm directly hitting the Town of Silver City with quarter to golf ball size hail. Hail fell for about 30 minutes in one spot at the peak of the storm's life cycle. Dozens of roofs were severely damaged, while automobiles were dented and windshields shattered. Street flooding also resulted from 1.75 inches of rain in 30 minutes. Across several event reports, the total property damages were estimated at \$1,767,100 (2024 dollars), while crop damage was estimated at \$173,300 (2024 dollars).

#### May 17, 2007 – Grant County

A severe thunderstorm moved slowly southward through the Mimbres Valley and released a substantial amount of large hail on the Grant County planning area. Hail, ranging from quarter to ping pong ball size, accumulated up to depths of at least a foot in the Town of Mimbres. This hail storm resulted in an estimated \$30,200 (2024 dollars) in property damage.

### PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 56 events in a 60.5-year reporting period for the Grant County planning area provides an average annual occurrence of approximately one event

<sup>4</sup> Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

## SECTION 10: HAIL

per year. This frequency supports a “Highly Likely” probability of future events for the Grant County planning area, including all participating jurisdictions.

### CLIMATE CHANGE CONSIDERATIONS

Although the impact of climate change on the frequency and severity of hail events is uncertain, some climate studies attempt to give insight on the future conditions of hailstorms. As ocean temperatures rise due to climate change, more moisture is evaporating into the atmosphere. The warm and moist air masses that fuel severe weather may become more unstable on average, which could favor the increased development of thunderstorms and hail. However, it is also suggested that in a warming climate, the average melting level will rise in thunderstorms, meaning small hailstones will have more of a chance to melt as they fall to the ground. Therefore, hail may become less frequent, but large hail can be expected when it does occur, leading to the possibility of increased damages.<sup>5</sup>

### VULNERABILITY AND IMPACT

Grant County has a vast, historically, and culturally significant agriculture industry which is a crucial part of the planning area’s economy. According to the USDA 2022 Census of Agriculture, there are 334 farms over a total of 794,499 acres throughout the Grant County planning area. While NCEI reported damages are limited, historically much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Impacts to crops can also have effects on the local economy; the average value of agricultural products sold in Grant County is \$15,602,000. All farms throughout the county may face extreme impacts and be more susceptible to hail damage.

Vehicles and the roofs of buildings and homes are often damaged by hail. Utility systems on roofs of buildings and critical facilities would be vulnerable and could be damaged. Hail could cause a significant threat to people, as they could be struck by hail and falling trees and branches. Outdoor activities and events may elevate the risk to residents and visitors when a hailstorm strikes with little warning. Portable buildings typically utilized by schools and commercial sites such as construction areas would be more vulnerable to hail events than the typical site-built structures.

The Grant County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to hail events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area including all participating jurisdictions which would also be more vulnerable. The U.S. Census data indicates a total of 3,824 (26 percent of total housing stock) manufactured homes located in the Grant County planning area. In addition, 56 percent (approximately 8,208 structures) of the housing structures in the Grant County planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events.

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<sup>5</sup> Yale Climate Connections, Hailstorms and Climate Change, March 17, 2022.

## SECTION 10: HAIL

**Table 10-4. Structures at Greater Risk by Participating Jurisdiction**

JURISDICTION	BUILT PRIOR TO 1980	MOBILE HOMES
Grant County	8,208	3,824
City of Bayard	809	164
Town of Hurley	631	195
Village of Santa Clara	518	265
Town of Silver City	3,509	730

While all citizens are at risk of the impacts of hail, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 21 percent of the planning area population live below the poverty level (Table 10-5). While warning times for this type of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

**Table 10-5. Populations at Greater Risk by Jurisdiction<sup>6</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

The Grant County Planning Team identified the following critical facilities (Table 10-6) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by hail events. For a comprehensive list by participating jurisdiction, see Appendix C.

<sup>6</sup> US Census Bureau 2022 data for Grant County

## SECTION 10: HAIL

**Table 10-6. Critical Facilities Vulnerable to Hail**

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> <li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li> <li>Emergency vehicles can be damaged by hailstones.</li> <li>Power outages could disrupt communications, delaying emergency response times.</li> <li>Accumulated hail on the streets may impede emergency response vehicle access to areas.</li> <li>Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> <li>Structures can be damaged by hailstones.</li> <li>Power outages could disrupt critical care.</li> <li>Backup power sources could be damaged.</li> <li>Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damage to facilities.</li> <li>Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.</li> <li>Temporary break in operations may significantly inhibit post event evacuations.</li> <li>Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.</li> </ul>
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"> <li>Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.</li> </ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> <li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li> <li>Power outages could disrupt communications, delaying emergency response times.</li> <li>Accumulated hail on the streets may impede service response vehicle access to areas.</li> <li>Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>

Hail has been known to cause injury to humans and occasionally has been fatal. Overall, the total loss estimate of property and crops in the planning area is \$2,267,700 (2024 dollars) with an average annualized loss of \$37,500. Based on historic loss and damages, the impact of hail on the Grant County planning area, including participating jurisdictions, can be considered “Limited” severity of impact, meaning minor quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

## SECTION 10: HAIL

**Table 10-7. Estimated Annualized Losses**

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Grant County	\$36,600	\$600
City of Bayard	\$0	\$0
Town of Hurley	\$400	\$0
Village of Santa Clara	\$0	\$0
Town of Silver City	\$2,230,700	\$36,900
<b>TOTALS</b>	<b>\$2,267,700</b>	<b>\$37,500</b>

### ASSESSMENT OF IMPACTS

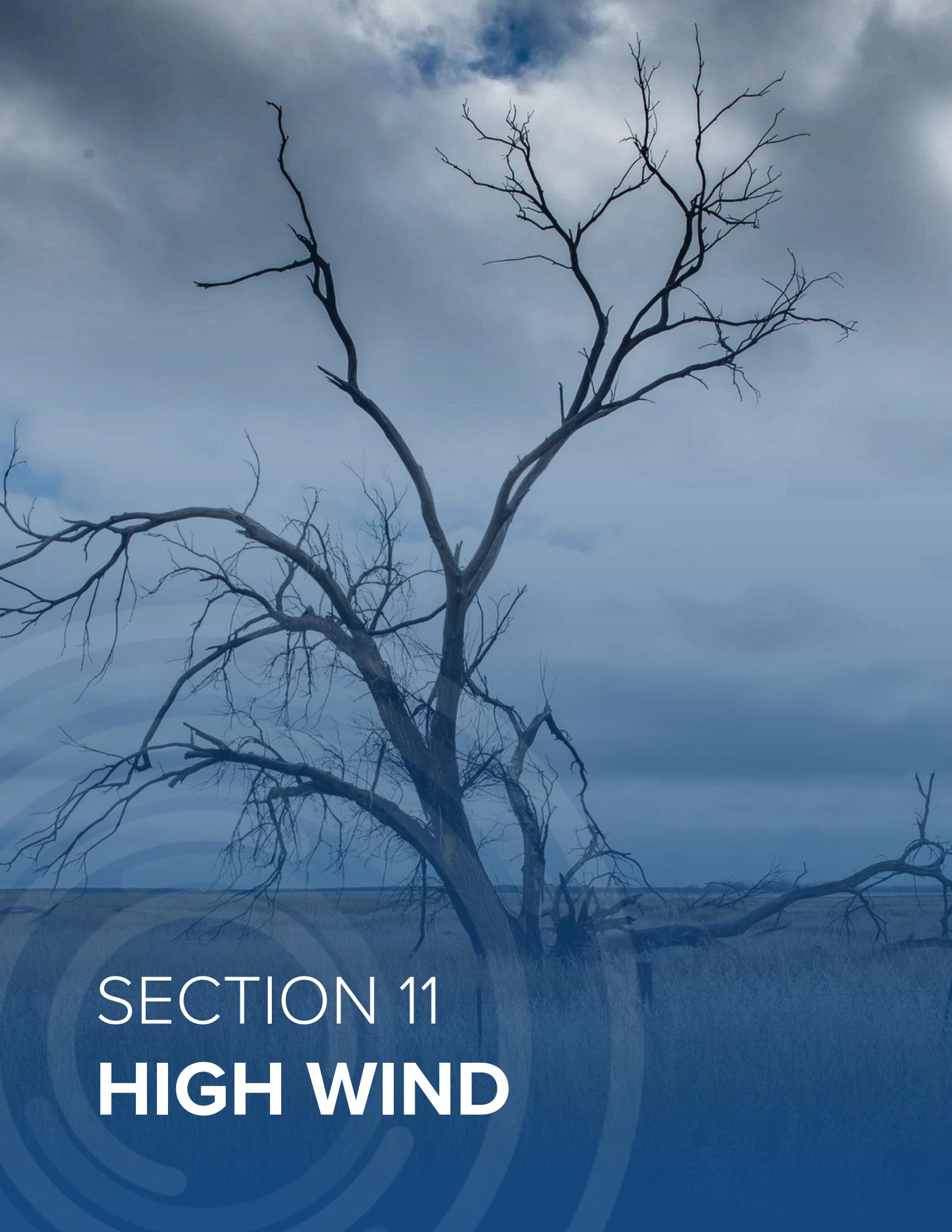
Hail events have the potential to pose a significant risk to people and can create dangerous situations. Hail conditions can be frequently associated with a variety of impacts, including:

- Hail may create hazardous road conditions during and immediately following an event, potentially delaying critical staff from reporting for duty as well as delaying first responders from providing for or preserving public health and safety.
- Individuals and first responders who are exposed to the storm may be struck by hail, falling branches, or downed trees resulting in injuries or possible fatalities.
- Large hail events will likely cause extensive roof damage to residential structures along with siding damage and broken windows, creating a spike in insurance claims and a rise in premiums, and potentially result in physical harm to occupants.
- Automobile damage may be extensive depending on the size of the hail and length of the storm.
- Hail events can result in power outages over widespread areas increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, damaged structures, hazardous spills, and debris that often accompany hail events, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Some businesses not directly damaged by the hail event may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.
- Depending on the severity and scale of damage caused by large hail events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- A significant hail event could significantly damage agricultural crops, resulting in extensive economic losses for the community and surrounding area.
- Hail events may injure or kill livestock and wildlife or destroy wildlife habitat.

## SECTION 10: HAIL

- A large hail event could impact the accessibility of recreational areas and parks due to extended power outages or debris clogged access roads.
- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are 47 historical sites listed on the National Register of Historic Places for Grant County and 71 listed on the New Mexico State Register of Cultural Properties.

The economic and financial impacts of hail will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning conducted by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of any hail event.



# SECTION 11

# **HIGH WIND**

## SECTION 11: HIGH WIND

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### HAZARD DESCRIPTION



Wind is the horizontal motion of the air past a given point, beginning with differences in air pressures. Pressure that is higher at one place than another sets up a force pushing from high toward low pressure: the greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air accelerates.

High wind events, those that sustain speeds of 40 mph or greater according to the National Weather Service (NWS), are often associated with severe thunderstorms. These wind events can cause significant property and crop damages. Winds in Grant County are typically straight-line winds, which are generally any thunderstorm wind that is not associated with rotation or tornados. Straight line winds are responsible for most high wind damages. One type of straight-line wind, the downburst, is a small area of rapidly descending air beneath a thunderstorm. A downburst can cause damage equivalent to a strong tornado and make air travel extremely hazardous. In addition, these strong winds and thunderstorm winds can sometimes blow large amounts of dust and debris, creating dust storms.

High winds can also occur in the absence of other definable hazard conditions creating “windstorms.” According to the NWS, high winds not associated with thunderstorms are often referred to as gradient winds. They are usually the result of tight pressure gradients between strong areas of low pressure and high pressure. These strong winds can be just as strong as thunderstorm wind gusts, but cover a much larger area, and can result in widespread damage.

Due to the geography in New Mexico, the planning area may also experience mountain-gap winds. This occurs when the wind is forced through a narrow gap, over mountain passes or ridgelines, it accelerates. High winds are typically stronger at narrow canyon openings. Spillover winds are also common in the area, which happens when wind approaches a mountain, and it is forced to rise to pass over. This upward movement creates an area of lower pressure on the windward side of the mountain. As a result, the wind speeds up to fill this area of lower pressure, which can lead to increased wind speeds on the windward slope of the mountain.

## SECTION 11: HIGH WIND

### LOCATION

High wind events can develop in any geographic location and are considered a common occurrence across the State of New Mexico. Therefore, a high wind event could occur at any location within the Grant County planning area. These storms develop randomly and are not confined to any geographic area within the County. It is assumed that the entire Grant County planning area, including all participating jurisdictions, is uniformly exposed to the threat of high winds.

### EXTENT

The extent or magnitude of a high wind event is measured by the Beaufort Wind Scale. Table 11-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

Table 11-1. Beaufort Wind Scale<sup>1</sup>

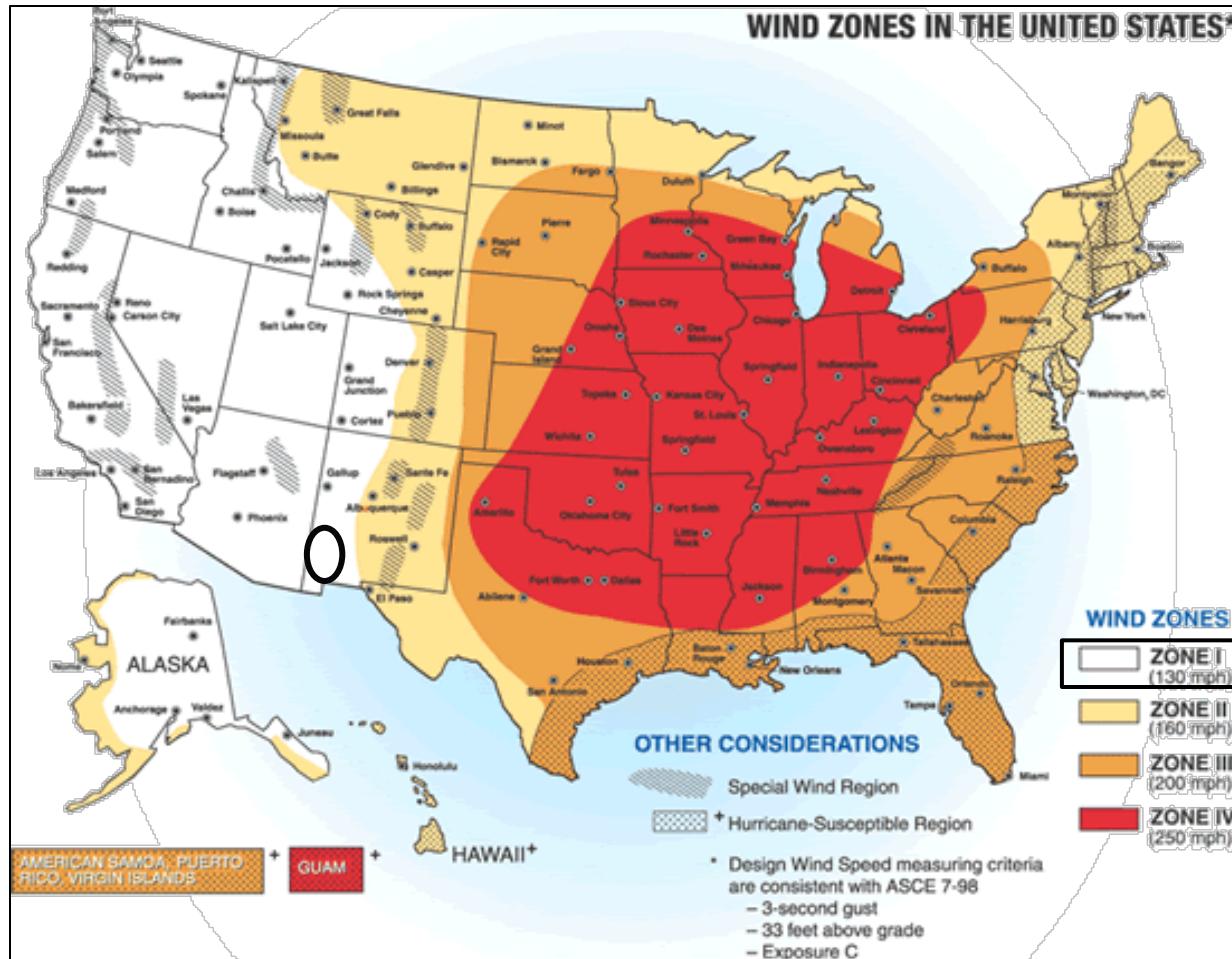
FORCE	WIND SPEED		WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
	MPH	KNOTS		
0	Less than 1	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-18	11-16	Moderate Breeze	Dust, leaves and loose paper lifted, small tree branches move
5	111-24	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	25-31	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	32-38	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	311-46	34-40	Gale	Whole trees in motion, resistance felt walking against wind
9	47-54	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	48-55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	64-72	56-63	Violent Storm	If experienced on land, widespread damage
12	72-83	64-71	Hurricane	Violence and destruction

<sup>1</sup> Source: World Meteorological Organization

## SECTION 11: HIGH WIND

Figure 11-1 displays the wind zones as derived from NOAA.

**Figure 11-1. Wind Zones in the United States<sup>2</sup>**



On average, the planning area experiences approximately two to three wind events every year. The Grant County planning area is located within Wind Zone I, meaning it can experience winds up to 130 mph. The Grant County planning area has experienced a significant wind event, or an event with winds in the range of "Force 12" on the Beaufort Wind Scale with winds above 72 mph. This is the worst to be anticipated for the entire planning area based on historic events.

Based on a search of past events from January 1993 through June 2024, the strongest events reported in the planning area occurred in Grant County on July 19, 2010, and October 12, 2021, with reported wind speeds of 74 knots, or 85 mph, on both of those days. The most significant recorded event in the planning area was reported in Grant County on January 18, 1993, and caused an estimated \$110,000 (2024 dollars) in damages.

## HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration. The NCEI is

<sup>2</sup> The Grant County planning area is indicated by the black oval.

## SECTION 11: HIGH WIND

the largest archive available for historic storm events data; however, it is important to note that only incidents recorded in the NCEI have been factored into this risk assessment unless otherwise noted. It is likely that a high number of occurrences have gone unreported over the past 31.5 years. Tables 11-2, 11-3, and 11-4 depict historical occurrences of high wind events for the Grant County planning area according to the NCEI database.

Since 1993, 80 high wind events are known to have occurred in the Grant County planning area. Table 11-4 presents information on known historical events impacting the Grant County planning area, resulting in damages, injuries, or fatalities. It is important to note that high wind events associated with tornadoes are not accounted for in this section. Property damage estimates are not always available. Table 11-5 provides event and damage summaries for each participating jurisdiction. Where an estimate has been provided in a table for losses, the dollar amounts have been modified for inflation to indicate the damage in 2024 dollars.

**Table 11-2. Historical High Wind Speeds, January 1993 – June 2024**

MAXIMUM WIND SPEED RECORDED (knots)	NUMBER OF REPORTED EVENTS
0-30	0
31-40	0
41-50	6
51-60	53
61-70	10
71-80	2
81-90	0
91-100+	0
Unknown	9

**Table 11-3. Historical Wind Event Types as Reported in the NCEI, 1993 – 2024**

TYPE	NUMBER OF REPORTED EVENTS
Dust Storm	7
High Wind	53
Thunderstorm Wind	20

## SECTION 11: HIGH WIND

**Table 11-4. Damaging Historical High Wind Events, January 1993 – June 2024<sup>3</sup>**

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	1/18/1993	-	0	0	\$110,000	\$0
Town of Silver City	7/1/2002	66	0	0	\$17,500	\$0
Town of Silver City	7/14/2003	60	0	0	\$17,100	\$0
Grant County	7/19/2010	74	0	0	\$107,900	\$0
Grant County	8/16/2014	52	0	0	\$33,000	\$0
<b>TOTALS</b>		<b>(MAX EXTENT)</b>	<b>0</b>	<b>0</b>	<b>\$285,500</b>	<b>\$0</b>

**Table 11-5. Summary of Historical Events by Jurisdiction, January 1993 – June 2024<sup>4</sup>**

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	69	74	0	0	\$250,900	\$0
City of Bayard	0	-	-	-	-	-
Town of Hurley	2	59	0	0	\$0	\$0
Village of Santa Clara	0	-	-	-	-	-
Town of Silver City	9	66	0	0	\$34,600	\$0
<b>TOTALS</b>	<b>80</b>	<b>(MAX EXTENT)</b>	<b>0</b>	<b>0</b>	<b>\$285,500</b>	

### SIGNIFICANT EVENTS

#### July 14, 2003 – Town of Silver City

A strong dry microburst, with winds estimated near 70 mph, blew over a storage shed and ripped off a metal awning in the Town of Silver City. The debris from the awning caused damage to several vehicles at two nearby automobile dealerships. Property damage was estimated at \$17,100 (2024 dollars).

#### July 19, 2010 – Grant County

A weak upper-level trough moved through southern New Mexico in a moderately unstable environment to produce a severe thunderstorm over the Gila which produced a microburst with estimated winds of 80 to 90 mph. In the Grant County planning area, these winds led to a newly placed trailer being overturned and blown off supports, another mobile home suffering significant roof damage, as well as multiple uprooted trees. Additional impacts included a large trampoline

<sup>3</sup> Only recorded events with damages are listed; no events causing fatalities or injuries were reported. Monetary damages are inflated to their 2024 value. Magnitude is listed when available.

<sup>4</sup> Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

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being blown off a property and numerous flattened yucca stalks. Total property damage was estimated at \$107,900 (2024 dollars).

### August 16, 2014 – Grant County

Thunderstorm wind gusts up to 60 mph caused two large trees to fall on vehicles near the Village of Santa Clara within the Grant County planning area. One of the vehicles was reported to be possibly totaled. Property damage from the fallen trees was estimated at \$33,000 (2024 dollars).

## PROBABILITY OF FUTURE EVENTS

Most high winds occur during the spring, with April and May being the windiest month for New Mexico, with March and June following. Based on available records of historic events, there have been a total of 80 events in a 31.5-year reporting period, which provides a probability of approximately two to three events every year. Even though the intensity of high wind events is not always damaging for the Grant County planning area, the frequency of occurrence for a high wind event is “Highly Likely”. This means that an event is probable within the next year for the Grant County planning area, including all participating jurisdictions.

## CLIMATE CHANGE CONSIDERATIONS

The impacts on the frequency and severity of severe wind events due to climate change are unclear. However, as ocean temperatures rise due to climate change, more moisture is evaporating into the atmosphere. The warm and moist air masses that fuel severe weather may become more unstable on average, which could favor the increased development of thunderstorms and wind related events. It is suspected that an increase in thunderstorms would mean an increase in damaging winds, but there is limited data available to understand the full scope of future climate change impacts at this time.

## VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since high wind events can occur at different strength levels, in random locations, and can create relatively narrow paths of destruction. Due to the randomness of these events, all existing and future structures, and facilities within the Grant County planning area, could potentially be impacted and remain vulnerable to possible injury and property loss from strong winds.

Trees, power lines and poles, signage, manufactured housing, radio towers, concrete block walls, storage barns, windows, garbage receptacles, brick facades, and vehicles, unless reinforced, are vulnerable to high wind events. More severe damage involves windborne debris; in some instances, patio furniture and other lawn items have been reported to have been blown around by wind and, very commonly, debris from damaged structures in turn have caused damage to other buildings not directly impacted by the event. In numerous instances roofs have been reported as having been torn off of buildings. The portable buildings typically used at schools and construction sites would be more vulnerable to high wind events than typical site-built structures and could potentially pose a greater risk for wind-blown debris.

According to the American Community Survey (ACS) five-year estimates for 2022, a total of 3,824 manufactured homes are located in the Grant County planning area (26 percent of total housing stock). In addition, approximately 8,208 structures (56 percent of total housing stock) of the

## SECTION 11: HIGH WIND

housing units were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events.

**Table 11-6. Structures at Greater Risk by Participating Jurisdiction**

JURISDICTION	BUILT PRIOR TO 1980	MOBILE HOMES
Grant County	8,208	3,824
City of Bayard	809	164
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Town of Silver City	3,509	730

While all citizens are vulnerable to the impacts of high wind, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 21 percent of the planning area population live below the poverty level (Table 11-7). While warning times for these types of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

**Table 11-7. Populations at Greater Risk by Participating Jurisdiction<sup>5</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
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Town of Silver City	2,126	788	1,700	2,113	311

The Grant County Planning Team identified the following critical facilities (Table 11-8) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by high wind events. The critical infrastructure with the greatest vulnerability to

<sup>5</sup> US Census Bureau 2022 data for Grant County

## SECTION 11: HIGH WIND

thunderstorms are power and communications facilities. Failures of these facilities can result in a loss of service and cascading impacts such as posing enormous risk to individuals dependent on electricity as a medical necessity. For a comprehensive list by participating jurisdiction, see Appendix C.

**Table 11-8. Critical Facilities Vulnerable to High Wind Event**

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"><li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li><li>Emergency vehicles can be damaged by falling trees or flying debris.</li><li>Power outages could disrupt communications, delaying emergency response times.</li><li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>Debris / downed trees can impede emergency response vehicle access to areas.</li><li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li><li>First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.</li></ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"><li>Structures can be damaged by falling trees or flying debris.</li><li>Power outages could disrupt critical care.</li><li>Backup power sources could be damaged.</li><li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damage to facilities.</li><li>Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.</li><li>Temporary break in operations may significantly inhibit post event evacuations.</li><li>Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.</li></ul>
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"><li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li><li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li><li>Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.</li></ul>
Utility Services and Infrastructure (electric, water,	<ul style="list-style-type: none"><li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li><li>Emergency vehicles can be damaged by falling trees or flying debris.</li></ul>

## SECTION 11: HIGH WIND

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
wastewater, communications)	<ul style="list-style-type: none"><li>Power outages could disrupt communications, delaying emergency response times.</li><li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>Debris/downed trees can impede emergency response vehicle access to areas.</li><li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li></ul>

A high wind event can also result in traffic disruptions, injuries and in rare cases, fatalities. There have been no reported injuries or fatalities due to high wind events in the Grant County planning area. Based on historic loss and damages, the impact of high wind on the Grant County planning area, including participating jurisdictions, can be considered “Limited” severity, meaning minor quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed or with major damage. Overall, in the past 31.5 years there has been an estimated total of \$285,500 in damages (2024 dollars) in the Grant County planning area due to high wind events. The estimated average annual loss from high wind events is \$9,100.

**Table 11-9. Estimated Annualized Losses by Participating Jurisdiction**

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Grant County	\$250,900	\$8,000
City of Bayard	\$0	\$0
Town of Hurley	\$0	\$0
Village of Santa Clara	\$0	\$0
Town of Silver City	\$34,600	\$1,100
<b>TOTALS</b>	<b>\$285,500</b>	<b>\$9,100</b>

### ASSESSMENT OF IMPACTS

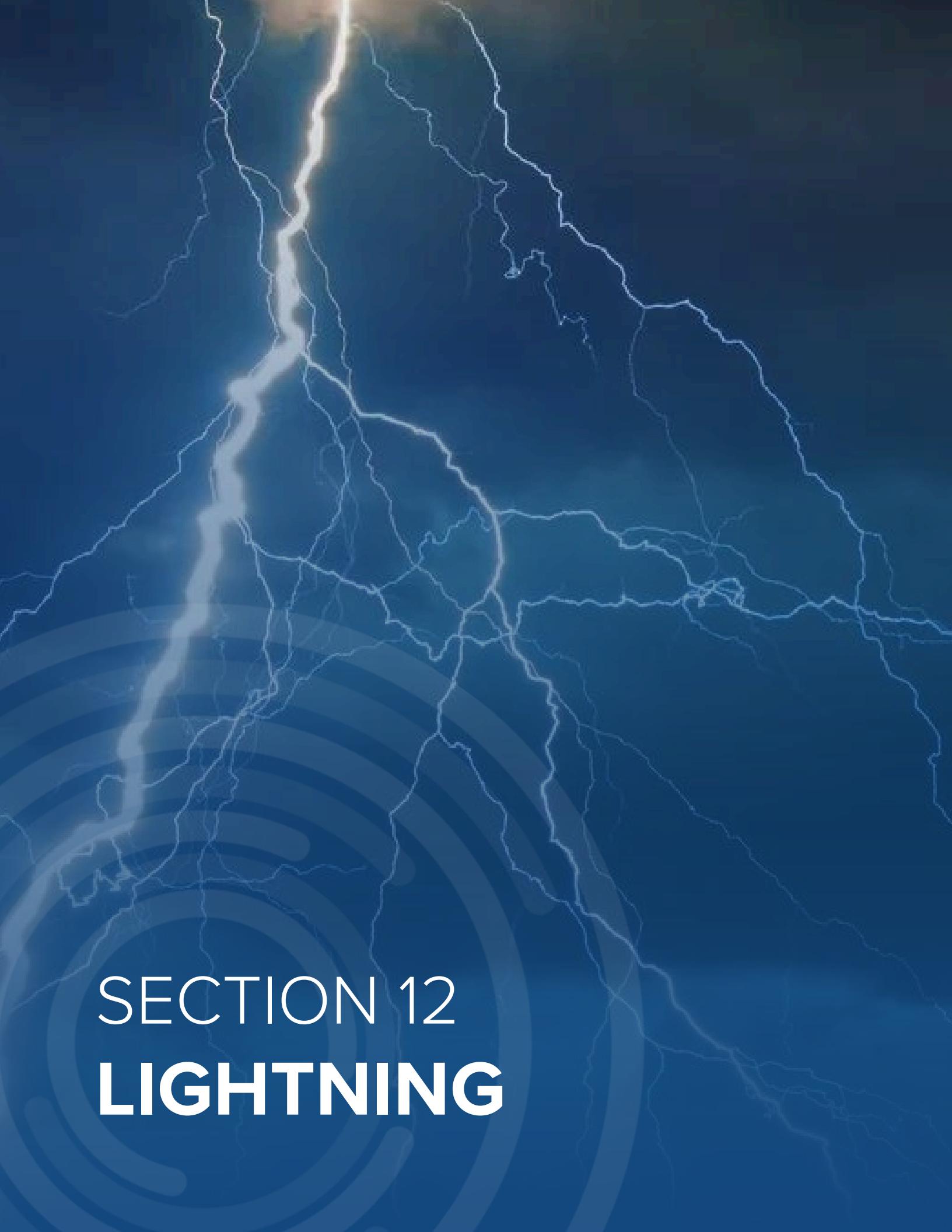
High wind events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. High wind conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.

## SECTION 11: HIGH WIND

- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- High wind events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Critical staff may be unable to report for duty, limiting response capabilities.
- Private sector entities that residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by high wind events may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures, specifically those built before 1980 (56 percent of the planning area), were built to less stringent building codes may suffer greater damage as they are typically more vulnerable to high winds.
- Recreational areas such as community parks and green spaces may be damaged or inaccessible due to downed trees or debris, causing temporary impacts to associated businesses in the area.
- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are 47 historical sites listed on the National Register of Historic Places for Grant County and 71 listed on the New Mexico State Register of Cultural Properties.

The economic and financial impacts of high winds on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any high wind event.



A large, bright lightning bolt strikes a dark, jagged rock formation. The bolt is vertical with several branching arcs on the left and right sides. The background is a bright, overexposed sky. In the foreground, there are dark, circular patterns resembling ripples in water or sound waves.

## SECTION 12

# LIGHTNING

## SECTION 12: LIGHTNING

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### HAZARD DESCRIPTION

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a “bolt” when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning often strikes outside of heavy rain and might occur as far as 10 miles away from any rainfall.

According to the National Weather Service (NWS), the 10-year (2012–2021) average for fatalities is 23 people with an average of 300 injuries in the United States each year by lightning. Lightning can occur as cloud to ground flashes or as intra-cloud lightning flashes. Direct lightning strikes can cause significant damage to buildings, critical facilities, infrastructure, and communication equipment affecting emergency response. Lightning is also responsible for igniting wildfires that can result in widespread damages to property before firefighters have the ability to contain and suppress the resultant fire.

### LOCATION

Lightning can strike in any geographic location and is considered a common occurrence in New Mexico, particularly between the months of April and August.<sup>1</sup> The Grant County planning area is in a region of the country that is moderately susceptible to a lightning strike. Therefore, lightning could occur at any location within the entire planning area. It is assumed that the entire Grant County planning area, including all participating jurisdictions, is uniformly exposed to the threat of lightning.

### EXTENT

According to the 2023 Annual Lightning Report by Vaisala, the State of New Mexico ranks 27<sup>th</sup> among all states in the U.S. for lightning strike density with an average of 39.6 flashes per square

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<sup>1</sup> Source:

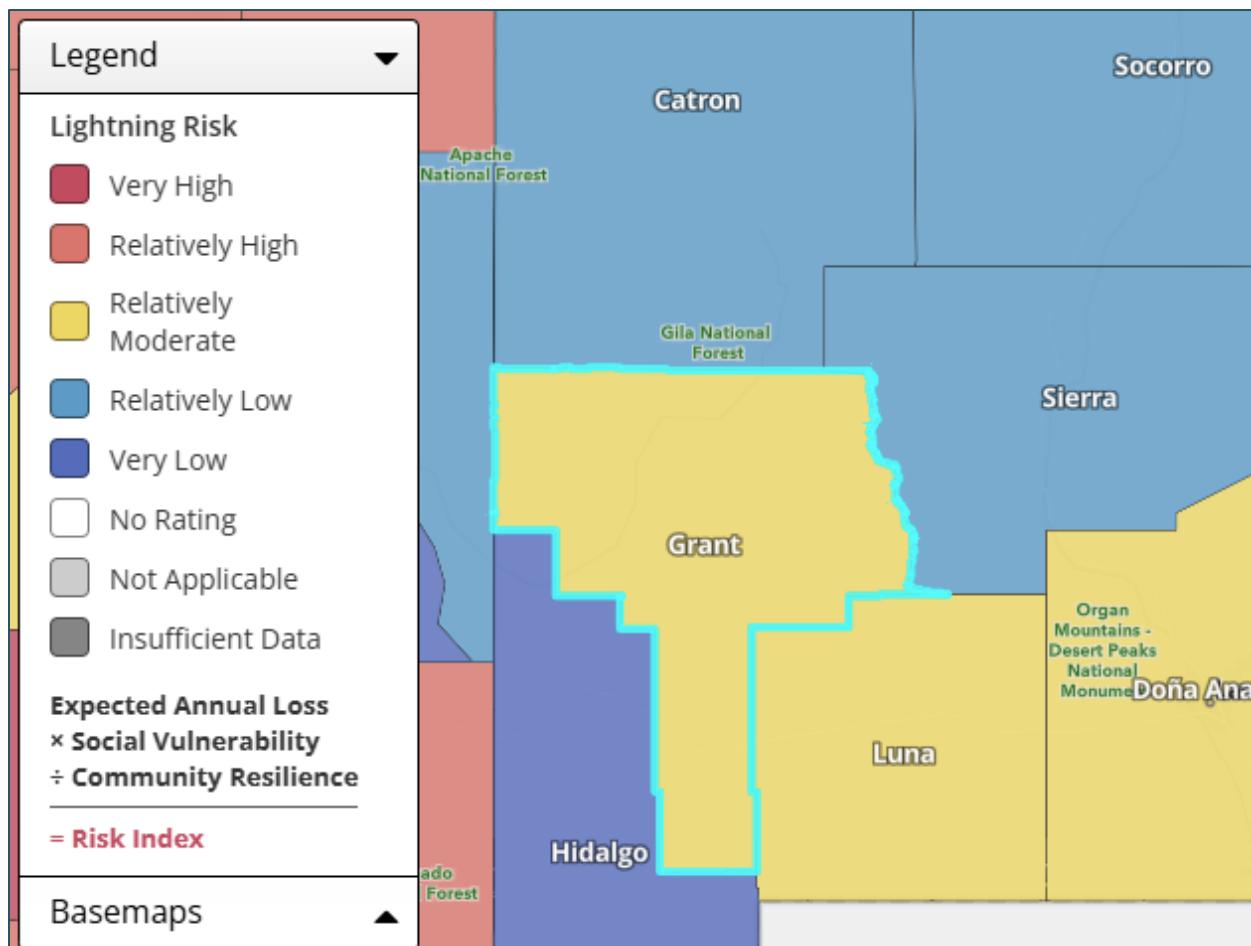
<https://www.weather.gov/abq/prephazards#:~:text>All%2033%20counties%20in%20New,eastern%20areas%20of%20the%20state.>

## SECTION 12: LIGHTNING

mile.<sup>2</sup> Vaisala's U.S. National Lightning Detection Network lightning flash density map shows an average of 39.4 lightning events per square mile per year for the Grant County planning area.<sup>3</sup> This rate equates to approximately 156,100 flashes per year across the entire planning area, or four to five flashes per 15-minute interval during storm events.

FEMA's National Risk Index includes an analysis of the planning area's expected annual loss and the community's risk factor which incorporates social vulnerability as well as community resilience to determine the lightning risk for the area, compared to the rest of the United States. Grant County is located in an area where the extent is largely classified as relatively moderate (Figure 12-1).

**Figure 12-1. Grant County Lightning Risk, National Risk Index, November 2024<sup>4</sup>**



## HISTORICAL OCCURRENCES

Since January 1996, there have been no recorded lightning events for the Grant County planning area, based upon NCEI records. It is highly likely multiple lightning occurrences have gone unreported before and during the recording period. The NCEI is a national data source organized

<sup>2</sup> Source: <https://www.xweather.com/annual-lightning-report>

<sup>3</sup> Source: <https://interactive-lightning-map.vaisala.com/>

<sup>4</sup> Source: Map | National Risk Index, <https://hazards.fema.gov/nri/map>

## SECTION 12: LIGHTNING

under the National Oceanic and Atmospheric Administration and considered a reliable resource for hazards. However, the flash density for the planning area along with input from local team members indicates regular lightning occurrences across the planning area that simply have not been reported.

### PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Grant County planning area is considered “Highly Likely”, or an event probable in the next year. The planning team stated that lightning occurs regularly in the area. According to the 2023 Annual Lightning Report by Vaisala, the Grant County planning area, including all participating jurisdictions, experiences approximately 39.4 lightning flashes per square mile per year (approximately 156,100 total flashes per year). Given this estimated probability of events, it can be expected that future lightning events will continue to threaten life and cause minor property damage throughout the planning area. Impacts of climate change are not expected to increase the average frequency of lightning events but may lead to an increase in the intensity of events when they do occur.

### CLIMATE CHANGE CONSIDERATIONS

As CO<sub>2</sub> increases and the land surface warms, stronger updrafts are more likely to produce lightning. In a climate with double the amount of CO<sub>2</sub>, we may see fewer lightning storms overall, but 25 percent stronger storms, with a 5 percent increase in lightning. Lightning damage is also likely to increase because of its role in igniting forest fires, where dry vegetation, also caused by rising temperatures, creates more ‘fuel’ for fires, so even a small climate change may have huge consequences. While the impact climate change will have on our weather still remains uncertain, researchers agree that implementing simple measures like lightning detection systems and installing grounding systems in buildings could go a long way in avoiding deaths and injuries.<sup>5</sup>

Lightning events have the potential to pose a significant risk to people and property throughout the planning area. The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. While no increase in the number of hazard events is anticipated, the impact of the hazard may see an increase in losses. As populations grow and urban development continues to rise, the overall vulnerability and impact are expected to increase in the next five years.

### VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since lightning events can occur at different strength levels, in random locations, and can create a broad range of damage depending on the strike location. Due to the randomness of these events, all existing and future structures and facilities in the Grant County planning area could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes.

The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on

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<sup>5</sup> Environmental Journal, Nathan Neal, January 11, 2021.

## SECTION 12: LIGHTNING

community resources. The entire population of the Grant County planning area, including participating jurisdictions, is considered exposed to the lightning hazard. The peak lightning season in the State of New Mexico is from July to August; with storms also peaking in the spring (April through June) in the eastern areas of the state. Fatalities occur most often when people are outdoors and/or participating in some form of recreation. Populations located outdoors during a lightning event is considered at risk and more vulnerable to a lightning strike compared to those inside a structure. Moving to a lower risk location will decrease a person's vulnerability.

The entire general building stock and all infrastructure of the Grant County planning area are considered exposed to the lightning hazard. Lightning can be responsible for damages to buildings, cause electrical, forest and/or wildfires, and damage infrastructure such as power transmission lines and communication towers.

While all citizens are at risk to the impacts of lightning, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 21 percent of the planning area population live below the poverty level and 28 percent of the total population is 65 years and older. In addition, people who speak a language other than English (3 percent of planning area population) may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. Persons with disabilities (22 percent of the total population) may also need additional assistance during an event and in recovery. Power outages as a result of lightning event also pose a greater risk to individuals that are dependent on electricity to live independently in their homes.

**Table 12-1. Populations at Greatest Risk to Lightning Events<sup>6</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

The Grant County Planning Team identified the following critical facilities (Table 12-2) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by lightning events. For a comprehensive list by participating jurisdiction, see Appendix C.

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<sup>6</sup> US Census Bureau, American Community Survey Five-Year Estimates, 2022

## SECTION 12: LIGHTNING

**Table 12-2. Critical Facilities Vulnerable to Lightning Events**

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> <li>Emergency operations and services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications as a result of lightning strikes.</li> <li>Emergency vehicles, including critical equipment, can be damaged by lightning strikes or by falling trees damaged by lightning.</li> <li>Power outages could disrupt communications, delaying emergency response times.</li> <li>Downed trees due to lightning strikes can impede emergency response vehicle access to areas.</li> <li>Lightning strikes can be associated with structure fires and wildfires, further straining the capacity and resources of emergency personnel.</li> <li>Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> <li>Structures can be damaged by falling trees damaged by lightning.</li> <li>Power outages could disrupt critical care.</li> <li>Backup power sources could be damaged.</li> <li>Evacuations may be necessary due to extended power outages, fires, or other associated damages to facilities.</li> </ul>
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> <li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li> <li>Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.</li> </ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> <li>Emergency operations and critical services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications as a result of lightning strikes.</li> <li>Emergency vehicles, including critical equipment, can be damaged by lightning strikes or by falling trees damaged by lightning.</li> <li>Power outages could disrupt communications, delaying emergency response times.</li> <li>Downed trees due to lightning strikes can impede emergency response vehicle access to areas.</li> <li>Lightning strikes can be associated with structure fires and wildfires, further straining the capacity and resources of emergency personnel.</li> </ul>

## SECTION 12: LIGHTNING

CRITICAL FACILITIES	POTENTIAL IMPACTS
	<ul style="list-style-type: none"><li>Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li></ul>

There are no recorded fatalities or injuries within the Grant County planning area due to lightning events. Additionally, there are no recorded lightning events in the planning area, and therefore total monetary losses or annual loss estimates due to lightning are difficult to determine. The limited recorded impacts indicate a “Limited” severity of impact for the Grant County planning area, including participating jurisdictions, meaning minimal quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed.

### ASSESSMENT OF IMPACTS

Lightning events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. Additional impacts to the planning area can include:

- The Grant County planning area features developed parks and green spaces. Lightning events could impact recreational activities, placing residents and visitors in imminent danger, potentially requiring emergency services or park evacuation.
- Older structures built to less stringent building codes may suffer greater damage from a lightning strike as they are typically built with less fire-resistant materials and often lack any fire mitigation measures such as sprinkler systems. 56 percent of homes in the county were built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. Currently, 47 sites and districts in the Grant County planning area are listed on the National Register of Historic Places and 71 sites are listed on the New Mexico State Register of Cultural Properties.
- Vegetation in urban parks may be destroyed by lightning caused brush fires and result in poor air quality impacting public health.
- Individuals exposed to the storm can be directly struck, posing significant health risks and potential death.
- Structures can be damaged or crushed by falling trees damaged by lightning, which can result in physical harm to the occupants.
- Lightning strikes can result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Lightning strikes can be associated with structure fires and wildfires, creating additional risk to residents and first responders.
- Emergency operations and services may be significantly impacted due to power outages and/or loss of communications.
- County departments may be damaged, delaying response and recovery efforts for the entire community.
- Economic disruption due to power outages and fires negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.

## SECTION 12: LIGHTNING

- Some businesses not directly damaged by lightning events may be negatively impacted while utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.

The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any significant lightning event.



# SECTION 13

# SEVERE WINTER

# STORM

## SECTION 13: SEVERE WINTER STORM

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### HAZARD DESCRIPTION



A severe winter storm event is identified as a storm with snow, ice, or freezing rain. This type of storm can cause significant problems for area residents. Winter storms are associated with freezing or frozen precipitation such as freezing rain, sleet, snow, and the combined effects of winter precipitation and strong winds. Wind chill is a function of temperature and wind. Low wind chill is a product of high winds and freezing temperatures.

Grant County receives snowfall on a regular seasonal basis, typically between the months of October and April. Due to the average storm size, the entire planning area is usually affected by these events. Most winter precipitation in New Mexico is associated with Pacific Ocean storms that move across the state from west to east. As storms move inland, much of the precipitation that falls in the mountain areas occurs as snow, whereas it may occur as either rain or snow in the valleys.

As indicated in Figure 13-1, the Grant County planning area is located within several Hardiness Zones according to the 2023 USDA Plant Hardiness Zone Map. These range from zone 7a to 8a, indicating a range of annual minimum temperatures between 0°F and 15°F. The northern portion of the planning area can anticipate the coldest minimum temperatures. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 13-1 describes the types of winter weather possible to occur in the Grant County planning area.

## SECTION 13: SEVERE WINTER STORM

Figure 13-1. Annual Minimum Temperature<sup>1</sup>



<sup>1</sup> USDA

## SECTION 13: SEVERE WINTER STORM

**Table 13-1. Types of Winter Weather**

TYPE OF WINTER WEATHER	DESCRIPTION
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/Freeze	Below freezing temperatures are expected and may cause significant damage to plants, crops, and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.
Heavy Snowfall	Snowfall accumulating to 4" or more in depth in 12 hours or less; or snowfall accumulating to 6" or more in depth in 24 hours or less.
Ice storm	An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous.
Flurries	Light snow falling for short durations with little or no accumulation.

### LOCATION

Winter storm events are not confined to specific geographic boundaries. Additionally, the size of a typical storm in the region is large enough to affect the entire planning area. Therefore, all existing and future buildings, facilities, and populations in the Grant County planning area, including participating jurisdictions, are vulnerable to a winter storm hazard and could potentially be impacted.

### EXTENT

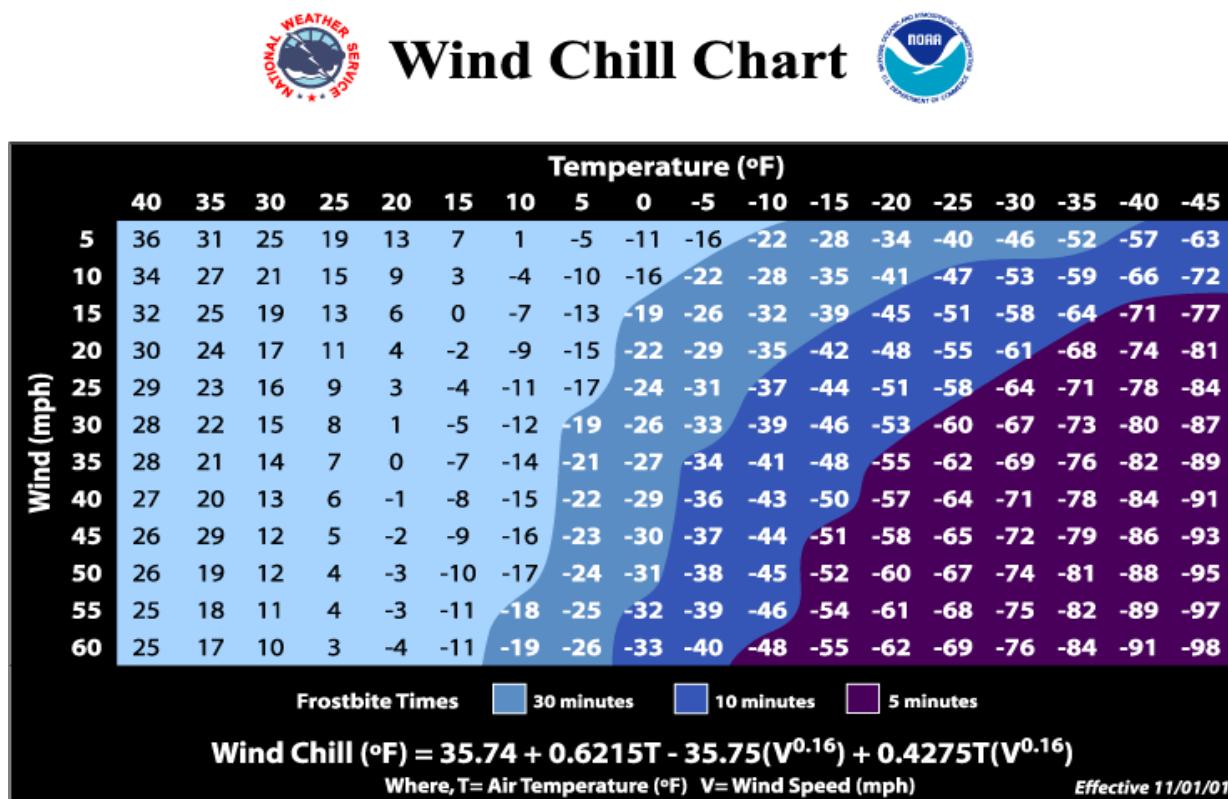
The extent or magnitude of a severe winter storm is measured in intensity based on the temperature and level of accumulations as shown in Table 13-2. Table 13-2 should be read in conjunction with the wind-chill factor described in Figure 13-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or winds are calm. This is an index developed by the National Weather Service.

## SECTION 13: SEVERE WINTER STORM

Table 13-2. Magnitude of Severe Winter Storms

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Mild	40° – 50°	Winds less than 10 mph and freezing rain or light snow falling for short durations with little or no accumulations
Moderate	30° – 40°	Winds 10 – 15 mph and sleet and/or snow up to 4 inches
Significant	25° – 30°	Intense snow showers accompanied with strong gusty winds between 15 and 20 mph with significant accumulation
Extreme	20° – 25°	Wind driven snow that reduces visibility, heavy winds (between 20 to 30 mph), and sleet or ice up to 5 millimeters in diameter
Severe	Below 20°	Winds of 35 mph or more and snow and sleet greater than 4 inches

Figure 13-2. Wind Chill Chart



Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a blustery 30°F day would feel just as cold as a calm day with 0°F temperatures. The average number of cold days is similar for the entire planning area. Therefore, the intensity or extent of a winter storm event to be mitigated for the area is severe winter storm (Table 13-2), as annual extreme minimum temperatures across the planning area may dip as low as 0°F.

## SECTION 13: SEVERE WINTER STORM

The National Weather Service issues a winter storm watch, advisory or warning in advance of an event in order to give people enough time to prepare for an event. Grant County could be under any of these warning types in advance of a winter storm event. Table 13-3 describes when each warning type would be issued.

**Table 13-3. Winter Storm Watch, Advisory, Warning Descriptions**

TYPE OF WINTER WEATHER	DESCRIPTION
Winter Weather Advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter Storm Watch	Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.

## HISTORICAL OCCURRENCES

According to historical records and the best available data there have been 27 recorded winter storm events in the Grant County planning area, all of which were reported as incidents of heavy snow. None of these recorded events included a description of damages, fatalities, or injuries. The NCEI provides winter storm event data from January 1996 through June 2024, however no events were reported in Grant County prior to 2015. It is highly likely that additional winter storm events have occurred and simply gone unreported.

Historical winter storm information, as provided by the NCEI, identifies winter storm activity across a multi-county forecast area for each event. The appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event, when appropriate. Historical winter storm data for the planning area is provided on a County-wide basis per the NCEI database. Table 13-4 shows historical incident information for previous events within the planning area.

**Table 13-4. Historical Winter Storm Events, January 1996 – June 2024**

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	1/2/2015	0	0	\$0	\$0
Grant County	1/2/2015	0	0	\$0	\$0
Grant County	1/22/2015	0	0	\$0	\$0
Grant County	12/26/2015	0	0	\$0	\$0
Grant County	12/26/2015	0	0	\$0	\$0
Grant County	12/26/2015	0	0	\$0	\$0
Grant County	12/26/2015	0	0	\$0	\$0
Grant County	1/4/2016	0	0	\$0	\$0
Grant County	2/1/2016	0	0	\$0	\$0

## SECTION 13: SEVERE WINTER STORM

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	1/15/2017	0	0	\$0	\$0
Grant County	1/20/2017	0	0	\$0	\$0
Grant County	12/27/2018	0	0	\$0	\$0
Grant County	2/11/2020	0	0	\$0	\$0
Grant County	2/11/2020	0	0	\$0	\$0
Grant County	2/11/2020	0	0	\$0	\$0
Grant County	2/11/2020	0	0	\$0	\$0
Grant County	10/26/2020	0	0	\$0	\$0
Grant County	10/26/2020	0	0	\$0	\$0
Grant County	1/25/2021	0	0	\$0	\$0
Grant County	1/25/2021	0	0	\$0	\$0
Grant County	2/14/2021	0	0	\$0	\$0
Grant County	2/14/2021	0	0	\$0	\$0
Grant County	2/16/2021	0	0	\$0	\$0
Grant County	1/1/2022	0	0	\$0	\$0
Grant County	12/12/2022	0	0	\$0	\$0
Grant County	1/1/2023	0	0	\$0	\$0
Grant County	2/15/2023	0	0	\$0	\$0
<b>TOTALS</b>		<b>0</b>	<b>0</b>		<b>\$0</b>

## SIGNIFICANT EVENTS

### February 14, 2021

An Arctic cold front pushed in from the east while a deep upper trough was moving through the Four Corners region. This led to snowfall amounts up to 9 inches in the Grant County planning area, with the highest snowfall being reported in the eastern portion of the County. Central areas of the planning area also received snowfall, with areas around the Town of Silver City reporting 2 to 4 inches of snow accumulation.

### December 12, 2022

A deep upper low was moving out of the Great Basin with an associated cold front, bringing moderate snow to the higher elevations of the Gila Region including Grant County. The highest snow accumulation was 6.5 inches reported 11 miles northwest of the Town of Silver City, with other reports of snow between 4 and 6 inches elsewhere within the northern portion of the planning area.

### February 15, 2023

## SECTION 13: SEVERE WINTER STORM

An upper low was moving through the Four Corners region which tapped some moisture from around Baja. Colder air was already in place from a storm system that moved through the planning area two days earlier, resulting in snowfall across Grant County. Snow accumulation between four and eight inches was reported across the planning area, with the most accumulation being reported in the community of Pinos Altos north of the Town of Silver City.

### PROBABILITY OF FUTURE EVENTS

According to historical records, the Grant County planning area has experienced 27 winter storm events in a 28.5 year reporting period, meaning the planning area can expect to experience approximately one winter storm events each year. The probability of a future winter storm event affecting the Grant County planning area, including participating jurisdictions, is considered “Highly Likely”, with a winter storm likely to occur within the next year.

### CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to reduce the number of extreme cold events statewide but increase in the variability of events. Extreme cold events will continue to be possible but overall winters are becoming milder, and the frequency of extreme winter weather events are decreasing due to the warming of the Arctic and less extreme cold air coming from that region. Fewer cold spells are projected to occur per year, but the length of cold spells may be longer when they do occur. A trend that is expected to continue with winter extremes estimated to be milder over the next 50 years compared to extremes in the historic record.<sup>2</sup>

### VULNERABILITY AND IMPACT

During periods of extreme cold and freezing temperatures, water pipes can freeze and crack, and ice can build up on power lines, causing them to break under the weight or causing tree limbs to fall on the lines. These events can disrupt electric service for significant periods.

An economic impact may occur due to increased consumption of heating fuel, which can lead to energy shortages and higher prices. House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

The Grant County Planning Team identified the following critical facilities (Table 13-5) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by winter storm events. For a comprehensive list by participating jurisdiction, see Appendix C.

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<sup>2</sup> Dunbar, N.W., Gutzler, D.S., Pearthree, K.S., Phillips, F.M., Bauer, P.W., Allen, C.D., DuBois, D., Harvey, M.D., King, J.P., McFadden, L.D., Thomson, B.M., and Tillery, A.C., 2022, Climate change in New Mexico over the next 50 years: Impacts on water resources: New Mexico Bureau of Geology and Mineral Resources, Bulletin 164, 218 p. <https://doi.org/10.58799/B-164>

## SECTION 13: SEVERE WINTER STORM

**Table 13-5. Critical Facilities Vulnerable to Winter Storm Events**

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> <li>Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.</li> <li>Exposure to extreme cold can cause illnesses in first responders if exposed for a period of time.</li> <li>Roads may become impassable due to snow and/or ice impacting response times by emergency services.</li> <li>Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li> </ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> <li>Power outages due to increased usage could disrupt critical care.</li> <li>Backup power sources could be damaged.</li> <li>Increased number of patients due to exposure to cold temperatures could lead to a strain on staff.</li> <li>Water pipes can freeze and burst leading to flooding within facilities.</li> <li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li> <li>Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.</li> <li>Exposure risks to outdoor workers.</li> </ul>
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> <li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li> </ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> <li>Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.</li> <li>Roads may become impassable due to snow and/or ice impacting response times by emergency services.</li> <li>Power outages due to increased usage could disrupt critical care.</li> <li>Backup power sources could be damaged.</li> <li>Water pipes can freeze and burst leading to flooding within facilities.</li> </ul>

People and animals are subject to health risks from extended exposure to cold air (Table 13-6). Elderly people are at greater risk of death from hypothermia during these events, especially in the neighborhoods with older housing stock. According to the U.S. Center for Disease Control, every year hypothermia kills about 600 Americans, half of whom are 65 years of age or older.

## SECTION 13: SEVERE WINTER STORM

Due to factors like limited mobility, communication difficulties, medical needs, sensitivity to cold temperatures, reliance on support services, transportation challenges, housing accessibility issues, and possible shortages in emergency shelter accommodations, people with disabilities are particularly vulnerable to winter storms. Inclusive measures are crucial to address these vulnerabilities and ensure their safety during severe weather events.

Populations living below the poverty level may not be able to afford to run heat on a regular basis or extend period of time. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Grant County planning area is estimated at 28 percent of the total population and children under the age of 5 are estimated at 4 percent. The population with a disability is estimated at 22 percent of the total population. An estimated 21 percent of the planning area population live below the poverty level and 3 percent of the populations speak English 'less than very well'.<sup>3</sup>

**Table 13-6. Populations at Greater Risk to Winter Storm Events**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

Older homes tend to be more vulnerable to the impacts of winter storm events. Approximately, 56 percent (an estimated 8,208 structures) of the housing units in the planning area were built before 1980 (Table 13-7).

**Table 13-7. Structures at Greater Risk to Winter Storm Events**

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Grant County	8,208
City of Bayard	809
Town of Hurley	631
Village of Santa Clara	518
Town of Silver City	3,509

<sup>3</sup> US Census Bureau, 2022 American Community Survey Five-Year Estimates

## SECTION 13: SEVERE WINTER STORM

Winter storms have been known to cause injury to humans and occasionally have been fatal. However, no injuries or fatalities have been reported in the NCEI for Grant County due to winter storm events. Additionally, no monetary damages to property or crops have been reported within the planning area. Based on historic loss and damages, the impact of winter storm damages on the Grant County planning area, including participating jurisdictions, can be considered “Limited” severity of impact, meaning minor quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

**Table 13-8. Winter Storm Event Damage Totals, January 1996 - June 2024**

JURISDICTION	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Grant County	\$0	\$0

### ASSESSMENT OF IMPACTS

The greatest risk from a winter storm hazard is to public health and safety. The impact of climate change could produce longer, more intense winter storm events, exacerbating the current winter storm impacts. Worsening winter storm conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (28 percent of total population), children under 5 (4 percent of total population), and those with a disability (22 percent of total population), can face serious or life-threatening health problems from exposure to extreme cold including hypothermia and frostbite.
- Loss of electric power or other heat source can result in increased potential for fire injuries or hazardous gas inhalation because residents burn candles for light or use fires or generators to stay warm.
- Response personnel, including utility workers, public works personnel, debris removal staff, tow truck operators, and other first responders, are subject to injury or illness resulting from exposure to extreme cold temperatures.
- Response personnel would be required to travel in potentially hazardous conditions, elevating the life safety risk due to accidents and potential contact with downed power lines.
- Operations or service delivery may experience impacts from electricity blackouts due to winter storms.
- Power outages are possible throughout the planning area due to downed trees and power lines and/or rolling blackouts.
- Critical facilities without emergency backup power may not be operational during power outages.
- Emergency response and service operations may be impacted by limitations on access and mobility if roadways are closed, unsafe, or obstructed.
- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.
- Depending on the severity and scale of damage caused by ice and snow events, damage to power transmission and distribution infrastructure can require days or weeks to repair.

## SECTION 13: SEVERE WINTER STORM

- Winter storms can reduce the efficacy of shaded fuel breaks for wildfire mitigation as treated areas were more likely to have downed trees and limbs than untreated areas.
- Winter storms can result in damage to endangered species habitat and increased fuel loads within forested habitats.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to impacts of winter storm events. Approximately 56 percent of homes in the County were built before 1980. Similarly, historic buildings and sites are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are 47 historical sites listed on the National Register of Historic Places for Grant County and 71 listed on the New Mexico State Register of Cultural Properties.
- Schools may be forced to shut early due to treacherous driving conditions.
- Exposed water pipes may be damaged by severe or late season winter storms at both residential and commercial structures, causing significant damages.

The economic and financial impacts of winter weather on the community will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of a winter storm event.

A dramatic, dark, swirling tornado in a field under a cloudy sky.

SECTION 14  
**TORNADO**

## SECTION 14: TORNADO

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### HAZARD DESCRIPTION

Tornadoes are among the most violent storms on the planet. A tornado is a rapidly rotating column of air extending between, and in contact with, a cloud and the surface of the earth. The most violent tornadoes are capable of tremendous destruction and have wind speeds of 250 miles per hour (mph) or more. In extreme cases, winds may approach 300 mph. Damage paths can be in excess of one mile wide and 50 miles long.



The most powerful tornadoes are produced by “Supercell Thunderstorms.” These thunderstorms are created when horizontal wind shears (winds moving in different directions at different altitudes) begin to rotate the storm. This horizontal rotation can be tilted vertically by violent updrafts, and the rotation radius can shrink, forming a vertical column of very quickly swirling air. This rotating air can eventually reach the ground, forming a tornado.

**Table 14-1. Variations among Tornadoes**

WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
<ul style="list-style-type: none"><li>• 69% of all tornadoes</li><li>• Less than 5% of tornado deaths</li><li>• Lifetime 1-10+ minutes</li><li>• Winds less than 110 mph</li></ul>	<ul style="list-style-type: none"><li>• 29% of all tornadoes</li><li>• Nearly 30% of all tornado deaths</li><li>• May last 20 minutes or longer</li><li>• Winds 110 – 205 mph</li></ul>	<ul style="list-style-type: none"><li>• 2% of all tornadoes</li><li>• 70% of all tornado deaths</li><li>• Lifetime can exceed one hour</li><li>• Winds greater than 205 mph</li></ul>

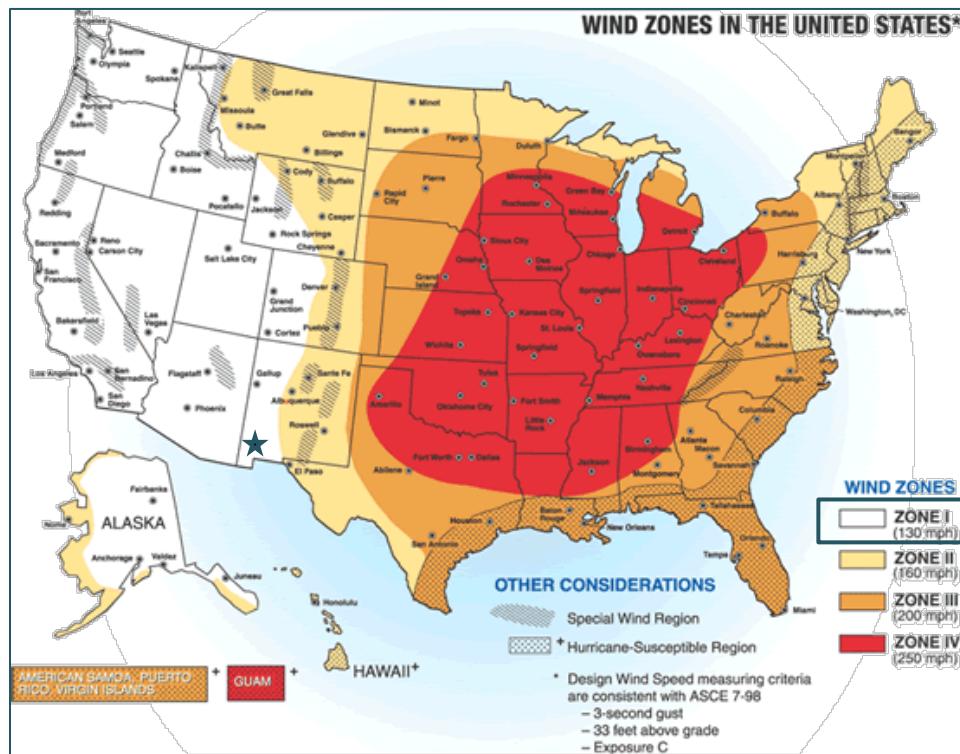
### LOCATION

Tornadoes do not have any specific geographic boundary and can occur throughout the county uniformly. It is assumed that the entire Grant County planning area, including all participating

## SECTION 14: TORNADO

jurisdictions, is uniformly exposed to tornado activity. The entire Grant County planning area is in Wind Zone I (Figure 14-1), where tornado winds can be as high as 130 mph.

**Figure 14-1. FEMA Wind Zones in the United States<sup>1</sup>**



## EXTENT

The destruction caused by tornadoes ranges from light to inconceivable, depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes (particularly mobile homes).

Tornado magnitudes prior to 2007 were determined using the traditional version of the Fujita Scale, which estimated tornado wind speeds based on the damage caused by an event. Since February 2007, the Enhanced Fujita Scale has been utilized to classify tornadoes, which included improvements to the original scale. The original Fujita scale had limitations, such as a lack of damage indicators, no account for construction quality and variability, and no definitive correlation between damage and wind speed. These limitations led to some tornadoes being rated in an inconsistent manner and, in some cases, an overestimate of tornado wind speeds. The Enhanced Fujita scale retains the same basic design and six strength categories as the previous scale. The newer scale reflects more refined assessments of tornado damage surveys, standardization, and damage consideration to a wider range of structures. Table 14-2 includes both scales for reference when analyzing historical tornadoes since tornado events prior to 2007 will follow the original Fujita Scale.

<sup>1</sup> Grant County is indicated by the star.

## SECTION 14: TORNADO

**Table 14-2. The Fujita and Enhanced Fujita Tornado Scale<sup>2</sup>**

Enhanced Fujita Scale				Fujita Scale			
Category	Wind Speed	Damage Level	Damage	Category	Wind Speed	Intensity	Damage
EF0	65-85 MPH	Gale	The environment sustained minor damage: tree branches are broken, some shallow-rooted trees are uprooted, and some chimneys are damaged.	F0	45-78 MPH	Gale	Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
EF1	86-110 MPH	Weak	The environment sustained moderate damage: mobile homes are tipped over, windows are broken, roof tiles may be blown off, and some tree trunks have snapped.	F1	79-117 MPH	Moderate	Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	111-135 MPH	Strong	The environment sustained considerable damage: mobile homes are destroyed, roofs are damaged, debris flies in the air, and large trees are snapped or uprooted.	F2	118-161 MPH	Significant	Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165 MPH	Severe	The environment sustained severe damage: roofs and walls are ripped off buildings, small buildings are destroyed, and most trees are uprooted.	F3	162-209 MPH	Severe	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
EF4	166-200 MPH	Devastating	The environment sustained devastating damage: well-built homes are destroyed, buildings are lifted off their foundations, cars are blown away, and large debris flies in the air.	F4	210-261 MPH	Devastating	Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.
EF5	200+ MPH	Incredible	The environment sustained incredible damage: well-built homes are lifted from their foundations, reinforced concrete buildings are damaged, the bark is stripped from trees, and car-sized debris flies through the air.	F5	262-317 MPH	Incredible	Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

<sup>2</sup> Source: <http://www.tornadoproject.com/fscale/fscale.htm>

## SECTION 14: TORNADO

Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences since tornado events that occurred before 2007 will follow the original Fujita Scale. The greatest magnitude reported within the planning area is an F3, a severe tornado in the original Fujita Scale. When converted to the Enhanced Fujita Scale, an F3 could equate to a high-end EF3, EF4 (devastating), or low-end EF5 (incredible) depending on exact windspeed. Based on the planning area's location in Wind Zone I, the planning area has the potential to experience anywhere from an EF0 to an EF3 depending on the wind speed. The F3 tornado Grant County experienced occurred on October 12, 1957. All other reported tornadoes within the planning area have been much less powerful, ranging from F0 to F1.

### HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA). The NCEI is the largest archive available for historic storm events data; however, it is important to note that only incidents recorded in the NCEI have been factored into this risk assessment unless otherwise noted. It is likely that a number of occurrences have gone unreported over time.

Figure 14-2 identifies the locations of previous occurrences in the Grant County planning area from January 1957 through June 2024. A total of seven events have been recorded by NOAA's Storm Prediction Center and National Centers for Environmental Information (NCEI) databases for the Grant County planning area. The strongest event reported in the planning area was an F3 tornado, which occurred in 1957. This was also the most significant tornado in terms of reported damages within the Grant County planning area, with \$2,785,300 (2024 dollars) in estimated property damage.

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Figure 14-2. Spatial Historical Tornado Events, January 1957 – June 2024<sup>3</sup>

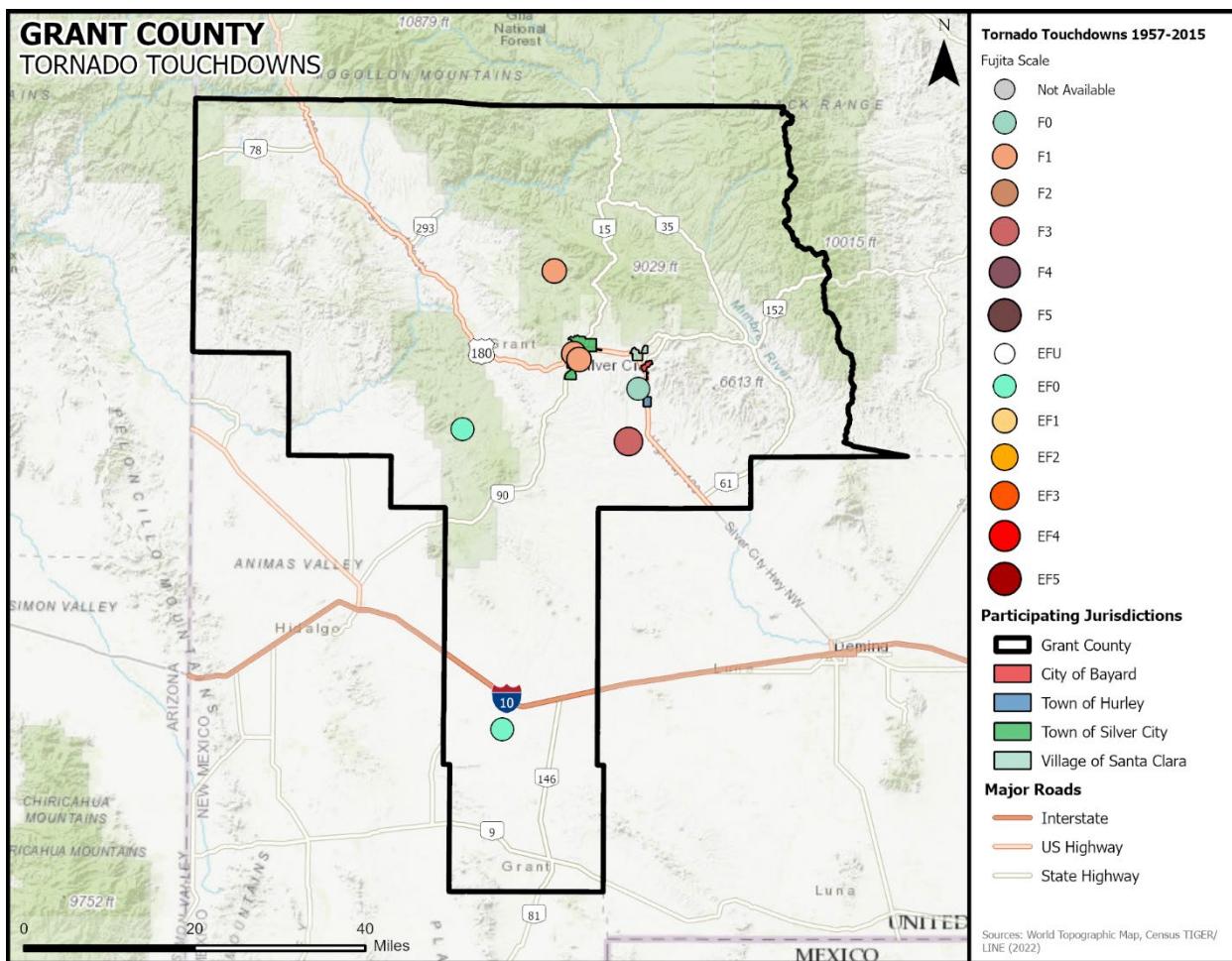


Table 14-3. Historical Tornado Events, January 1957 – June 2024<sup>4</sup>

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Grant County	10/12/1957	F3	0	0	\$2,785,300	\$0
Grant County	6/15/1967	F1	0	0	\$23,700	\$0
Grant County	7/31/1979	F0	0	0	\$0	\$0
Grant County	8/19/1979	F1	0	0	\$1,068,100	\$0
Grant County	8/13/1989	F1	0	0	\$0	\$0
Grant County	9/6/2007	EF0	0	0	\$0	\$0
Grant County	10/7/2015	EF0	0	0	\$0	\$0
<b>TOTALS</b>		<b>(MAX EXTENT)</b>	<b>0</b>	<b>0</b>	<b>\$3,877,100</b>	<b>\$0</b>

<sup>3</sup> Source: NOAA Storm Prediction Center

<sup>4</sup> Magnitude is listed when available. Damage values are in 2024 dollars.

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**Table 14-4. Historical Tornado Events Summary, January 1957 – June 2024<sup>5</sup>**

JURISDICTION	NUMBER of EVENTS	MAX MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Grant County	7	F3	0	0	\$3,877,100	\$0
City of Bayard	0	-	-	-	-	-
Town of Hurley	0	-	-	-	-	-
Village of Santa Clara	0	-	-	-	-	-
Town of Silver City	0	-	-	-	-	-
<b>TOTAL LOSSES</b>	<b>7</b>	<b>(Max Extent)</b>	<b>0</b>	<b>0</b>	<b>\$3,877,100</b>	

### SIGNIFICANT EVENTS

#### **October 12, 1957 – Grant County**

The strongest and most damaging tornado in Grant County's history, an F3, touched down south of the Town of Silver City in the evening. The tornado followed a path northeast for 8.2 miles, heading towards the Mimbres River. It was estimated that the tornado's width measured approximately 50 yards. No injuries or fatalities were reported, but considerable property damage occurred; total damages were estimated at \$2,785,300 (2024 dollars).

#### **August 19, 1979 – Grant County**

An F1 tornado touched down near the Town of Silver City around 11:00am, with the tornado's width estimated at around 33 yards. Recorded details of the tornado's path before dissipating are limited. No injuries or fatalities were reported, however an estimated \$1,068,100 (2024 dollars) in property damage was inflicted by the tornado.

### PROBABILITY OF FUTURE EVENTS

Tornadoes can occur at any time of year and at any time of day, but they are typically more common in the spring months during the late afternoon and evening hours. A smaller, high frequency period can emerge in the fall during the brief transition between the warm and cold seasons. With seven historical events over a 67.5-year reporting period, Grant County can anticipate a tornado touchdown approximately once every five years. This frequency supports an "Occasional" probability of future events for the Grant County planning area, including participating jurisdictions.

### CLIMATE CHANGE CONSIDERATIONS

According to the National Oceanic and Atmospheric Administration (NOAA), the average annual number of EF1+ tornadoes is stable and has not shown a significant increase or decrease so far. However, tornado outbreaks, events with 16 or more EF1+ tornadoes, are increasing. There is

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<sup>5</sup> Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

## SECTION 14: TORNADO

also some evidence that suggests a shift in when we might experience tornadoes, due to climate change. According to the NOAA, the number of EF-1+ tornadoes is decreasing in the spring and summer but increasing in the fall and winter. This suggests a greater risk of more off-season tornadoes in the future warmer climate. This could mean more tornado events at a time of year when people are not expecting it. The impacts on the frequency and severity of tornado events due to climate change can be hard to understand and results are generally inconclusive for tornado frequency during the traditional severe weather season.<sup>6</sup>

### VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Grant County planning area are considered to be exposed to this hazard and could potentially be impacted. The damage caused by a tornado is typically a result of high wind velocity, wind-blown debris, lightning, and large hail.

The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Consequently, vulnerability of humans and property is difficult to evaluate since tornadoes form at different strengths, in random locations, and create relatively narrow paths of destruction. Although tornadoes strike at random, making all buildings vulnerable, three types of structures are more likely to suffer damage:

- Manufactured Homes;
- Homes built of peer and beam construction (more susceptible to lift); and
- Buildings with large spans, such as shopping malls, gymnasiums, and factories.

Tornadoes can cause a significant threat to people as they could be struck by flying debris, falling trees / branches, utility lines, and poles. Blocked roads could prevent first responders from responding to calls. Tornadoes commonly cause power outages which could cause health and safety risks to residents and visitors, as well as to patients in hospitals.

The Grant County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to tornado events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area, which would also be more vulnerable. The U.S. Census data indicates a total of 3,824 (26 percent of total housing stock) manufactured homes located in the Grant County planning area. In addition, 56 percent (approximately 8,208 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events (Table 14-5).

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<sup>6</sup> National Oceanic and Atmospheric Administration. Tornadoes and Climate Change.  
[https://www.noaa.gov/sites/default/files/2023-10/Tornadoes\\_Climate\\_OnePager\\_July2023.pdf](https://www.noaa.gov/sites/default/files/2023-10/Tornadoes_Climate_OnePager_July2023.pdf)

## SECTION 14: TORNADO

**Table 14-5. Structures at Greater Risk by Participating Jurisdiction**

JURISDICTION	BUILT PRIOR TO 1980	MOBILE HOMES
Grant County	8,208	3,824
City of Bayard	809	164
Town of Hurley	631	195
Village of Santa Clara	518	265
Town of Silver City	3,509	730

While all citizens are at risk to the impacts of a tornado, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. The elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. The population over 65 in the Grant County planning area is estimated at 28 percent of the total population and children under the age of 5 are estimated at 4 percent. The population with a disability is estimated at 22 percent of the total population. In addition, an estimated 21 percent of the planning area population live below the poverty level and 3 percent of the populations speaks English 'less than very well' (Table 14-6).

**Table 14-6. Populations at Greater Risk to Tornado Events<sup>7</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

The Grant County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by tornado events (Table 14-7). The critical infrastructure with the greatest vulnerability to tornadoes are power and communications facilities. Failures of these facilities can result in a

<sup>7</sup> U.S. Census Bureau 2022 data for Grant County

## SECTION 14: TORNADO

loss of service and cascading impacts such as posing enormous risk to individuals dependent on electricity as a medical necessity. For a comprehensive list by participating jurisdiction, see Appendix C.

**Table 14-7. Critical Facilities Vulnerable to Tornado Events**

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"><li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li><li>Emergency vehicles can be damaged by falling trees or flying debris.</li><li>Power outages could disrupt communications, delaying emergency response times.</li><li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>Debris/downed trees can impede emergency response vehicle access to areas.</li><li>Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li><li>First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.</li><li>Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li></ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"><li>Structures can be damaged by falling trees damaged by lightning.</li><li>Power outages could disrupt critical care.</li><li>Backup power sources could be damaged.</li><li>Evacuations may be necessary due to extended power outages, fires, or other associated damage to facilities.</li><li>Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.</li><li>Temporary break in operations may significantly inhibit post event evacuations.</li><li>Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.</li></ul>
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"><li>Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible.</li><li>Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.</li><li>Additional emergency responders and critical aid workers may not be able to reach the area for days.</li></ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"><li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li><li>Emergency vehicles can be damaged by falling trees or flying debris.</li><li>Power outages could disrupt communications, delaying emergency response times.</li></ul>

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CRITICAL FACILITIES	POTENTIAL IMPACTS
	<ul style="list-style-type: none"><li>• Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li><li>• Debris/downed trees can impede emergency response vehicle access to areas.</li><li>• Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.</li><li>• First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.</li><li>• Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.</li></ul>

The total loss estimate due to tornado events is \$3,877,100 (2024 dollars), having an approximate annual loss estimate of \$57,400. No reported injuries or fatalities have occurred within the Grant County planning area due to tornado events. Based on historic damages and best available data the impact of a tornado event on the Grant County planning area, including participating jurisdictions, would be considered “Limited”, with injuries and illnesses treatable with first aid, critical facilities and services shutdown for 24-hours or less and less than 10 percent of properties destroyed or with major damage.

**Table 14-8. Estimated Average Annual Losses**

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Grant County	\$3,877,100	\$57,400
City of Bayard	\$0	\$0
Town of Hurley	\$0	\$0
Village of Santa Clara	\$0	\$0
Town of Silver City	\$0	\$0
<b>TOTALS</b>	<b>\$3,877,100</b>	<b>\$57,400</b>

### ASSESSMENT OF IMPACTS

Tornadoes have the potential to pose a significant risk to the population and can create dangerous situations. Often, providing and preserving public health and safety is difficult. The impact of climate change could produce larger, more severe tornado events, exacerbating the current tornado impacts. More destructive tornado conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.

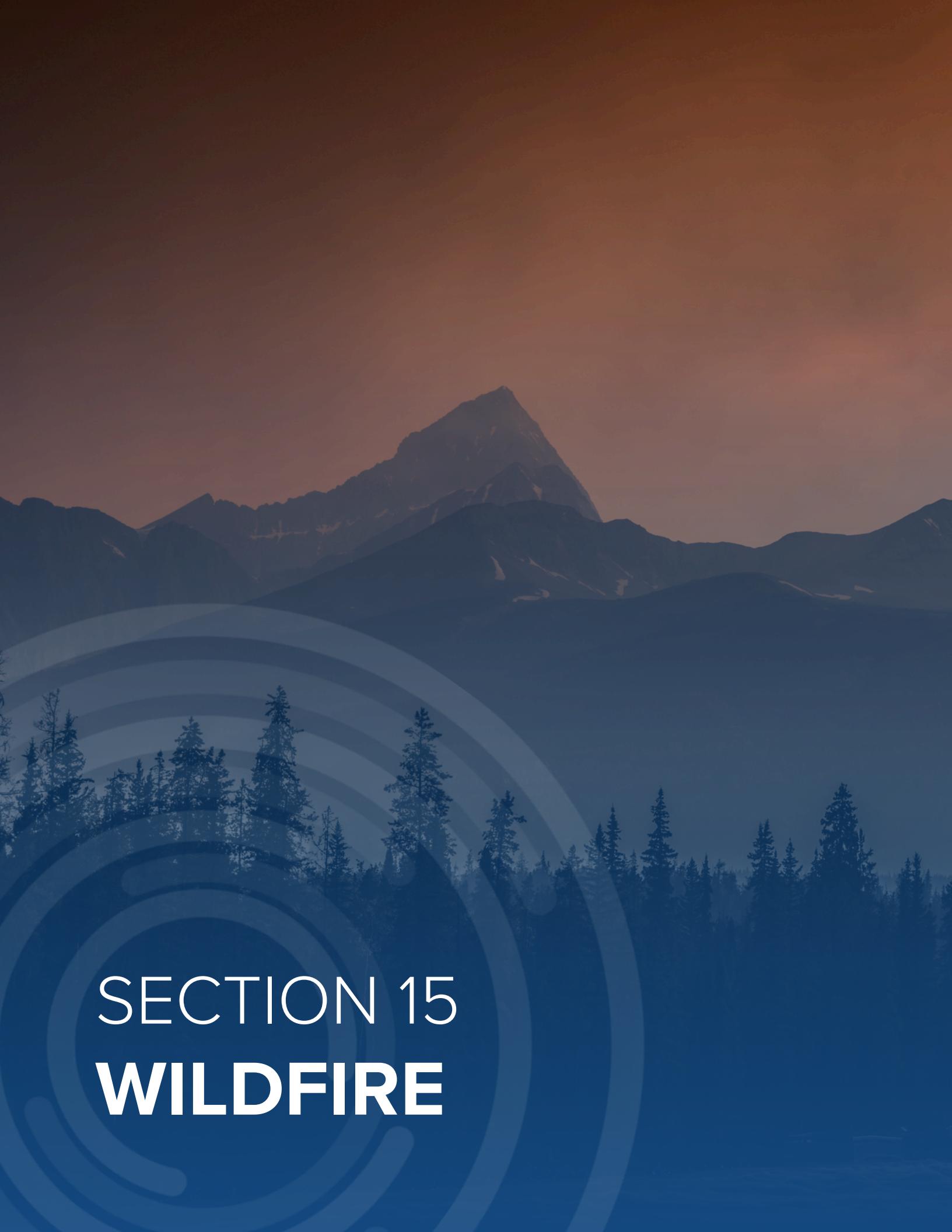
## SECTION 14: TORNADO

- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Manufactured homes may suffer substantial damage as they would be more vulnerable than typical site-built structures.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Tornadoes often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Tornadoes can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders must enter the damage area shortly after the tornado passes to begin rescue operations and to organize cleanup and assessments efforts, therefore they are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities, loss of communications, and damaged emergency vehicles and equipment.
- Private sector entities such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue, especially if damage is sustained to major employers within the planning area.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, and normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures destroyed by a tornado may not be rebuilt for years, reducing the tax base for the community.
- Large or intense tornadoes may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large tornado, devastating directly related local businesses.
- Tornadoes may destroy or degrade endangered species habitat

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- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. The Grant County planning area has 47 historical properties listed on the National Register of Historic Places and 71 listed on the New Mexico State Register of Cultural Properties.

The economic and financial impacts of a tornado event on the community will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a tornado event.



# SECTION 15

# WILDFIRE

## SECTION 15: WILDFIRE

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### HAZARD DESCRIPTION

Wildfire is an unplanned fire burning in natural or wildland areas such as forests, shrub lands, grasslands, or prairies.<sup>1</sup> Wildfires can start from both human and natural causes, such as lightning. New Mexico is prone to large wildfires, with the second most acres burned among all states in 2022.<sup>2</sup>

Wildfire risk is highest in the Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth and development within the WUI substantially increases the risk of wildfire. The Grant County WUI is presented in Figure 15-1 below.

Continued housing development in the WUI will put more people at a greater risk of catastrophic wildfire and put more pressure on land managers and fire department personnel to mitigate fire risk. Additionally, the area is experiencing hotter, drier climatic conditions. These factors combine to make the planning area at risk from wildfires. While Grant County is continually at some risk for wildfires, that risk is elevated during the summer and fall seasons.

Wildfires spread based on the type and quantity of fuel that surrounds it. Fuel can include everything from trees, underbrush and dry grassy fields to homes. The amount of flammable material that surrounds a fire is referred to as the fuel load. Conditions in the weather and environment, such as drought, winds, and extreme heat, can cause a fire to spread more quickly.<sup>3</sup> A wildfire event often begins unnoticed and spreads quickly, lighting brush, trees, and homes on fire. Most ignition sources for wildfires are a result of human activities. For example, a wildfire may be started by a campfire that was not doused properly, a tossed cigarette, burning debris, or arson. Wildland fires are fueled almost exclusively by natural vegetation, while interface or intermix fires are urban / wildland fires in which vegetation and the built environment provide the fuel.

Fuel treatment and reduction is a great concern for the Grant County planning area and has been identified as a goal in the Grant County Community Wildfire Protection Plan (CWPP) and a

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<sup>1</sup> Source: FEMA: <https://hazards.fema.gov/nri/wildfire>

<sup>2</sup> Source: National Interagency Fire Center. <https://www.nifc.gov/foia/23870>

<sup>3</sup> Source: NOAA Weather Forecasting: <https://scijinks.gov/wildfires/>

## SECTION 15: WILDFIRE

mitigation action during this planning process. The County and at risk communities are actively addressing this issue and will continue to implement related mitigation strategies.

### LOCATION

A wildfire incident can have devastating consequences due to human activities, drought conditions, lightning, or wind event, if the conditions allow. Wildfires can vary greatly in terms of size, location, intensity, and duration. While wildfires are not confined to any specific geographic location, they are most likely to occur in open grasslands.

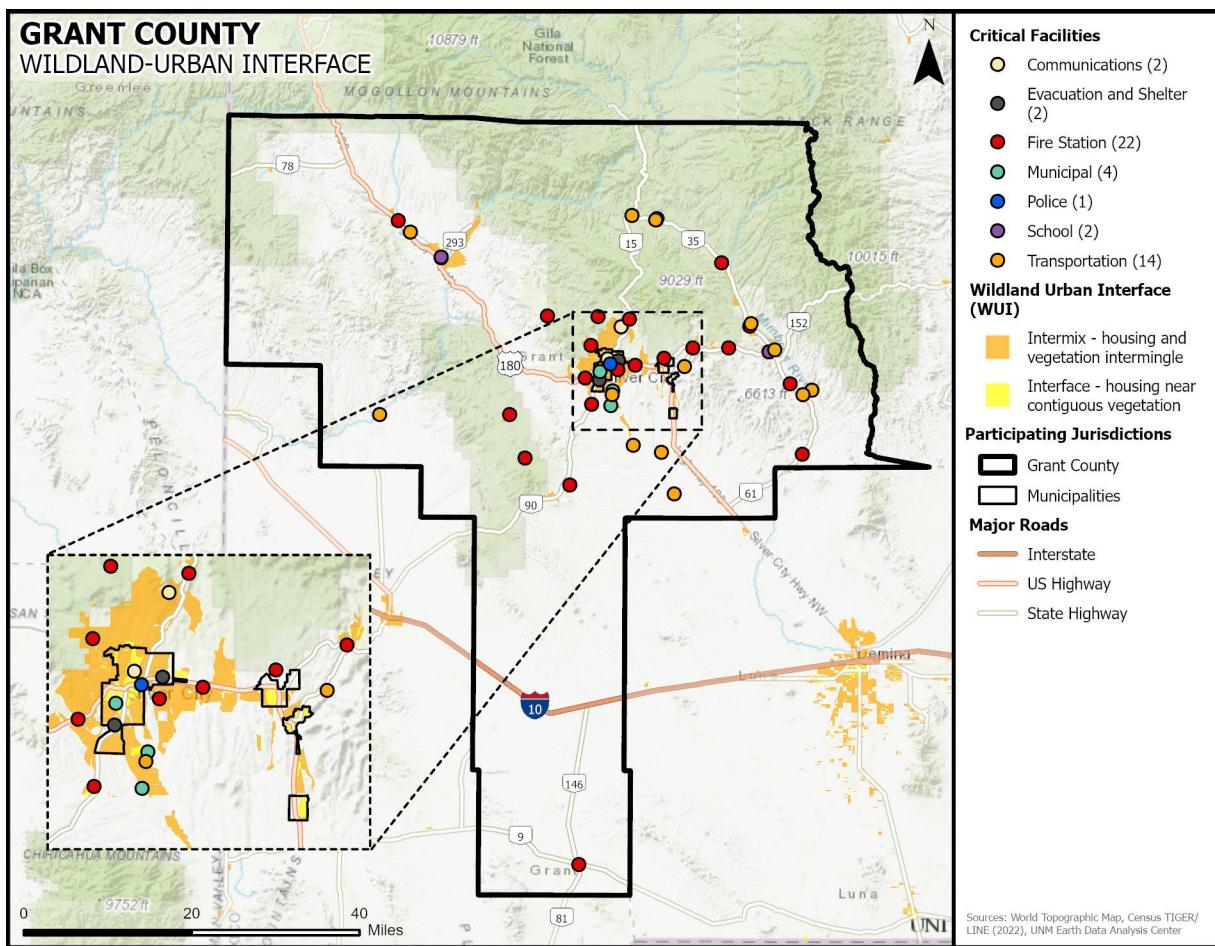
The New Mexico Wildfire Risk Assessment Portal (NMWRAP) provides historical wildfire data for New Mexico counties along with mapping resources that includes data layers on the WUI boundaries for communities throughout the Grant County planning area including all participating jurisdictions, along with multiple tips, recommendations and mitigation solutions for communities and residents. The NMWRAP portal was utilized to produce the maps found in this profile.

The threat to people and property from a wildfire event is greater in the fringe areas where developed areas meet open grass lands, such as the Wildland Urban Interface (WUI) (Figure 15-1 through Figure 15-5).

According to the Grant County CWPP, all communities have some level of risk, but those of the highest concern include Mimbres Hot Springs Ranch, San Juan, Feeley Subdivision, Owens Road, Pinos Altos, Wagon Wheel Subdivision, LS Mesa Arena, Cleveland Mine Road / Pinos Altos Mountain Estates, Cooper Ridge Subdivision, Indian Hills Subdivision, Gila Hot Springs / Gila Cliff Dwellings and Visitor Center, Lake Roberts, Lake Roberts Heights, Trout Valley, Paradise Acres I and II, Rosedale / West Peterson, Flying A Subdivision, and the Wind Canyon II and Wind Canyon Estates.

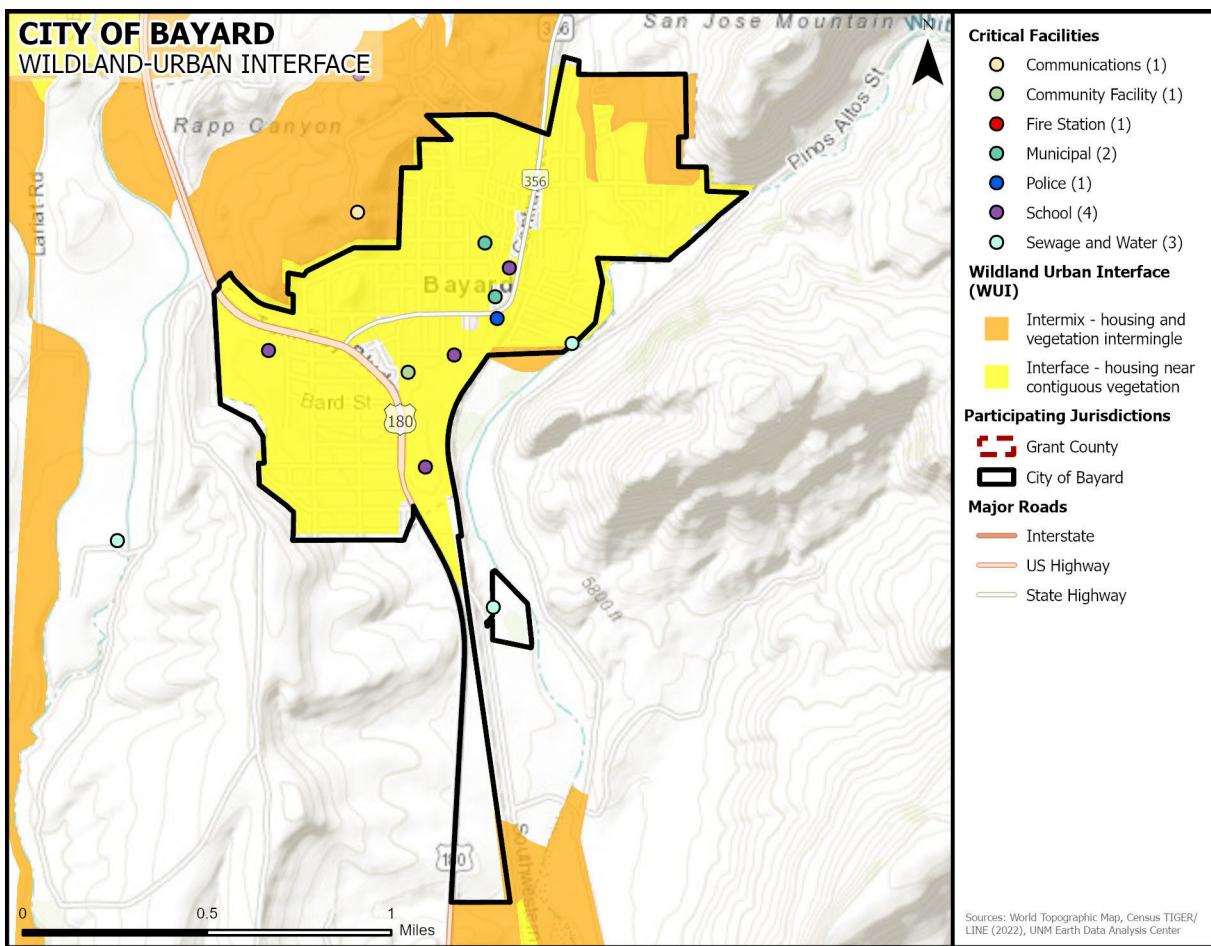
## SECTION 15: WILDFIRE

Figure 15-1. Wildland Urban Interface Map for Grant County



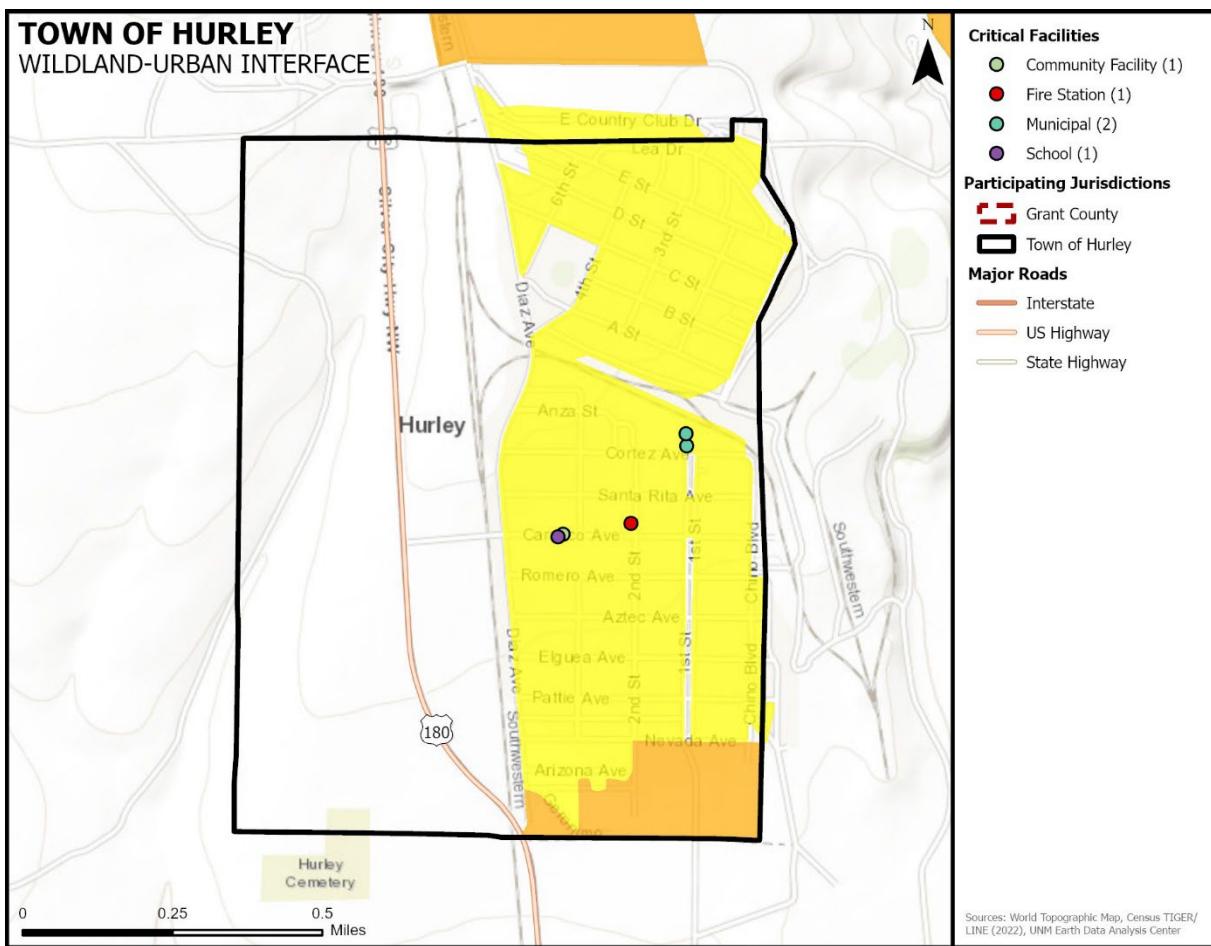
## SECTION 15: WILDFIRE

Figure 15-2. Wildland Urban Interface Map for the City of Bayard



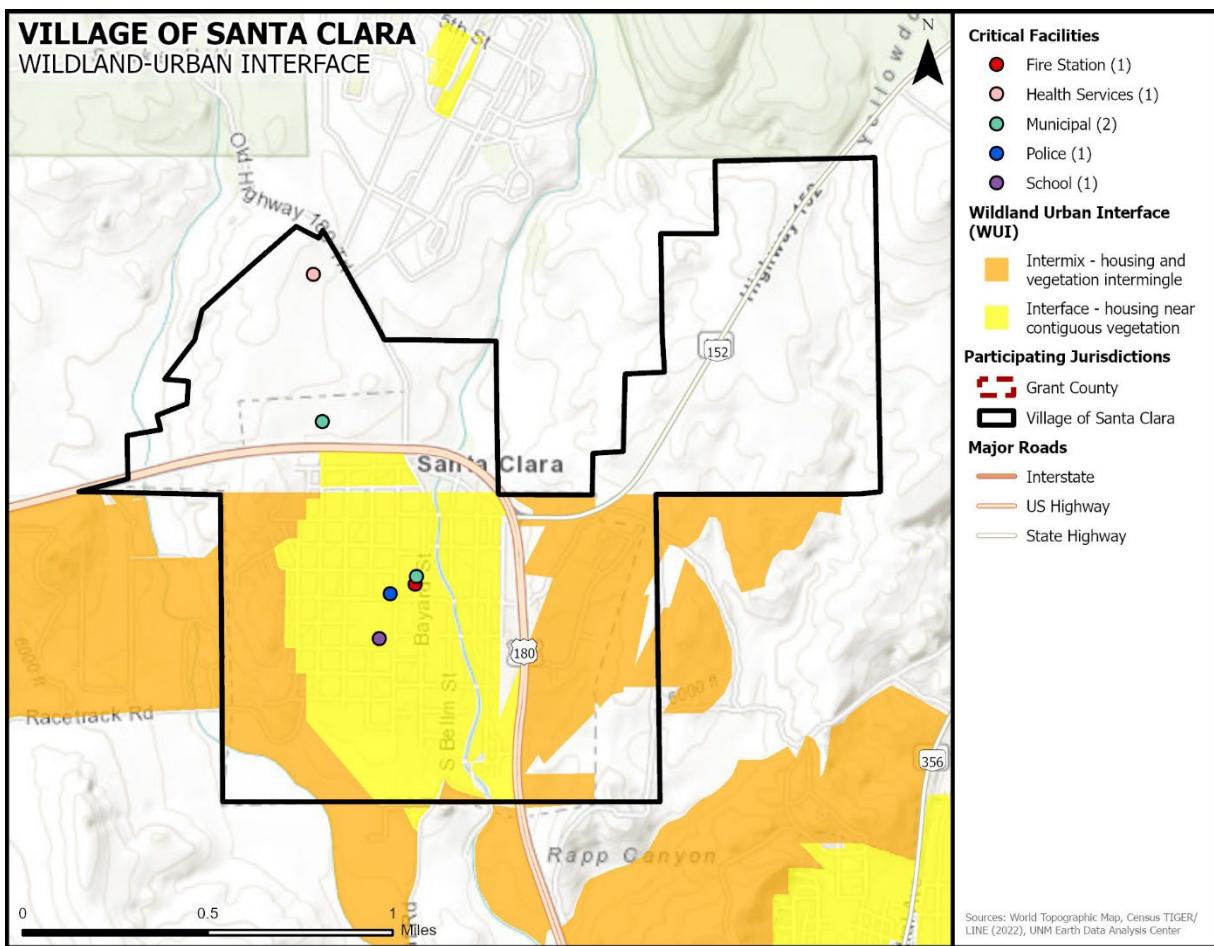
## SECTION 15: WILDFIRE

**Figure 15-3. Wildland Urban Interface Map for the Town of Hurley**



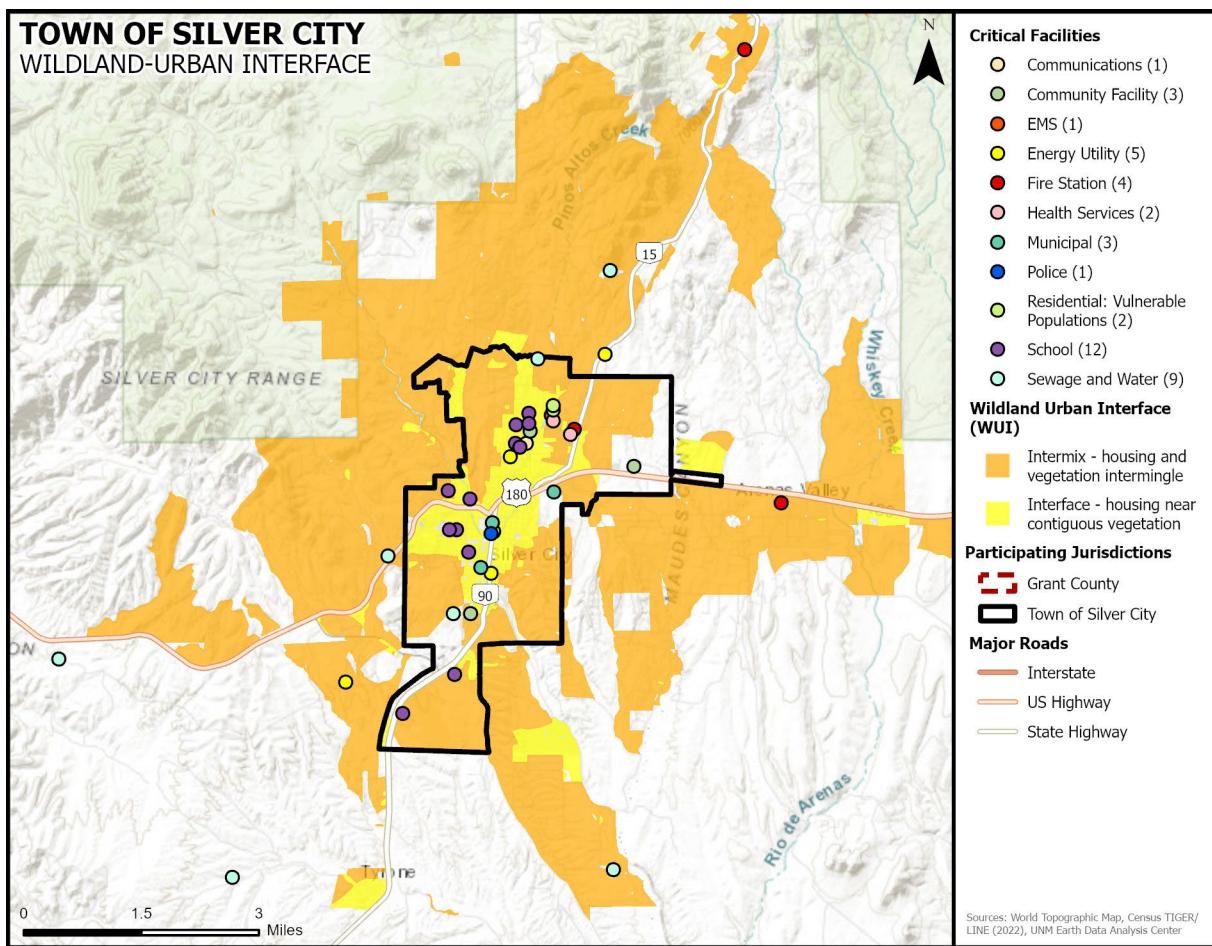
## SECTION 15: WILDFIRE

**Figure 15-4. Wildland Urban Interface Map for the Village of Santa Clara**



## SECTION 15: WILDFIRE

Figure 15-5. Wildland Urban Interface Map for the Town of Silver City



## EXTENT

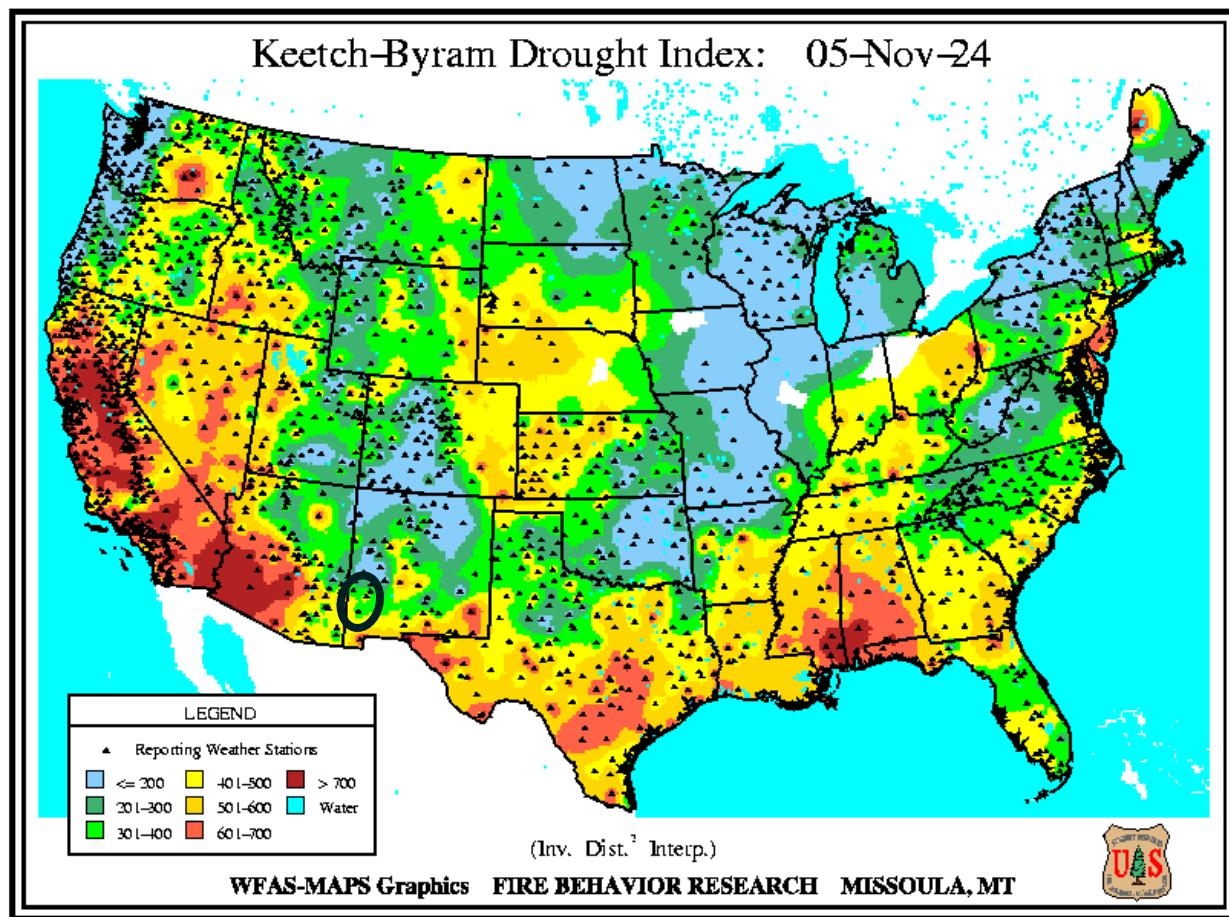


Risk for a wildfire event is measured in terms of magnitude and intensity using the Keetch Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI determines forest fire potential based on a daily water balance, derived by balancing a drought factor with precipitation and soil moisture (assumed to have a maximum storage capacity of eight inches), and is expressed in hundredths of an inch of soil moisture depletion.

Each color in Figure 15-6 represents the drought index at that location, by date. The drought index ranges from 0 to 800. A drought index of 0 represents no moisture depletion, and a drought index of 800 represents absolutely dry conditions. The most current available data shows the planning area is currently experiencing low moisture depletion with a KBDI between 300 and 500. However, the planning area has been subject to drier conditions historically and can expect a maximum KBDI range of 800.

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Figure 15-6. Keetch-Byram Drought Index (KBDI), November 2024<sup>4</sup>



Fire behavior can be categorized at four distinct levels on the KBDI:

- **0 -200:** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 -400:** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- **400 -600:** Fires intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 -800:** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

<sup>4</sup> Grant County planning area is located within the black circle.

## SECTION 15: WILDFIRE

The KBDI is a good measure of the readiness of fuels for a wildfire event. It should be referenced as the area experiences changes in precipitation and soil moisture, while caution should be exercised in dryer, hotter conditions.

Based on historical occurrences and readily available fuel, the planning area can anticipate the full KBDI range of 0 to 800. At the high end of this range fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

Fire conditions change daily, which is why the National Wildfire Coordinating Group created the National Fire Danger Rating System (NFDRS). Fire danger ratings describe conditions that reflect the potential, over a large area, for a fire to ignite, spread and require suppression action. There are five color coded levels that express the current risk level and potential fire extent. The rating system is provided in Table 15-1.<sup>5</sup> The Wildland Fire Assessment System (WFAS) provides spatial views of fire weather and fire potential, including fuel moistures and fire danger classes from the National Fire Danger Rating System, Keetch-Byram and Palmer drought indices, lower atmospheric stability and satellite-derived vegetation conditions.

The Grant County planning area can experience the full range of extent, from a low to extreme level of fire danger. Fire danger levels are anticipated to be higher during summer months and periods of extreme heat and drought. As shown in Figure 15-7, the Grant County planning area experienced a very high level of fire danger in June of 2024.

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<sup>5</sup> United States Forest Service. National Fire Danger Rating System.  
<https://www.fs.usda.gov/detail/cibola/landmanagement/resourcemanagement/?cid=stelprdb5368839>

## SECTION 15: WILDFIRE

Figure 15-7. Wildland Fire Assessment System (WFAS), June 2024<sup>6</sup>

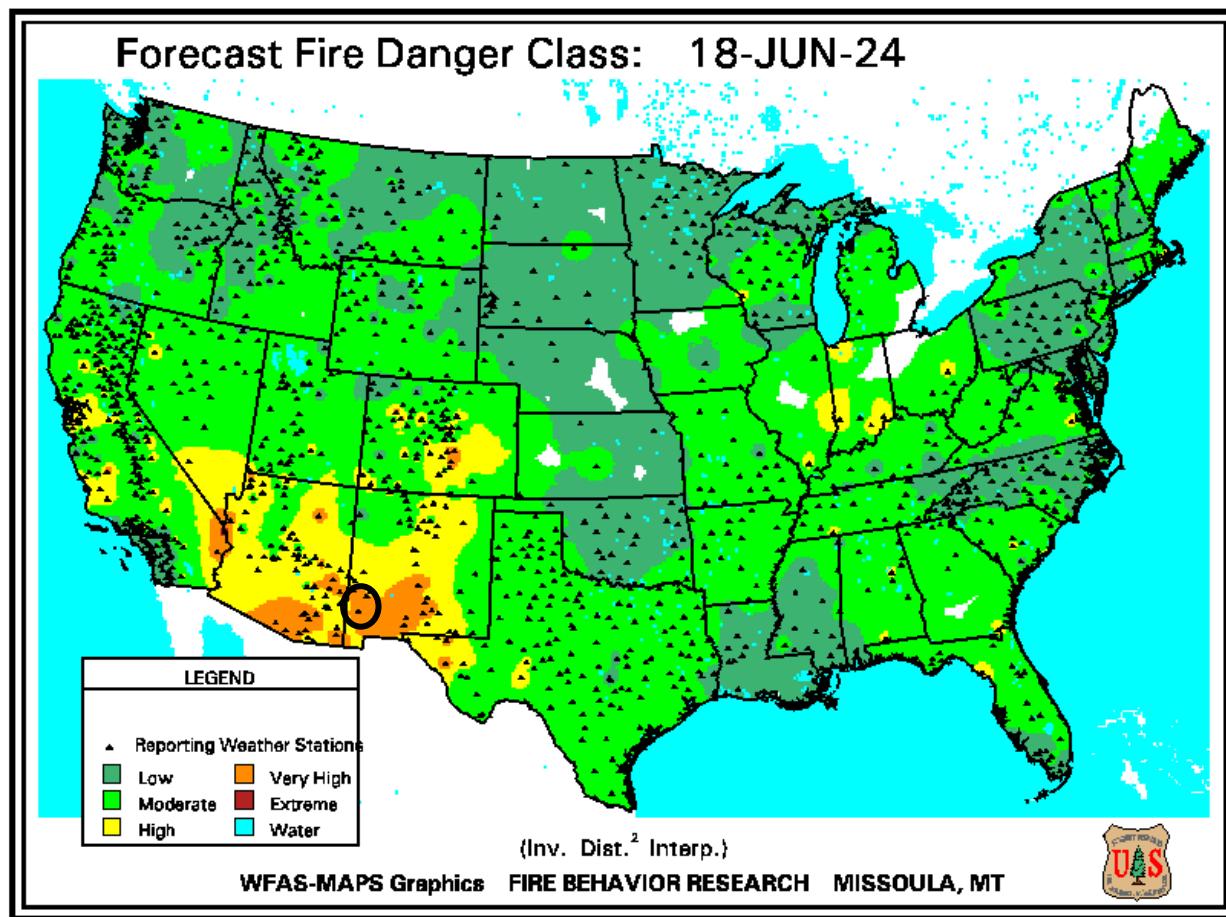


Table 15-1. National Fire Danger Rating System

RATING	DESCRIPTION	FULL EXTENT
Low (Green)	Fuels do not ignite easily	Fuels do not ignite easily from small embers, but a more intense heat source, such as lightning, may start fires in duff or dry rotten wood. Fires in open, dry grasslands may burn easily a few hours after a rain, but most wood fires will spread slowly, creeping or smoldering. Control of fires is generally easy.
Moderate (Light Green)	Fires can start easily and spread at a moderate rate	Fires can start from most accidental causes, but the number of fire starts is usually pretty low. If a fire does start in an open, dry grassland, it will burn and spread quickly on windy days. Most wood fires will spread slowly to moderately. Average fire intensity will be moderate except in heavy concentrations of fuel, which may burn hot. Fires are still not likely to become serious and are often easy to control.

<sup>6</sup> Wildland Fire Assessment System. <https://www.wfas.net/index.php/keetch-byram-index-moisture--drought-49>

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RATING	DESCRIPTION	FULL EXTENT
High (Yellow)	Fires can start easily and spread at a rapid rate	Fires can start easily from most causes and small fuels (such as grasses and needles) will ignite readily. Unattended campfires and brush fires are likely to escape. Fires will spread easily, with some areas of high intensity burning on slopes or concentrated fuels. Fires can become serious and difficult to control unless they are put out while they are still small.
Very High (Orange)	Fires start very easily and spread at a very fast rate	Fires will start easily from most causes. The fires will spread rapidly and have a quick increase in intensity, right after ignition. Small fires can quickly become large fires and exhibit extreme fire intensity, such as long-distance spotting and fire whirls. These fires can be difficult to control and will often become much larger and longer-lasting fires.
Extreme (Red)	Fire situation is intense and can result in significant property damage	Fires of all types start quickly and burn intensely. All fires are potentially serious and can spread very quickly with intense burning. Small fires become big fires much faster than at the "very high" level. Spot fires are probable, with long-distance spotting likely. These fires are very difficult to fight and may become very dangerous and often last for several days.

## HISTORICAL OCCURRENCES

The Historic Fires Database<sup>7</sup> reported 180 wildfire events for the Grant County planning area between January 1985 and June 2024. These events are reported on a county-wide basis, therefore events for the City of Bayard, Town of Hurley, Village of Santa Clara, and Town of Silver City are not reported separately. Many fire events may be unreported, but the Historic Fires Database provides the best available historical wildfire data. Tables 15-2 and 15-3 identify the number of wildfires and total acreage burned each year within the county boundaries. Figures 15-8 through 15-12 below show approximate locations of historic wildfires and statistical causes.

**Table 15-2. Historical Wildfire Events Summary, January 1985 – June 2024<sup>8</sup>**

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Grant County	180	1,468,945

<sup>7</sup> Historic Fires Database. <https://giscenterisu.edu/research/Techpg/HFD/index.htm>

<sup>8</sup> Source: Historic Fires Database, Idaho State University and NASA

## SECTION 15: WILDFIRE

**Table 15-3. Historical Wildfire Events and Acreage Burned by Year**

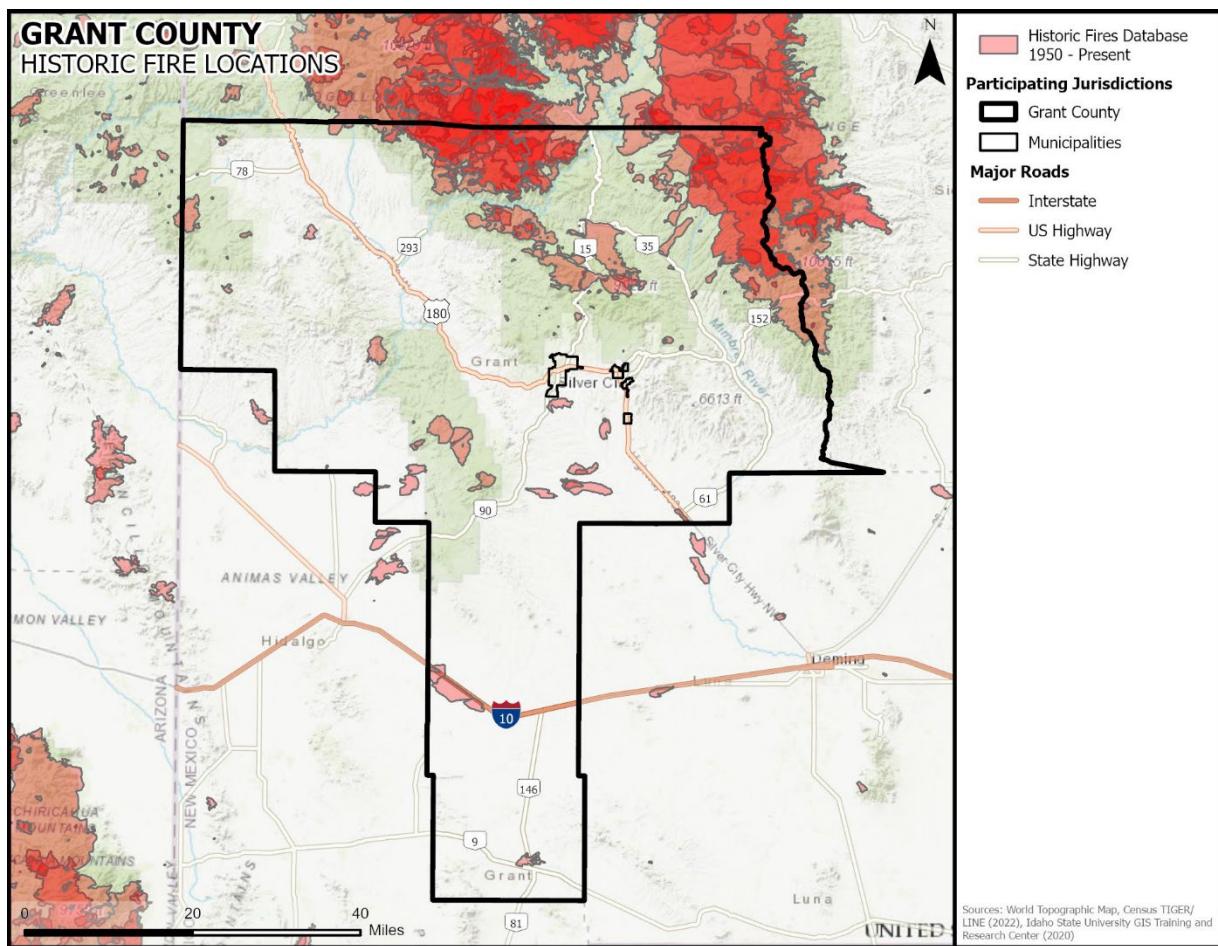
YEAR	NUMBER OF EVENTS	ACRES BURNED
1985	4	6,926
1986	1	1,579
1987	5	15,247
1989	6	23,018
1990	1	35
1991	1	504
1992	5	6,050
1993	4	39,526
1994	9	16,462
1995	5	47,105
1996	5	14,663
1997	5	5,321
1998	6	3,456
1999	2	446
2000	5	18,548
2001	5	2,307
2002	1	13
2003	13	126,283
2004	5	12,485
2005	2	549
2006	2	13,471
2007	6	10,765
2008	2	113
2009	14	21,492
2010	5	6,630
2011	11	88,387
2012	11	300,582

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YEAR	NUMBER OF EVENTS	ACRES BURNED
2013	1	138,515
2014	4	5,488
2015	1	4,013
2016	5	10,032
2017	2	29,187
2019	3	2,025
2021	9	104,760
2022	6	325,974
2023	8	66,988
<b>Total</b>	<b>180</b>	<b>1,468,945</b>

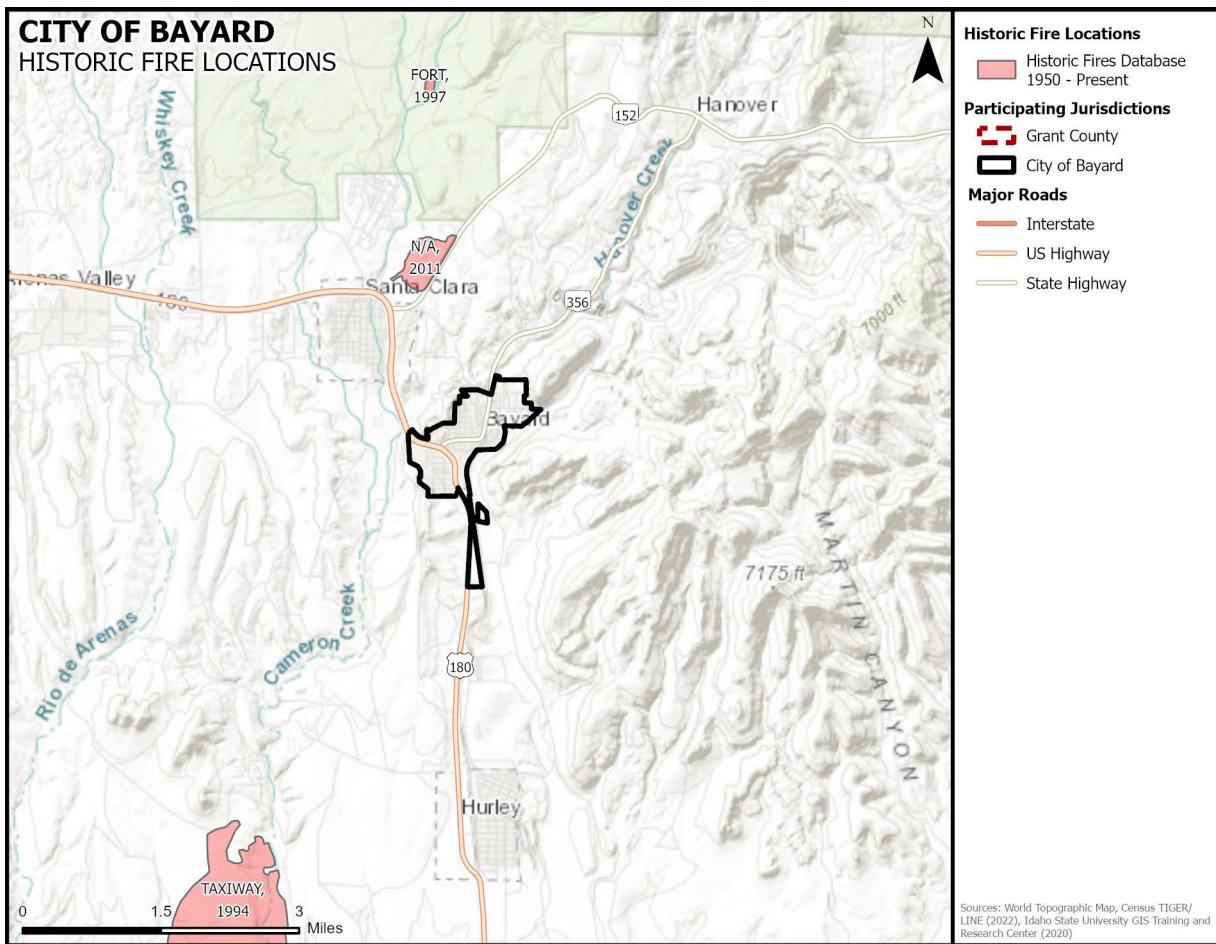
## SECTION 15: WILDFIRE

Figure 15-8. Location and Historic Wildfire Events in Grant County



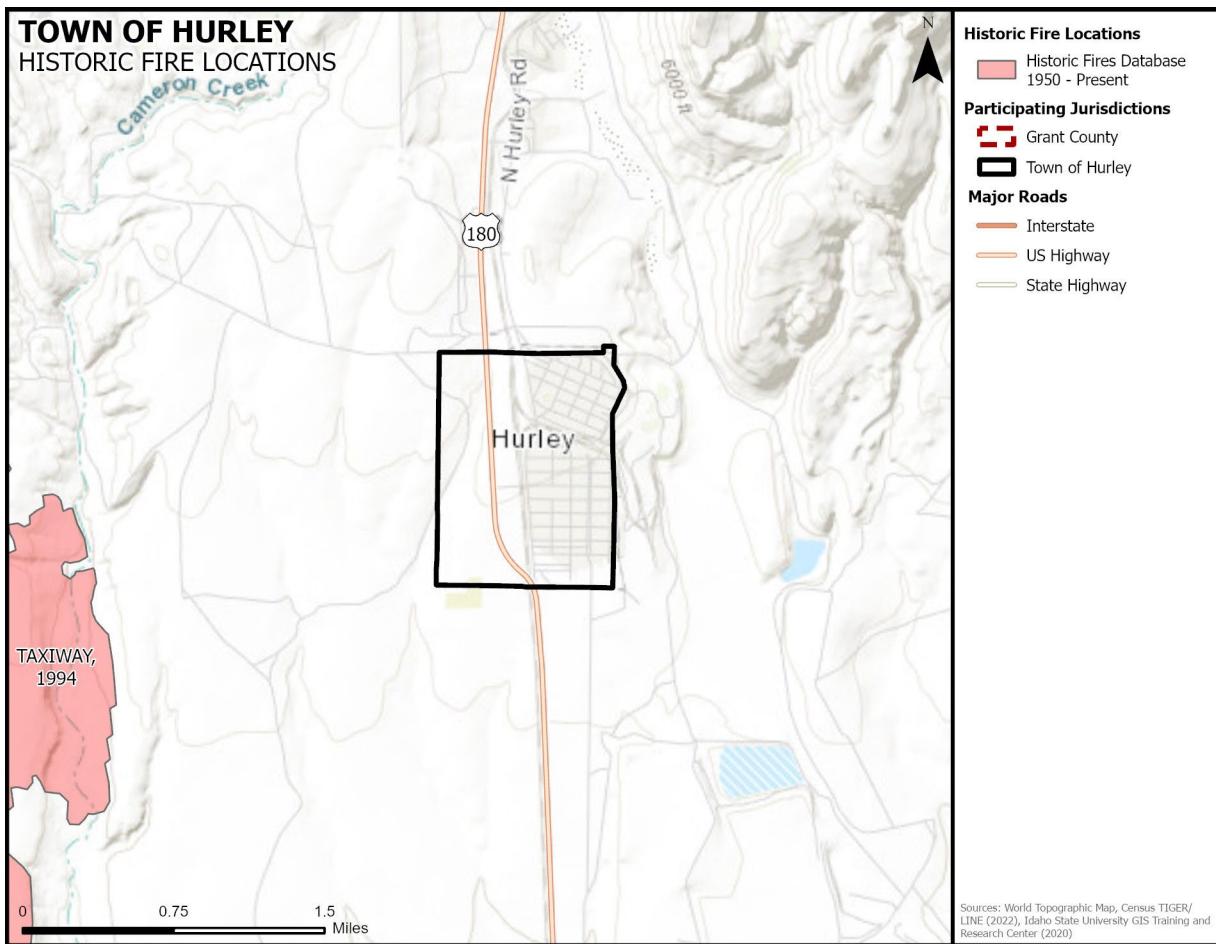
## SECTION 15: WILDFIRE

**Figure 15-9. Location and Historic Wildfire Events in the City of Bayard**



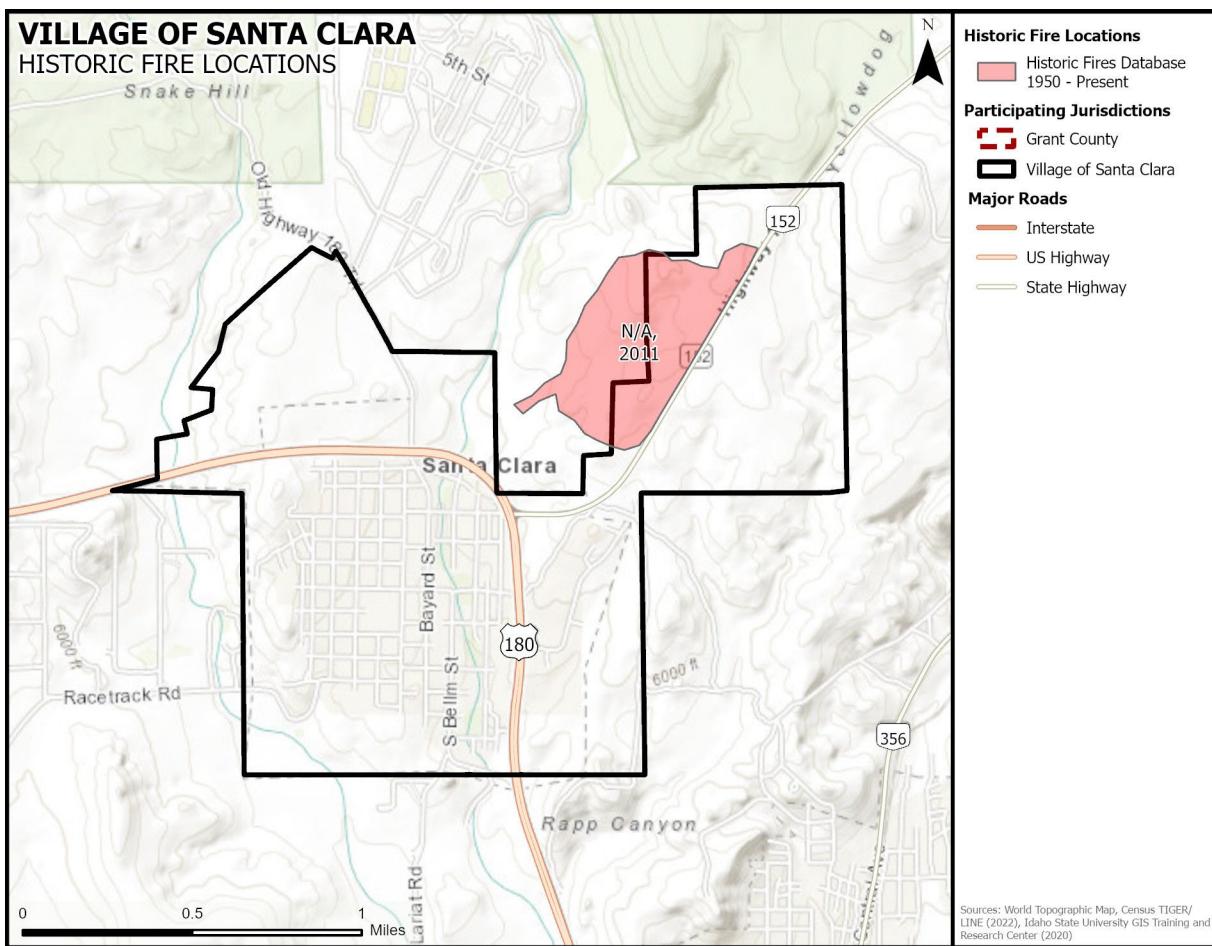
## SECTION 15: WILDFIRE

**Figure 15-10. Location and Historic Wildfire Events in the Town of Hurley**



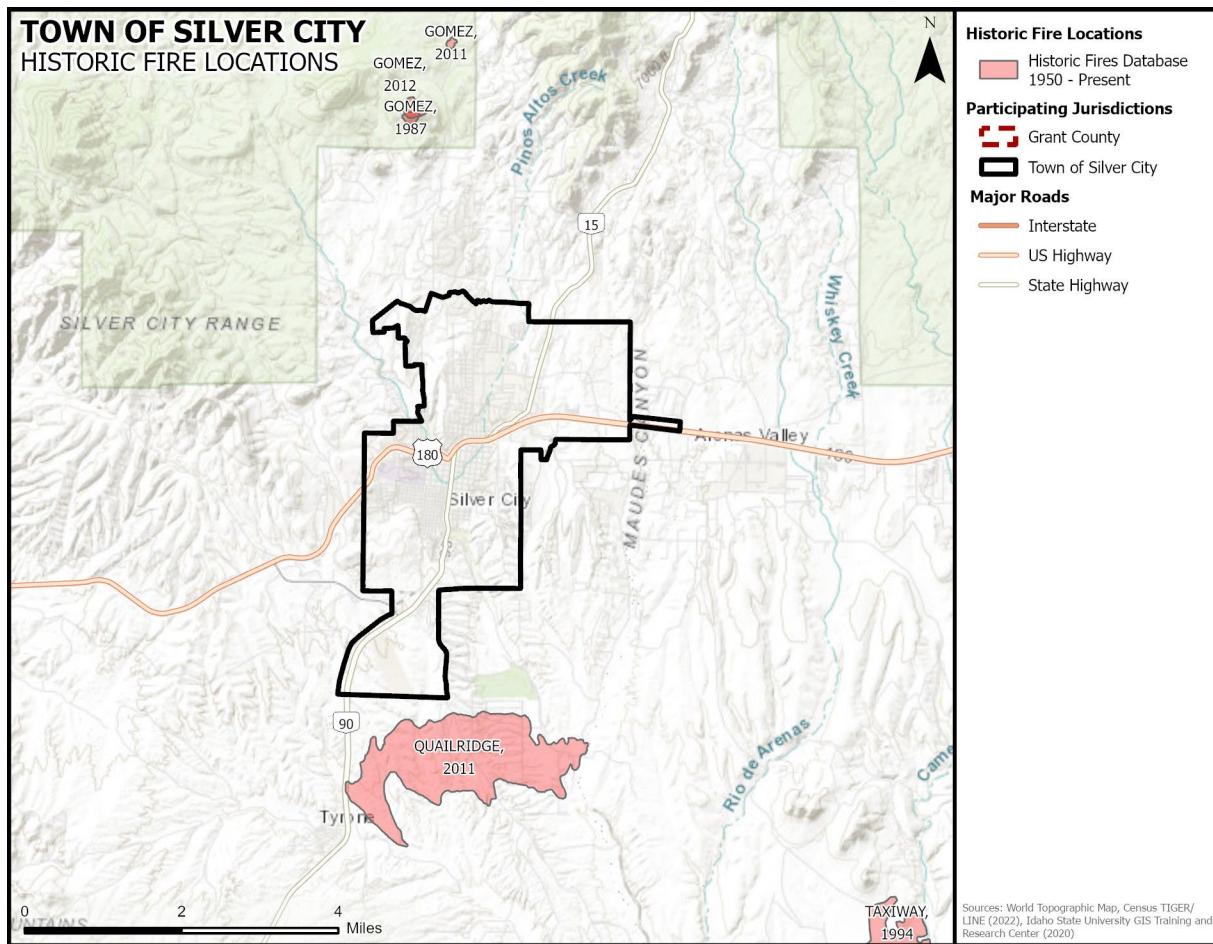
## SECTION 15: WILDFIRE

Figure 15-11. Location and Historic Wildfire Events in the Village of Santa Clara



## SECTION 15: WILDFIRE

Figure 15-12. Location and Historic Wildfire Events in the Town of Silver City



### SIGNIFICANT EVENTS

There have been 3 declared disasters related to wildfire in Grant County between 1953 and 2024 (Table 15-4). Additional details on certain wildfire events are described below.

Table 15-4. Federal Disaster Declarations for Wildfire, 1953-2024

YEAR	DECLARATION TITLE	DECLARATION TYPE	DISASTER NO.
2000	New Mexico Fire	EM	EM-3154-NM
2011	New Mexico Quail Ridge Fire	FM	FM-2866-NM
2012	New Mexico Whitewater-baldy Fire Complex	FM	FM-2978-NM

#### May 13, 2022 (Black Fire)

The summer of 2022 was the worst wildfire season in New Mexico, primarily due to extreme drought conditions, low snowpack, and high winds. The Black Fire event was human-caused and began on May 13, 2022, in the Gila National Forest in southwest New Mexico. This was an estimated 24 miles north of Mimbres in Grant County. Three days later, the fire tripled in size with

## SECTION 15: WILDFIRE

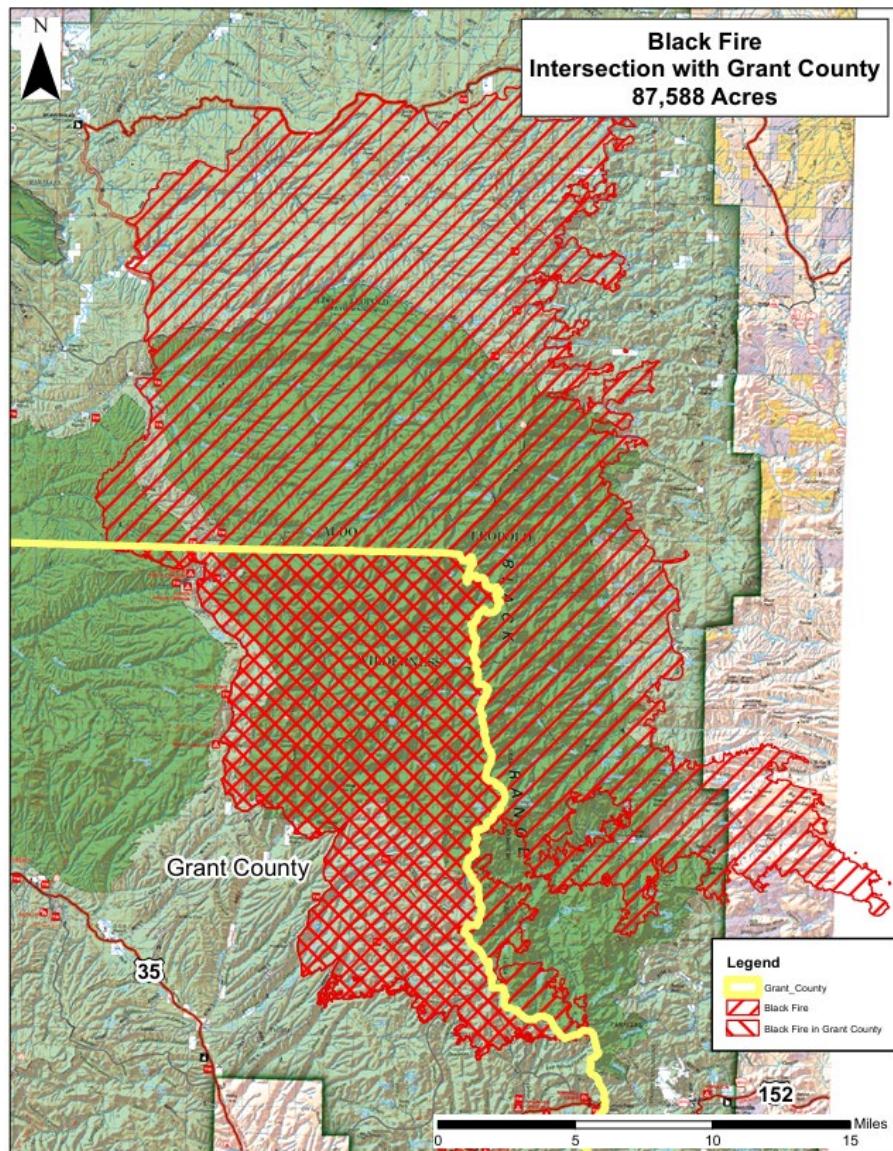
a notable increase in fire intensity and rate of spread. By May 21, 2022, the Black Fire became the second-largest fire to burn in State of New Mexico history.

The Black Fire had widespread impacts on the region and the Grant County planning area, in which the County issued resolution No. R-22-33 declaring a state of emergency for the area. According to the Post-Fire Burned Area Emergency Response (BAER) Assessment Report, post-fire landscape and watershed conditions such as loss of vegetation, decreased soil absorbency, and increased hydrophobicity (water repellency) in soils created an increased risk of stormwater runoff and debris-flows. More than 163 miles of roads were impacted, including 4 major state highways. Recreational areas such as camp sites were in the burned area, including 267 miles of trails, which now have an increased post-fire flood risk. Several rare and endangered species were harmed during the fire in parts of the Gila National Forest area.

The Historic Fires Database reports a total of 325,136 acres burned during the Black Fire. Figure 15-13 below shows where the Black Fire crossed over into the Grant County planning area.

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Figure 15-13. Black Fire Intersection with Grant County, NM



### PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As Grant County communities move into wildland, the potential area of occurrence of wildfire increases. There have been 180 events in a 39.5-year period, however some events may have gone unreported. Wildfire events within the Grant County planning area, including all participating jurisdictions, are considered "Highly Likely", meaning an event is probable within the next year. According to NOAA, research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons, indicating an increase in the frequency and severity of events in the planning area going forward.

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### CLIMATE CHANGE CONSIDERATIONS

According to the Fifth National Climate Assessment, in the Southwest, fires have become larger, more frequent, and, in many areas, more severe, with clear evidence of climate change as a major cause.

Wildfires require the alignment of a number of factors, including temperature, humidity, and the lack of moisture in fuels, such as trees, shrubs, grasses, and forest debris. All these factors have strong direct or indirect ties to climate variability and climate change. Research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons. Increases in temperatures and the thirst of the atmosphere due to human-caused climate change have increased aridity of forest fuels during the fire season.<sup>9</sup>

The U.S. Climate Explorer indicates that wildfire risk for Grant County may increase due to increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in average extreme heat temperatures. Historically, extreme temperatures averaged 95°F in Grant County, but between 2035 and 2064 the average will be 101°F. With the full range of projections average temperatures could increase up to 20°F higher but the severity is dependent on overall future emissions.

Extreme heat and extended periods of drought contribute to wildfire risk in the planning area. Extreme temperatures and periods of drought destroy vegetation in the area, contributing to available fuels that spread wildfires. Additional climate change impacts from drought and extreme heat are discussed in Sections 6 and 8 of this Plan. The projected increases in favorable wildfire conditions, including drought and extreme heat, indicate an increase in favorable wildfire conditions. Additional information and studies are needed to determine the degree and rate of any increased wildfire risk.

As wildfire risk is expected to increase with climate change, additional risks and cascading impacts will be worsened. For example, with an increase in the severity and number of wildfire events, an increase in the frequency and intensity of flash flooding and debris flow can also be expected. Wildfires destroy vegetation and burn the ground, meaning the soil is no longer able to absorb rainwater. It can take years for vegetation to be restored, increasing long term flood risk.

### VULNERABILITY AND IMPACT

Periods of drought, dry conditions, high temperatures, and low humidity are factors that contribute to the occurrence of a wildfire event. Less developed areas, such as along interstates or in more remote areas where fuels are more prevalent have an increased risk of being affected by wildfire.

The more heavily populated areas of the planning area are not highly likely to experience large, sweeping fires. Unoccupied buildings and open spaces that have not been maintained have the greatest vulnerability to wildfire. The overall level of concern for wildfires is located across the county where wildland and urban areas interface. Wildfires can devastate infrastructure by damaging roads, bridges, power lines, and communication networks, hindering emergency response efforts and disrupting daily life for impacted communities. People face immediate threats to their health and safety from flames, smoke inhalation, and evacuation challenges, leading to potential injuries and fatalities.

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<sup>9</sup> NOAA Wildfire Climate Connection, August 2022: wildfire-climate-connection.

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While all citizens are vulnerable to the impacts of wildfire, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 21 percent of the planning area population live below the poverty level (Table 15-5). While evacuation times for these types of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

**Table 15-5. Populations at Greater Risk by Jurisdiction<sup>10</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

The Grant County Planning Team identified the following critical facilities (Table 15-6) as assets that are considered the most important to the planning area and are located in the WUI, the area of greater risk. For a detailed list of identified critical facilities see Appendix C.

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<sup>10</sup> US Census Bureau 2022 data for Grant County.

## SECTION 15: WILDFIRE

**Table 15-6. Critical Facilities/Critical Services Vulnerable to Wildfire Events**

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	Grant County: 13 Fire Stations, 1 Police Station City of Bayard: 1 Fire Station, 1 Police Station Town of Hurley: 1 Fire Station Town of Silver City: 1 EMS, 3 Fire Stations, 2 Health Services Village of Santa Clara: 1 Fire Station, 1 Police Station	<ul style="list-style-type: none"> <li>Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty.</li> <li>First responders are at greater risk of injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area.</li> <li>Critical city departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted.</li> <li>Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility, slowing or preventing access for emergency response vehicles.</li> <li>Fire suppression costs can be substantial, exhausting the financial resources of the community.</li> <li>First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat.</li> <li>Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.</li> <li>Power outages could disrupt communications, delaying emergency response times.</li> <li>Structures can be damaged or destroyed in the path of the wildfire.</li> <li>Power outages could disrupt critical care.</li> <li>Backup power sources could be damaged or destroyed.</li> <li>Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.</li> </ul>
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	Grant County: 3 Municipal, 6 Transportation Facilities, 2 Schools City of Bayard: 1 Community Facility, 1 Municipal, 4 Schools	<ul style="list-style-type: none"> <li>Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.</li> <li>Additional emergency responders and critical aid workers may not be able to reach the area for days.</li> <li>Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.</li> </ul>

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CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
	<p>Town of Hurley: 2 Municipal, 1 School, 1 Community Facility</p> <p>Town of Silver City: 2 Community Facilities, 2 Municipal, 2 Residential (Vulnerable Populations), 11 Schools</p> <p>Village of Santa Clara: 1 Municipal, 1 School</p>	
Commercial Supplier (food, fuel, etc.)	N/A	<ul style="list-style-type: none"> <li>Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.</li> <li>Essential supplies like medicines, water, food, and equipment deliveries may be delayed.</li> <li>Economic disruption due to power outages and fires negatively impact services as well as area businesses reliant on commercial suppliers.</li> </ul>
Utility Services and Infrastructure (electric, water, wastewater, communications)	<p>Grant County: 1 Communication Facility</p> <p>City of Bayard: 1 Communication, 1 Sewage and Water</p> <p>Town of Silver City: 1 Communication, 4 Energy Utility, 4 Sewage and Water</p>	<ul style="list-style-type: none"> <li>Wastewater and drinking water facilities and infrastructure may be damaged or destroyed resulting in service disruption or outage for multiple days or weeks.</li> <li>Disruptions and outages impact public welfare as safe drinking water is critical.</li> <li>A break in essential and effective wastewater collection and treatment is a health concern, potentially spreading disease.</li> <li>Exposure to untreated wastewater is harmful to people and the environment.</li> <li>Any service disruptions can negatively impact or delay emergency management operations.</li> </ul>

Within the Grant County planning area, a total of 180 fire events were reported from January 1985 through June 2024. All events were suspected wildfires. Historic loss and annualized estimates of acres burned due to wildfires are presented in Table 15-7 below. The average frequency is approximately four to five events every year.

## SECTION 15: WILDFIRE

**Table 15-7. Average Annualized Acreage Losses<sup>11</sup>**

JURISDICTION	TOTAL ACRES BURNED	AVERAGE ANNUAL ACRE LOSSES
Grant County	1,468,945	37,188

Diminished air quality is an environmental impact that can result from a wildfire event and pose a potential health risk. The smoke plumes from wildfires can contain potentially inhalable carcinogenic matter. Fine particles of invisible soot and ash that are too small for the respiratory system to filter can cause immediate and possibly long-term health effects. The elderly or those individuals with compromised respiratory systems may be more vulnerable to the effects of diminished air quality after a wildfire event.

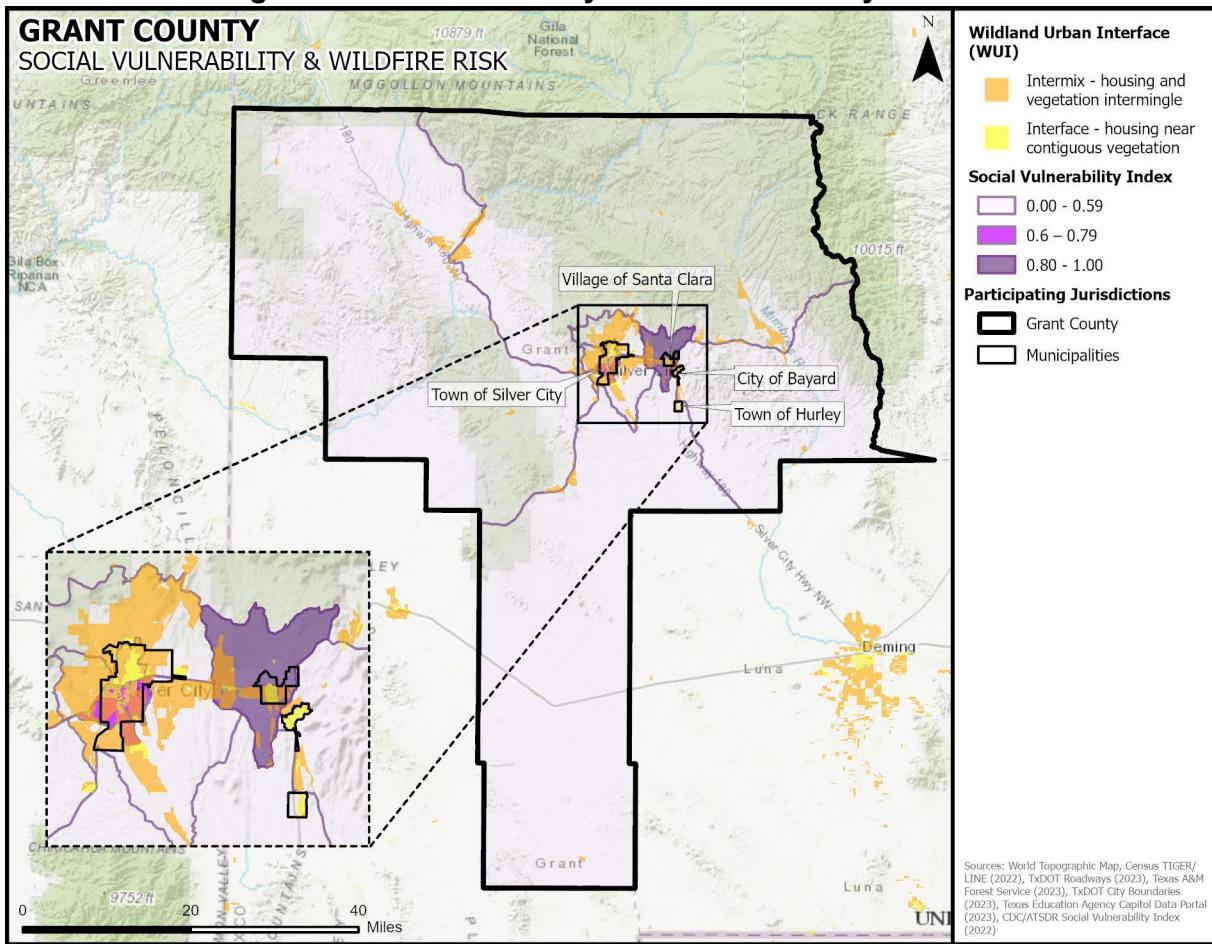
The Center for Disease Control (CDC) created a Social Vulnerability Index (SVI) which includes a database and mapping application that identifies and quantifies communities experiencing social vulnerability. The current CDC SVI uses 16 U.S. census variables from the 5-year American Community Survey (ACS) to identify communities that may need support before, during, or after disasters. All 16 variables fall under four broad categories including socioeconomic status (population in poverty, unemployment, etc.), household characteristics (age, disability status, etc.), racial and ethnic minority status, and housing type and transportation (mobile homes, no vehicles, etc.). Populations experiencing social vulnerability may be adversely impacted by natural hazards, disasters, and other community-level stressors. Figure 15-14 identifies areas of social vulnerability using the CDC's SVI and where these areas overlap with the Grant County WUI areas, where wildfire risk is considered the highest.

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<sup>11</sup> Events divided by 17 years of data.

## SECTION 15: WILDFIRE

Figure 15-14. Grant County Social Vulnerability and WUI



Climatic conditions such as severe freezes and drought can significantly increase the intensity of wildfires since these conditions kill vegetation, creating a prime fuel source for wildfires. The intensity and rate at which wildfires spread are directly related to wind speed, temperature, and relative humidity.

Wildfires can cause further cascading impacts such as flooding and debris flow. The loss of vegetation reduces the ability of the ground to absorb water, increasing runoff during rainstorms and increasing the risk of flash flooding. Without the stabilizing effect of live vegetation, slopes are more prone to erosion, leading to debris flows where mud, ash, and debris rush downhill, posing additional risk to communities. Burn scar areas are known to have increased flood risk in the Grant County planning area, prolonging the recovery process and increasing the overall damage caused by wildfires.

The severity of impact from a major wildfire event in the Grant County planning area, including all participating jurisdictions, may be considered “Substantial” depending on the size and location of the event. Such events can cause multiple deaths, shut down critical facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. Severity of impact is gauged by acreage burned, homes and structures lost, and the number of resulting injuries and fatalities.

## SECTION 15: WILDFIRE

### ASSESSMENT OF IMPACTS

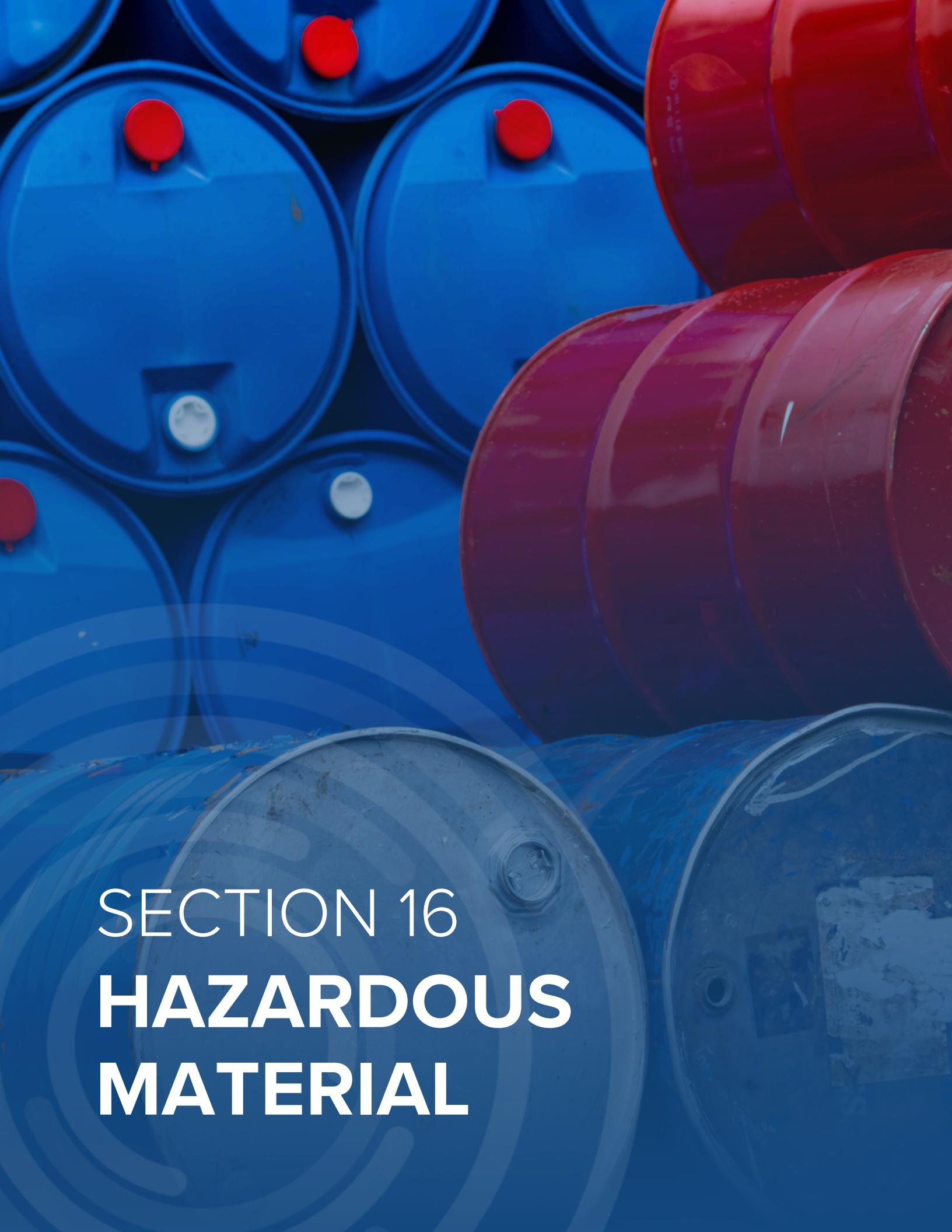
A wildfire event poses a potentially significant risk to public health and safety, particularly if the wildfire is initially unnoticed and spreads quickly. The impacts associated with a wildfire are not limited to direct damage. Significant wildfire events can be frequently associated with a variety of impacts, including:

- The Grant County planning area contains numerous open space areas. Wildfire may adversely affect or destroy endangered species habitat, reduce air quality, increase erosion and risk of flash flooding, contribute to increased local temperatures, and disrupt other ecological functions.
- Recreation activities throughout county and city parks may be unavailable and tourism can be unappealing for years following a large wildfire event, devastating directly related local businesses and negatively impacting economic recovery.
- Persons, pets, and wildlife in the area at the time of the fire are at risk for injury or death from burns and/or smoke inhalation. First responders are at greater risk of physical injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area.
- First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat.
- Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty.
- Critical county departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted.
- Non-critical businesses may be directly damaged, suffer loss of utility services, or be otherwise inaccessible, delaying normal operations and slowing the recovery process.
- Displaced residents may not be able to immediately return to work, slowing economic recovery.
- Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility.
- Older homes are generally exempt from modern building code requirements, which may require fire suppression equipment in the structure. An estimated 56 percent (approximately 8,202 structures) of homes in the planning area were built before 1980.
- Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. There are 47 historical sites listed on the National Register of Historic Places for Grant County and 71 listed on the New Mexico State Register of Cultural Properties.
- Some high-density neighborhoods feature small lots with structures close together, increasing the potential for fire to spread rapidly.
- Air pollution from smoke may exacerbate respiratory problems of vulnerable residents.
- Charred ground after a wildfire cannot easily absorb rainwater, increasing the risk of flooding and potential mudflows, especially during periods of heavy rains, or during monsoon season.
- Wildlife may be displaced or destroyed.
- Historical or cultural resources may be damaged or destroyed.
- Tourism can be significantly disrupted, further delaying economic recovery for the area.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.

## SECTION 15: WILDFIRE

- Fire suppression costs can be substantial, exhausting the financial resources of the community.
- Water supply may be limited for some communities, impacting the ability to extinguish the fire.
- Residential structures lost in a wildfire may not be rebuilt for years, reducing the tax base for the community.
- Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground delivery lines, and soil erosion or debris deposits into waterways after the fire.

The economic and financial impacts of a wildfire event on local government will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a wildfire event.

The background of the image is a stack of industrial drums. Most of the drums are a vibrant blue color, while a few are a deep red. They are stacked in a somewhat haphazard manner, with some drums in the foreground partially obscuring others. The drums have various caps and labels, suggesting they contain hazardous materials. The lighting is dramatic, with strong highlights and shadows on the metallic surfaces.

# SECTION 16 HAZARDOUS MATERIAL

## SECTION 16: HAZARDOUS MATERIALS

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### HAZARD DESCRIPTION



Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.

Chemicals are found everywhere. They purify drinking water, increase crop production, and simplify household chores. But chemicals also can be

hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. You and your community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play.

The U.S. Occupational Safety and Health Administration (OSHA) defines hazardous materials as being any substance or chemical which is a "physical or health hazard." This includes chemicals which are carcinogens; toxic agents; irritants; corrosives; sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics.

In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops.

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) which contains information on toxic chemical releases and other waste management activities that are reported annually by certain covered industry groups federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to the EPA and their state or tribal entity. A facility must report if it meets the following three criteria:

## SECTION 16: HAZARDOUS MATERIALS

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; Resource Conservation and Recovery Act (RCRA) Subtitle C Treatment, Storage and Disposal (TSD) facilities; and solvent recovery services.
- Have ten or more full-time employee equivalents.
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, Bio-accumulative and Toxic (PBT) chemicals are subject to different thresholds of ten pounds, 100 pounds or 0.1 grams depending on the chemical.

Submission of a Tier II form is required under Section 312 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Under EPCRA, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in New Mexico share this information by reporting hazardous chemical inventories with the State Emergency Response Commission (SERC) and Local Emergency Planning Committees (LEPC). This communication between facilities and the SERC and LEPC includes designating a facility representative, providing notice of any facility changes that may be relevant to emergency planning, and providing necessary information for developing or implementing local emergency plans. The New Mexico Tier II Report contains facility identification information and detailed chemical data about hazardous chemicals stored at the facility.

A facility must report if it meets the following criteria:

- Any company using chemicals that could present a physical or health hazard must report them if the quantities of those chemicals exceed Tier II threshold limits.
- If an industry has an Occupational Safety and Health Administration (OSHA) deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, then the chemical must be reported. These chemicals may be on the list of 355 Extremely Hazardous Substances (EHS) or could be one of the 650,000 reportable hazardous substances (not on the EHS list). This reporting format is for a "snapshot in time." EHS chemicals must be reported if the quantity is greater than 500 pounds or the Threshold Planning Quantity (TPQ) amount, if the TPQ is less than 500 pounds. Chemicals not considered to be EHS must be reported if their quantity is 10,000 pounds or greater.<sup>1</sup>

## LOCATION

A hazardous material spill occurring along major highways near populated areas in the Grant County planning area is of concern. Trucks can carry a variety of materials that would, in large quantity, threaten the health and safety of people and the natural environment in the vicinity of a spill.

The U.S. Department of Transportation's National Hazardous Materials Route Registry (NHMRR) lists, as reported by States and Tribal governments, all designated and restricted roads and preferred highway routes for transportation of highway route-controlled quantities of Class 7 radioactive materials and non-radioactive hazardous materials. According to the NHMRR, no

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<sup>1</sup> Source: <https://www.nmdhsem.org/preparedness-bureau/hazmat-program/epcra/>

## SECTION 16: HAZARDOUS MATERIALS

routes for the transportation of these hazardous materials are located in or near the Grant County planning area<sup>2</sup>

The Grant County planning area contains rail lines, some of which are known to transport hazardous materials. This network of rail lines enters Grant County from the southeast, extending northwest into the County and branching off into multiple different railroads. These railroads follow paths into the community of Tyrone, as well as the participating jurisdictions of Town of Silver City, Town of Hurley, and City of Bayard. Each of these participating jurisdictions face additional risk of hazardous material spills, as a train-related spill along these railroads may occur in their more densely populated areas. Hazardous materials transported by rail through the City of Bayard enter close proximity to commercial and residential areas as well as an elementary school, meaning an incident along this route could cause significant portions of the city to be shut down or evacuated.

Another rail line parallels I-10 in the southern portion of the planning area, however this is part of the Amtrak South Route and is primarily used for passenger service. While train derailments and fuel spills could still create hazardous material incidents, especially since this rail line parallels a major highway, significant risk associated with the transport of hazardous materials by train is not anticipated for this railroad<sup>3</sup>.

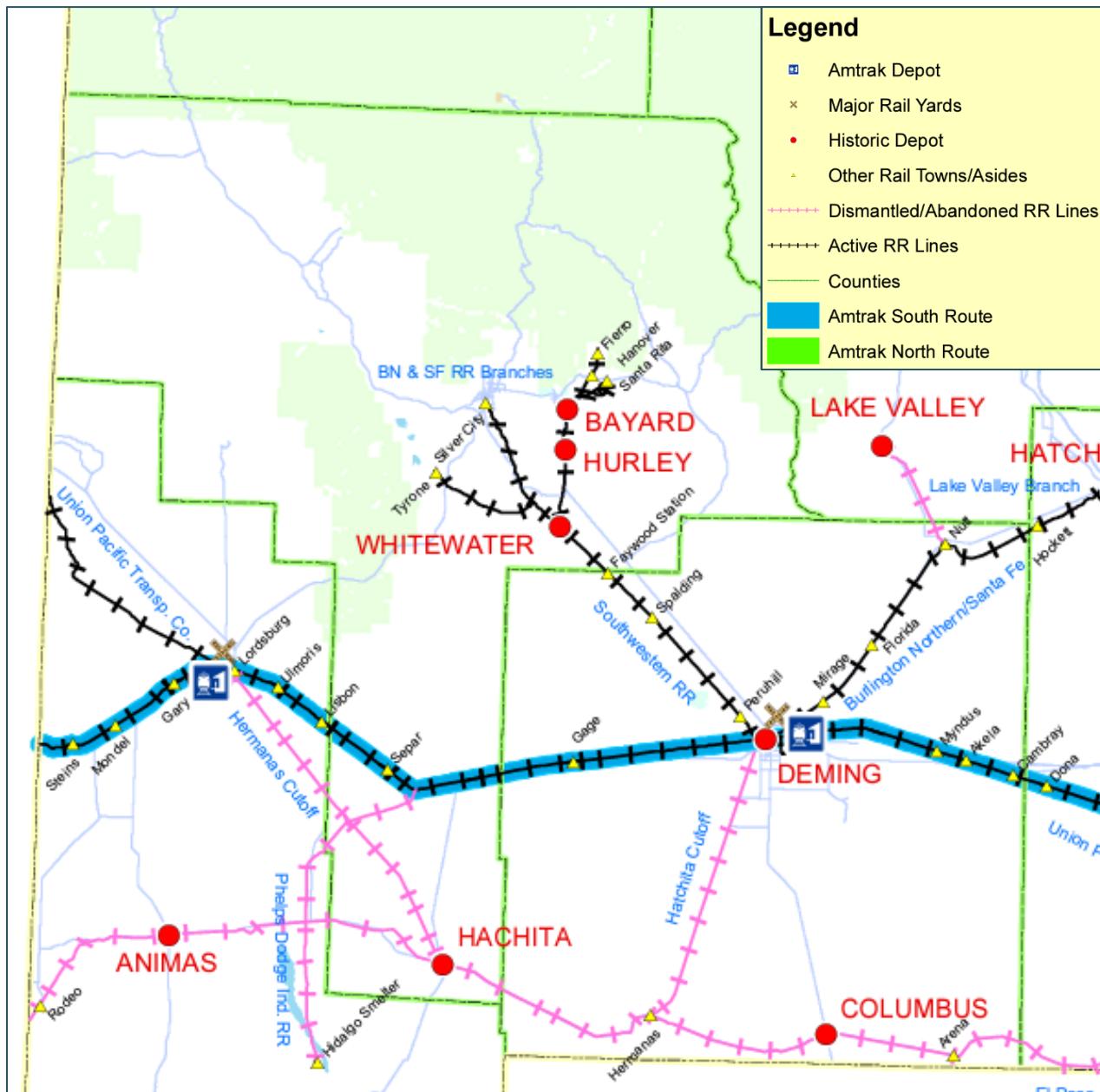
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<sup>2</sup> Source: <https://www.fmcsa.dot.gov/regulations/hazardous-materials/national-hazardous-materials-route-registry-state>

<sup>3</sup> This rail line and I-10 are major east-west transportation routes transporting an unknown amount of hazardous materials daily.

## SECTION 16: HAZARDOUS MATERIALS

Figure 16-1. Railroads in the Grant County Planning Area



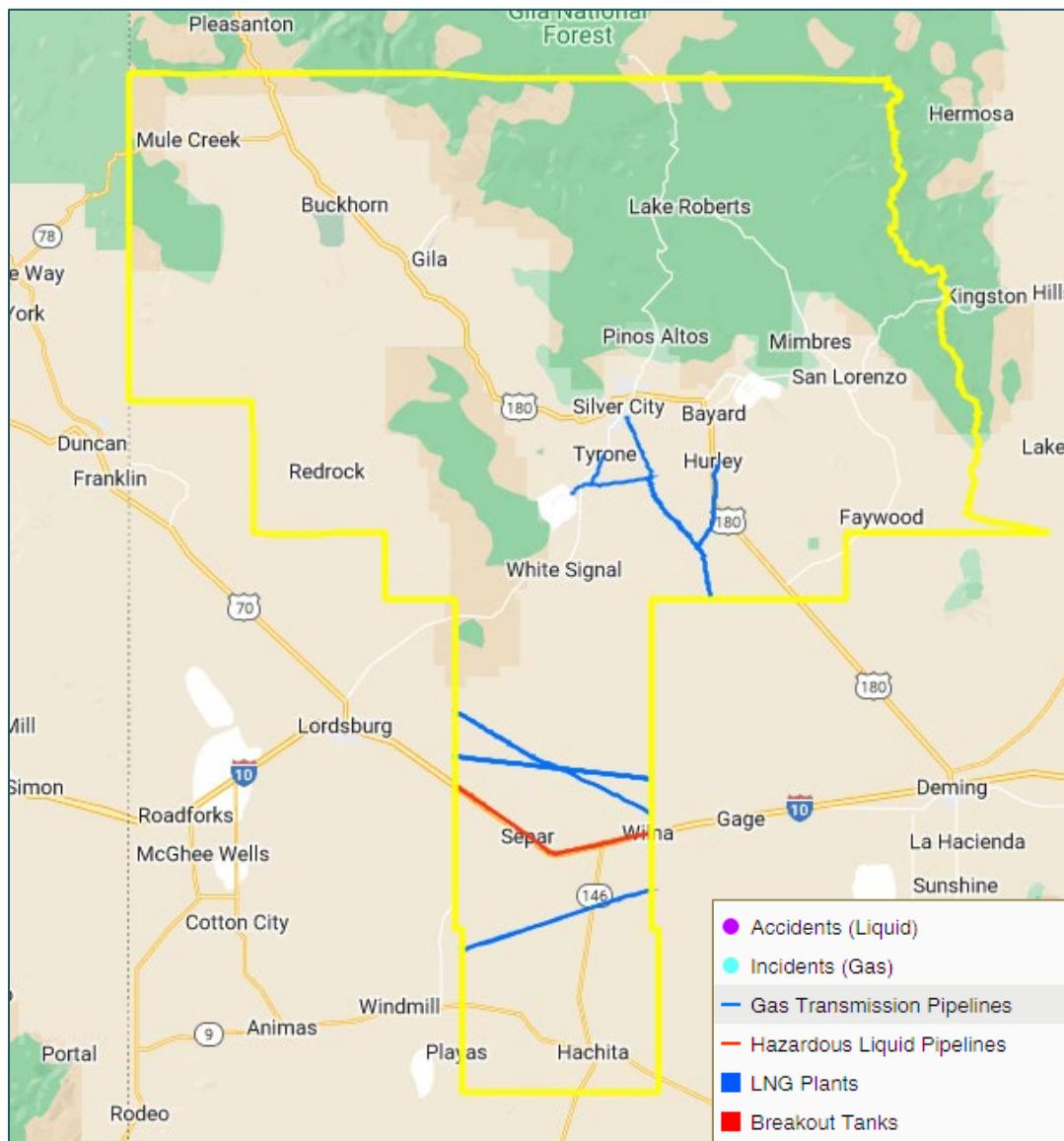
Major highways and the surrounding areas are also at risk of a hazardous materials incident. In the Grant County planning area, the primary highway of concern is State Highway 180, which runs generally northwest to southeast through the planning area and passes through all of the participating jurisdictions, those being Town of Silver City, Village of Santa Clara, City of Bayard, Town of Hurley. In particular, the Town of Hurley faces elevated risk due to State Highway 180, as traffic is required to make a 90-degree turn within the Town to proceed over a bridge to offload their contents. These conditions create a higher risk of an accident involving trucks transporting hazardous materials within the Town of Hurley.

Pipelines transporting hazardous materials or gas are another type of site which could lead to potential hazardous material events. According to the National Pipeline Mapping System (NPMS),

## SECTION 16: HAZARDOUS MATERIALS

There is a network of gas transmission pipelines in the central portion of the county, extending up into the Town of Silver City and Town of Hurley. There are additional gas transmission lines in the southern portion of Grant County, as well as a hazardous liquid pipeline in that area along I-10. The impacts of a spill associated with this hazardous materials pipeline could be exacerbated due to its close proximity to a major highway. Figure 16-2 shows these pipelines mapped in the NPMS public viewer tool.

**Figure 16-2. Gas and Hazardous Liquid Pipeline Locations<sup>4</sup>**



Under the Community Right-to-Know program laws upheld at the state and federal level, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in New Mexico share this information by filing annual hazardous chemical inventories with the state, with Local Emergency

<sup>4</sup> Source: <https://pvnpms.phmsa.dot.gov/PublicViewer/>

## SECTION 16: HAZARDOUS MATERIALS

Planning Committees (LEPCs), and with local fire departments. LEPC's develop hazardous materials emergency plans to use in responding to and recovering from hazardous substance incidents; these plans are then reviewed and approved by the State Emergency Response Commission (SERC).<sup>5</sup>

Figure 16-3 shows the locations of available georeferenced TRI toxic sites in and around the Grant County planning area. Only toxic sites that have georeferenced data available were analyzed; 500-meter and 2500-meter circle buffers are also drawn around each hazardous material site.

There are three TRI toxic sites in the Grant County planning area in total, with all three sites reporting previous toxic releases between 1987 and 2023 according to the EPA's database. One of these sites, US Forest Service Silver City Airtanker Base, only reported one previous chemical release, a relatively small amount of ammonia (250 lbs.) in 1994. The other two sites, both part of the two major open pit copper mines in Grant County, reported multiple significant releases every year in the reporting period. Between the two sites, at least a million pounds of metal compounds such as copper, lead, or manganese are released yearly in Grant County. Another significant hazardous material that has been released in large amounts yearly is sulfuric acid; releases of sulfuric acid have ranged from approximately 3,000 lbs. to over 20,000 lbs. over the past decade.

In 2023, the most recent reporting year available, two of three TRI toxic sites in Grant County reported toxic releases or waste. Over a million pounds of lead and lead compounds were reported to be released in the planning area during 2023. Per the EPA's TRI Toxics Tracker, when accounting for both the amount released and level of hazard presented by each material, the highest risk toxic release in 2023 was Arsenic and arsenic compounds (61,000 lbs.), followed by lead and lead compounds, and chromium and chromium compounds (85,000 lbs.).

Table 16-1 lists the names, locations, and top hazardous chemicals associated of available TRI toxic sites in and around the Grant County planning area that reported toxic releases for 2023.

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<sup>5</sup> Source: <https://www.nmdhsem.org/preparedness-bureau/hazmat-program/epcra/>

## SECTION 16: HAZARDOUS MATERIALS

Figure 16-3. EPA Toxic Release Inventory (TRI) Facility Locations

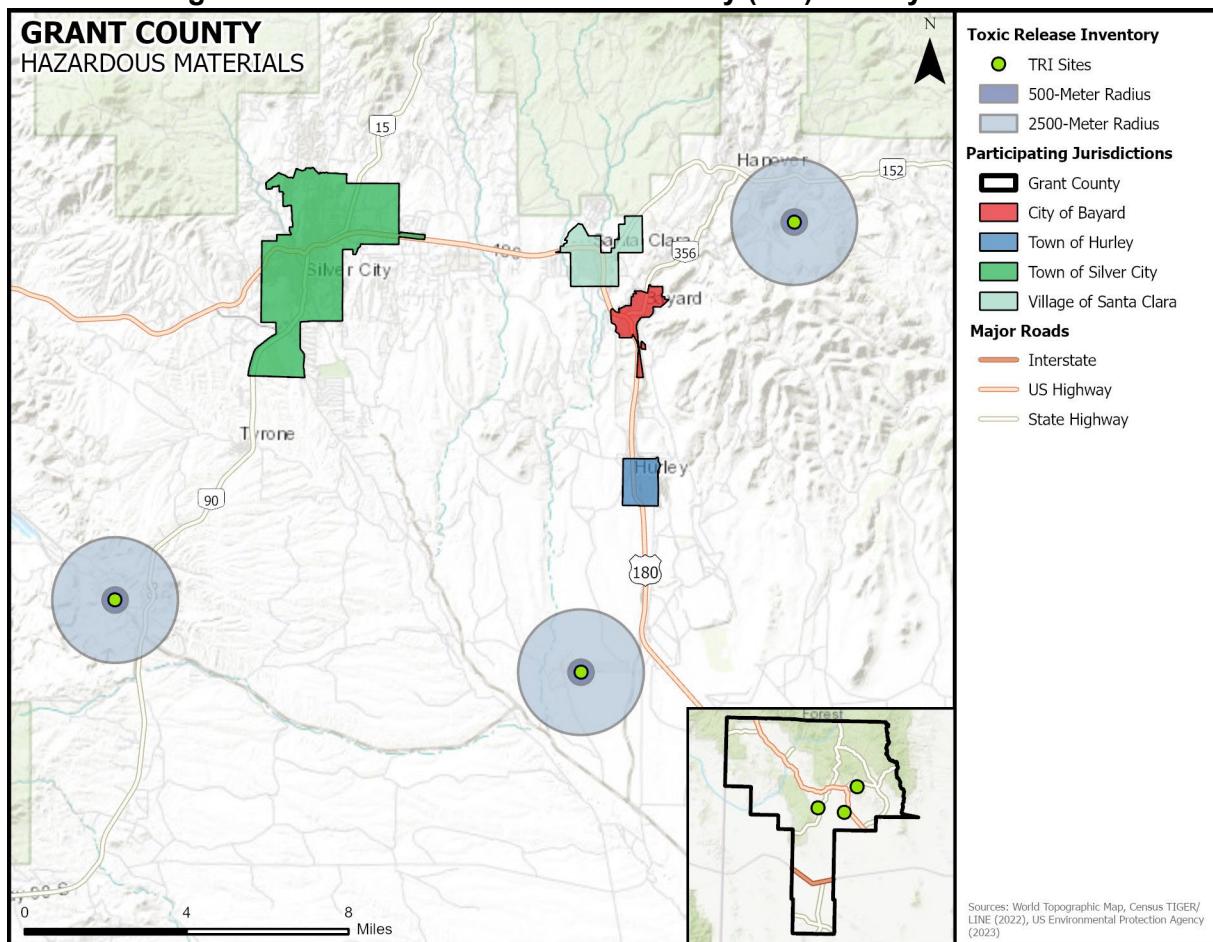


Table 16-1. EPA 2023 Toxic Release Inventory (TRI) for Grant County<sup>6</sup>

TRI FACILITY NAME	LOCATION	ASSOCIATED CHEMICALS
Chino Mines Co. Mine Concentrator-SXEW Plants	Several miles northeast of City of Bayard	Lead and Lead Compounds, Chromium, Arsenic, Cobalt and Cobalt Compounds, Nickel, Manganese, Nitrate Compounds, Copper and Copper Compounds, Sulfuric Acid
Freeport-McMoRan Tyrone Inc.	10 miles south of Town of Silver City, along NM-90	Lead and Lead Compounds, Sulfuric Acid, Copper and Copper Compounds, Nitrate Compounds

Another hazardous material concern to note is the presence of per- and polyfluoroalkyl substances (PFAs). PFAs are a group of chemicals used to make fluoropolymer coatings and

<sup>6</sup> Only TRI sites with reported chemical releases for 2023 are listed. Source: <https://www.epa.gov/toxics-release-inventory-tri-program>

## SECTION 16: HAZARDOUS MATERIALS

products that resist heat, oil, stains, grease, and water. These chemicals may be present in fire-fighting foams, non-stick cooking surfaces, electrical wire insulation, adhesives, furniture, and other products. PFAs are a concern because they do not break down in the environment, can amass in fish and wildlife, and can move through soils and contaminate drinking water sources. Human health can be impacted by exposure to PFAs in a number of ways, including developmental effects, increased risk of some cancers, negative impacts on the body's immune system, and interference with the body's natural hormones.<sup>7</sup>

### EXTENT

The extent of a hazardous material release will depend on whether it is from a mobile or fixed site and the size of impact. The range of intensity will vary greatly depending on the circumstances. These factors and conditions include the material, toxicity, duration of the release, and environmental conditions such as the wind and precipitation.

Hazardous materials or toxic releases can have substantial impact on communities. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions would directly affect how the hazard develops. The micro-meteorological effects on buildings and terrain can alter travel patterns and duration of agents. Shielding in the form of permanent shelter can protect people from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

### HISTORICAL OCCURRENCES

Hazardous materials are substances that if released or misused can cause death, serious injury, long-lasting health effects, and damage to infrastructure and the environment. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

A total of eight spill incidents have been reported in Grant County and occurred between 1999 and 2022, according to the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration's (PHMSA) Hazmat Incident Database.<sup>8</sup> This includes chemical spills reported using the DOT Hazardous Materials Incident Report Form 5800.1. The most significant of these occurred on August 14, 2006, when 3,600 gallons of sulfuric acid was spilled after a tanker truck was involved in a traffic accident. Per PHMSA data, damages from this event were estimated at \$210,000. Comprehensive details on damages, injuries, and fatalities are not always reported in this database, and a spill's inclusion in this dataset does not necessarily indicate significant damage to public health, property, or the natural environment occurred. Of the available data, the only incident that resulted in a fatality occurred during a fire / explosion event in 2005. Four additional incidents have occurred since the previous 2019 Plan.

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<sup>7</sup> Source: <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

<sup>8</sup> Source: <https://www.phmsa.dot.gov/hazmat-program-management-data-and-statistics/data-operations/incident-statistics>

## SECTION 16: HAZARDOUS MATERIALS

Several other incidents were provided by the Planning Team, including an event on September 26, 2022, in which an overturned truck spilled approximately 2,000 gallons of asphalt emulsion into Jaybird Canyon. Another incident in 2011 consisted of hazardous materials from mining activity contaminating the natural environment, leading to contaminated surface and groundwaters as well as negative impacts to the terrestrial habitat and migratory birds. A Groundwater Restoration Plan was completed in 2012 for the Chino, Cobre, and Tyrone Mine facilities to repair these damages.

There have also been several train derailments in the planning area, one of which killed three train operators in 2013, though no hazardous materials were on board.<sup>9</sup> Another train carrying sulfuric acid derailed six months after the 2013 incident, however no injuries were reported.

Overall, the historical occurrences of hazardous materials incidents in Grant County do not necessarily indicate high frequency of such incidents, but they do demonstrate the planning area's potential to experience significant impacts when a hazardous materials spill does occur.

## PROBABILITY OF FUTURE EVENTS

Hazardous material spills are usually the result of human error and/or accidents, which cannot be predicted. However, given the amount of traffic through the planning area and its large network of transportation, it is probable that an incident will occur in any given year. Most spills will not lead to negative health or safety impacts and will not cause substantial negative impacts on the air, soil, or groundwater. The probability of a spill threatening the health of thousands and of having long-term negative environmental consequences is, based on previous experience, low.

Based on the historic incident records and team input, the frequency of occurrence for typical hazardous material incidents would be considered highly likely. However, many of the previous spill incidents were minor and related to vehicle accidents resulting in fuel and oil spills. Based on the best available data, the frequency of occurrence for more significant hazardous material incidents is considered "Occasional", meaning an event is probable in the next five years for the Grant County planning area, including participating jurisdictions.

## CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of hazardous material incidents. However, climate change is associated with an increase in severe weather. Severe weather events may cause damage to the storage of hazardous materials and can lead to an increase in chemical spills, leaks, or fires. Research and data regarding the impact of climate change on non-natural events is minimal and limited.

## VULNERABILITY AND IMPACT

Based on the prevalence and geographic proximity of hazardous materials transportation routes, as well as gas and hazardous liquid pipelines, there are areas along these routes and pipelines throughout the Grant County planning area that are vulnerable to hazardous materials incidents. State Highway 180, the most notable major roadway on which hazardous materials are transported, passes through all participating jurisdictions. Critical facilities, infrastructure, and

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<sup>9</sup>Source: <https://www.theguardian.com/world/2013/dec/01/new-mexico-train-derail-ravine>

## SECTION 16: HAZARDOUS MATERIALS

people located within a mile of this transportation route would be considered the most vulnerable to a hazardous materials transportation incident. Additionally, all roadways on which materials are transported to or from the Freeport-McMoRan or Chino and Tyrone mines incur elevated risks of hazardous materials spills in the event of a traffic accident.

Public health and environmental impacts are the most common effects of a hazardous materials incident. The release of toxic chemicals can pose immediate health effects including respiratory problems, chemical burns, poisoning, and long-term illnesses such as cancer. Vulnerable populations including children and the elderly may be more susceptible to health impacts. The population over 65 and under the age of 5 in the Grant County planning area is estimated at 32 percent of the total population or an estimated total of 9,210 potentially vulnerable residents in the planning area based on age.

In extreme cases, an evacuation may be ordered to remove people from the hazardous area. Evacuating areas affected by HAZMAT incidents can be difficult, especially for those with disabilities, language barriers, or who live below the poverty level and lack transportation and financial resources.

**Table 16-2. Populations at Greater Risk of HAZMAT Incidents<sup>10</sup>**

JURISDICTION	POPULATION				
	65 AND OLDER	UNDER 5	WITH A DISABILITY	BELOW POVERTY LEVEL	LIMITED ENGLISH SPEAKING
Grant County	7,952	1,258	6,170	5,741	717
City of Bayard	469	93	472	605	46
Town of Hurley	317	64	384	351	21
Village of Santa Clara	469	109	485	520	35
Town of Silver City	2,126	788	1,700	2,113	311

Hazardous materials can have significant and long-term environmental impacts due to the release of toxic chemicals into the environment. Spills or leaks of chemicals may contaminate the soil, making it unsuitable for agriculture. Hazardous material incidents can also cause water pollution. The toxic substances can be carried by rainwater or runoff into nearby water bodies, which can harm aquatic life, disrupt ecosystems, and pose a public health risk if contamination occurs to drinking water sources. Gaseous releases can lead to air pollution, which can become widespread. HAZMAT incidents can also disrupt the local ecosystem, harming animals, and insects, leading to the displacement of native species.

While the best available data does not provide historical dollar loss amounts, hazardous material incidents can also be costly and impact the local economy. Emergency containment, clean up, and disposal may strain local resources and budgets. HAZMAT incidents can also lead to property damage, most commonly to industrial facilities and transportation networks. Based on best available data and the significant amount of hazardous materials released and transported within

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<sup>10</sup> U.S. Census Bureau, American Community Survey, 2022

## SECTION 16: HAZARDOUS MATERIALS

the Grant County planning area, the impact of hazardous materials incidents is considered “Major,” meaning injuries and/or illnesses resulting in permanent disability, complete shutdown of critical facilities and services between one and four weeks, and more than 25 percent of property destroyed or with major damage.

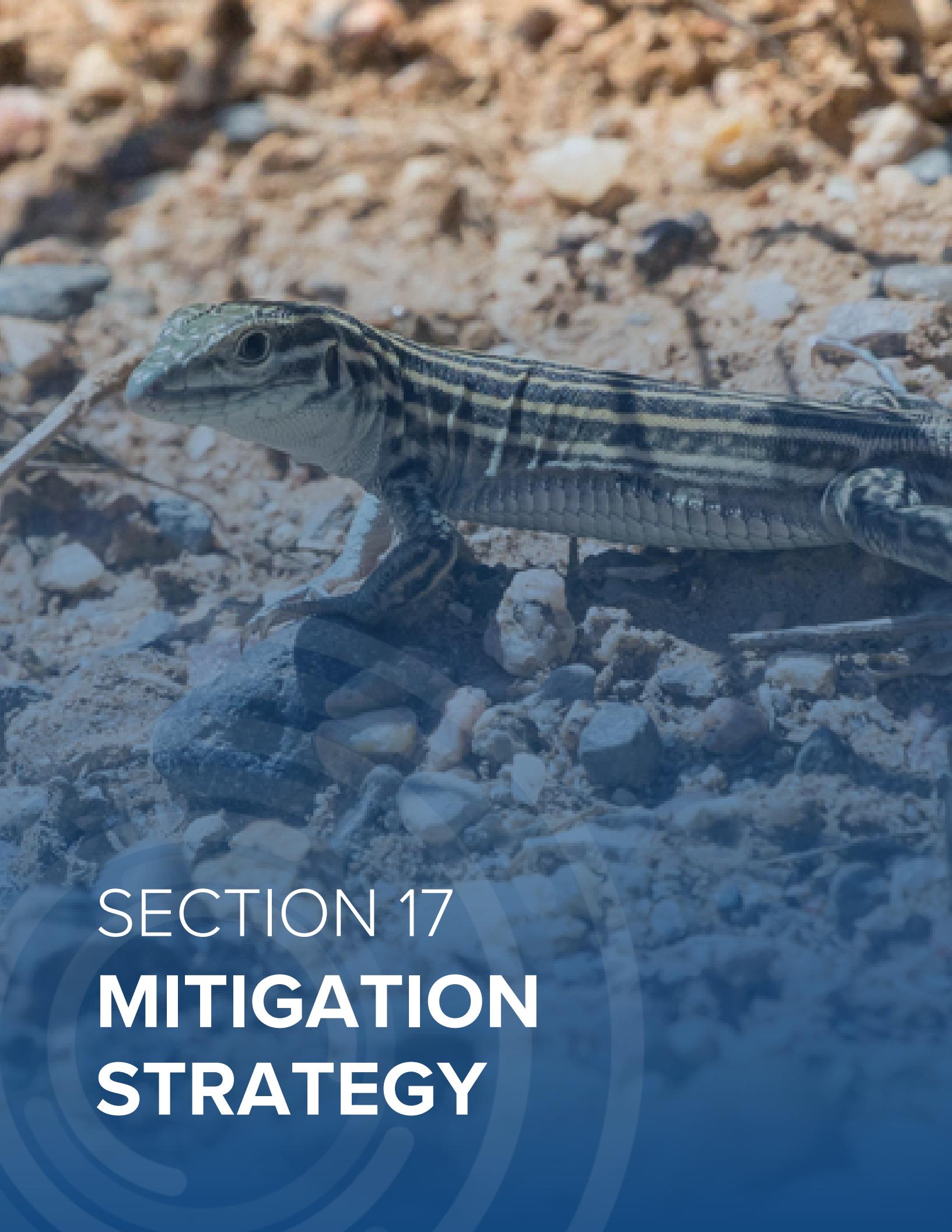
Critical facilities in the planning area are vulnerable to a range of direct and indirect impacts caused by HAZMAT incidents. Many of the impacts to critical facilities identified by the Grant County Planning Team are similar to the impacts listed in Sections 5 through 15. For a comprehensive list of identified critical facilities by participating jurisdiction, see Appendix C.

### ASSESSMENT OF IMPACTS

HAZMAT incidents have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. HAZMAT incidents can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (28 percent of total population) and children under 5 (4 percent of total population), can face serious or life-threatening health problems from exposure to toxic chemicals.
- Transportation disruptions and road closures can result in emergency response vehicles being unable to access areas of the community.
- First responders are exposed to toxic chemicals, hazardous materials, and generally unsafe conditions, which could result in sickness and long-term health impacts.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Evacuations, shelter in place orders, or the closure of transportation routes can lead to the disruption of critical facilities, businesses, and schools.
- The environment may experience significant damage leading to air and water contamination, loss of wildfire, agriculture, and tourism.

The economic and financial impacts of hazardous material incidents on the area will depend entirely on the scale of the event, where the event occurs, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any HAZMAT incident.



# SECTION 17

# MITIGATION

# STRATEGY

## SECTION 17: MITIGATION STRATEGY

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### MITIGATION GOALS

Based on the results of the risk and capability assessments, the Planning Team developed and prioritized the mitigation strategy. At the Mitigation Workshop in September 2024, Planning Team members reviewed the mitigation strategy from the previous 2019 Plan<sup>1</sup>. The consensus among all members present was that the strategy developed for the 2019 Plan required some changes including expanding on existing goals and the addition of a goal around equity and vulnerable populations.

#### GOAL 1

Protect public health and safety.

##### *OBJECTIVE 1.1*

Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

##### *OBJECTIVE 1.2*

Maximize utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.

##### *OBJECTIVE 1.3*

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

##### *OBJECTIVE 1.4*

Protect critical facilities and services.

##### *OBJECTIVE 1.5*

Reduce the risks to and from High Hazard Potential Dams across the planning area.

#### GOAL 2

Build and support local capacity and commitment to continuously become less vulnerable to hazards.

##### *OBJECTIVE 2.1*

Build and support local partnerships to continuously become less vulnerable to hazards.

---

<sup>1</sup> The 2019 Plan was not formally adopted however was reviewed during the 2025 plan development.

## SECTION 17: MITIGATION STRATEGY

### *OBJECTIVE 2.2*

Build a cadre of committed volunteers to safeguard the community before, during, and after a disaster.

### *OBJECTIVE 2.3*

Build hazard mitigation concerns into county, city, town, and village planning and budgeting processes.

## **GOAL 3**

Increase public understanding, support, and demand for hazard mitigation.

### *OBJECTIVE 3.1*

Heighten public awareness regarding the full range of natural and man-made hazards the public may face.

### *OBJECTIVE 3.2*

Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards and increase individual efforts to respond to potential hazards.

### *OBJECTIVE 3.3*

Publicize and encourage the adoption of appropriate hazard mitigation measures.

## **GOAL 4**

Protect new and existing properties.

### *OBJECTIVE 4.1*

Reduce repetitive losses to the National Flood Insurance Program (NFIP).

### *OBJECTIVE 4.2*

Use the most cost-effective approach to protect existing buildings and public infrastructure from hazards.

### *OBJECTIVE 4.3*

Enact and enforce regulatory measures to ensure that future development will not put people in harm's way or increase threats to existing properties.

## **GOAL 5**

Maximize the resources for investment in hazard mitigation.

### *OBJECTIVE 5.1*

Maximize the use of outside sources of funding.

### *OBJECTIVE 5.2*

Maximize participation of property owners in protecting their properties.

### *OBJECTIVE 5.3*

Maximize insurance coverage to provide financial protection against hazard events.

### *OBJECTIVE 5.4*

Prioritize mitigation projects, based on cost-effectiveness and sites facing the greatest threat to life, health, and property.

## **GOAL 6**

Promote growth in a sustainable manner.

## SECTION 17: MITIGATION STRATEGY

### *OBJECTIVE 6.1*

Incorporate hazard mitigation activities into long-range planning and development activities.

### *OBJECTIVE 6.2*

Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.

### *OBJECTIVE 6.3*

Utilize regulatory approaches to prevent creation of future hazards to life and property.

## **GOAL 7**

Promote equity and protect vulnerable populations and underserved communities through hazard mitigation activities.

### *OBJECTIVE 7.1*

Allocate resources and funding to implement hazard mitigation activities that directly benefit vulnerable and underserved communities.

### *OBJECTIVE 7.2*

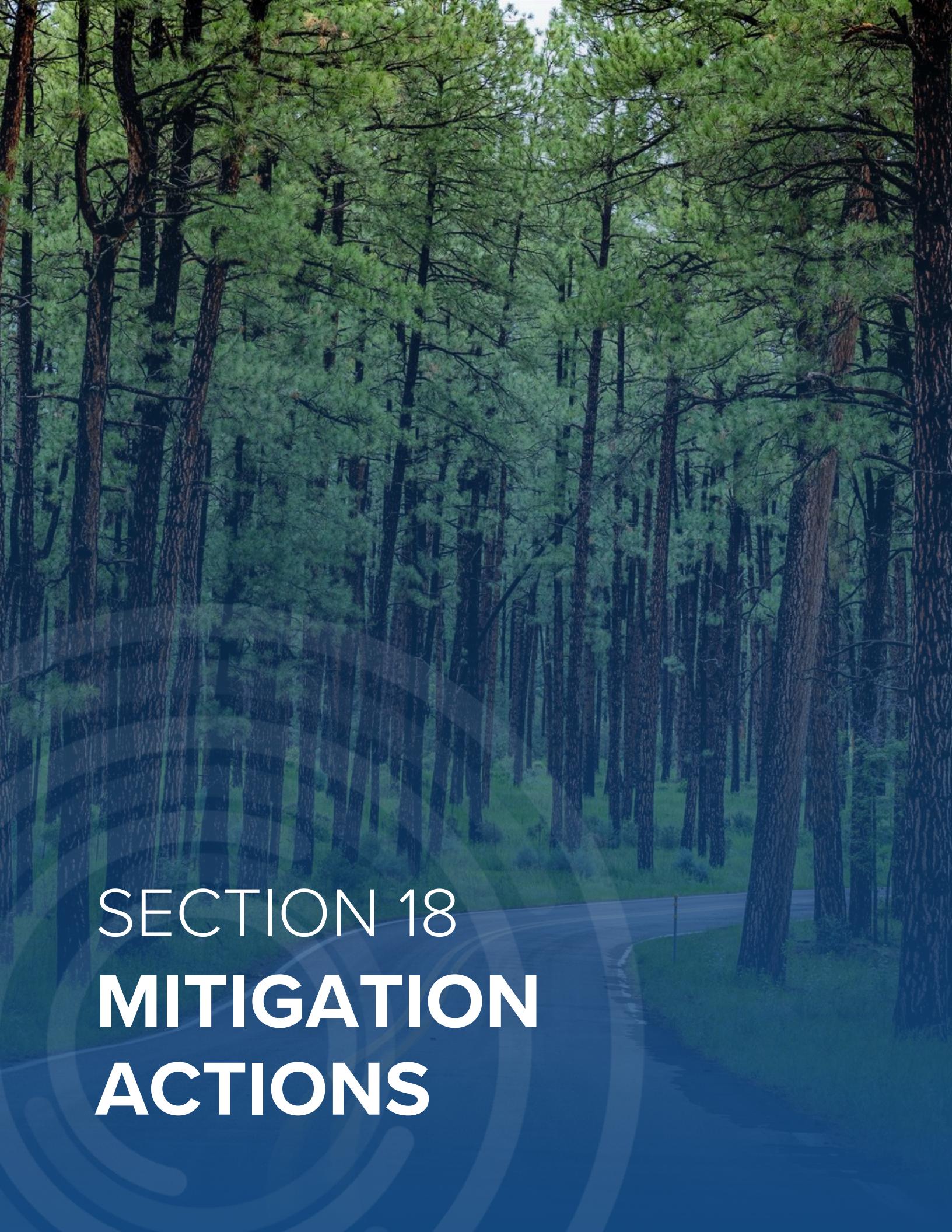
Build and support local partnerships to leverage resources and expertise in addressing hazard related equity concerns.

### *OBJECTIVE 7.3*

Establish internal decision-making processes that integrate equity into project selection.

### *OBJECTIVE 7.4*

Monitor and evaluate the effectiveness of mitigation activities to ensure equitable outcomes and protection of vulnerable populations.



# SECTION 18

# MITIGATION

# ACTIONS

## SECTION 18: MITIGATION ACTIONS

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### SUMMARY

As discussed in Section 2, at the mitigation workshop the planning team and stakeholders met to develop mitigation actions for each of the natural hazards included in the Plan. Each of the actions in this section were prioritized based on FEMA's Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria necessary for the implementation of each action.

As part of the economic evaluation of the STAPLEE analysis, jurisdictions analyzed each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it. As a result of this exercise, priority was assigned to each mitigation action by marking them as High (H), Moderate (M), or Low (L). An action that is ranked as "High" indicates that the action will be implemented as soon as funding is received. A "Moderate" action is one that may not be implemented right away depending on the cost and number of citizens served by the action. Actions ranked as "Low" indicate that they will not be implemented without first seeking grant funding and after "High" and "Moderate" actions have been completed. This process was also used to prioritize actions related to High Hazard Potential Dams (HHPDs).

Within each mitigation action worksheet, the Planning Team considered all potential funding sources that could be utilized to implement the proposed project. To ensure all potential funding resources are considered and are not limited to those sources identified within the action worksheet, please see Appendix G for a list of all available State and Federal grant programs as of 2024. The Planning Team will continue to seek out other available funding sources during the 5-year cycle as notices of funding opportunity (NOFO) are released.

All mitigation actions created by Planning Team members are presented in this section in the form of a Mitigation Action Table. More than one hazard is sometimes listed for an action, if appropriate. Actions presented in this section represent a comprehensive range of mitigation actions per current State and FEMA Guidelines, including one action, per hazard, and at least two different types for each participating jurisdiction.

Grant County, the City of Bayard, the Village of Santa Clara, and the Town of Silver City are participants in the National Flood Insurance Program (NFIP). Flooding was identified as a significant risk for these communities therefore many of the mitigation actions were developed with flood mitigation in mind. Actions related to NFIP compliance include additional narrative when deemed appropriate.

## SECTION 18: MITIGATION ACTIONS

Table 18-1. Grant County Mitigation Action Matrix

Jurisdiction	TYPE OF ACTION											
	Action #1 – Plans/Regulations (Blue)				Action #4 – Structural (Orange)				Action #5 – Preparedness/Response (Black)			
	Action #2 – Education/Awareness (Red)											
	Action #3 – Natural Systems Protections (Green)											
	Dam Failure	Drought	Extreme Cold	Extreme Heat	Flood	Hail	High Wind	Lightning	Severe Winter Storm	Tornado	Wildfire	Hazardous Materials
Grant County	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
City of Bayard	N/A	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Town of Hurley	N/A	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Village of Santa Clara	N/A	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Town of Silver City	N/A	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY

#### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
1	In order to better understand the risk of dam failure in the Multi-Jurisdictional Area, Grant County OEM will obtain all EAPs and inundation maps of each high hazard (Hazard Class I) dam in the county. This will be done by communicating and partnering with the owning organizations of each dam and requesting this information.	County-wide high hazard dams	The inundation maps and EAPs will help Grant County OEM better understand the dam failure risk.	Local Plans and Regulations	Dam Failure	Safety/Security, Water Systems	Y	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM	24 Months	ESF #5, ESF #13	N/A
2	Encourage the public and private outdoor recreation sites (i.e., golf courses, parks etc.) and events (concerts, parades etc.) to plan for sites to provide adequate shelter for severe storm events. Incorporate appropriate language into permitting process.	County-wide recreation areas	Ensure the public has a safe place of refuge during severe weather events.	Education Awareness, Local Plans and Regulations	Extreme Cold, Extreme Heat, Hail, High Wind, Lightning, Severe Winter Storm, Tornado, Wildfire	Safety/Security, Shelter	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #5, ESF #13	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
3	Work with PNM and rural electric co-ops to encourage them to address burying powerlines or strengthening power poles to avoid power outages and wildfires from hazard events.	County-wide	Avoid power outages and potential wildfires.	Structure and Infrastructure	Extreme Cold, Extreme Heat, Hail, High Wind, Lightning, Severe Winter Storm, Tornado, Wildfire	Energy (Power/Fuel)	Y	L	\$1,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with PNM and rural electric co-ops	48 Months	ESF #12, ESF #14, ESF #15	N/A
4	Organize outreach programs and transportation to vulnerable populations, including establishing and promoting accessible shelters in the community.	County-wide senior center and fire stations	Ensure the public and most vulnerable populations have a safe place of refuge during hazard events.	Education and Awareness	Extreme Cold, Extreme Heat, Severe Winter Storm	Communication, Food, Hydration, Shelter	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #1, ESF #5, ESF #6, ESF #13	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

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Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
5	Acquire emergency generators for senior centers and fire stations in remote areas of the county to ensure residents have a safe place of refuge or shelter during hazard events and reliable points of distribution.	County-wide senior center and fire stations	Ensure citizens have a safe place of refuge or shelter during hazard events.	Structure and Infrastructure	Dam Failure, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communications, Energy (Power/Fuel), Food, Hydration, Shelter	Y	M	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #6, ESF #12, ESF #13	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.
6	Acquire portable solar generators for communication sites and radio stations in the county to ensure continued emergency communications and public safety notifications during hazard events.	County-wide communication sites and radio stations	Ensure continued emergency communications and public safety notifications during hazard events.	Preparedness/Response	Dam Failure, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communications, Energy (Power/Fuel)	Y	H	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	36 Months	ESF #2, ESF #13	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
7	Purchase and install back-up emergency generators and long term emergency fuel supply for the Grant County Administration Building, Public Safety Building, & Emergency Shelter. These are key county facilities and have been identified as critical infrastructure.	County-wide critical infrastructure	Ensure uninterrupted County services during hazard events.	Structure and Infrastructure	Dam Failure, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security, Energy (Power/Fuel)	Y	H	\$1,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	36 Months	ESF #2, ESF #6, ESF #12, ESF #13	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.
8	Purchase and install surge protectors, pods, or protection systems for critical infrastructure.	County-wide critical infrastructure	Reduce natural hazard risk and vulnerability of critical infrastructure from damage.	Structure and Infrastructure	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	36 Months	ESF #3, ESF #13	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
9	Incorporate routine wind mitigation inspections of critical infrastructure and retrofit, as necessary.	County-wide critical infrastructure	Reduce natural hazard risk and vulnerability of critical infrastructure from damage.	Structure and Infrastructure Local Plans and Regulations	High Wind, Severe Winter Storm	Safety/Security	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	36 Months	ESF #3, ESF #13	N/A
10	Conduct vegetation management alongside county-owned roads to reduce the risk of fuel, downed trees, and branches from hazard events.	County-wide roads identified for evacuation routes	Ensure public transportation routes remain open and limit damage to critical infrastructure and powerlines from downed trees.	Natural Systems Protection	Dam Failure, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire	Safety/Security, Transportation	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #1, ESF #3, ESF #12, ESF #13	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
11	Develop and implement policies and projects that support flood risk reduction and stormwater management improvements. Work with U.S. Army Corps of Engineers and on a drainage basin analysis in vulnerable flood-prone areas of the county such as Bear Creek.	County-wide roads, bridges, and high water crossing in evacuation routes	Ensure public transportation routes remain open for first responders/evacuations and limit damage to critical infrastructure from flooding.	Local Plans and Regulations Structure and Infrastructure	Flood	Safety/Security	N/A	M	\$1,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TxDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant Public Works in coordination with local county administration	48 Months	ESF #1, ESF #3, ESF #5, ESF #13	Protects communities and reduces risk of flooding.
12	Participate in the planned update of the Grant County Community Wildfire Protection Plan (CWPP) to address areas of wildfire risk that affect our community. Maximize mitigation CWPP participation by all jurisdictions within Grant County.	Wildland-Urban Interface areas of the county	Reduce natural hazard risk and vulnerability through thinning projects to reduce the potential for wild land fire and public education.	Local Plans and Regulations	Wildfire	Safety/Security	N/A	H	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TxDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #5, ESF #13, ESF #15	N/A

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### GRANT COUNTY MITIGATION ACTIONS

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Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
13	Promote public awareness of the risk of wildfire when advised by the Grant County OEM by promoting an understanding of the Ready, Set, Go program, and educate on defensible space through IPAWS, PSAs, the county website, social media page, and local radio station.	County-wide	Ensure the public receives early warning of potential wildfires and knowledge of identified evacuation routes.	Education and Awareness	Wildfire	Communication	N/A	H	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #2, ESF #5, ESF #13	N/A
14	Ensure the Grant County Multijurisdictional Emergency Operations Plan (EOP) is updated, and addresses policy & procedures needed to support emergency management functions prior to, during, and following a hazard event.	County-wide	Ensure county preparedness and readiness across a range of EM functions to include sheltering of displaced residents and pets.	Education and Awareness Preparedness/Response	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	H	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #5, ESF #13, ESF #15	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
15	Ensure designated facilities are identified and prepared for providing mass care sheltering and human services. Ensure county staff are trained in sheltering operations and providing services. Provide transportation for vulnerable residents to designated facilities.	County-wide	Ensure county residents have shelter due to hazard events or evacuation.	Structure and Infrastructure	Dam Failure, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	H	\$1,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #1, ESF #6, ESF #13	Promotes public safety.
16	Provide education and outreach to residents on preparedness for severe weather events, periods of extreme temperatures and extended power outages through PSAs, the county website, social media page, local radio station and other media outlets as needed.	County-wide	Ensure the public receives education and early warning of potential hazard events.	Education and Awareness	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #2, ESF #5, ESF #12, ESF #13	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
17	Revisit and review all existing mutual aid agreements and memorandums of understanding and determine how new action items should be incorporated.	County-wide	Ensure response of additional assets and resources to assist in the mitigation of disasters & hazard events.	Local Plans and Regulations Preparedness /Response	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with surrounding jurisdictions	24 Months	ESF #2, ESF #12, ESF #13	Promotes public safety.
18	Ensure municipalities are collaborating and coordinating the implementation of mitigation initiatives to ensure synergies are leveraged, when applicable, and that mitigation actions in one community are not adversely impacting another community.	County-wide	Ensure mitigation actions do not adversely impact and harm another community.	Local Plans and Regulations Preparedness /Response	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with surrounding jurisdictions	36 Months	ESF #2, ESF #5, ESF #12, ESF #13	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
19	Support planning partner education by requesting mobile training courses covering the National Flood Insurance Program and Community Rating System information during the period of this plan.	County-wide	Increase public knowledge on public assistance and information on floodplain requirements and impacts.	Education and Awareness	Flood	Communication, Safety/Security	N/A	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with surrounding jurisdictions	48 Months	ESF #2, ESF #5, ESF #13, ESF #15	Protects communities and reduces risk of flooding.
20	Continue the ongoing process of updating existing plans and procedures to mitigate against all hazards and continue to develop new plans and procedures to mitigate new hazards. Continue to support the countywide initiatives identified in this plan.	County-wide	Ensure county preparedness and readiness across a range of EM functions and potential hazards.	Local Plans and Regulations / Preparedness / Response	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	M	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	48 Months	ESF #2, ESF #5, ESF #13, ESF #15	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
21	Develop Post-Disaster Recovery Plan - utilizing resilience of critical facilities; development and improvements utilizing valid data; establishment of partnerships with neighboring communities and other governments; etc.	County-wide	Ensure a resilient community.	Local Plans and Regulations Preparedness /Response	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	48 Months	ESF #2, ESF #5, ESF #13, ESF #14, ESF #15	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
22	Develop Evacuation Plan - early warning program through IPAWS, PSAs, the county website, social media page and local radio station. Established partnerships with Red Cross, NGOs, municipalities, and communities. Establish evacuation routes and contingency routes.	County-wide	Reduce loss of injury/save lives and expedite & clarify the evacuation process and roles of involved agencies.	Local Plans and Regulations	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	N/A	H	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant OEM in coordination with local county administration	24 Months	ESF #2, ESF #5, ESF #13, ESF #14, ESF #15	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
23	Create an internal policy and procedure to ensure proposed development, structural and non-structural, have floodplain determinations prior to approval of development. Development of policy and procedure requiring that prior to approval of development, including subdivisions, building permits and manufactured home placement permits, all areas will be checked for floodplain involvement and will comply with current county ordinances.	County-wide	Reduce flooding risks.	Local Plans and Regulations	Flood	Safety/Security	N/A	H	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County Planning and Community Development, Floodplain Manager	24 Months	Comprehensive Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
24	Partner with local utility agencies and other jurisdictions to ensure floodplain determinations are completed prior to development approval. Partner with local utility agencies and other jurisdictions. Develop policies and procedures that coordinate utility service activation or placement of utility tanks and compliance with floodplain regulation.	County-wide	Reduce losses related to flooding.	Local Plans and Regulations	Flood	Safety/Security	N/A	M	\$2,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	PNM Electric Utility, New Mexico Gas Company	24 Months	Comprehensive Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
25	Identify low water crossing areas and mark areas with signage to warn residents of flash flooding. Develop list of low water areas based on information provided by the National Weather Service and erect signage provided by the New Mexico Department of Transportation (NMDOT) warning residents of flash flooding. Additionally, implement a program to record high water marks following high-water events.	County-wide	Reduce loss of life and property due to flooding.	Education and Awareness	Flood	Safety/Security	N/A	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	NWS, NM DOT, Grant County OEM, Road Dept., Planning and Community Development	24-36 Months	Comprehensive Plan	Protects communities and reduces risk of flooding.
26	Identify responsible agencies for keeping newly identified low water areas clear of debris and vegetation that can compound the effects of flooding. Work with U.S. Army Corps of Engineers (USACE), to study and assess in greater detail the risks associated flooding and conduct drainage basin analysis in designated areas.	County-wide	Reduce losses due to flooding.	Local Plans and Regulations Education and Awareness	Flood	Safety/Security	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County Road Dept., County Planning and Community Development Dept., County	12-24 months	Comprehensive Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
27	Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts.	County-wide	Reduce flood insurance premiums for local residents; Reduce flood risk and build resiliency.	Local Plans and Regulations Education and Awareness	Flood	Communication, Safety/Security	N/A	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County, County Floodplain Manager, USACES, FEMA	12-24 Months	Hazard Mitigation Plan	Protects communities and reduces risk of flooding.
28	Implement education and awareness programs utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages. Include links to weather alerts and departmental phone listings with contact personnel for residents.	County-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County, County Planning and Community Development, FEMA, USACES	24-36 Months	Hazard Mitigation Plan Emergency Operations Plan	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
29	Incorporate flood Hazard Mitigation information into Grant County's website to provide existing and future residents and business owners with easy access to vital information, data and maps, and forms on Flood Hazard Mitigation regulations and activities. Educate and inform citizens and business owners within Grant County of Flood Hazard Mitigation Regulations, as well as risks of flooding, through a website and community events. Support planning partner education by requesting mobile training courses covering the National Flood Insurance Program and Community Rating System information during the period of this plan.	County-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Flood	Communication	N/A	M	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County, County Planning and Community Development, FEMA, USACEs	24-36 Months	Hazard Mitigation Plan	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
30	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. The County Commission will draft a water use restriction program based on a sliding scale with increasingly restrictive measures based on the severity of existing drought conditions. Consider the development of a countywide climate adaptation strategy committee.	County-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Local Plans and Regulations	Drought	Safety/Security	Y	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County Commissioners	36-48 Months	Strategic Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
31	Continue to identify areas in the public domain and create priorities and thinning projects to reduce the potential for wild land fire throughout the county. Public land clearing program. Public lands will be inspected and cleared as necessary in order to reduce the potential fuel load existing in these areas. Ensure these actions are included in the update of the Grant County Community Wildfire Protection Plan (CWPP). Grant County was awarded a USDA Community Wildfire Defense Grant to update the CWPP which should be approved and adopted in 2025.	County-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirement/s/restrictions	Structure and Infrastructure Natural Systems Protection	Wildfire	Safety/Security	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, City EMC, Fire Dept., Public Works, Parks and Recreation, County Fire Management Office	36 Months	Comprehensive Plan Community Wildfire Protection Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
32	Grant County HAZMAT transport survey. Conduct a hazardous material transport survey within Grant County. This survey will detail the number and types of hazardous material transports traversing Grant County for one month. The survey will include the number and types of transport moving through the county, the roadway on which they were observed, and the identity of the hazardous material being carried.	County-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security	N/A	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Local Fire Dept.	36-48 Months	Emergency Operations Plan Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
33	Determine the most critical locations where hazardous material transport accidents have been occurring within Grant County and local jurisdictions. Grant County HAZMAT response survey. Statistical data will be collected over a six-month period to examine the location of the most serious traffic accident locations in Grant County and local jurisdictions with a concentration on identified HAZMAT routes within the county. In addition, the survey will document all accidents involving hazardous material transport and the type of material being carried.	County-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security, Communication	N/A	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	County Grant OEM, Local Fire Dept.	36-48 Months	Emergency Operations Plan Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
34	Educate the public about actions to take during a HAZMAT incident. Public education program. Public education meetings will be designed and conducted to provide the county's residents with information concerning the actions they should take prior to and during a HAZMAT event. This education will be in the form of pamphlets, public meetings, and exercises.	County-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security	N/A	M	\$20,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Local Fire Dept.	36-48 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
35	Continue funding of the emergency notification system (Onsolve-CodeRED) in order to ensure the county and its jurisdictions maintain the ability to access FEMA-IPAWS. Funding will be sought in order to continue an alert system for use within Grant County and its included jurisdictions in order to provide rapid warning of HAZMAT incidents and provide instructions as to what actions residents should take for their safety. Grant funding is available through the State Homeland Security Grant Program (SHSGP).	County-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness Preparedness /Response	Dam Failure, Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication, Safety/Security	N/A	H	\$20,000 for 3 years	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Local Jurisdictions	36-48 Months	Hazard Mitigation Plan Emergency Operations Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
36	Provide private landowners with information concerning the necessity for clearing potential fuel from their land and instructions for creating defensible space around all structures. Private property defensible space. All local jurisdictions will institute a public education program, such as Fire Wise, concerning the need for defensible space around structures in the urban/wild land interface. This program will be conducted through public service announcements to property owners identified as having land within the urban/wild land interface. Ensure community involvement and input be included in the update of the Grant County Community Wildfire Protection Plan (CWPP). Grant County was awarded a USDA Community Wildfire Defense Grant to update the CWPP which should be approved and adopted in 2025.	County-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirement/s/restrictions	Education and Awareness	Wildfire	Communication	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County PIO, City PIO, Grant County OEM, County Fire Marshall	24-36 Months	Community Wildfire Protection Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
37	Obtain and review all Grant County dam inspections, identify all dams rated as poor. Ensure all noted deficiencies are discussed and detailed with dam owners and a plan developed to improve their rating.	County-wide high hazard dams	Review of dam inspection reports will help Grant County OEM identify high risk dams and develop plans to warn potential impacted communities.	Local Plans and Regulations	Dam Failure	Safety/Security, Water Systems	N/A	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM	36 Months	Capital Improvement Plan EPA	N/A
38	Continue planning for and improving dam breach data, state and local partnerships, community engagement, and maximizing funding capabilities to improve local mitigation, planning, and development practices regarding all dams in the planning area.	County-wide high hazard dams	Reduce vulnerabilities to and from high hazard potential dams; Address deficiencies in capabilities; Reduce risk of dam failure.	Local Plans and Regulations	Dam Failure	Safety/Security, Water Systems	N/A	M	\$1,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM	36 Months	Capital Improvement Plan EPA	N/A

## SECTION 18: MITIGATION ACTIONS

### GRANT COUNTY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
39	Implement repairs or upgrades to high hazard dams in poor condition to mitigate dam failure, improve stability, increase water storage capacity, and reduce erosion.	County-wide high hazard dams	Reduce damages to structures and infrastructure; Reduce risk of injuries or fatalities; Reduce risk of flood and water contamination.	Local Plans and Regulations	Dam Failure	Safety/Security, Water Systems	N/A	M	\$1,000,000	Local Budget; State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM	48 Months	Capital Improvement Plan EPA	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD

CITY OF BAYARD MITIGATION ACTIONS														
*Reduces risk to new and/or existing buildings and infrastructure														
Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
1	Complete application for National Flood Insurance Program Community Rating System.	City-wide	Reduce flood insurance premiums for local residents; Reduce flood risk and build resiliency.	Education and Awareness Local Plans and Regulations	Flood	Communication	Y	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard EMC, County Floodplain, USACEs, FEMA	24 Months	Hazard Mitigation Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

CITY OF BAYARD MITIGATION ACTIONS														
<i>*Reduces risk to new and/or existing buildings and infrastructure</i>														
Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
2	Implement education and awareness programs utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages. Include links to weather alerts and departmental phone listings with contact personnel for residents. Plan and organize community education events for National Flood Safety Awareness Week including education on Bayard of Flood Hazard Mitigation Regulations.	City-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard, City Floodplain Dept., USACEs, FEMA	24-36 Months	Hazard Mitigation Plan	Promote public safety.

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
3	Complete waterway bank stabilization projects along the arroyos in areas experiencing erosion and severe stream change that have the potential to impact structures and public facilities. Complete water way stabilization projects and repair existing stabilization infrastructure.	City-wide	Reduce flood damages and risk of injuries or fatalities through stabilization projects.	Structure and Infrastructure	Flood	Safety/Security	N/A	L	\$250,000 per project	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council, USACEs, FEMA	36 Months	Comprehensive Plan	Protects communities and reduces risk of flooding.
4	Harden/retrofit critical facilities to hazard-resistant levels.	City-wide	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard EMC	36 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
5	Adopt and implement a program for clearing debris from bridges, drains, and culverts.	City-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Structure and Infrastructure	Flood	Safety/Security	Y	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard EMC	36 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.
6	Repair existing structures utilized for bank stabilization.	City-wide waterways	Reduce flood damages and risk of injuries or fatalities through stabilization projects.	Structure and Infrastructure	Flood	Safety/Security	N/A	L	\$2,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council, USACEs, FEMA	36-48 months	Comprehensive Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
7	Purchase and install surge protectors, pods, or protection systems for critical infrastructure.	City-wide critical infrastructure	Reduce natural hazard risk and vulnerability of critical infrastructure from damage.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard EMC	36 Months	Capital Improvement Plan Emergency Operations Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
8	Acquire and install generators with hard wired quick connections at all critical facilities.	City-wide	Provide power for critical facilities during power outages and ensure continuity of critical services.	Structure and Infrastructure	Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Energy (Power/Fuel)	N/A	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard EMC	36 Months	Emergency Operations Plan	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
9	Conduct inspections of private properties to identify and inventory existing conditions in the floodplain; continue annual inspections to prevent illegal fill activities, enforcing Flood Hazard Mitigation Regulations and subsequent violations as required. Inspect, Inventory and Mitigate Floodplain Fill/Obstructions. Complete inventory of fill and obstructions and address as required to remove/mitigate impact to floodplain.	City-wide	Reduce flood damages and risk of injuries or fatalities through comprehensive inspections and standards.	Education and Awareness	Flood	Safety/Security, Communications	N/A	L	\$300,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council, USACEs, FEMA	24-36 Months	Capital Improvement Plan Hazard Mitigation Plan	Protects communities and reduces risk of flooding.
10	Develop regulations governing the maintenance of waterways within the City.	City-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Local Plans and Regulations	Flood	Safety/Security	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council, USACEs	36 Months	Comprehensive Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
11	Complete cleanup and mitigation activities on properties bordering waterways, particularly underneath or near bridges experiencing high overgrowth and accumulation of debris against pylons and supports.	City-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Education and Awareness	Flood	Safety/Security	N/A	M	\$300,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council, USACEs	36-48 Months	Comprehensive Plan Hazard Mitigation Plan	Protects communities and reduces risk of flooding.
12	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. The City Council will draft a water use restriction program based on a sliding scale with increasingly restrictive measures based on the severity of existing drought conditions.	City-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Local Plans and Regulations Natural System Protection	Drought	Safety/Security	Y	M	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council	36-48 Months	Drought Contingency Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
13	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. A rebate program will be developed to provide city residents with an incentive to replace older toilets and showerheads with low flow units. An additional incentive program will be developed addressing the installation of gray water recovery systems.	City-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Education and Awareness	Drought	Safety/Security	N/A	M	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council	36-48 Months	Drought Contingency Plan	N/A
14	Implement regulations restricting the amount of non-drought resistant landscaping materials that can be planted/installed in new commercial construction within the city. Implement regulations restricting the amount of non-drought resistant landscaping materials that can be planted/installed in new commercial construction within the city.	City-wide	Reduce risk through improved development practices and building requirements/restrictions	Local Plans and Regulations Natural Systems Protection Education and Awareness	Drought	Safety/Security	Y	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Bayard City Council	24-36 Months	Comprehensive Pln	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
15	Continue to identify areas in the public domain and create priorities and thinning projects to reduce the potential for wild land fire throughout the city. Continue to identify areas in the public domain and create priorities and thinning projects to reduce the potential for wild land fire throughout the city.	City-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirement/s/restrictions	Structure and Infrastructure Natural Systems Protection	Wildfire	Safety/Security, Communication	N/A	M	\$20,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard Fire Dept., Public Works, Parks and Recreation	36 Months	Comprehensive Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
16	Provide private landowners with information concerning the necessity for clearing potential fuel from their land and instructions for creating defensible space around all structures local jurisdictions will institute a public education program, such as Firewise, concerning the need for defensible space around structures in the urban/wild land interface. This program will be conducted through public service announcements to property owners identified as having land within the urban/wild land interface.	City-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions	Education and Awareness	Wildfire	Safety/Security, Communication	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard Fire Dept., Public Works, Parks and Recreation	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

CITY OF BAYARD MITIGATION ACTIONS														
<i>*Reduces risk to new and/or existing buildings and infrastructure</i>														
Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
17	Code enforcement on private property to reduce hazardous fuels. Continue code enforcement on private property to reduce hazardous fuels.	City-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness Local Plans and Regulations	Wildfire	Safety/Security, Communication	N/A	M	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard Fire Dept., Public Works, Parks and Recreation, Code Enforcement	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
18	Implement a Firewise community program with information concerning the necessity for clearing fuel from public/private lands and with instructions for creating defensible space around all structures. Private property defensible space. Bayard will institute a public education program, such as Firewise, concerning the need for defensible space around structures in the urban/wild land interface. This program will be conducted through public service announcements to property owners identified as having land within the urban/wild land interface.	City-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirement/s/restrictions	Education and Awareness	Wildfire	Safety/Security, Communication	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard Fire Dept., Public Works, Parks and Recreation, Code Enforcement	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
19	Grant County HAZMAT transport survey. Conduct a hazardous material transport survey within Grant County. This survey will detail the number and types of hazardous material transports traversing Grant County for one month. The survey will include the number and types of transport moving through the county, the roadway on which they were observed, and the identity of the hazardous material being carried.	City-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, City of Bayard Fire Dept.	36 Months	Hazard Mitigation Plan Emergency Management Action Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
20	Determine the most critical locations where hazardous material transport accidents have been occurring within Grant County and City of Bayard. Grant County HAZMAT response survey. Statistical data will be collected over a six-month period to examine the location of the most serious traffic accident locations in Grant County and local jurisdictions with a concentration on identified HAZMAT routes within the county. In addition, the survey will document all accidents involving hazardous material transport and the type of material being carried.	City-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security, Communication	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, City of Bayard Fire Dept.	36 Months	Hazard Mitigation Plan Emergency Management Action Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### CITY OF BAYARD MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
21	Continue funding the emergency notification system in order to provide an alert system for the county and its jurisdictions. Notification system. Funding will be sought in order to continue an alert system for use within Grant County and its included jurisdictions in order to provide rapid warning of hazard events and provide instructions as to what actions residents should take for their safety.	City-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication, Safety/Security	N/A	M	\$20,000 per 3 years	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Bayard City Council	24 Months	Capital Improvement Plan Hazard Mitigation Plan	Promote public safety.
22	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of way and drainage systems on a scheduled basis.	City-wide	Reduce damages to infrastructure; Ensure continuity of services during and after event.	Structure and Infrastructure	Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire	Safety/Security, Energy (Power/Fuel)	Y	M	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	City Of Bayard EMC	24 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY

#### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
1	Join the National Flood Insurance Program (NFIP).	Town-wide	Provide access to flood insurance for local residents; Reduce flood risk and build resiliency.	Local Plans and Regulations	Flood	Communication	Y	High	\$5,000	Local Funds (Staff Time)	Town of Hurley Council	48 Months	Hazard Mitigation Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
2	Allow no vegetation in easements or require fire-resistant landscaping.	Town-wide	Reduce risk of wildfires and the spread of wildfire through improved development practices and building requirements/restrictions.	Local Plans and Regulations	Wildfire	Safety/Security	Y	H	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Council	24 Months	Comprehensive Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
3	Adopt and implement routine fire hydrant maintenance program.	Town-wide	Reduce risk and spread of wildfires through routine maintenance of fire hydrants; Reduce risk of injury or damages.	Local Plans and Regulations	Wildfire	Safety/Security	Y	H	\$5,000	Local Budget	Town of Hurley Fire Department	24 Months	Capital Improvement Plan	N/A
4	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of way and drainage systems on a scheduled basis to reduce wildfire fuels.	Town-wide	Reduce damages to infrastructure; Ensure continuity of services during and after event.	Structure and Infrastructure	Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire	Safety/Security, Energy (Power/Fuel)	Y	M	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Council	24 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents. Helps

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
5	Adopt and implement a program for clearing debris from bridges, drains, and culverts.	Town-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Structure and Infrastructure	Flood	Safety/Security	Y	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Council	36 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.
6	Purchase and install surge protectors, pods, or protection systems for critical infrastructure. The surge protectors will add additional protection for electronic equipment.	Town-wide critical infrastructure	Reduce natural hazard risk and vulnerability of critical infrastructure from damage.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Town Council	36 Months	Capital Improvement Plan Hazard Mitigation Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
7	Acquire and install generators with hard wired quick connections at all critical facilities. A generator installed at prioritized critical facilities will allow the town to remain operational during hazard events.	Town-wide	Provide power for critical facilities during power outages and ensure continuity of critical services.	Structure and Infrastructure	Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Energy (Power/Fuel)	N/A	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Town Council	36 Months	Hazard Mitigation Plan	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.
8	Harden/retrofit critical facilities to hazard-resistant levels. Hardening for High Wind include protective barriers, hazard resistant or ember resistant roofing material, using heat resistant material, ember resistant screens for windows and vents, non-combustible siding, and landscaping or vegetation made of non-combustible materials.	Town-wide	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Town Council	36 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
9	Install a local Emergency Warning System. Implement an all-hazards emergency notification system to be used to warn the general population of potential danger in a short amount of time and to notify them that the emergency has passed.	Town-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Structure and Infrastructure Education and Awareness	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	H	\$150,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Town Council	36-48 months	Hazard Mitigation Plan	Promote public safety.
10	Establish a current floodplain map for Hurley. Seek updated floodplain maps for Hurley. A petition to FEMA requesting the updating of Hurley's floodplain maps will be made. Enact legislation to restrict future growth into floodplains in Hurley.	Town-wide	Reduce damages at critical facilities; Reduce losses due to flooding.	Local Plans and Regulations	Flood	Safety/Security	N/A	L	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Town Council	48-60 Months	Comprehensive Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
11	In conjunction with the County implement an education and awareness programs utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages. Include links to weather alerts.	Town-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Council	24-36 Months	Hazard Mitigation Plan	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
12	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. The Town Council will draft a water use restriction program and incentives to convert to low flow units, grey water systems, or sliding scale with increasingly restrictive measures based on the severity of existing drought conditions. A rebate program will be developed to provide Town residents with an incentive to replace older toilets and showerheads with low flow units.	Town-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Education and Awareness	Drought	Safety/Security	N/A	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Council	36-48 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
13	Improve regulations addressing landscape requirements and restrictions for commercial development to limit the amount of non-drought resistant vegetation that can be used in new landscape projects.	Town-wide	Reduce risk through improved development practices and building requirements/restrictions.	Local Plans and Regulations Natural Systems Protection Education and Awareness	Drought	Safety/Security, Communication	Y	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Council	24-36 Months	Comprehensive Plan	N/A
14	Continue to identify areas in the public domain and create priorities and thinning projects to reduce the potential for wild land fire throughout the town. Public lands will be inspected and cleared as necessary in order to reduce the potential fuel load existing in these areas.	Town-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions.	Structure and Infrastructure Natural Systems Protection	Wildfire	Safety/Security	N/A	L	\$20,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Fire Dept., Public Works, Parks and Recreation	36 Months	Hazard Mitigation Plan Comprehensive Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
15	Provide private landowners with information concerning fuels reduction and creating defensible space around their property. This will be conducted through outreach to property owners identified as having land within the urban/wild land interface utilizing social media or printed materials.	Town-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions.	Education and Awareness	Wildfire	Safety/Security, Communication	N/A	L	\$10,000	Local Budget; State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Fire Dept., Public Works, Parks and Recreation	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
16	In coordination with the County, implement a Firewise community program with information concerning the necessity for clearing fuel from public / private lands and with instructions for creating defensible space around all structures. Private property defensible space. Hurley will institute a public education program, such as Fire Wise, concerning the need for defensible space around structures in the urban/wild land interface. This program will be conducted through public service announcements to property owners identified as having land within the urban/wild land interface.	Town-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions.	Education and Awareness	Wildfire	Safety/Security, Communication	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Hurley Fire Dept., Public Works, Parks and Recreation, Code Enforcement	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF HURLEY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Timeline	Existing Plans	NFIP
17	In coordination with the County, conduct a hazardous material transport survey. This survey will detail the number and types of hazardous material transports traversing Grant County for one month. The survey will include the number and types of transport moving through the county, the roadway on which they were observed, and the identity of the hazardous material being carried. When this has been completed the County and the Town will obtain information on accidents in known HAZMAT routes to determine critical locations for further mitigation efforts.	Town-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Town of Hurley Fire Dept.	36-48 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA

#### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
1	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of way and drainage systems on a scheduled basis.	Village-wide	Reduce damages to infrastructure; Ensure continuity of services during and after event.	Structure and Infrastructure	Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire	Safety/Security, Energy (Power/Fuel)	Y	M	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	24 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents. Helps
2	Adopt and implement a program for clearing debris from bridges, drains, and culverts.	Village-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Structure and Infrastructure	Flood	Safety/Security	Y	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	36 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
3	Purchase and install surge protectors, pods, or protection systems for critical infrastructure.	Village-wide critical infrastructure	Reduce natural hazard risk and vulnerability of critical infrastructure from damage.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	36 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
4	Acquire and install generators with hard wired quick connections at all critical facilities.	Village-wide	Provide power for critical facilities during power outages and ensure continuity of critical services.	Structure and Infrastructure	Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Energy (Power/Fuel)	N/A	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	36 Months	Emergency Operations Plan	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
5	Harden/retrofit critical facilities to hazard-resistant levels.	Village-wide	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	36 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
6	Complete application for National Flood Insurance Program Community Rating System.	Village-wide	Reduce flood insurance premiums for local residents; Reduce flood risk and build resiliency.	Local Plans and Regulations, Education and Awareness	Flood	Communication	N/A	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, County Floodplain, USACEs, FEMA	24 Months	Hazard Mitigation Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
7	Complete waterway bank stabilization projects along the arroyos in areas experiencing erosion and severe stream change that have the potential to impact structures and public facilities. Complete water way stabilization projects and repair existing stabilization infrastructure.	Village-wide Arroyos	Reduce flood damages and risk of injuries or fatalities through stabilization projects.	Structure and Infrastructure	Flood	Safety/Security	N/A	L	\$250,000 per project	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, County Floodplain, USACEs, FEMA	36-48 Months	Comprehensive Plan	Protects communities and reduces risk of flooding.
8	Repair existing gabions utilized for bank stabilization.	Village-wide waterways	Reduce flood damages and risk of injuries or fatalities through stabilization projects.	Structure and Infrastructure	Flood	Safety/Security	N/A	L	\$2,000,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, County Floodplain, USACEs, FEMA	48 Months	Comprehensive Plan Capital Improvement Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
9	Conduct inspections of private properties to identify and inventory existing conditions in the floodplain; continue annual inspections to prevent illegal fill activities, enforcing Flood Hazard Mitigation Regulations and subsequent violations as required. Inspect, Inventory and Mitigate Floodplain Fill/Obstructions. Complete inventory of fill and obstructions and address as required to remove/mitigate impact to floodplain.	Village-wide	Reduce flood damages and risk of injuries or fatalities through comprehensive inspections and standards.	Education and Awareness	Flood	Safety/Security, Communications	N/A	L	\$300,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, USACEs, FEMA	24-36 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.
10	Develop regulations governing the maintenance of waterways within the Village.	Village-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Local Plans and Regulations	Flood	Safety/Security	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, USACEs, FEMA, Private and Public Landowners	36 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
11	Complete cleanup and mitigation activities on properties bordering waterways, particularly underneath or near bridges experiencing high overgrowth and accumulation of debris against pylons and supports.	Village-wide	Reduce flood damages and risk of injuries or fatalities through comprehensive inspections and standards.	Education and Awareness	Flood	Safety/Security	N/A	L	\$300,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, USACEs, FEMA, Private and Public Landowners	36-48 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.
12	Conduct regular inspections of private properties traversed by waterways to identify obstruction or overgrowth hazards.	Village-wide	Reduce flood damages and risk of injuries or fatalities through comprehensive inspections and standards.	Education and Awareness	Flood	Safety/Security	N/A	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, USACEs, FEMA, Private and Public Landowners	36-48 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
13	Conduct inspections and complete an inventory of all existing culverts and bridges crossing waterways in Santa Clara; replace, repair, or remove culverts and bridges, as necessary.	Village-wide	Reduce flood damages and risk of injuries or fatalities through comprehensive inspections and standards.	Local Plans and Regulations Structure and Infrastructure	Flood	Safety/Security	Y	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, USACEs, FEMA, Private and Public Landowners	36-48 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.
14	Identify and stabilize public waterway banks that are being eroded. Create and prioritize projects to stabilize identified erosion areas.	Village-wide	Reduce flood damages and risk of injuries or fatalities through comprehensive inspections and standards.	Structure and Infrastructure	Flood	Safety/Security	N/A	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator, Floodplain Manager, Public Works, USACEs	36 Months	Comprehensive plan Capital Improvement Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
15	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. The Village Council will draft a water use restriction program based on a sliding scale with increasingly restrictive measures based on the severity of existing drought conditions.	Village-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Local Plans and Regulations Natural Systems Protection	Drought	Safety/Security	N/A	M	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Village Council	36-48 Months	Hazard Mitigation Plan	N/A
16	Implement education and awareness programs utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages. Include links to weather alerts and departmental phone listings with contact personnel for residents.	Village-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	24-36 Months	Hazard Mitigation Plan	Promotes public safety.

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
17	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. A rebate program will be developed to provide Village residents with an incentive to replace older toilets and showerheads with low flow units. An additional incentive program will be developed addressing the installation of gray water recovery systems.	Village-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Education and Awareness	Drought	Safety/Security	N/A	L	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	36-48 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
18	Implement regulations restricting the amount of non-drought resistant landscaping materials that can be planted/installed in new commercial construction within the Village of Santa Clara. Improve regulations addressing landscape requirements and restrictions for commercial development to limit the amount of non-drought resistant vegetation that can be used in new landscape projects based on a specific percentage of the overall area to be landscaped.	Village-wide	Reduce risk through improved development practices and building requirements/restrictions.	Education and Awareness Natural System Protection Local Plans and Regulations	Drought	Safety/Security	Y	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Administrator	24-36 Months	Comprehensive Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
19	Continue to identify areas in the public domain and create priorities and thinning projects to reduce the potential for wild land fire throughout the county. Continue to identify areas in the public domain and create priorities and thinning projects to reduce the potential for wild land fire throughout the Village.	Village-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions.	Structure and Infrastructure Natural Systems Protection	Wildfire	Safety/Security	N/A	M	\$20,000	Local Budget; State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Fire Dept., Public Works and Parks and Recreation	36 Months	Comprehensive Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
20	Provide private landowners with information concerning the necessity for clearing potential fuel from their land and instructions for creating defensible space around all structures. Local jurisdictions will institute a public education program, such as Firewise, concerning the need for defensible space around structures in the urban/wild land interface. This program will be conducted through public service announcements to property owners identified as having land within the urban/wild land interface.	Village-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions.	Education and Awareness	Wildfire	Safety/Security, Communication	N/A	H	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Fire Dept., Public Works and Parks and Recreation	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
21	Code enforcement on private property to reduce hazardous fuels. Continue code enforcement on private property to reduce hazardous fuels.	Village-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness Local Plans and Regulations	Wildfire	Safety/Security, Communication	N/A	M	\$5,000	Local Budget; State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Fire Dept., Public Works, Parks and Recreation, Code Enforcement	36 Months	Comprehensive Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
22	Implement a Firewise community program with information concerning the necessity for clearing fuel from public/private lands and with instructions for creating defensible space around all structures. Private property defensible space. Bayard will institute a public education program, such as Fire Wise, concerning the need for defensible space around structures in the urban/wild land interface. This program will be conducted through public service announcements to property owners identified as having land within the urban/wild land interface.	Village-wide	Reduce risk of wildfires and the spread of wildfire through improved practices and building requirements/restrictions.	Education and Awareness	Wildfire	Safety/Security, Communication	N/A	M	\$10,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Village of Santa Clara Fire Dept., Public Works, Parks and Recreation, Code Enforcement	36 Months	Hazard Mitigation Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
23	Grant County HAZMAT transport survey. Conduct a hazardous material transport survey within Grant County. This survey will detail the number and types of hazardous material transports traversing Grant County for one month. The survey will include the number and types of transport moving through the county, the roadway on which they were observed, and the identity of the hazardous material being carried.	Village-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Village of Santa Clara Fire Dept.	36-48 Months	Hazard Mitigation Plan Emergency Operations Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
24	Determine the most critical locations where hazardous material transport accidents have been occurring within Grant County and Village of Santa Clara. Grant County HAZMAT response survey. Statistical data will be collected over a six-month period to examine the location of the most serious traffic accident locations in Grant County and local jurisdictions with a concentration on identified HAZMAT routes within the county. In addition, the survey will document all accidents involving hazardous material transport and the type of material being carried.	Village-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security, Communication	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Village of Santa Clara Fire Dept.	36-48 Months	Emergency Operations Plan Capital Improvement Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### VILLAGE OF SANTA CLARA MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
25	Continue funding the emergency notification system in order to provide an alert system for the county and its jurisdictions. Notification system. Funding will be sought in order to continue an alert system for use within Grant County and its included jurisdictions in order to provide rapid warning of hazard events and provide instructions as to what actions residents should take for their safety.	Village-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Hazardous Materials	Communication, Safety/Security	N/A	H	\$20,000 per 3 years	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Village of Santa Clara Administrator	36 Months	Hazard Mitigation Plan Emergency Operations Plan	Promote public safety.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY

#### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
1	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of way and drainage systems on a scheduled basis.	Town-wide	Reduce damages to infrastructure; Ensure continuity of services during and after event.	Structure and Infrastructure	Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire	Safety/Security, Energy (Power/Fuel)	Y	M	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	24 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
2	Adopt and implement a program for clearing debris from bridges, drains, and culverts.	Town-wide	Reduce damages caused by flooding by maintaining or restoring drainage capacity.	Structure and Infrastructure	Flood	Safety/Security	Y	M	\$50,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	36 Months	Capital Improvement Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
3	Purchase and install surge protectors, pods, or protection systems for critical infrastructure.	Town-wide critical infrastructure	Reduce natural hazard risk and vulnerability of critical infrastructure from damage.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	36 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.
4	Harden/retrofit critical facilities to hazard-resistant levels.	Town-wide	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.	Structure and Infrastructure	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Safety/Security	Y	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	36 Months	Capital Improvement Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
5	Acquire and install generators with hard wired quick connections at all critical facilities.	Town-wide	Provide power for critical facilities during power outages and ensure continuity of critical services.	Structure and Infrastructure	Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Energy (Power/Fuel)	N/A	M	\$500,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	36 Months	Emergency Operations Plan	Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.
6	Complete application for National Flood Insurance Program Community Rating System.	Town-wide	Reduce flood insurance premiums for local residents; Reduce flood risk and build resiliency.	Education and Awareness	Flood	Communication	Y	M	\$15,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator, USACEs, FEMA	24 Months	Hazard Mitigation Plan	Protects communities and reduces risk of flooding.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
7	Incorporate all future comprehensive planning for Silver City with the Grant County Mitigation Plan. Ensure that future growth does not expand into areas that expose the community to increased flood risks. Silver City has an ongoing planning effort to ensure that its growth is done in an organized manner. It is vital that all planning efforts consider the identified hazard locations in and around Silver City to avoid increasing the community's exposure to hazard risk. To accomplish this goal, the town council will enact legislation to ensure that all future planning will take into consideration the Grant County Mitigation Plan, which also includes Silver City.	Town-wide	Reduce risk through improved development practices and building requirements/restrictions.	Local Planning and Regulations	Flood	Safety/Security	N/A	M	\$15,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City City Council, Attorney, Planning, Engineer, Floodplain Manager	12-24 Months	Comprehensive Plan	Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
8	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. The City Council will draft a water use restriction program based on a sliding scale with increasingly restrictive measures based on the severity of existing drought conditions.	Town-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Local Plans and Regulations Natural System Protection	Drought	Safety/Security	N/A	M	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City City Council	36-48 Months	Drought Contingency Plan	N/A
9	Implement education and awareness programs utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages. Include links to weather alerts and departmental phone listings with contact personnel for residents.	Town-wide	Promote hazard awareness and protect citizens from potential injuries and damages.	Education and Awareness	Drought, Extreme Cold, Extreme Heat, Flood, Hail, High Wind, Lightning, Severe Winter Storms, Tornado, Wildfire, Hazardous Materials	Communication	N/A	M	\$40,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	24-36 Months	Hazard Mitigation Plan	Promote public safety.

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
10	Enact legislation regarding water use during drought conditions that raises the level of restriction as drought conditions become more severe. A rebate program will be developed to provide city residents with an incentive to replace older toilets and showerheads with low flow units. An additional incentive program will be developed addressing the installation of gray water recovery systems.	Town-wide	Reduce loss of critical infrastructure and property due to drought conditions.	Education and Awareness	Drought	Safety/Security	N/A	L	\$5,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Administrator	36-48 Months	Drought Contingency Plan	N/A
11	To reduce the potential impact of severe weather events on critical facilities in Silver City install metal overhead covers on government parking lots.	Town-wide	Reduce loss of town owned property.	Structure and Infrastructure	Hail, High Wind, Lightning, Severe Winter Storms, Tornado	Safety/Security	N/A	L	\$100,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Town of Silver City Public Works, Parks and Wildlife	24 Months	Capital Improvement Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
12	Grant County HAZMAT transport survey. Conduct a hazardous material transport survey within Grant County. This survey will detail the number and types of hazardous material transports traversing Grant County for one month. The survey will include the number and types of transports moving through the county, the roadway on which they were observed, and the identity of the hazardous material being carried.	Town-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	County Grant OEM, Town of Silver City Fire Dept.	36-48 Months	Emergency Action Management Plan	N/A

## SECTION 18: MITIGATION ACTIONS

### TOWN OF SILVER CITY MITIGATION ACTIONS

*\*Reduces risk to new and/or existing buildings and infrastructure*

Action #	Proposed Action	Site	Benefit	Action Type	Hazards	Community Lifeline	Infra.*	Priority (High, Mod., Low)	Cost	Potential Funding Sources	Lead Agency	Time-line	Existing Plans	NFIP
13	Determine the most critical locations where hazardous material transport accidents have been occurring within Grant County and Town of Silver City. Grant County HAZMAT response survey. Statistical data will be collected over a six-month period to examine the location of the most serious traffic accident locations in Grant County and local jurisdictions with a concentration on identified HAZMAT routes within the county. In addition, the survey will document all accidents involving hazardous material transport and the type of material being carried.	Town-wide	Reduce damages at critical facilities; Reduce risk of injury to emergency and critical personnel.	Education and Awareness	Hazardous Materials	Hazardous Materials, Safety/Security, Communication	Y	M	\$30,000	Local Budget: State Grants (GLO, TAMFS, TDA, TDEM, TWDB, TXDOT); Federal Grants (FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS)	Grant County OEM, Town of Silver City Fire Dept.	36-48 Months	Emergency Action Management Plan	N/A



# SECTION 19

# PLAN

# MAINTENANCE

## SECTION 19: PLAN MAINTENANCE

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### PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the participating jurisdictions within Grant County, and the general public will be involved in implementing, evaluating, and enhancing the Plan over time. These maintenance procedures for the plan include all mitigation actions and hazard assessments found within the Grant County Hazard Mitigation Action Plan 2025. The sustained hazard mitigation planning process consists of four main parts:

- Incorporation
- Monitoring and Evaluation
- Updating
- Continued Public Involvement

### INCORPORATION

Participating jurisdictions within Grant County will be responsible for further development and implementation of mitigation actions. Each action has been assigned to a specific department within the participating jurisdictions. The following describes the process by which participating jurisdictions will incorporate elements of the mitigation plan into other planning mechanisms.

### PROCESS OF INCORPORATION

Once the Plan is adopted, participating jurisdictions within Grant County will implement actions based on priority and the availability of funding. The planning area currently implements policies and programs to reduce loss to life and property from hazards. The mitigation actions developed for this Plan enhance this ongoing effort and will be implemented through other program mechanisms where possible.

The potential funding sources listed for each identified action may be used when the jurisdiction seeks funds to implement actions. An implementation time period or a specific implementation date has been assigned to each action as an incentive for completing each task and gauging whether actions are implemented in a timely manner.

Participating jurisdictions within Grant County will integrate implementation of their mitigation actions with other plans and policies such as construction standards and emergency management plans, and ensure that these actions, or proposed projects, are reflected in other planning efforts.

## SECTION 19: PLAN MAINTENANCE

Coordinating and integrating components of other plans and policies into goals and objectives of the Plan will further maximize funding and provide possible cost-sharing of key projects, thereby reducing loss of lives and property and mitigating hazards affecting the area.

Upon formal adoption of the Plan, planning team members from each participating jurisdiction will work to integrate the hazard mitigation strategies into other plans and codes as they are developed. Participating team members will conduct periodic reviews of plans and policies, once per year at a minimum, and analyze the need for revisions in light of the approved Plan. The planning team will review all comprehensive land use plans, capital improvement plans, annual budget reviews, emergency operations or management plans (applicable jurisdictions only), and transportation plans (applicable jurisdictions only) to guide and control development. Participating jurisdictions will ensure that capital improvement planning in the future will also contribute to the goals of this hazard mitigation Plan to reduce the long-term risk to life and property from all hazards. Within one year of formal adoption of the hazard mitigation Plan, existing planning mechanisms will be reviewed by each jurisdiction.

Grant County is committed to supporting the participating jurisdictions as they implement their mitigation actions. Planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the planning area will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 19-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts. The team members, listed in Table 19-2 below, will be responsible for the review of these planning mechanisms and their incorporation of the plan, with the exception of the Floodplain Management Plans; the jurisdictions who have a Floodplain Administrator on staff will be responsible for incorporating the plan when floodplain management plans are updated, or new plans are developed.

**Table 19-1. Methods of Incorporation of the Plan**

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	<b>Grant County</b> – Emergency Management: Emergency Management Coordinator <b>City of Bayard</b> – City Council: Mayor <b>Town of Hurley</b> – Administration: Town Clerk <b>Village of Santa Clara</b> – Administration: Village Administration <b>Town of Silver City</b> – Fire: Fire Chief	Various departments and key personnel that participated in the planning process for participating jurisdictions within Grant County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.

## SECTION 19: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Capital Improvement Plans	<p><b>Grant County</b> – Emergency Management: Emergency Management Coordinator</p> <p><b>City of Bayard</b> – City Council: Mayor</p> <p><b>Town of Hurley</b> – Administration: Town Clerk</p> <p><b>Village of Santa Clara</b> – Administration: Village Administration</p> <p><b>Town of Silver City</b> – Fire: Fire Chief</p>	<p>All participating jurisdictions within Grant County have a Capital Improvement Plan (CIP) in place or under development. Prior to any revisions to the CIP, County, City, Town, and Village departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.</p>
Community Wildfire Protection Plan	<p><b>Grant County</b> – Emergency Management: Emergency Management Coordinator</p> <p><b>Town of Silver City</b> – Fire: Fire Chief</p>	<p>Community Wildfire Protection Plans (CWPPs) include preventative and corrective actions to address a community's risk of damage from wildfire. Information found in Section 15 of this Plan discussing the people and property at risk to wildfire will be reviewed and revised when participating jurisdictions update their CWPP or develop new plans.</p>
Comprehensive Plans	<p><b>Grant County</b> – Emergency Management: Emergency Management Coordinator</p> <p><b>City of Bayard</b> – City Council: Mayor</p> <p><b>Town of Hurley</b> – Administration: Town Clerk</p> <p><b>Village of Santa Clara</b> – Administration: Village Administration</p> <p><b>Town of Silver City</b> – Fire: Fire Chief</p>	<p>All participating jurisdictions within Grant County have a Comprehensive Land Use Plan in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.</p>
Floodplain Management Plans	<p><b>Grant County</b> – Floodplain Administrator</p> <p><b>City of Bayard</b> – Floodplain Administrator</p> <p><b>Village of Santa Clara</b> – Floodplain Administrator</p> <p><b>Town of Silver City</b> – Floodplain Administrator</p>	<p>Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 9 of this Plan discussing the people and property at risk to flood will be reviewed and revised when the county and participating jurisdictions within Grant County update their management plans or develops new plans.</p>

## SECTION 19: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Grant Applications	<b>Grant County</b> – Emergency Management: Emergency Management Coordinator <b>City of Bayard</b> – City Council: Mayor <b>Town of Hurley</b> – Administration: Town Clerk <b>Village of Santa Clara</b> – Administration: Village Administration <b>Town of Silver City</b> – Fire: Fire Chief	The HMAP will be evaluated by participating jurisdictions within Grant County when grant funding is sought for mitigation projects. If a project is not in the Plan, a Plan Revision may be necessary to include the action in the Plan.
Regulatory Plans	<b>Grant County</b> – Emergency Management: Emergency Management Coordinator <b>City of Bayard</b> – City Council: Mayor <b>Town of Hurley</b> – Administration: Town Clerk <b>Village of Santa Clara</b> – Administration: Village Administration <b>Town of Silver City</b> – Fire: Fire Chief	Currently, several participating jurisdictions within Grant County have regulatory plans in place, such as Emergency Operations Plans, Land Use Plans, and Evacuation Plans. The Plan will be consulted when County, City, Town, and Village departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

## MONITORING AND EVALUATION

Periodic revisions of the Plan are required to ensure that goals, objectives, and mitigation actions are kept current. When the plan is discussed in these sections it includes the risk assessment and mitigation actions as a part of the monitoring, evaluating, updating and review process. Revisions may be required to ensure the Plan is in compliance with federal and state statutes and regulations. This section outlines the procedures for completing Plan revisions, updates, and review. Table 19-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

**Table 19-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan**

ORGANIZATION / DEPARTMENT	TITLE
Grant County – Emergency Management	Emergency Management Coordinator
City of Bayard – City Council	Mayor
Town of Hurley – Administration	Town Clerk
Village of Santa Clara – Administration	Village Administrator
Town of Silver City – Community Development	Director
Town of Silver City – Fire	Fire Chief

## SECTION 19: PLAN MAINTENANCE

### MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 19-2. Individuals holding the title listed in Table 19-2 will be responsible for monitoring the Plan on an annual basis. Plan monitoring includes reviewing and incorporating into the Plan other existing planning mechanisms that relate or support goals and objectives of the Plan; monitoring the incorporation of the Plan into future updates of other existing planning mechanisms as appropriate; reviewing mitigation actions submitted and coordinating with various County, City, Town, Village departments to determine if mitigation actions need to be re-evaluated and updated; evaluating and updating the Plan as necessary; and monitoring plan maintenance to ensure that the process described is being followed, on an annual basis, throughout the planning process. The Planning Team will develop a brief report that identifies policies and actions in the plan that have been successfully implemented and any changes in the implementation process needed for continued success. A summary of meeting notes will report the particulars involved in developing an action into a project. In addition to the annual monitoring, the Plan will be similarly reviewed immediately after extreme weather events including, but not limited to, state and federally declared disasters.

### EVALUATION

As part of the evaluation process, the Planning Team will assess changes in risk; determine whether the implementation of mitigation actions is on schedule; determine whether there are any implementation problems, such as technical, political, legal, or coordination issues; and identify changes in land development or programs that affect mitigation priorities for each respective department or organization.

The Planning Team will meet on an annual basis to evaluate the Plan and identify any needed changes and assess the effectiveness of the plan achieving its stated purpose and goals. The team will evaluate the number of mitigation actions implemented along with the loss-reduction associated with each action. Actions that have not been implemented will be evaluated to determine if any social, political, or financial barriers are impeding implementation and if any changes are necessary to improve the viability of an action. The team will evaluate changes in land development and/or programs that affect mitigation priorities in their respective jurisdictions. The annual evaluation process will help to determine if any changes are necessary. In addition, the Plan will be similarly evaluated immediately after extreme weather events including, but not limited to, state and federally declared disasters.

### UPDATING

#### PLAN REVISIONS

At any time, minor technical changes may be made to update the Grant County Hazard Mitigation Action Plan 2025. Material changes to mitigation actions or major changes in the overall direction of the Plan or the policies contained within it, must be subject to formal adoption by the participating jurisdictions.

The participating jurisdictions within Grant County will review proposed revisions and vote to accept, reject, or amend the proposed change. Upon ratification, the revision will be transmitted to NM DHSEM.

## SECTION 19: PLAN MAINTENANCE

In determining whether to recommend approval or denial of a Plan Revision request, participating jurisdictions will consider the following factors:

- Errors or omissions made in the identification of issues or needs during the preparation of the Plan;
- New issues or needs that were not adequately addressed in the Plan; and
- Changes in information, data, or assumptions from those on which the Plan was based.

### FIVE (5) YEAR REVIEW

The Plan will be thoroughly reviewed by the Planning Team at the end of three years<sup>1</sup> from the approval date, to determine whether there have been significant changes in the planning area that necessitate changes in the types of mitigation actions proposed. Factors that may affect the content of the Plan include new development in identified hazard areas, increased exposure to hazards, disaster declarations, increase or decrease in capability to address hazards, and changes to federal or state legislation.

The Plan review process provides the participating jurisdictions within Grant County an opportunity to evaluate mitigation actions that have been successful, identify losses avoided due to the implementation of specific mitigation measures, and address mitigation actions that may not have been successfully implemented as assigned.

It is recommended that the full Executive and Advisory Planning Team (Section 2, Tables 2-1 and 2-2) meet to review the Plan at the end of three years because grant funds may be necessary for the development of a five-year update. Reviewing planning grant options in advance of the five-year Plan update deadline is recommended considering the timelines for grant and planning cycles can be in excess of a year.

Following the Plan review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and Plan revision process outlined herein. Upon completion of the review, update, and revision process the revised Plan will be submitted to NM DHSEM for final review and approval in coordination with FEMA.

### CONTINUED PUBLIC INVOLVEMENT

Public input was an integral part of the preparation of this Plan and will continue to be essential for Plan updates. The public will be directly involved in the annual evaluation, monitoring, reviews, and cyclical updates. Changes or suggestions to improve or update the Plan will provide opportunities for additional public input.

The public can review the Plan on the participating jurisdictions' websites, where officials and the public are invited to provide ongoing feedback, via email.

The Planning Team may also designate voluntary citizens from the planning area or willing stakeholder members from the private sector businesses that were involved in the Plan's development to provide feedback on an annual basis. It is important that stakeholders and the immediate community maintain a vested interest in preserving the functionality of the planning

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<sup>1</sup> Three years is recommended to begin review of the planning area to prevent the Plan for expiring.

## SECTION 19: PLAN MAINTENANCE

area as it pertains to the overall goals of the mitigation plan. The Planning Team is responsible for notifying stakeholders and community members on an annual basis and maintaining the Plan.

Media, including local newspaper and radio stations, will be used to notify the public of any maintenance or periodic review activities during the implementation, monitoring, and evaluation phases. Additionally, local news media will be contacted to cover information regarding Plan updates, status of grant applications, and project implementation. Local and social media outlets, such as Facebook, Instagram, LinkedIn, NextDoor, and X (formerly known as Twitter), will keep the public and stakeholders apprised of potential opportunities to fund and implement mitigation projects identified in the Plan.



# APPENDIX A PLANNING TEAM

## APPENDIX A: PLANNING TEAM

Planning Team Members .....	1
Stakeholders .....	2

### PLANNING TEAM MEMBERS

The Grant County Hazard Mitigation Action Plan 2025 was organized using a direct representative model. An Executive Planning Team from the participating jurisdictions, shown in Table A-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table A-2 reflects the Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table A-3 is comprised of stakeholders who were invited to provide Plan input. Public outreach efforts and meeting documentation is provided in Appendix E.

**Table A-1. Executive Planning Team**

ORGANIZATION / DEPARTMENT	TITLE
Grant County – Emergency Management	Emergency Management Coordinator
City of Bayard – City Council	Mayor
Town of Hurley – Administration	Town Clerk
Village of Santa Clara – Administration	Village Administrator
Town of Silver City – Community Development	Director
Town of Silver City – Fire	Fire Chief

**Table A-2. Advisory Planning Team**

ORGANIZATION / DEPARTMENT	TITLE
Grant County – Administration	County Manager
Grant County – Administration	Deputy County Manager
Grant County – Facilities & Grounds Maintenance	Public Works Director
Grant County – Fire	County Fire Chief
Grant County – Government	District 1 Commissioner
Grant County – Government	District 2 Commissioner
Grant County – Government	District 3 Commissioner
Grant County – Government	District 4 Commissioner
Grant County – Government	District 5 Commissioner

## APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
Grant County – Planning & Community Development	Code Enforcement Officer
Grant County – Planning & Community Development	GIS Mapping
Grant County – Planning & Community Development	Planning & Development Director
Grant County – Sheriff's Office	County Sheriff
City of Bayard – Municipal Utilities	Public Works Maintenance
City of Bayard – Municipal Utilities	Wastewater
City of Bayard – Public Safety	Fire Chief
City of Bayard – Public Safety	Chief of Police
Town of Hurley – Administration	Maintenance Supervisor
Town of Hurley – Administration	Mayor
Town of Hurley – Fire	Fire Chief
Town of Hurley – Police	Police Chief
Village of Santa Clara – Administration	Code Enforcement
Village of Santa Clara – Administration	Mayor
Village of Santa Clara – Administration	Public Works Administrator
Village of Santa Clara – Administration	Village Clerk
Village of Santa Clara – Fire	Fire Chief
Village of Santa Clara – Police	Police Chief
Town of Silver City – Executive	Town Manager
Town of Silver City – Government	Mayor
Town of Silver City – Police	Chief of Police
Town of Silver City – Public Works & Parks	Director of Public Works
Town of Silver City – Utilities	Director

## STAKEHOLDERS

The following groups listed in Table A-3 represent a list of organizations invited to stakeholder meetings, public meetings, and workshops throughout the planning process and include members of community groups, non-profit organizations, private businesses, utility providers, neighboring

## APPENDIX A: PLANNING TEAM

counties, schools, state and federal agencies. The public were also invited to participate via e-mail throughout the planning process. Many of the invited organizations and stakeholders participated and were integral to providing comments and data for the Plan. For a list of attendees at meetings, please see Appendix E<sup>1</sup>.

**Table A-3. Stakeholders**

AGENCY	TITLE	STAKEHOLDER TYPE
American Red Cross	Area Volunteer	Non-Profit Organization
American Red Cross	Senior Disaster Program Manager	Non-Profit Organization
Bayard Public Library	Librarian	Community Organization
Catron County	Emergency Manager	Neighboring Community
Cobre Consolidated Schools	Superintendent	Academia
Columbus Electric Cooperative	Executive Vice President / General Manager	Utility Provider
The Commons - Center for Food Security and Sustainability	Operations Manager	Community Organization
Emergency Food & Shelter Program	President	Community Organization
Environmental Protection Agency – Region 6	Director of Emergency Management Division	Federal Agency
FEMA – Region 6	Hazard Mitigation Branch Director	Federal Agency
Forest Stewards Guild / New Mexico State Forestry Division	Forest Health Specialist	State Agency
Freeport-McMoRan	Senior Social Performance Manager	Private Organization
Freeport-McMoRan	Social Performance Manager	Private Organization
Gila Landscape Collaborative	Director	State Agency
Gila Regional Medical Center	Safety and Emergency Manager	Healthcare Agency
Grant County Airport	Airport Manager	Private Organization
Grant County Community Foundation	Founder	Community Organization
Grant Soil and Water Conservation District	Administrative Assistant	Utility Provider

<sup>1</sup> Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

## APPENDIX A: PLANNING TEAM

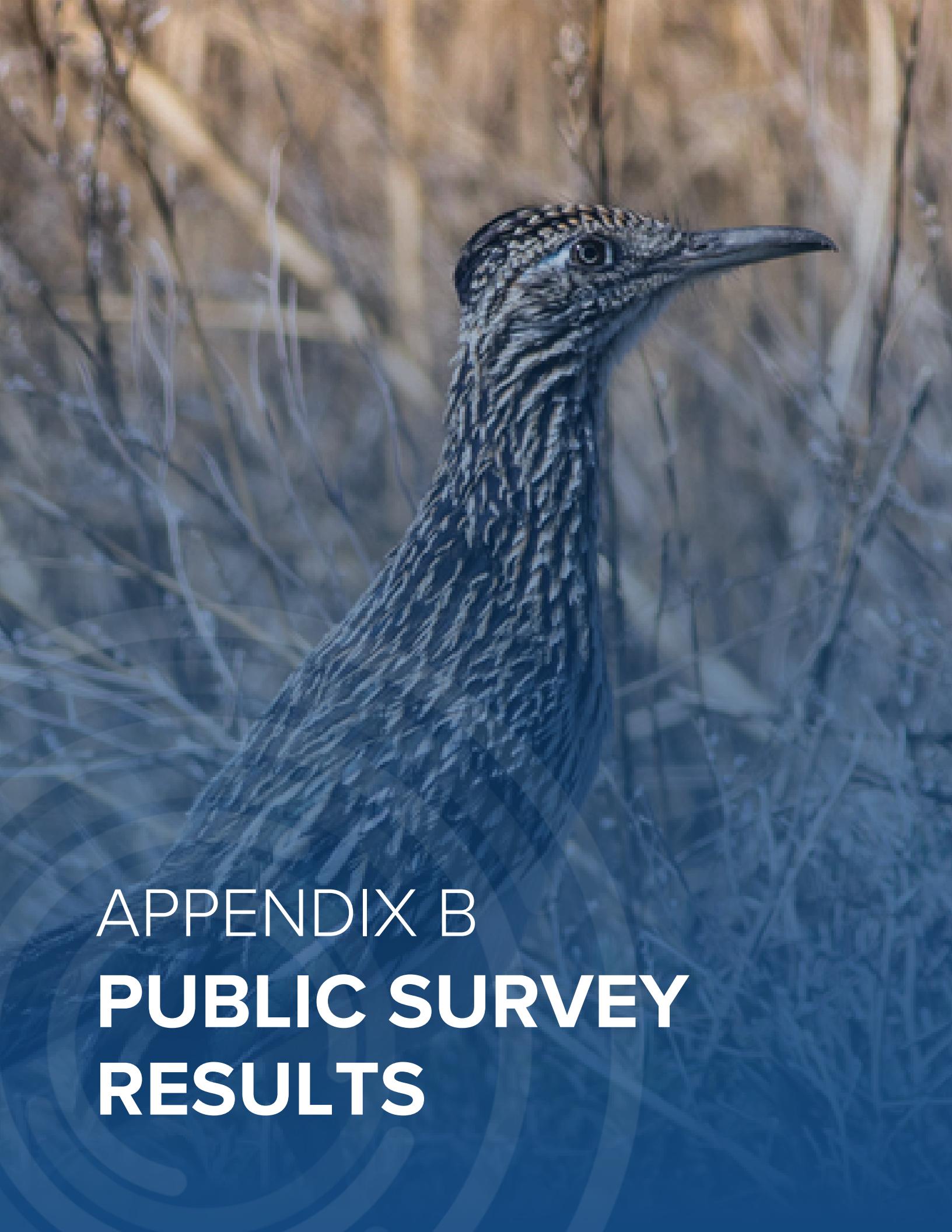
AGENCY	TITLE	STAKEHOLDER TYPE
Greenlee County	Emergency Manager	Neighboring Community
Habitat for Humanity	Executive Director	Non-Profit Organization
Hidalgo County	Emergency Manager / Health Department Director	Neighboring Community
Hidalgo Medical Services	Director of Senior Services	Healthcare Agency
High Desert Humane Society	General Representative	Community Organization
HMS Senior Service Program	CEO	Community Organization
Luna County	Emergency Manager	Neighboring Community
New Mexico Acequia Association	Executive Director	Private Organization
New Mexico Aging and Long-Term Services	Cabinet Secretary	State Agency
New Mexico Bureau of Land Management	District Fire Management Officer	State Agency
New Mexico Bureau of Land Management	Fuels Specialist	State Agency
New Mexico Bureau of Minerals and Geology	Director and State Geologist	State Agency
New Mexico Cattle Growers Association	President	State Agency
New Mexico Department of African American Affairs	Communications and Marketing Coordinator	State Agency
New Mexico Department of African American Affairs	Deputy Director	State Agency
New Mexico Department of Agriculture	Biosecurity Program Specialist of the Southwest Boarder Food Protection and Emergency Preparedness Center	State Agency
New Mexico Department of Agriculture	Co-Director of the Southwest Boarder Food Protection and Emergency Preparedness Center	State Agency
New Mexico Department of Agriculture	Director of the Southwest Boarder Food Protection and Emergency Preparedness Center	State Agency
New Mexico Department of Energy, Minerals, and Natural Resources	Communications Coordinator	State Agency

## APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
New Mexico Department of Health	Communications Coordinator	State Agency
New Mexico Department of Health	Emergency Manager Healthcare Coalition for Region II	State Agency
New Mexico Department of Health	Preparedness and Response Section Manager	State Agency
New Mexico Department of Health	Public Information Official	State Agency
New Mexico Department of Homeland Security and Emergency Management	Response, Recovery, and Mitigation Bureau Chief	State Agency
New Mexico Department of Homeland Security and Emergency Management	Mitigation Specialist	State Agency
New Mexico Department of Indian Affairs	Cabinet Secretary	State Agency
New Mexico Department of Transportation	District 1 (D1) Public Information Official	State Agency
New Mexico Drought Task Force	Water Use & Conservation	State Agency
New Mexico Environmental Department	Environmental Specialist	State Agency
New Mexico Environmental Department	Incident Response Coordinator	State Agency
New Mexico Gas Company	Media Representative	Utility Provider
New Mexico Gas Company	Operations Manager	Utility Provider
New Mexico Livestock Bureau	Deputy Director	State Agency
New Mexico Office of the State Engineer – Dam Safety	Bureau Chief	State Agency
New Mexico Office of the State Engineer – Dam Safety	Public Information Official	State Agency
New Mexico Wildlife Center	Communications Specialist	Community Organization
NOAA	Western Regional Contact	Federal Agency
NWS	Regional Office Contact	Federal Agency
PNM	Community Manager	Utility Provider
Sierra County	Emergency Manager	Neighboring Community

## APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Silver City Natural Resource Conservation Service Center	County Representative	Community Organization
Silver City Public Library	Assistant Director	Community Organization
Silver Consolidated Schools	Superintendent	Academia
Southwest Solid Waste Authority	Manager	Utility Provider
Synergy Disaster Recovery	Director of Planning	Private Organization
Tyrone Water & Wastewater Association	President	Utility Provider
United Ways of Southwest New Mexico	Community Engagement Specialist	Community Organization
United Ways of Southwest New Mexico	Grant Coordinator	Community Organization
Upper Gila Valley Arroyos Watershed District	Grant Administrator	Private Organization
U.S. Army Corps of Engineers	Southwest Regional Contact	Federal Agency
U.S. Department of Agriculture / Rural Partners Network	Community Liaison	Federal Agency
U.S. Fish and Wildlife	Southwest Regional Contact	Federal Agency
U.S. Forest Service	Public Affairs Officer	Federal Agency
Western New Mexico University	Chief of Staff	Academia



# APPENDIX B PUBLIC SURVEY RESULTS

## APPENDIX B: PUBLIC SURVEY RESULTS

Overview.....	1
Public Survey Results .....	2

### OVERVIEW

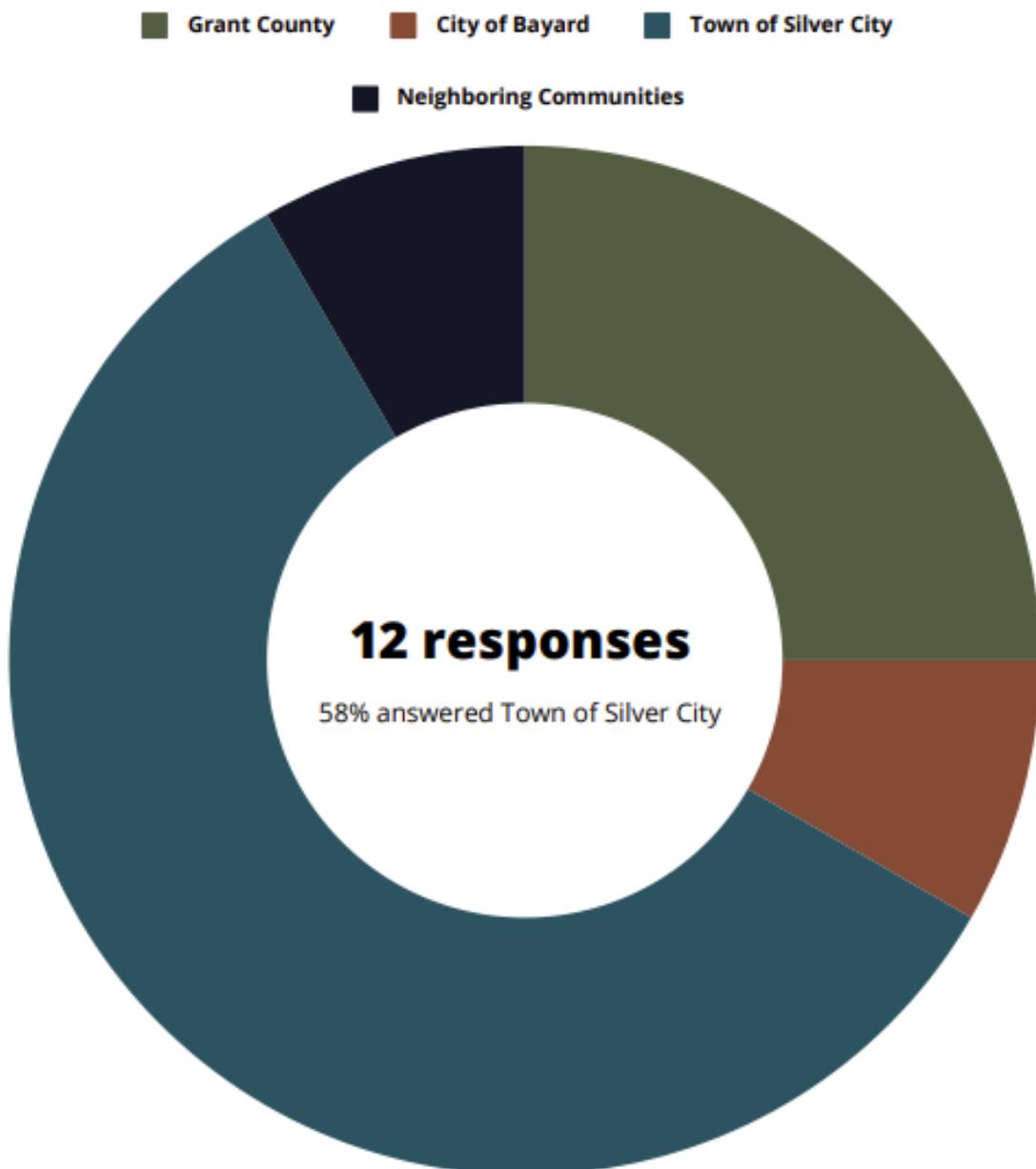
Grant County prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available via the participating jurisdictions' websites. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

A total of 12 surveys were collected, the results of which are analyzed in Appendix B. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdictions identify any potential actions or problem areas.

All public survey results were discussed and shared with the Planning Team during the Mitigation Strategy Workshop. These results are also provided below. The survey results provide information regarding the public's experience with natural hazards, their perceived hazards of concern, recommended mitigation actions, and additional valuable insights. Overall, this survey enhances the mitigation planning process by ensuring the plan properly represents the community through local knowledge, and by promoting equity.

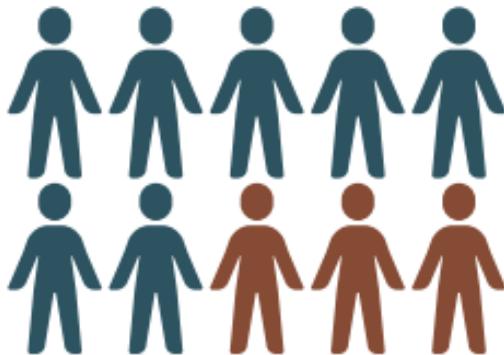
## APPENDIX B: PUBLIC SURVEY RESULTS

### PUBLIC SURVEY RESULTS



## APPENDIX B: PUBLIC SURVEY RESULTS

**Have you ever experienced or been impacted by a disaster?**



**67%**  
**Responded**  
**'Yes'**

**Personal experiences shared in survey responses included:**

"The Black Fire in June of 2022 and the flooding in August that followed."

"We were in set mode for Black Fire. We prepared for evacuation and had to find places we could take our livestock/horses."

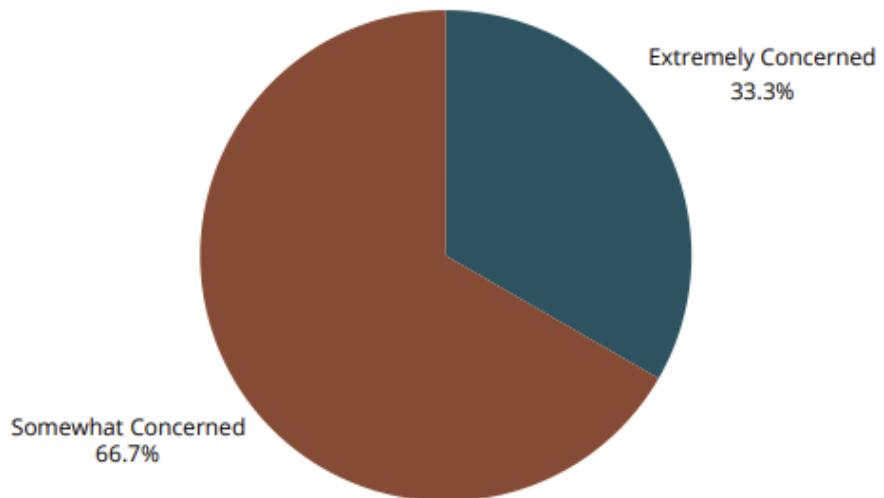
"Fire coming over the Boston Hill."

**38% of those who have been impacted by a disaster mentioned wildfire in their explanations.**



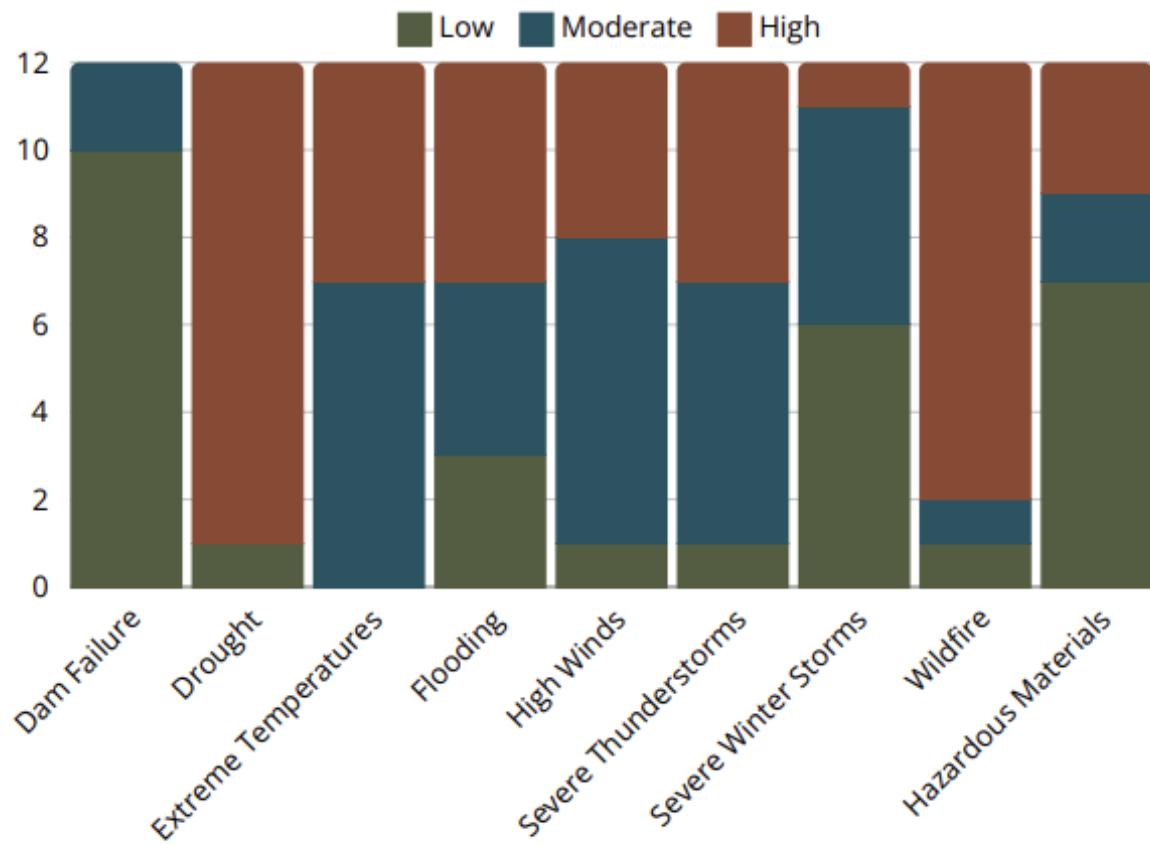
## APPENDIX B: PUBLIC SURVEY RESULTS

**Concern level for the possibility of their community being impacted by a disaster.**



## APPENDIX B: PUBLIC SURVEY RESULTS

**With the consideration of frequency of occurrence and potential impact severity, please select the one hazard you think is the highest and second highest threat to your neighborhood:**



**Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?**



Cyber Attack



Water Contamination



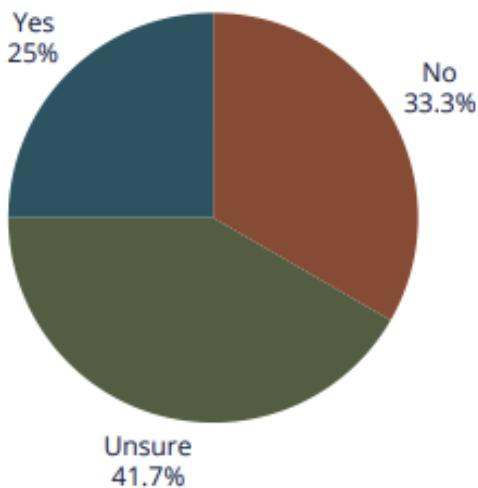
Air Pollution



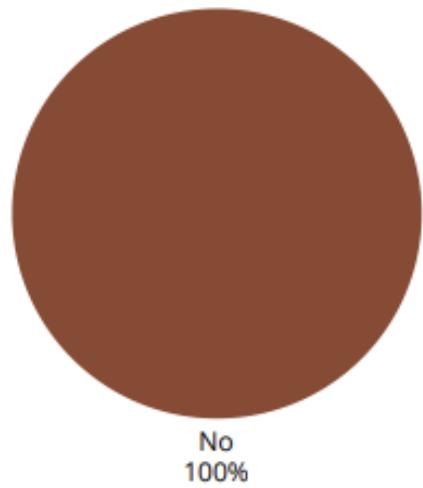
Debris Removal

## APPENDIX B: PUBLIC SURVEY RESULTS

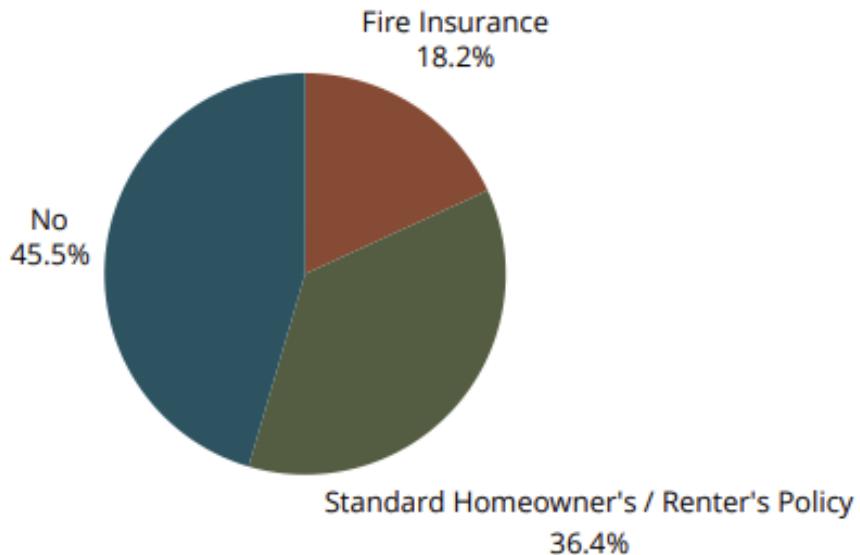
**To your knowledge, is your home located in any high hazard risk zones?**



**Have you had any issues getting homeowners or renters insurance due to risks of hazardous events?**



**Do you have any hazard specific insurance?  
Why or why not?**



## APPENDIX B: PUBLIC SURVEY RESULTS

### **Have you taken any actions to make your home or neighborhood more resistant to hazards?**



**92%**  
**Responded**  
**'Yes'**

#### **Actions taken included:**

**82% of those who have taken action have done so through fuels reduction**



"Fuels reduction by ensuring there is a defensible space around my home."

"Solar power bank not part of the power grid."

"Removal of downed wood, stucco applied to carport, will be sealing eaves as part of ongoing renovations, house has metal roof and concrete block walls."

"Removing ladder fuels from property, trimming dead tree limbs; house has metal roof, concrete block exterior walls; do not burn trash or debris; do not set off fireworks, et al."

"Removed dead trees."

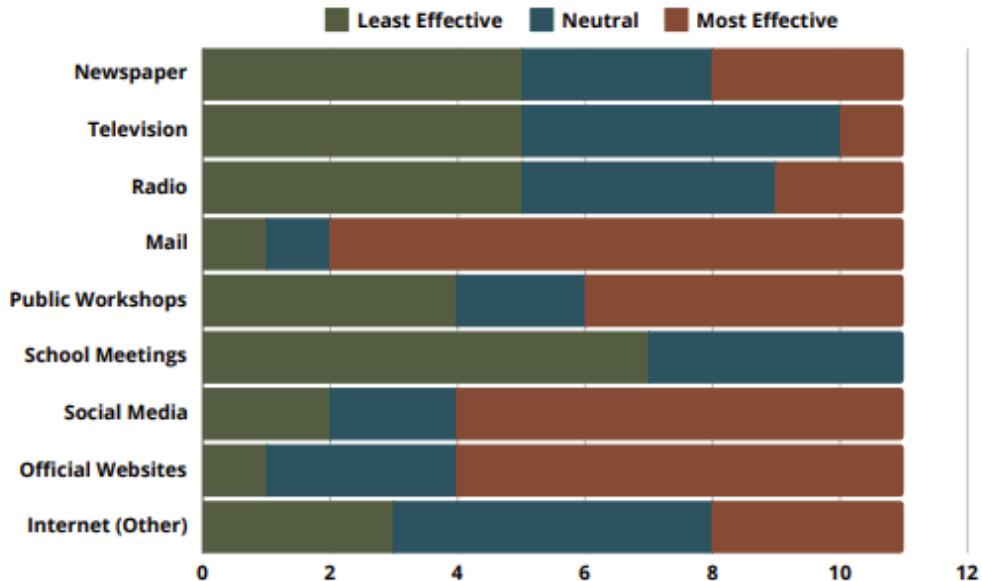
"Erosion mitigation."

**82% of survey responders are interested in making their homes or neighborhoods more resistant to hazards.**



## APPENDIX B: PUBLIC SURVEY RESULTS

**What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?**



**Effectiveness of communication methods for receiving information about how to make your home and neighborhood more resistant to hazards**



**Additional communication methods recommended:**



Texts / Alerts



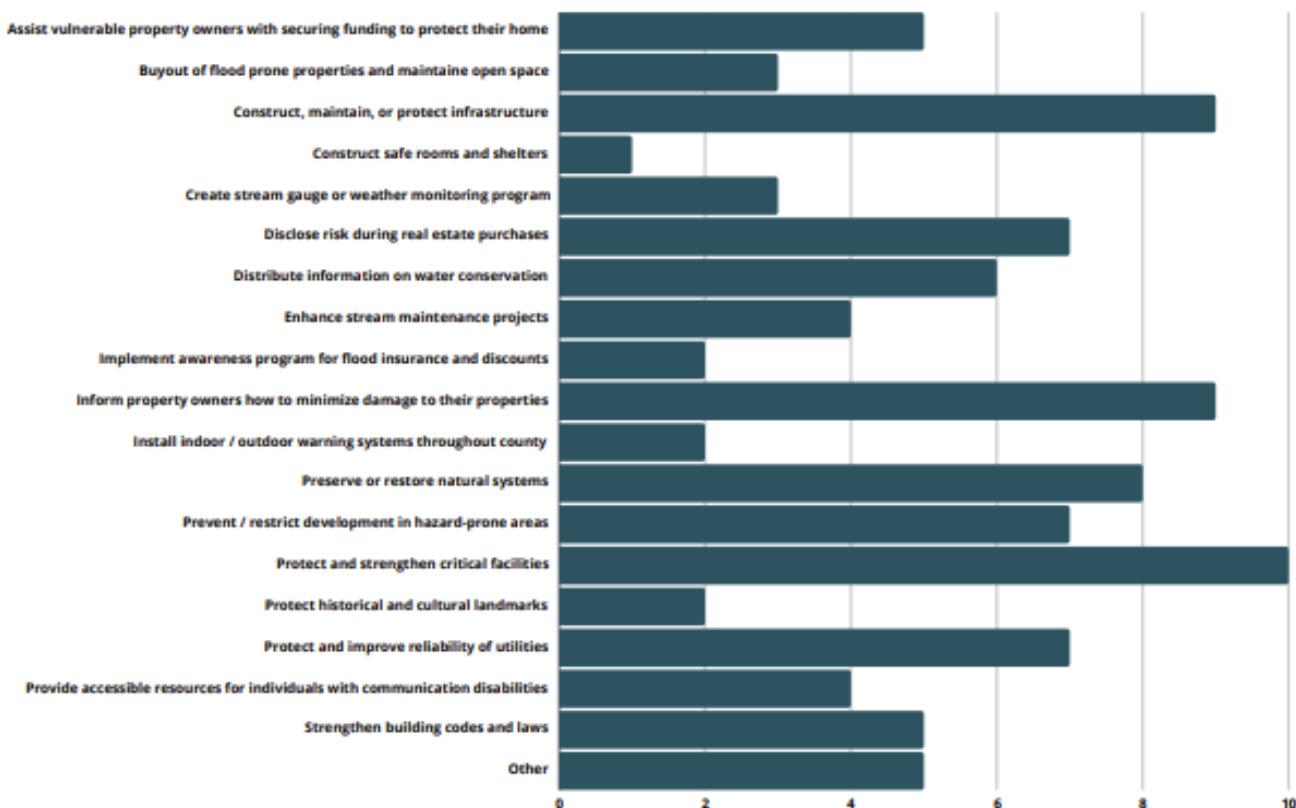
Email



Flyers

## APPENDIX B: PUBLIC SURVEY RESULTS

**In your opinion, please select steps your local government should prioritize to reduce or eliminate the risk of future hazard damages in your neighborhood.**



## APPENDIX B: PUBLIC SURVEY RESULTS

### **Is there anything else regarding hazard mitigation that you would like to note?**

"Good communication. Recognizing infrastructure limitations - lack of alternative evacuation routes."

"Make the state and county THIRA/HMGP plans public."

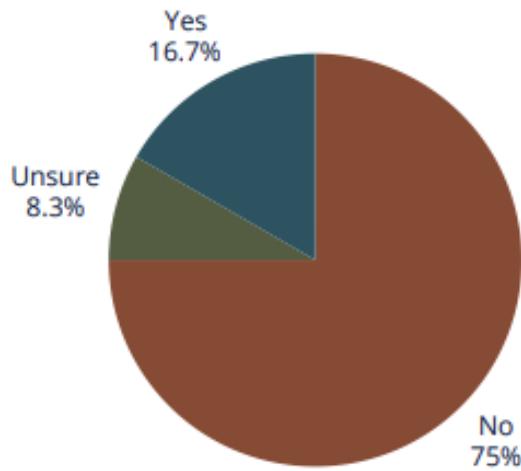
"Need to include awareness and plans for nursing and assisted living facilities as well as any group homes for disabled adults."

"I hope that natural resource protection, Prevention/Local Plans & Regulations, and public education would reduce greatly the need for property protection and structural projects."

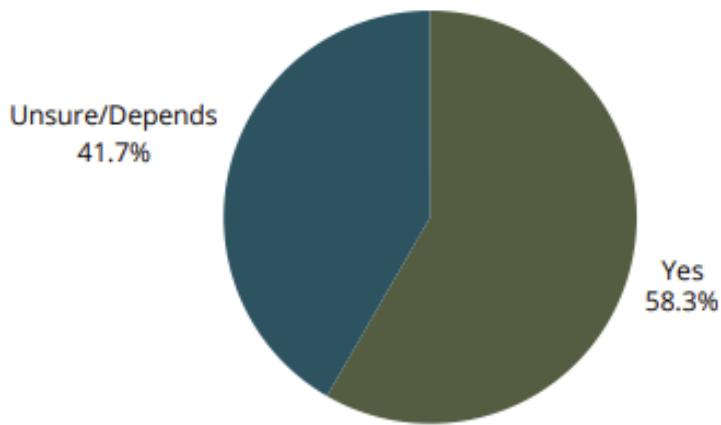
"Code enforcement w perhaps a volunteer committee to search and find violations and then report them to authorities."

## APPENDIX B: PUBLIC SURVEY RESULTS

**Do you have any special access to functional needs (AFN) within your household that would require early warning or specialized response during disasters?**

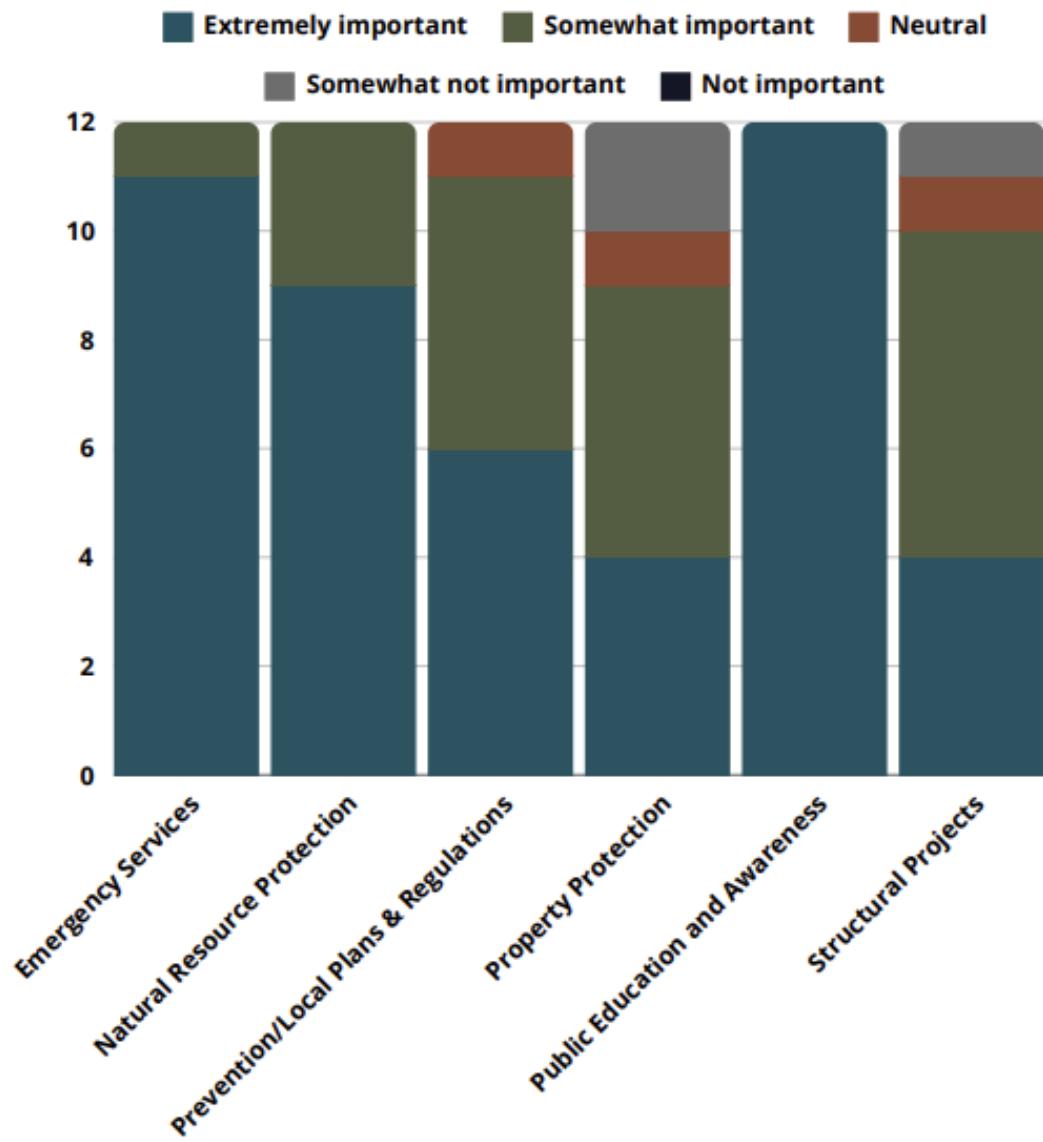


**Would you support regulation (restrictions) on land uses within known high hazard areas?**



## APPENDIX B: PUBLIC SURVEY RESULTS

**A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.**



**Emergency Services** - Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.

**Natural Resource Protection** - Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

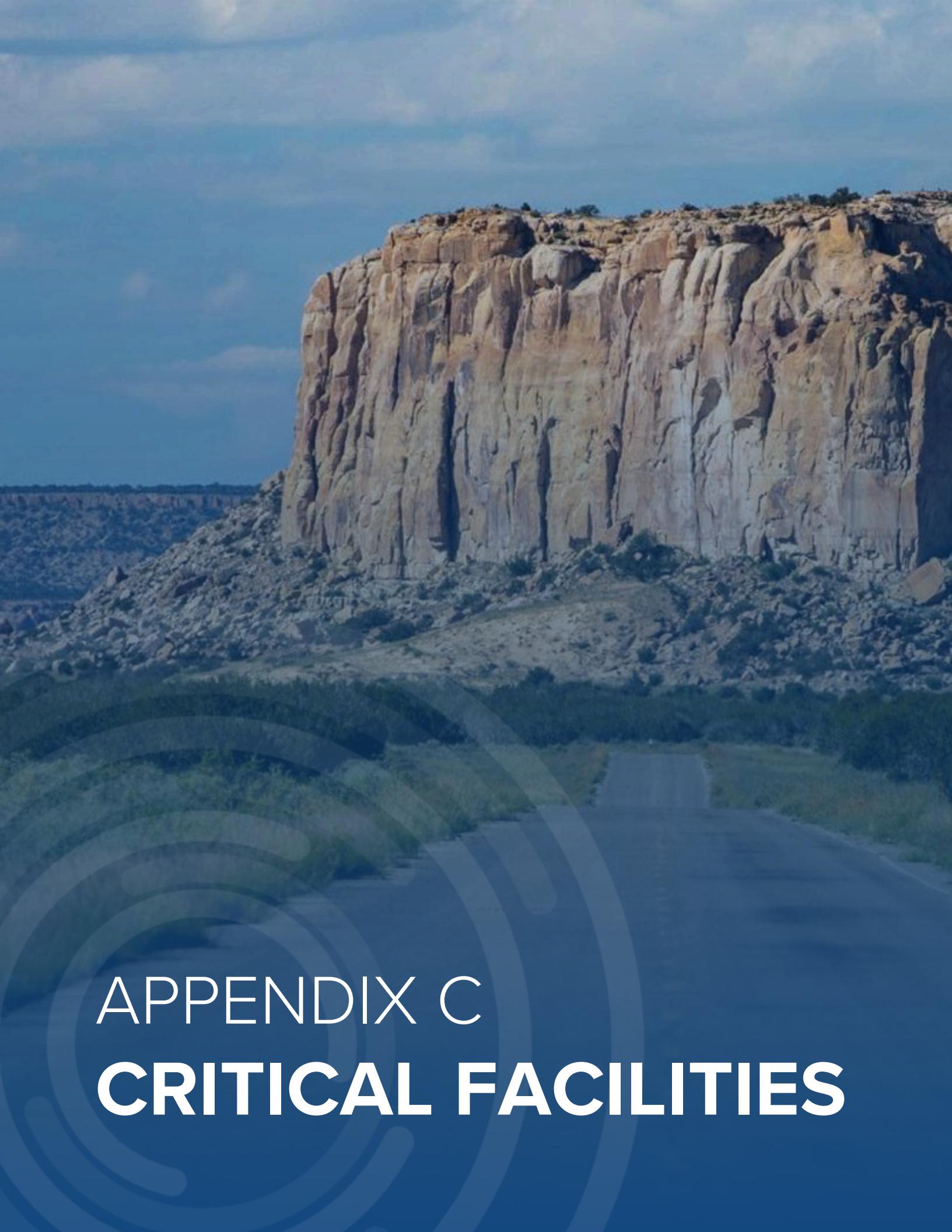
## APPENDIX B: PUBLIC SURVEY RESULTS

**Prevention / Local Plans & Regulations** - Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.

**Property Protection** - Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.

**Public Education and Awareness** - Actions to inform citizens about hazards and techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.

**Structural Projects** - Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls, and storm sewers.



# APPENDIX C

# CRITICAL FACILITIES

## APPENDIX C: CRITICAL FACILITIES

Overview.....	1
Critical Facilities .....	2

### OVERVIEW

Appendix C is **For Official Use Only (FOUO)** and may be exempt from public release under FOIA. Figures C-1 through C-5 locate all critical facilities that were included in the risk assessment. Mapped facilities were provided by Planning Team members. Tables C-1 through C-5 note the critical facilities by type.

## APPENDIX C: CRITICAL FACILITIES

### CRITICAL FACILITIES

Figure C-1. Critical Facilities in Grant County

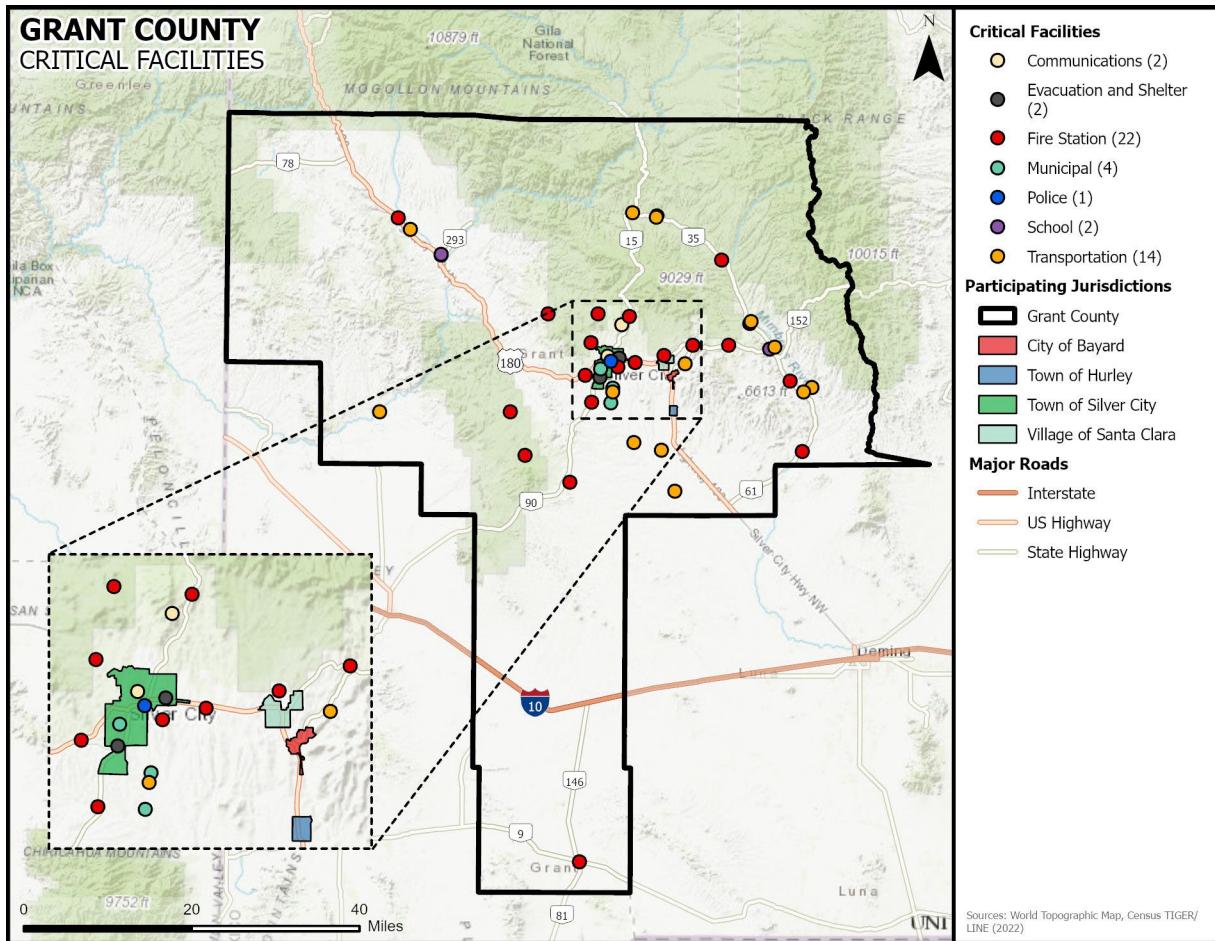
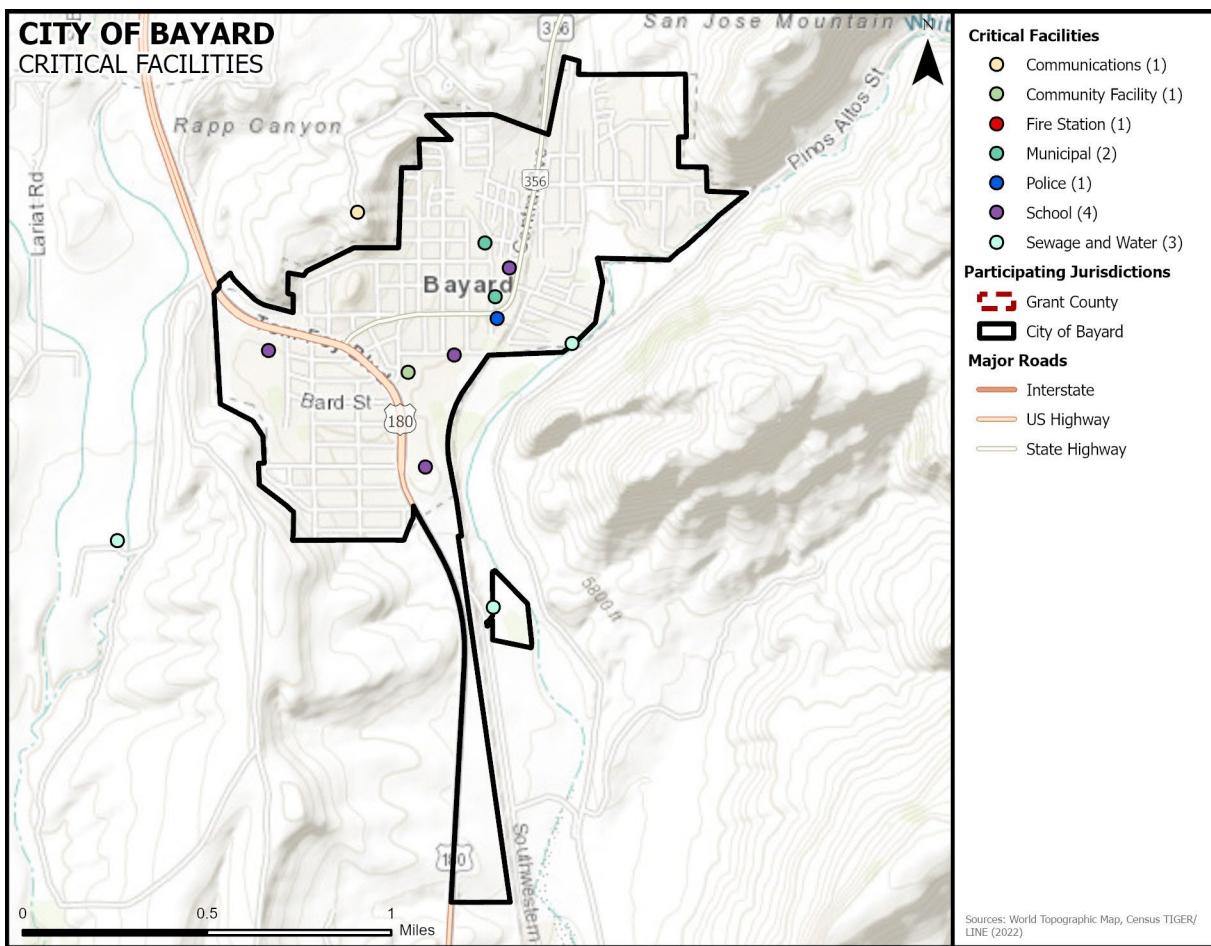


Table C-1. Critical Facilities by Type in Grant County

TYPE	NUMBER	TYPE	NUMBER
Communications – Emergency/Warning	1	Police	1
Communications - Tower	1	School	2
Evacuation and Shelter	2	Transportation – Air	1
Fire Station	22	Transportation – Bridges	13
Municipal	4		

## APPENDIX C: CRITICAL FACILITIES

**Figure C-2. Critical Facilities in the City of Bayard**



**Table C-2. Critical Facilities by Type in the City of Bayard**

TYPE	NUMBER
Communications – Emergency/Warning	1
Community Facility	1
Fire Station	1
Municipal	2
Police	1
School	4
Sewage and Water – Lift Station	1
Sewage and Water – Wastewater Treatment Plant	1
Sewage and Water – Well	1

## APPENDIX C: CRITICAL FACILITIES

Figure C-3. Critical Facilities in the Town of Hurley

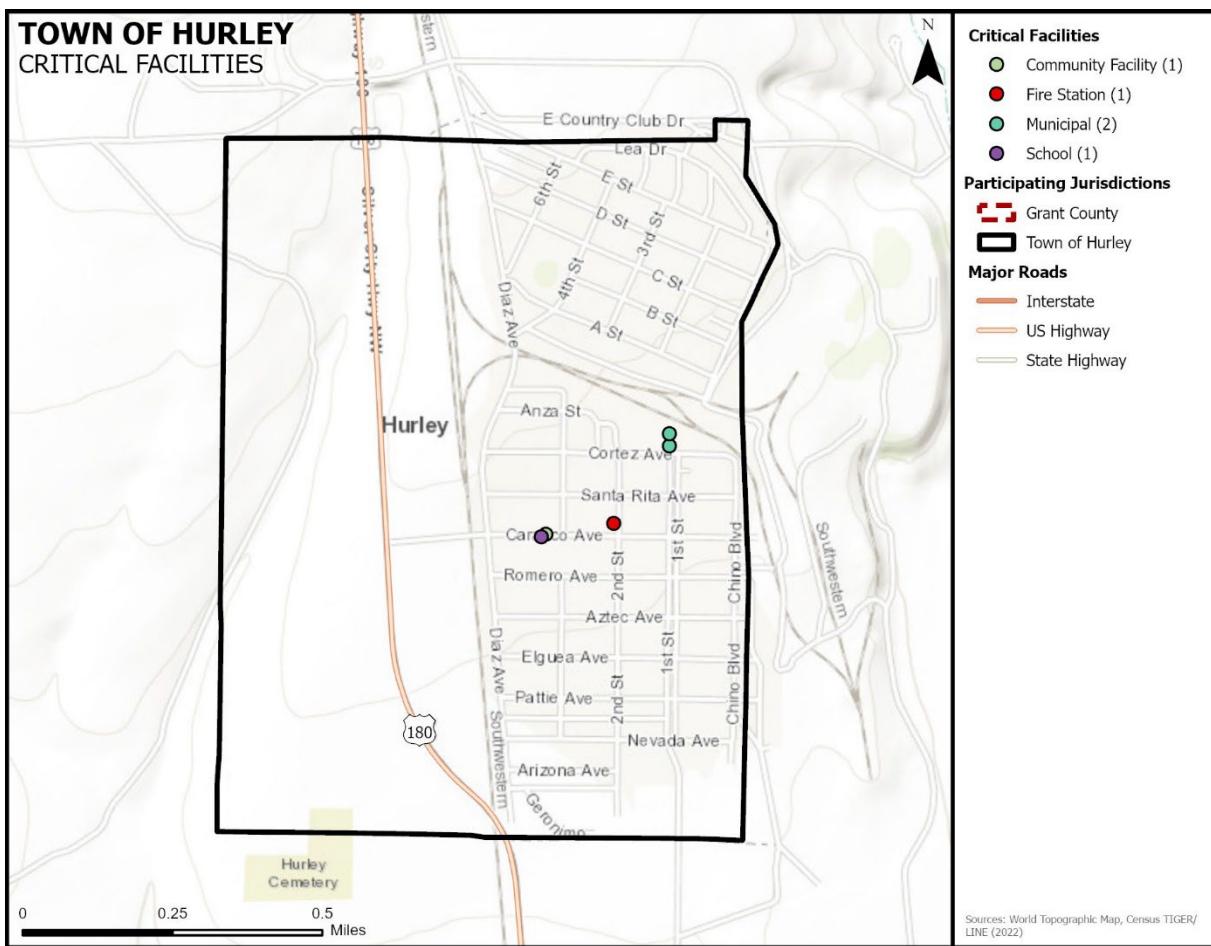


Table C-3. Critical Facilities by Type in the Town of Hurley

TYPE	NUMBER
Community Facility	1
Fire Station	1
Municipal	2
School	1

## APPENDIX C: CRITICAL FACILITIES

Figure C-4. Critical Facilities in the Village of Santa Clara

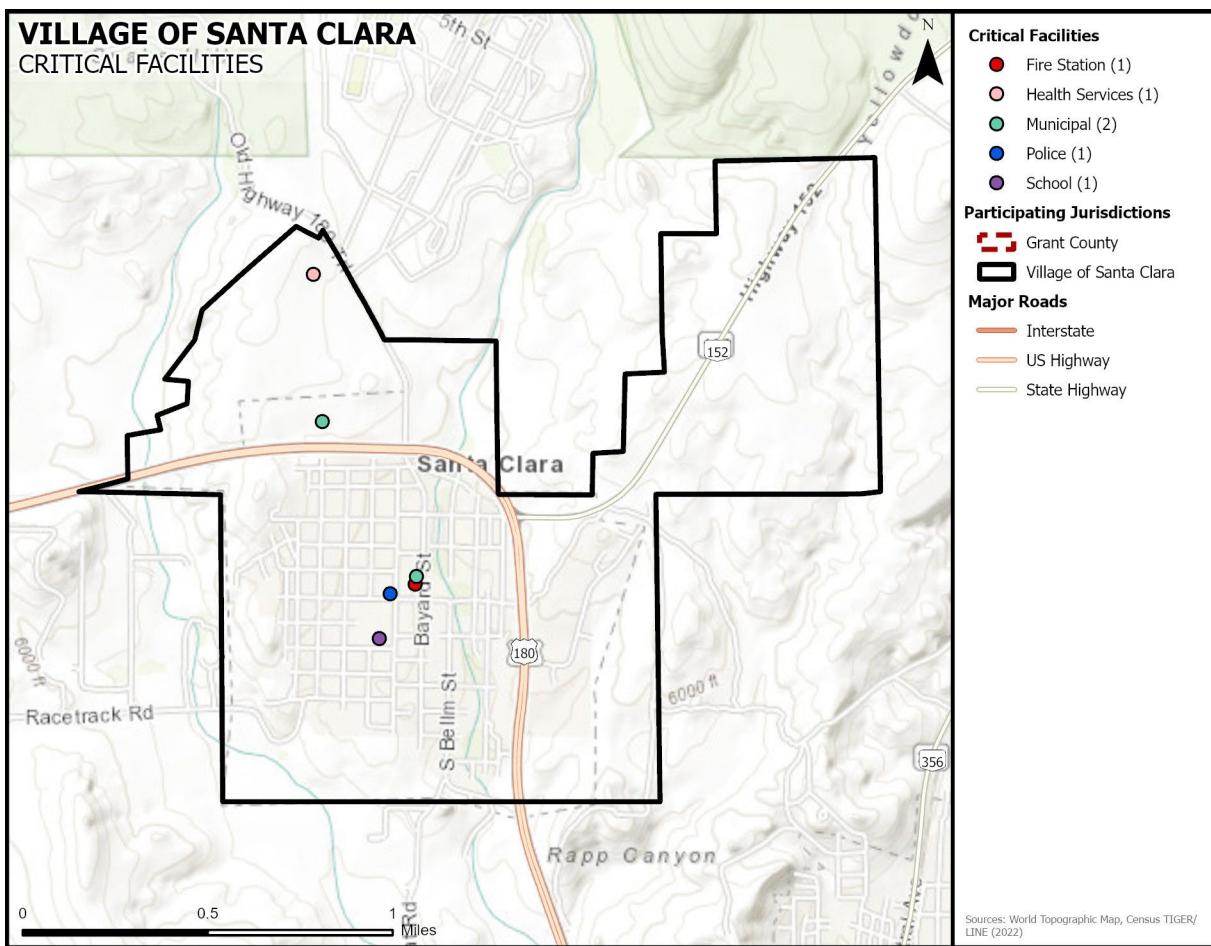


Table C-4. Critical Facilities by Type in the Village of Santa Clara

TYPE	NUMBER
Fire Station	1
Health Services	1
Municipal	2
Police	1
School	1

## APPENDIX C: CRITICAL FACILITIES

Figure C-5. Critical Facilities in the Town of Silver City

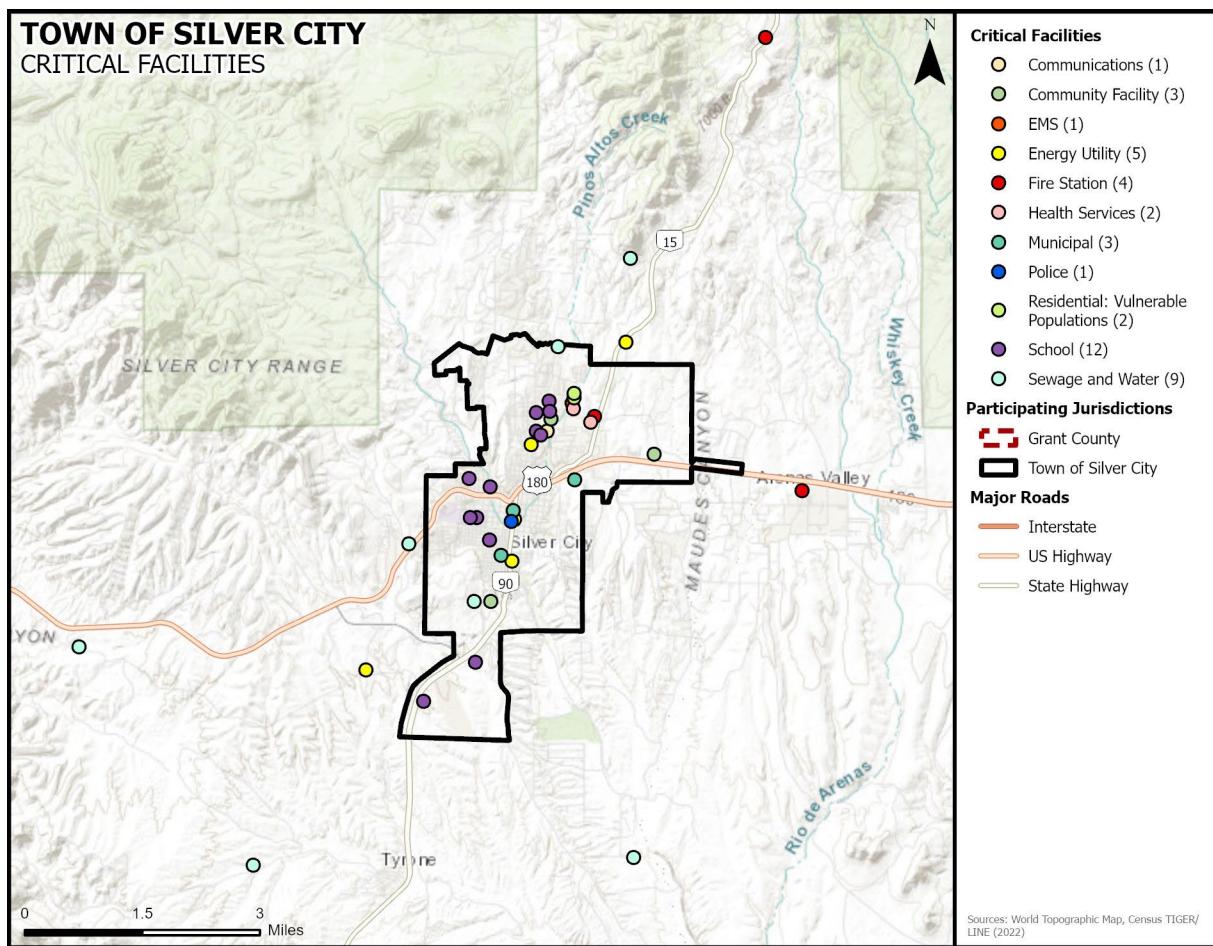
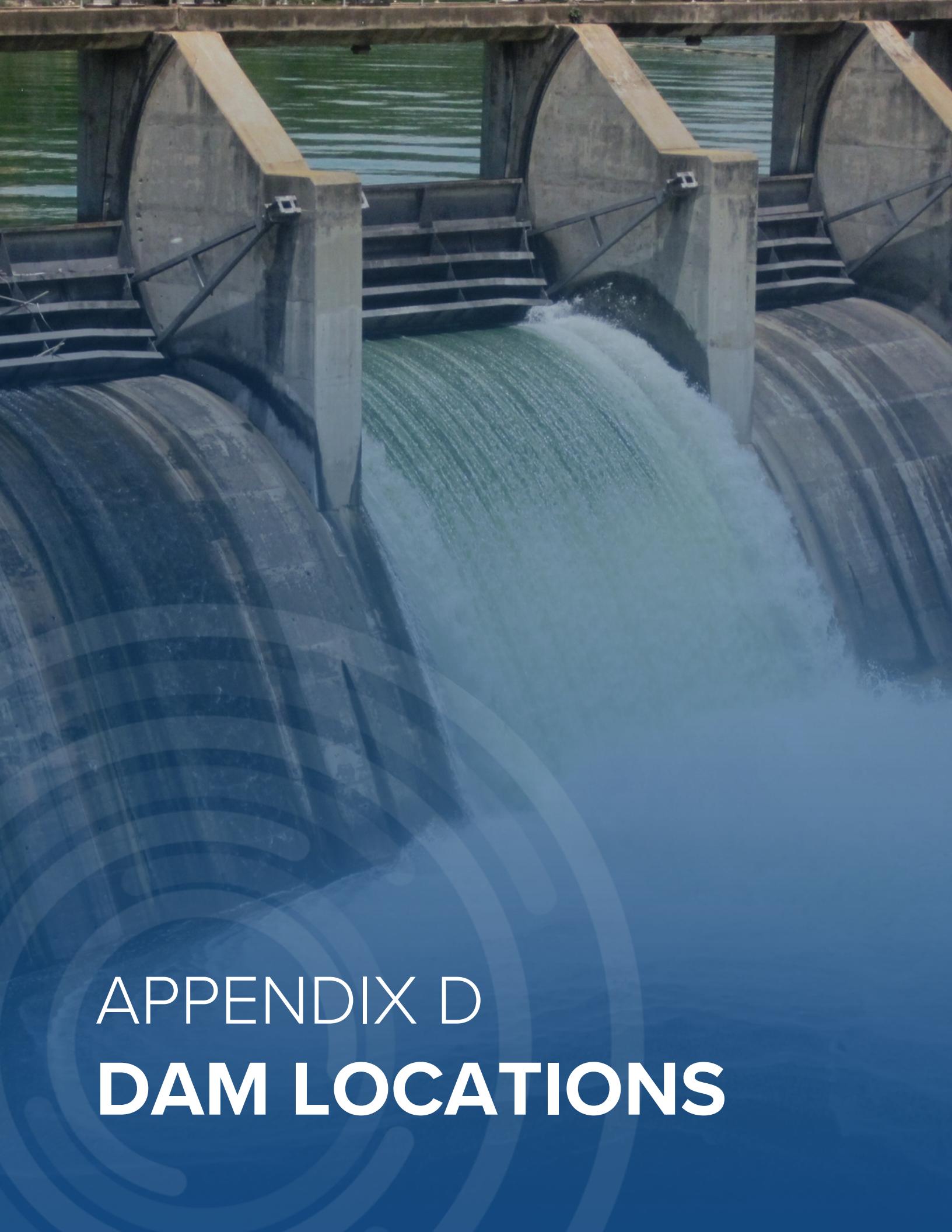


Table C-5 Critical Facilities by Type in the Town of Silver City

TYPE	NUMBER	TYPE	NUMBER
Communications – Emergency Warning	1	Municipal	3
Community Facility	3	Police	1
EMS – Heliport	1	Residential: Vulnerable Populations	2
Energy Utility - Electric	3	School	11
Energy Utility - Gas	2	School – University	1
Fire Station	4	Sewage and Water – Booster Station	4
Health Services – Hospital	1	Sewage and Water – Wastewater Treatment Plant	1
Health Services – Urgent Care	1	Sewage and Water – Water Tank/Tower	4



# APPENDIX D

# DAM LOCATIONS

## APPENDIX D: DAM LOCATIONS

Overview.....	1
Dam Locations .....	1

### OVERVIEW

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

### DAM LOCATIONS

Table D-1 below reflects all dams that are located in the participating jurisdictions within the Grant County Hazard Mitigation Action Plan 2025. This list includes High, Significant, and Low Hazards Dams. Section 5 of the plan doesn't profile dams that were deemed to possess no past, current, or future risk to the planning area as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. The asterisk denotes those that were profiled in the hazards assessment.

**Table D-1. List of Dam Locations and Storage Capacities**

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (feet)	STORAGE (acre feet)
Grant County*	32.88311	-107.9924	99	1483
Grant County*	33.00953	-108.5744	50	982
Grant County*	33.00724	-108.5962	32	341
Grant County*	32.9908	-108.5519	34.5	224
Grant County*	33.00392	-108.5306	37	203
Grant County*	32.97918	-108.5995	41	118.8
Grant County*	32.9668	-108.5641	36	107
Grant County*	33.024942	-108.5501	38	94
Grant County*	33.0176	-108.5636	33	87
Grant County*	33.01994	-108.5584	35	82
Grant County*	32.97993	-108.5616	28.8	48
Grant County	33.03112	-108.165	64	2,982
Grant County*	32.6338	-108.1005	230	19,800
Grant County	32.86473	-108.5756	170	2,375
Grant County	32.8513	-108.088	310	1,590
Grant County	32.84880	-108.0839	140	52
Grant County	32.67704	-108.1096	75	3,798.5

## APPENDIX D: DAM LOCATIONS

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (feet)	STORAGE (acre feet)
Grant County	32.69078	-108.1094	70	980
Grant County	32.79957	-108.0553	110	499
Grant County	32.77925	-108.03	50	44.3

A photograph of a narrow canyon with steep, reddish-brown rock walls. A metal walkway bridge with a black railing spans the narrow opening. The ground at the bottom of the canyon is rocky and appears to be a dry streambed. The sky is overcast.

# APPENDIX E

# MEETING

# DOCUMENTATION

## APPENDIX E: MEETING DOCUMENTATION

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Public Meeting Documentation.....	5
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## WORKSHOP DOCUMENTATION

Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

Grant County held a series of Planning Team workshops: a Kickoff Workshop on May 15, 2024, a Risk Assessment Workshop on July 23, 2024, and a Mitigation Strategy Workshop on September 17, 2024. At each of these workshops members of the Planning Team were informed of the planning process, expressed opinions, and volunteered information. Grant County hosted public meetings. The sign-in sheets for each workshop and public meeting are included below. For more details on the workshops and planning process, see Section 2.

**Figure E-1. Grant County Kickoff Workshop, May 15, 2024**



GRANT COUNTY HAZARD MITIGATION PLAN  
Kick-Off Workshop  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
May 15, 2024 @ 3:00pm



Name	Jurisdiction	Title	Email	Phone
Will Parker	H2O Partners	Mitigation Specialist	wparker@h2opartnersusa.com	817-470-1479
SCOT FULLER	GRANT COUNTY	EMERGENCY MANAGER	scotfuller@grantcountynm.gov	575-956-5420
Robert Esquiza	Town of Silver City	Utilities Director	robert.esquiza@silvercitynm.gov	575-534-6355
Thandy Hernandez	Grant County	Planning Director	thandyrhernandez@grantcountynm.gov	575-574-0007
Darren Arcey	Grant County	Planning Specialist	darren@grantcountynm.gov	575-574-0037
Kristian Murray	H2O Partners	Mit. Specialist	kmurray@h2opartnersusa.com	254-482-1023
Peter Lemos	Town of Silver City	Public Works	pplema@silvercitynm.gov	(575) 328-4440
Pete Stevens	Grant County	Fire Chief	pete.stevens@grantcountynm.gov	575
Emerson Hernandez	VOBC	Administrator	emerson.hernandez@vobcnm.com	525-537-2443
Paul Villanueva	Grant County	Sheriff	pvillanueva@grantcountynm.gov	575-574-0100

## APPENDIX E: MEETING DOCUMENTATION



GRANT COUNTY HAZARD MITIGATION PLAN  
Kick-Off Workshop  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
May 15, 2024 @ 3:00pm



GRANT COUNTY HAZARD MITIGATION PLAN  
Kick-Off Workshop  
Virtual Attendance - Zoom  
May 15, 2024 @ 3:00pm



Name	Jurisdiction	Title	Email	Phone
Michael Paez	Bayard	Director of Public Works	bayardmaint@cityofbayardnm.com	575-537-3312
Milo Lambert	Silver City	Fire Chief	Mlambert@silvercitynm.gov	575-590-0339
Jacqui Olea	Silver City	Community Development Director	jolea@silvercitynm.gov	575-534-6372
Charlene Webb	Grant County	County Manager	cwebb@grantcountynam.gov	575-574-0001
Fran "Henry" Browne	Grant County	District 5 Commissioner	hbrowne@grantcountynam.gov	575-313-9728
Sharon Offutt	Freeport-McMoRan	Sr. Social Performance Manager	soffutt@fmi.com	n/a
Stevie-Ann O'Donnell	H2O Partners Inc	Mitigation Outreach Coordinator	sodonnell@h2opartnersusa.com	631-921-2460

## APPENDIX E: MEETING DOCUMENTATION

**Figure E-2. Grant County Risk Assessment Workshop, July 23, 2024**



GRANT COUNTY HAZARD MITIGATION PLAN  
Risk Assessment Workshop  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
July 23, 2024 @ 3:00pm



Name	Jurisdiction	Title	Email	Phone
Scot Fuller	GRANT	Emergency Manager	sfuller@grantcountynm.gov	575-956-5426
Milo E. Lambert	TOSC	Fire Chief	mlambert@silvercitynm.gov	575-590-0339
Robert M. Esqueda	Taos	Utilities Director	resqueda@silvercitynm.gov	575-534-6355
Jeff Potts	Town of SC	Public Works Dir.	ppotts@silvercitynm.gov	575-388-4640
Roger Graves	Grant Co	Fire Chief	rgraves@grantcountymgov	574-0035
Shauna Pagan	H2O	Mitigation Specialist	Spagan@h2opartnersusa.com	915-252-1588
Kyleigh Murray	H2O	Mit. Specialist	kmurray@h2opartnersusa.com	254-482-1683



GRANT COUNTY HAZARD MITIGATION PLAN  
Risk Assessment Workshop  
Virtual Attendance - Zoom  
July 23, 2024 @ 3:00pm



Name	Jurisdiction	Title	Email	Phone
Jay Madrid	Town of Hurley	Hurley VFD Chief	townofhurleyfirechief1@gmail.com	575-621-9215
Andrea Montoya	Grant County	Deputy County Manager	amontoya@grantcountynm.gov	575-574-0131
Bobby Esqueda	Town of Silver City	Utilities Director	resqueda@silvercitynm.gov	575-534-6355
Jacqui Olea	Town of Silver City	Community Development Director	jolea@silvercitynm.gov	575-534-6372
Rhonda Murphy	H2O Partners Inc	Deputy Mitigation Program Manager	rmurphy@h2opartnersusa.com	512-571-2088
Stevie-Ann O'Donnell	H2O Partners Inc	Mitigation Outreach Coordinator	sodonnell@h2opartnersusa.com	631-921-2460
Payton Morris	H2O Partners Inc	Mitigation Specialist	pmorris@h2opartnersusa.com	737-376-4992

## APPENDIX E: MEETING DOCUMENTATION

**Figure E-3. Grant County Mitigation Strategy Workshop, September 17, 2024**



GRANT COUNTY HAZARD MITIGATION PLAN  
Mitigation Strategy Workshop  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
September 17, 2024 @ 3:00pm



Name	Jurisdiction	Title	Email	Phone
Shawna Payan	H2O	Mitigation Spec	SPayan@h2opartnersusa.com	915-262-1588
Payton Mammis	H2O	Mitigation Specialist	PMammis@h2opartnersusa.com	737-376-4992
Milo Lambert	Silver City Fire	Fire Chief	mlambert@silvercitynm.gov	575-590-0339
SCOT FULLER	GRANT CO	GRANT OEM	SGFuller@grantcountynam.gov	575-966-5426
Heath Lambeth	Bayard PD	Chief of Police	HLambeth@CityofBayardnm.gov	575-537-3212
ANNEKE PUES	CITY OF BAYARD	Public Works Director	Bayard@CityofBayardnm.gov	575-537-1258
JOLYNAGA	BAYARD	MAYOR	Mayor@CityofBayard	575-537-1250
ANDREA MONTAÑA	GRANT COUNTY	Deputy County Clerk	AMontana@grantcountynam.gov	575-574-0181
Rufel Perea	TOWN OF SILVER CITY	Public Works Director	pperea@silvercitynm.gov	575-388-4690
Oneill Battaglia	VOSE	Admin.	oneillbattaglia@villagewatersolutions.com	575-557-2443



GRANT COUNTY HAZARD MITIGATION PLAN  
Mitigation Strategy Workshop  
Virtual Attendance - Zoom  
1400 Highway 180 East, Silver City, New Mexico  
September 17, 2024 @ 3:00pm



Name	Jurisdiction	Title	Email	Phone
Darlene McBride	Town of Hurley	Deputy Clerk	Deputyclerk@townofhurleynm.us	575-537-2287
Harry Browne	Grant County	Commissioner	Hbrowne@grantcountynam.gov	575-313-9728
Krystian Murray	H2O Partners	Mitigation Specialist	Kmurray@h2opartnersusa.com	254-482-1683

## APPENDIX E: MEETING DOCUMENTATION

### PUBLIC MEETING DOCUMENTATION

As discussed in Section 2, public meetings were held in Grant County. Documentation in the form of sign-in sheets for each of the meetings follows.

**Figure E-4. Public Meeting 1, May 15, 2024**



GRANT COUNTY HAZARD MITIGATION PLAN  
Public Meeting #1  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
May 15, 2024 @ 6:00pm



Name	Jurisdiction	Title	Email	Phone
Will Parker	H2O Partners	Mitigation Specialist	wparker@h2opartnersusa.com	517-470-1471
Krystian Mirell	H2O Partners	Mit. Specialist	kmirell@h2opartnersusa.com	254-432-1625
Scot Fuller	GRANT Co.	EMERGENCY MANAGER	scotfuller@grantcountynm.gov	575-956-5426
Charlene Webb	Grant Co.	Co. Manager	cwebb@grantcountynm.gov	575-574-9675
Audra Montoya	Grant Co	Dpty Co Mgr.	amontoya@grantcountynm.gov	575-574-0131



GRANT COUNTY HAZARD MITIGATION PLAN  
Public Meeting #1  
Virtual Attendance - Zoom  
May 15, 2024 @ 6:00pm



Name	Jurisdiction	Title	Email	Phone
Jon Selby	NM Bureau of Land Management	Fuels Specialist	jselby@blm.gov	575-525-4300
Stevie-Ann O'Donnell	H2O Partners Inc.	Mitigation Outreach Coordinator	sodonnell@h2opartnersusa.com	631-921-2460

## APPENDIX E: MEETING DOCUMENTATION

## Figure E-5. Public Meeting 2, July 23, 2024



## GRANT COUNTY HAZARD MITIGATION PLAN

Public Meeting # 2  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
July 23, 2024 @ 6:00pm



## GRANT COUNTY HAZARD MITIGATION PLAN

Public Meeting # 2  
Virtual Attendance - Zoom  
July 23, 2024 @ 6:00pm



## APPENDIX E: MEETING DOCUMENTATION

## Figure E-6. Public Meeting 3, September 17, 2024



## GRANT COUNTY HAZARD MITIGATION PLAN

Public Meeting # 3  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
September 17, 2024 @ 6:00pm



## GRANT COUNTY HAZARD MITIGATION PLAN

Public Meeting # 3  
Grant County Administration Building  
1400 Highway 180 East, Silver City, New Mexico  
September 17, 2024 @ 6:00pm



## APPENDIX E: MEETING DOCUMENTATION



GRANT COUNTY HAZARD MITIGATION PLAN  
Public Meeting # 3  
Virtual Attendance - Zoom  
September 17, 2024 @ 6:00pm



Name	Jurisdiction	Title	Email	Phone
Stevie-Ann O'Donnell	H2O Partners Inc.	Mitigation Outreach Coordinator	sodonell@h2opartnersusa.com	631-921-2460

## PUBLIC NOTICES

Public notices to announce Grant County's participation in the Plan development process were posted on their website, on social media sources, including Facebook, through the local media, and/or posting the information on bulletin boards in public facilities.

**Figure E-7. Grant County Public Notices, Grant County**



*GRANT COUNTY PUBLIC BULLETIN - PUBLIC MEETING 1*

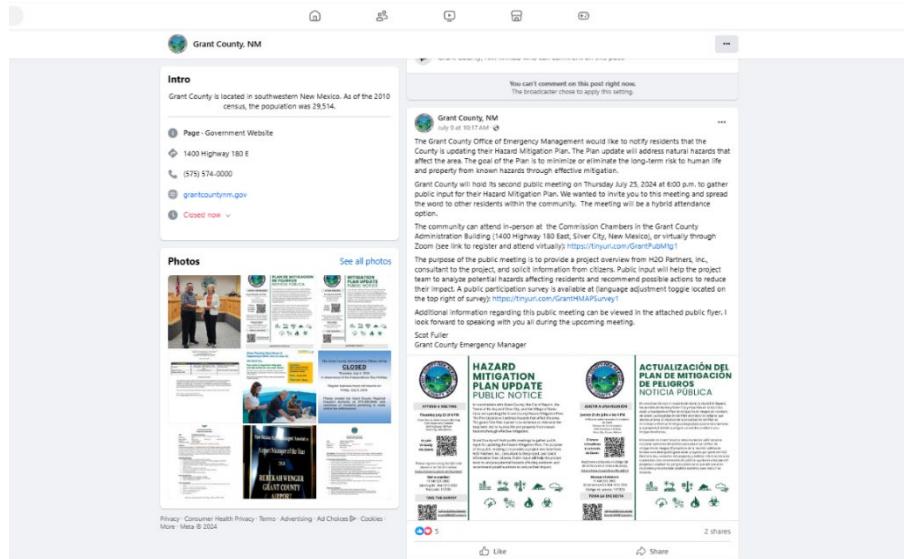
## APPENDIX E: MEETING DOCUMENTATION



### GRANT COUNTY NEWSPAPER - PUBLIC MEETING 1

### GRANT COUNTY WEBSITE - PUBLIC MEETING 2

## APPENDIX E: MEETING DOCUMENTATION



### GRANT COUNTY FACEBOOK - PUBLIC MEETING 2

#### Fwd: Public Meeting Notice - Grant County Hazard Mitigation Plan Update

Scot Fuller <sfuller@grantcountymn.gov>

Tue 7/16/2024 7:16 PM  
ToMark Karagis <mkaragis@hotmail.com>;Aaron Seavers <aaseavers@silvercitynm.gov>;Aaron Seavers <assistantchief@silvercitynm.gov>;Adam Mendonca <adam.mendonca@usda.gov>;Amy Chappell <achappell@grcd911.com>;Ben Chavez <bchavez51@gmail.com>;Bobby Terrazas <burley4@yahoo.com>;Brad Gutierrez <bgutierrez@diginwave.com>;Brandon T <brando7n@hotmail.com>;Bruce Ashburn <bruce.ashburn@prnm.com>;Charles Perez - NM DOH <charles.perez@doh.nm.gov>;Cinda Gillian <milliescenter@gmail.com>;Daniel Coyle <Dcoyle@fmi.com>;David Nell <david.nell@state.nm.us>;Denice Baird <dbaird@grmc.org>;Ed Stevens <suntreat@grplanet.com>;Eddie Flores <flores4@nmnu.edu>;Elizabeth Sircy <lisircy@hotmail.com>;Good Evening LEPC members

For those interested the following is information on the upcoming public meeting on July 25 in regards to the Hazard Mitigation Plan update. The meeting can be attended virtually.

Thank you!  
Scot [\(2\)](#)

Good Morning!

Grant County is updating their Hazard Mitigation Plan. The Plan Update will address natural hazards that affect the area. The goal of the Plan is to minimize or eliminate the long-term risk to human life and property from known hazards through effective mitigation.

Grant County will hold their **second** public meeting on **Thursday July 25 , 2024, at 6:00 p.m.** to gather public input for their Hazard Mitigation Plan. We wanted to invite you to this meeting and spread the word to other residents within the community. The meeting will be a hybrid attendance option.

The community can attend in-person at the Commission Chambers in the Grant County Administration Building (1400 Highway 180 East, Silver City, New Mexico), or virtually through Zoom (see link to register and attend virtually): <https://us06web.zoom.us/meeting/register/tZcpduvrDgtGt20gvcoXcoMuAdxx-k1NSR>

The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to analyze potential hazards affecting residents and recommend possible actions to reduce their impact. A public participation survey is available at (language adjustment toggle located on the top right of survey): <https://tinyurl.com/GrantHMAPSurvey1>

Additional information regarding this public meeting can be viewed in the attached public flyer. I look forward to speaking with you all during the upcoming meeting.

Stevie Ann Hodgson-O'Donnell  
Mitigation Outreach Coordinator  
[sodonnell@h2opartnersusa.com](mailto:sodonnell@h2opartnersusa.com)  
Personal: 631.921.2460 | Main: 888.318.5112



### GRANT COUNTY LEPC OUTREACH NOTIFICATION - PUBLIC MEETING 2

## APPENDIX E: MEETING DOCUMENTATION

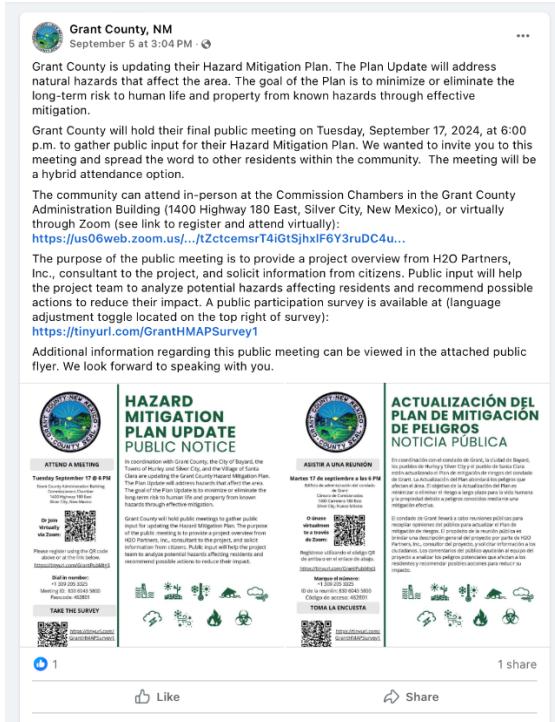


GRANT COUNTY PUBLIC BULLETIN - PUBLIC MEETING 2



GRANT COUNTY PUBLIC BULLETIN - PUBLIC MEETING 3

## APPENDIX E: MEETING DOCUMENTATION



Grant County, NM  
September 5 at 3:04 PM

Grant County is updating their Hazard Mitigation Plan. The Plan Update will address natural hazards that affect the area. The goal of the Plan is to minimize or eliminate the long-term risk to human life and property from known hazards through effective mitigation.

Grant County will hold their final public meeting on Tuesday, September 17, 2024, at 6:00 p.m. to gather public input for their Hazard Mitigation Plan. We wanted to invite you to this meeting and spread the word to other residents within the community. The meeting will be a hybrid attendance option.

The community can attend in-person at the Commission Chambers in the Grant County Administration Building (1400 Highway 180 East, Silver City, New Mexico), or virtually through Zoom (see link to register and attend virtually): <https://us06web.zoom.us.../tZctcemstT4iGtjhxf6Y3ruDC4u...>

The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to analyze potential hazards affecting residents and recommend possible actions to reduce their impact. A public participation survey is available at (language adjustment toggle located on the top right of survey): <https://tinyurl.com/GrantHMAPSurvey1>

Additional information regarding this public meeting can be viewed in the attached public flyer. We look forward to speaking with you.

**ATTEND A MEETING**  
Tuesday September 17 @ 6 PM  
Commission Chambers  
1400 Highway 180 East  
Silver City, NM 88061

**Or join  
virtually  
via Zoom**

**HAZARD  
MITIGATION  
PLAN UPDATE  
PUBLIC NOTICE**

In coordination with Grant County, the City of Bayard, the Towns of Hurley and Silver City, and the Village of Santa Clara are updating the Grant County Hazard Mitigation Plan. The purpose of the Plan Update is to minimize or eliminate the long-term risk to human life and property from known hazards through effective mitigation.

Grant County will hold a public meeting to gather public input for updating the Hazard Mitigation Plan. The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to analyze potential hazards affecting residents and recommend possible actions to reduce their impact.

**Take in person:**  
Meeting ID: 830 6143 1000  
<https://us06web.zoom.us/j/83061431000?pwd=QkFzZ2p5aUJ6aUJ6aUJ6aUJ6aUJ6aUJ6>

**Take the survey:**  
<https://tinyurl.com/GrantHMAPSurvey1>

**ACTUALIZACIÓN DEL  
PLAN DE MITIGACIÓN  
DE PELIGROS  
NOTICIA PÚBLICA**

En coordinación con el condado de Grant, la ciudad de Bayard, las ciudades de Hurley y Silver City y la villa de Santa Clara se actualizan el Plan de Mitigación de Peligros del condado de Grant. El propósito de la actualización es minimizar o eliminar el riesgo a largo plazo para la vida humana y la propiedad de los peligros conocidos a través de la mitigación efectiva.

El condado de Grant realizará una reunión pública para reunir información para la actualización del Plan de Mitigación de Peligros. El propósito de la reunión pública es proporcionar una visión general del proyecto de H2O Partners, Inc., consultor del proyecto, y solicitar información de los ciudadanos. La información pública ayudará al equipo de proyecto a analizar los peligros potenciales que afectan a los residentes y recomendar las acciones para reducir su impacto.

**Asistir a una reunión:**  
Martes 17 de septiembre a las 6 PM  
Cámaras de la Comisión  
1400 Highway 180 East  
Silver City, Nueva México

**o deje  
que lo  
asista  
a través  
de Zoom**

**Regístrese utilizando el código QR  
de la reunión en línea o la clave de  
asistencia en la página de inicio.**

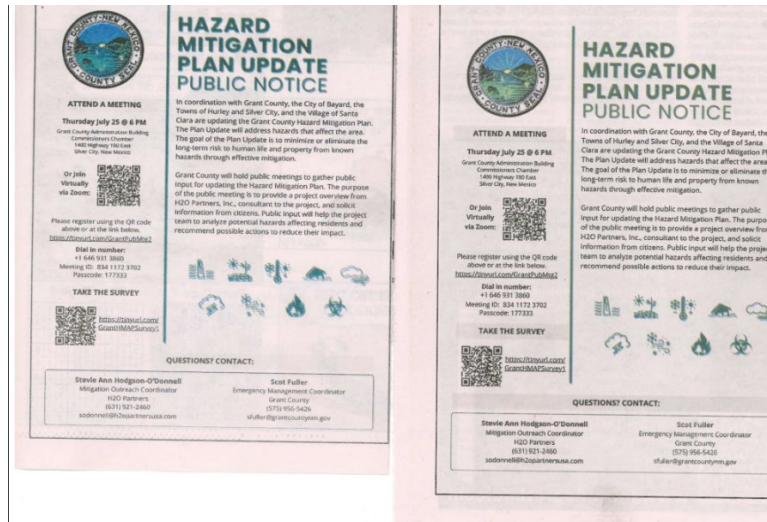
**Participación en persona:**  
ID de reunión: 830 6143 1000  
Clave de reunión: 177332

**TOMA LA ENCUESTA**

**1 share**

**Like** **Share**

GRANT COUNTY FACEBOOK - PUBLIC MEETING 3



**ATTEND A MEETING**  
Thursday July 25 @ 6 PM  
Grant County Adminstration Building  
Commissioners Chamber  
1400 Highway 180 East  
Silver City, New Mexico

**Or join  
virtually  
via Zoom**

**HAZARD  
MITIGATION  
PLAN UPDATE  
PUBLIC NOTICE**

In coordination with Grant County, the City of Bayard, the Towns of Hurley and Silver City, and the Village of Santa Clara are updating the Grant County Hazard Mitigation Plan. The Plan Update will address hazards that affect the area. The goal of the Plan Update is to minimize or eliminate the long-term risk to human life and property from known hazards through effective mitigation.

Grant County will hold public meetings to gather public input for updating the Hazard Mitigation Plan. The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to analyze potential hazards affecting residents and recommend possible actions to reduce their impact.

**Take in person:**  
Meeting ID: 834 1172 3922  
Passcode: 177332

**Take the survey:**  
<https://tinyurl.com/GrantHMAPSurvey1>

**QUESTIONS? CONTACT:**

Stevie Ann Hodgeson-O'Donnell  
Migratory Bird Plan Coordinator  
H2O Partners  
(611) 921-2460  
sodonnelly@2partnerusa.com

Scott Fuller  
Emergency Management Coordinator  
Grant County  
(575) 956-5426  
sfuller@grantcountynm.gov

**ATTEND A MEETING**  
Thursday July 25 @ 6 PM  
Grant County Adminstration Building  
Commissioners Chamber  
1400 Highway 180 East  
Silver City, New Mexico

**Or join  
virtually  
via Zoom**

**HAZARD  
MITIGATION  
PLAN UPDATE  
PUBLIC NOTICE**

In coordination with Grant County, the City of Bayard, the Towns of Hurley and Silver City, and the Village of Santa Clara are updating the Grant County Hazard Mitigation Plan. The Plan Update will address hazards that affect the area. The goal of the Plan Update is to minimize or eliminate the long-term risk to human life and property from known hazards through effective mitigation.

Grant County will hold public meetings to gather public input for updating the Hazard Mitigation Plan. The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to analyze potential hazards affecting residents and recommend possible actions to reduce their impact.

**Take in person:**  
Meeting ID: 834 1172 3922  
Passcode: 177332

**Take the survey:**  
<https://tinyurl.com/GrantHMAPSurvey1>

**QUESTIONS? CONTACT:**

Stevie Ann Hodgeson-O'Donnell  
Migratory Bird Plan Coordinator  
H2O Partners  
(611) 921-2460  
sodonnelly@2partnerusa.com

Scott Fuller  
Emergency Management Coordinator  
Grant County  
(575) 956-5426  
sfuller@grantcountynm.gov

GRANT COUNTY NEWSPAPER - PUBLIC MEETING 3

## APPENDIX E: MEETING DOCUMENTATION

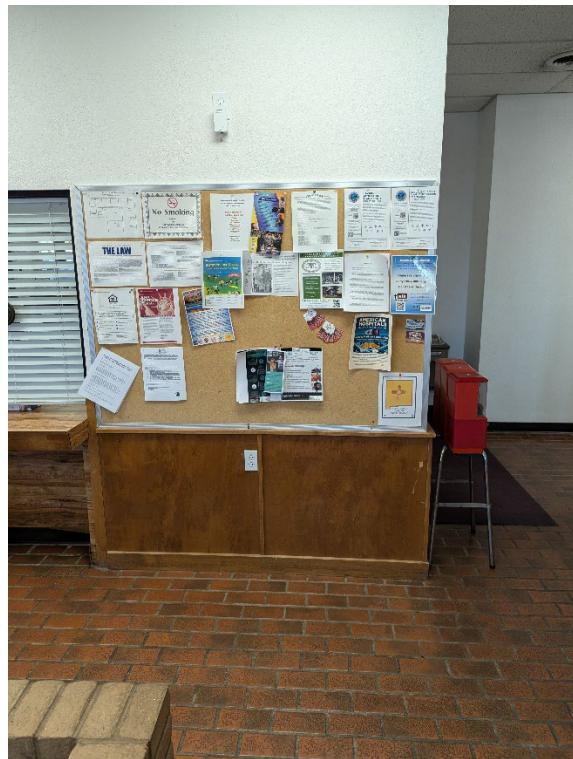
**Figure E-8. Grant County Public Notices, City of Bayard**



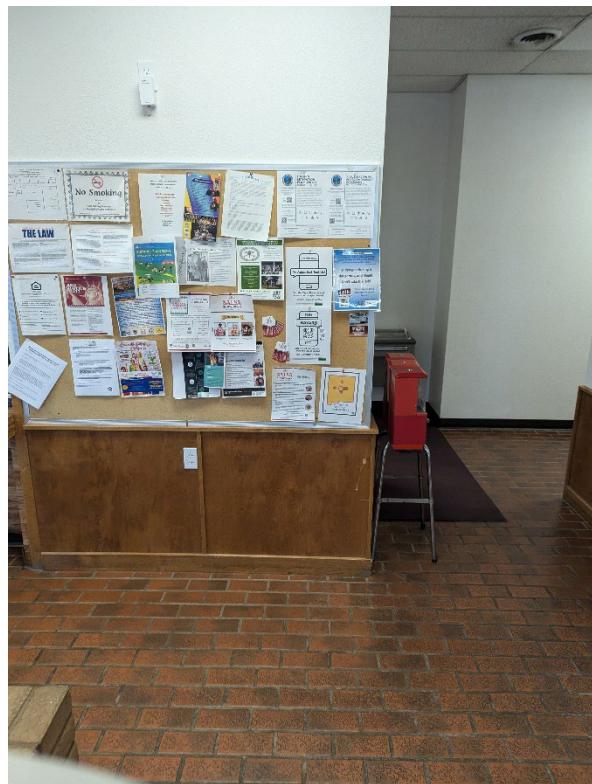
*CITY OF BAYARD PUBLIC BULLETIN - PUBLIC MEETING 1*

*CITY OF BAYARD WEBSITE - PUBLIC MEETING 2*

## APPENDIX E: MEETING DOCUMENTATION



CITY OF BAYARD PUBLIC BULLETIN - PUBLIC MEETING 2



CITY OF BAYARD PUBLIC BULLETIN - PUBLIC MEETING 3

## APPENDIX E: MEETING DOCUMENTATION

**Figure E-9. Grant County Public Notice, Town of Hurley**



*TOWN OF HURLEY PUBLIC BULLETIN - PUBLIC MEETING 1*



*TOWN OF HURLEY PUBLIC BULLETIN - PUBLIC MEETING 2*

## APPENDIX E: MEETING DOCUMENTATION



*TOWN OF HURLEY PUBLIC BULLETIN - PUBLIC MEETING 3*

**Figure E-10. Grant County Public Notice, Village of Santa Clara**



*VILLAGE OF SANTA CLARA PUBLIC BULLETIN - PUBLIC MEETING 1*

## APPENDIX E: MEETING DOCUMENTATION

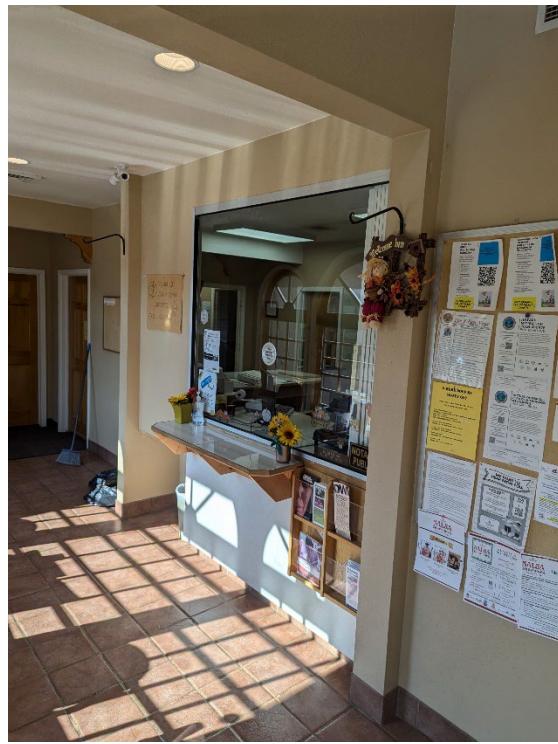


VILLAGE OF SANTA CLARA PUBLIC BULLETIN - PUBLIC MEETING 2



VILLAGE OF SANTA CLARA PUBLIC BULLETIN - PUBLIC MEETING 2

## APPENDIX E: MEETING DOCUMENTATION



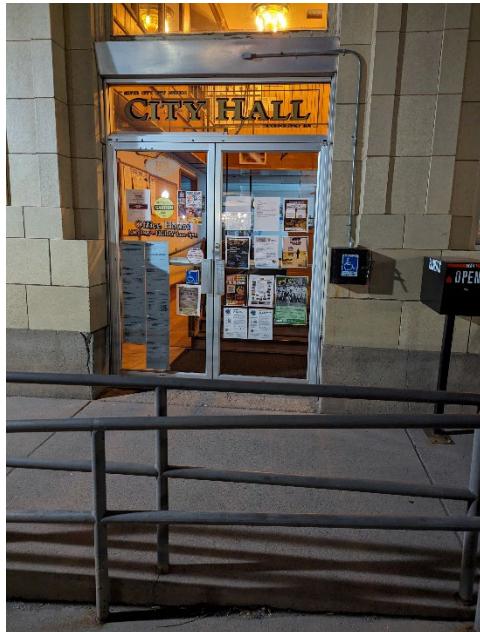
VILLAGE OF SANTA CLARA PUBLIC BULLETIN - PUBLIC MEETING 3



VILLAGE OF SANTA CLARA PUBLIC BULLETIN - PUBLIC MEETING 3

## APPENDIX E: MEETING DOCUMENTATION

**Figure E-11. Grant County Public Notice, Town of Silver City**



*TOWN OF SILVER CITY PUBLIC BULLETIN - PUBLIC MEETING 1*

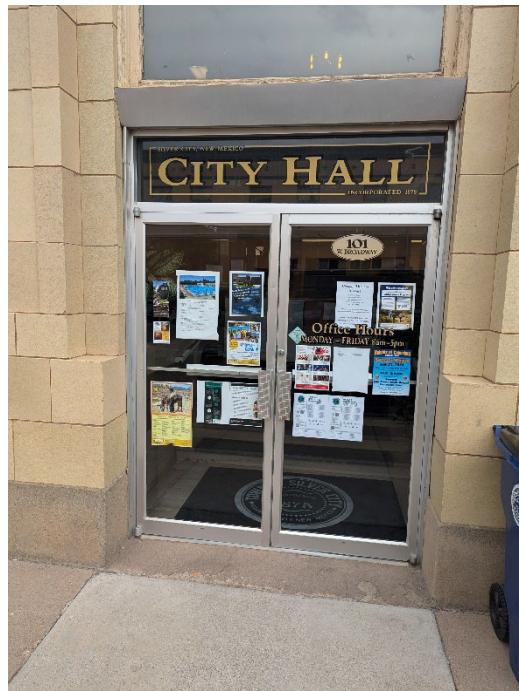


*TOWN OF SILVER CITY PUBLIC BULLETIN - PUBLIC MEETING 1*

## APPENDIX E: MEETING DOCUMENTATION



*TOWN OF SILVER CITY PUBLIC BULLETIN - PUBLIC MEETING 2*



*TOWN OF SILVER CITY PUBLIC BULLETIN - PUBLIC MEETING 2*

## APPENDIX E: MEETING DOCUMENTATION



*TOWN OF SILVER CITY PUBLIC BULLETIN - PUBLIC MEETING 3*



*TOWN OF SILVER CITY PUBLIC BULLETIN - PUBLIC MEETING 3*



# APPENDIX F

# CAPABILITY

# ASSESSMENT

## APPENDIX F: CAPABILITY ASSESSMENT

Overview.....	1
Community Capability Assessments .....	2

### OVERVIEW

A Community Capability Assessment is an integral component of the Hazard Mitigation Planning Process. It is an invaluable tool in assessing a community's existing planning and regulatory capabilities to support implementation of mitigation strategy objectives.

Beginning on Page 2, a completed Capability Assessment Checklist provides information on existing policies, plans, and regulations in place for Planning Team members at the local level or that may be provided by the County on an as-needed basis. ***Participation is denoted with an “x” on the Checklist.***

## APPENDIX F: CAPABILITY ASSESSMENT

### COMMUNITY CAPABILITY ASSESSMENTS

COMMUNITY CAPABILITY CHECKLIST	Grant County	City of Baynard	Town of Hurley	Village of Santa Clara	Town of Silver City
<b>PLANS</b>					
Asset Management Plan	X				
Capital Improvements Plan	X	X	X	X	X
Climate Change Adaptation Plan					X
Community Wildfire Protection Plan	X				X
Comprehensive / Master Plan / Land Use Plan	X	X	X	X	X
Continuity of Operations Plan					
Drought Contingency Plan/Protocol on Water Restrictions		X			X
Economic Development Plan	X		X	X	X
Emergency Management Action Plan		X			X
Emergency Operations Plan	X	X		X	X
Evacuation Plan		X			
Extreme Heat Protocol		X			
Hazard Mitigation Plan	X	X	X	X	X
Resilience Action Plan	X				
Stormwater Management Plan / Ordinance					
Strategic Plan	X				
Transportation Plan					X
<b>POLICIES / ORDINANCES</b>					
Building Codes (IBC 2021 & IRC 2021)	X	X	X	X	X
Fire Code		X			X

## APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	Grant County	City of Baynard	Town of Hurley	Village of Santa Clara	Town of Silver City
Floodplain Ordinance	X	X		X	X
Manufactured Home Restrictions		X	X	X	X
Stormwater Ordinance					
Subdivision Regulations	X	X		X	X
Wildfire Ordinance			X		
Zoning Ordinance/Land Use Restrictions		X		X	X
PROGRAMS					
Firewise Communities	X				
Floodplain Maps/Flood Insurance Studies	X	X	X	X	X
Hydrologic/Hydraulic Studies					
Mutual Aid Agreement	X			X	X
National Flood Insurance Program Participant	X	X		X	X
NFIP Community Rating System Participant					
Property Acquisition Program		X			
Public Education/Awareness Programs		X			X
Storm Drainage Systems Maintenance Program		X			
Stream Maintenance Program		X			
StormReady Communities		X			
Warning Systems/Services (reverse 911, outdoor warning sirens)	X	X		X	X
STAFF / DEPARTMENTS					
Building Code Official				X	
Emergency Manager	X			X	X

## APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	<i>Grant County</i>	<i>City of Baynard</i>	<i>Town of Hurley</i>	<i>Village of Santa Clara</i>	<i>Town of Silver City</i>
Engineers		X		X	X
Environmental Conservation Specialist					
Floodplain Administrator	X	X		X	X
Geographic Information System (GIS) Coordinator	X	X		X	X
Personnel with Hazard Knowledge		X		X	X
Planners	X			X	X
Public Information Official		X	X	X	X
Resource Development/Grant Writer		X		X	X



## **APPENDIX G**

# **STATE AND FEDERAL FUNDING OPPORTUNITIES**

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

Overview.....	1
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### OVERVIEW

New Mexico utilizes state funds to improve statewide hazard mitigation capabilities and advance their hazard mitigation goals to help identify, understand, and manage various risks associated with natural hazards. State funds also provide funding for state facility and infrastructure upgrades, hazard mapping, mitigation planning, and other mitigation programmatic activities. Table G-1 describes varied loan and grant programs offered by state agencies for which mitigation activities may be eligible.

**Table G-1. Summary of State Funded Mitigation Programs**

AGENCY	FUNDING PROGRAM
Department of Finance and Administration	<ul style="list-style-type: none"><li>Community Development Block Grant (CDBG)</li></ul>
Department of Homeland Security & Emergency Management (DHSEM)	<ul style="list-style-type: none"><li>Annual Emergency Management Performance Grant (EMPG)</li><li>Building Resilient Infrastructure Communities (BRIC)</li><li>Community Assistance Program-State Support Services Element (CAP-SSSE)</li><li>EMPG-American Recovery Act (EMPG-ARPA)</li><li>Non-Profit Security Grant Program (NSGP)</li><li>Fire Management Assistance Grants (FMAG)</li><li>Fire Protection Grants</li><li>Flood Mitigation Assistance (FMA)</li><li>Hazard Mitigation Grant Program (HMPG)</li><li>Hazard Mitigation Grant Program-Post Fire (HMPG-PF)</li><li>Hazardous Materials Emergency Preparedness Grant (HMEP)</li><li>Homeland Security Grant Program (HSGP)</li><li>Off Cycle EMPG American Recovery Act Plan (EMPG-ARPA)</li><li>Operation Stonegarden Grant (OPSG)</li><li>Public Assistance (PA)</li><li>State and Local CyberSecurity Grant Program (SLCGP)</li><li>...</li></ul>
New Mexico Economic Development Department (EDD)	<ul style="list-style-type: none"><li>Collateral Assistance Program (CAP)</li><li>LEDA Rural Infrastructure Grants</li><li>New Mexico MainStreet (NMMS)</li><li>State Small Business Credit Initiative (SSBCI)</li></ul>
New Mexico Energy, Minerals and Natural Resources Department (EMNRD) Forestry Division	<ul style="list-style-type: none"><li>Community Wildfire Defense Grants</li><li>Conservation Seedling Program</li><li>Urban and Community Forestry Program</li><li>Volunteer Fire Assistance Grant (VFA)</li></ul>

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

AGENCY	FUNDING PROGRAM
<b>New Mexico Environmental Department (NMED)</b>	<ul style="list-style-type: none"> <li>• Brownfield Clean-up Resolving Loan Fund</li> <li>• Clean Diesel Program</li> <li>• Clean Water State Revolving Fund (CWSRF)</li> <li>• Corrective Action Fund (CAF)</li> <li>• Diesel Emissions Reduction Act</li> <li>• Dredge and Fill Activities Drinking Water State Revolving Fund (DWSRF)</li> <li>• Drinking Water State Revolving Fund</li> <li>• Drinking Water and Wastewater Investments</li> <li>• Recycling and Illegal Dumping Fund</li> <li>• Rural Infrastructure Program</li> <li>• Overflow Sewer Grants</li> <li>• Rural infrastructure Program</li> <li>• Solid Waste Facility Grant Fund</li> <li>• Stormwater Reuse Municipal Grants Program</li> <li>•</li> </ul>
<b>New Mexico Financial Authority (NMFA)</b>	<ul style="list-style-type: none"> <li>• Drinking Water Loan</li> <li>• Local Government Planning Fund</li> <li>• Public Project Revolving Fund</li> </ul>
<b>New Mexico Grant Administration</b>	<ul style="list-style-type: none"> <li>• Destination Forward Grant Program</li> <li>• Fire Prevention &amp; Safety</li> <li>• Large-Scale Water Recycling Projects</li> <li>• Route 66 Corridor Preservation</li> <li>• SAFER Grant Program</li> <li>• Walmart Community Impact</li> <li>• WaterSMART: Planning and Project Design</li> <li>• WaterSMART: Small-scale Water Efficiency Projects</li> <li>•</li> </ul>
<b>Office of Science &amp; Technology (OSST)</b>	<ul style="list-style-type: none"> <li>• Science &amp; Technology Business Start-Up Grants</li> <li>• Small Business Innovation Research Grant (NM SBIR)</li> </ul>
<b>Outdoor Recreation Division (ORD)</b>	<ul style="list-style-type: none"> <li>• Outdoor Equity Fund</li> <li>• Outdoor Recreation Trails</li> </ul>

In addition to State funded programs, many local jurisdictions benefit from federal mitigation funding opportunities. FEMA'S Hazard Mitigation Assistance is a primary source for the implementation of mitigation projects throughout the Nation. Table G-2 described additional Federal, State, Local, and Non-Profit mitigation funding sources specifically within the State of New Mexico.

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

**Table G-2. Federal, State, Local and Non-Profit Mitigation Funding Sources in Texas**

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<b>Agricultural Conservation Easement Program (ACEP)</b>	Federal	NRCS	EMNRD	Provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits.
<b>Agricultural Management Assistance (AMA)</b>	Federal	USDA, NRCS	NMDA	Provides financial and technical assistance to agricultural producers to voluntarily address issues such as water management, water quality, and erosion control by incorporating conservation methods into their farming operations.
<b>Agricultural Water Enhancement Program (AWEP)</b>	Federal	USDA, NRCS	NMED	Voluntary conservation initiative that provides financial and technical assistance to agricultural producers to implement water enhancement activities on agricultural land to conserve surface and ground water and improve water quality.
<b>AmeriCorps – Corporation for National &amp; Community Service (CNCS)</b>	Federal	AmeriCorps		Provides funding for volunteers to serve communities, including disaster prevention. AmeriCorps/Vista has assisted local communities with wildfire mitigation projects.
<b>American Recovery and Reinvestment Act (ARRA)</b>	Federal	EPA	NMED	Provides significant funding for states to finance high priority water infrastructure projects through a \$2 billion appropriation to the Drinking Water State Revolving Fund (DWSRF) program and a \$4 billion appropriation to the Clean Water State Revolving Fund (CWSRF) program.
<b>Aquatic Ecosystem Restoration</b>	Federal	DOD-USACE		Direct support for carrying out aquatic ecosystem restoration project that will improve the equality of the environment.
<b>Assistance to Firefighters Grants (AFG)</b>	Federal	FEMA	EMNRD	The primary goal of the Assistance to Firefighters Grant (AFG) is to meet the firefighting and emergency response needs of fire departments and non-affiliated emergency medical service organizations. Fire safety grants fund critically needed resources to equip and train emergency personnel, enhance efficiencies and support community resilience.
<b>Beneficial Uses of Dredged Materials</b>	Federal	DOD-USACE	NMED	Provides direct assistance for projects that protect, restore, and create aquatic and ecologically related habitats, including wetlands,

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

Name	Level	Source Agency	Managing State Agency	Purpose of Funding
<b>Beneficial Uses of Dredged Materials (continued)</b>				in connection with dredging and authorized Federal navigation projects.
<b>Bridges Replacement and Rehabilitation</b>	Federal	US DOT Federal Highway Administration FHWA	NMDOT	Provides funding for eligible bridges on any public road that require replacement or rehabilitation.
<b>Building Resilient Infrastructure &amp; Communities (BRIC)</b>	Federal	FEMA	DHSEM	Pre-disaster/annual cycle addressing all natural hazards, emphasis on infrastructure & lifelines.
<b>Carbon Reduction Program (CRP)</b>	Federal	USDOT	NMDOT	Provides funds for projects that are designed to reduce transportation emissions (CO2). This program can fund a wide range of projects designed to reduce carbon dioxide emissions from on-road highway sources.
<b>Center for Integration of Natural Disaster Information</b>	Federal	DOI/USGS, The Center for Integration of Natural Hazards Research	DHSEM	Technical Assistance: Develops and evaluates technology for information integration and dissemination.
<b>Clean School Bus Program</b>	Federal	EPA		Provides assistance to replace existing school buses with zero-emission and low-emission models.
<b>Clean Water Act Section 319 Grants</b>	Federal	EPA	NMED	Provides funds to implement non-point source programs, including support for non-structural watershed resource restoration activities.
<b>Clean Water Act Section 604(b)</b>	State	NMED	NMED	Provides funding for State and Regional water quality planning activities.
<b>Clean Water State Revolving Fund (CWSRF)</b>	Federal	EPA	NMED	Provides a source of low-cost financing for a wide range of wastewater and stormwater projects that protect surface and groundwater. Funds may also be used for projects that control non-point source water pollution, such as a solid waste and septic tank installations
<b>Community Assistance Program (CAP)</b>	Federal	FEMA, NFIP	EDD	Provides funding to states to provide technical assistance to communities in the National Flood Insurance Program (NFIP) and to evaluate

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<b>Community Assistance Program (CAP) (continued)</b>				community performance in implementing NFIP floodplain management activities
<b>Climate Pollution Reduction Grant</b>	Federal	EPA	NMED/EMNRD	Supports the State in creating two climate action plans (i.e., one priority plan and one comprehensive plan) for implementing effective greenhouse gas reduction strategies while ensuring the benefits of these actions are delivered to New Mexicans, especially Low Income or Disadvantaged communities (LIDAC) as defined by US EPA. This grant will give New Mexico communities the opportunity to collaborate with the State to build projects and programs that provided high-quality jobs, improve health, and keep families safe where they live.
<b>Community Development Block Grant (CDBG)</b>	Federal	HUD	DFA	Provides assistant to the State to develop viable communities (e.g., housing, a suitable living environment, expanded economic opportunities) in non-entitled areas, for low- and moderate-income persons.
<b>Community Development Block Grant – Disaster Recovery (CDBG-DR)</b>	Federal	HUD	DFA	Grants to fund recovery in cities, counties, and State after a Presidential Declaration.
<b>Community Development Block Grant – Entitlement Communities Program</b>	Federal	HUD	DFA	Grants to entitled cities and urban counties to develop viable communities (e.g., decent housing, a suitable living environment, expanded economic opportunities), principally for low- and moderate- income persons.
<b>Community Fire Protection Program</b>	Federal	USDA		Mitigation delivered via USDA Forest Service and Private Forestry Coop Fire Program.
<b>Community Rating System (CRS)</b>	Federal	FEMA		Voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. CRS not only assists communities in reducing flood risks, but also enhances public safety, reduces damage to property and public infrastructure, avoids economic disruption and

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<b>Community Rating System (CRS)</b>				losses, reduces human suffering, and protects the environment. Technical assistance on designing and implementing some activities is available at no charge. Participating in the CRS provides an incentive to maintain and improve a community's floodplain management program over the years. Implementing some CRS activities can help project qualify for certain other Federal assistance funds.
<b>Community Wildfire Defense Grant (CWDG)</b>	Federal	USFS	EMNRD-Forestry	Funds are intended to help at-risk local communities and tribes plan for and reduce wildfire risks. CWDGs prioritize at-risk communities in areas identified as having high or very high wildfire hazard potential, are low-income, or have been impacted by a severe disaster. Applicants are encouraged to submit applications that focus on the following activities: <ul style="list-style-type: none"> <li>Community Wildfire Protection Plan (CWPP) updates</li> <li>Development of building code ordinance proposals to improve wildfire safety in communities at risk</li> <li>Hazardous fuel mitigation projects that are specifically described in CWPPs not more than 10 years old</li> </ul>
<b>Conservation Contracts</b>	Federal	USDA-FSA		Debt reduction for delinquent and non-delinquent borrowers in exchange for Conservation contracts placed on environmentally sensitive real property that secures FSA Loans.
<b>Conservation Innovation Grants (CIG)</b>	Federal	USDA, NRCS		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.
<b>Conservation Technical Assistance (CTA) Program</b>	Federal	USDA-NRCS		Technical assistance for run-off retardation and soil erosion prevention to reduce hazards to life and property.
<b>Decision, Risk, and Management Science Program</b>	Federal	NSF		Funding for research and related educational activities on risk, perception, communication, and management (primarily technological hazards).

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
<b>Disaster Mitigation Planning and Technical Assistance</b>	Federal	DOC, EDA		Technical and planning assistance grants for capability building and mitigation project activities focusing on creating disaster resistant jobs and workplaces.
<b>Division of Homeland Security Financial Assistance</b>	Federal	US Department of Homeland Security	HSD	Supports a wide variety of funding and financial assistance programs that support preparedness, resilience, and post-disaster relief.
<b>Drinking Water State Revolving Loan Fund (DWSRF)</b>	Federal	EPA	NMED	Operates in partnership with the New Mexico Environment Department (NMED) to provide low-cost financing for the construction of and improvements to drinking water facilities throughout New Mexico in order to protect drinking water quality and the public health.
<b>Economic Development Administration Grants and Investments</b>	Federal	U.S. DOC, EDA	EDD	Invests and provides grants for community construction projects, including mitigation activities.
<b>Economic Injury Disaster Loan</b>	Federal	SBA		The COVID EIDL program ceased accepting applications on December 31, 2021, however, the disaster EIDL program continues to be available to businesses impacted by other publicly declared disasters.
<b>Emergency Community Water Assistance Grants</b>	Federal	USDA	HSD	Provides assistance to communities who have experienced a decline in quantity or quality of drinking water as a result of an emergency including drought. \$150,000 to \$500,000 available to rural communities with populations over 10,000 people with a median household income less than \$65,900.
<b>Emergency Management / Mitigation Training</b>	Federal	FEMA	DHSEM	Training in disaster mitigation, preparedness, planning.
<b>Emergency Management Institute</b>	Federal	FEMA		Education training programs to prepare emergency management professionals to prepare for, respond to, and recover from disasters and emergency.

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
<b>Emergency Management Performance Grant (EMPG)</b>	Federal	FEMA	DHSEM	Provides a yearly allocation of funding to support state and local emergency management programs. This has included providing some funding for local mitigation plans, mitigation-oriented studies, and related activities.
<b>Emergency Relief (ER) Program</b>	Federal	US DOT - FHWA		Provides funds for roads and bridges on Federal-aid highways that are damaged as a direct result of a natural disaster or catastrophic failure from an external cause.
<b>Emergency Watershed Protection Program (EWPP)</b>	Federal	USDA, NRCS	NMDA	Provides technical and financial assistance for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas damaged by severe natural hazard events.
<b>Environmental Justice Government-to-Government Program (EJG2G)</b>	Federal	EPA	NMED	Provides funding to support government activities that lead to measurable environmental or public health impacts in communities disproportionately burdened by environmental harms.
<b>Environmental Justice Collaborative Problem Solving Program</b>	Federal	EPA		Provides funding directly to community-based organizations to address environmental injustices.
<b>Environmental Quality Incentives Program (EQIP)</b>	Federal	USDA, NRCS		Voluntary conservation program for farmers that provides technical, educational, and limited financial assistance to encourage environmental enhancement.
<b>Farm Ownership Loans</b>	Federal	USDA-FSA		Direct loans, guaranteed / insured loans, and technical assistance to farmers so that they may develop, construct, improve, or repair farm homes, farms, and service buildings, and to make other necessary improvements.
<b>Federal Land Transfer / Federal Land to Parks Program</b>	Federal	DOI-NPS		Identifies, assesses, and transfers available Federal real property for acquisition for State and local parks and recreation, such as open space.
<b>Fire Management</b>	Federal	FEMA	DHSEM	Provides fire suppression support to states when loss of life and property are imminent. Wildfire

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

Name	Level	Source Agency	Managing State Agency	Purpose of Funding
Assistance Grants (FMAG)				mitigation is also eligible under emergency protection if life is in imminent danger.
Fire Prevention and Control – Recruitment and Retention Grant Program	State	DHSEM	DHSEM	Supports the recruitment and retention of volunteer firefighters and emergency services personnel by promoting the development of, or supporting existing, regional recruitment and retention efforts. The program's primary objectives are to support organizational leadership development through education and training and to develop and implement recruitment and retention programs and materials.
Fire Prevention and Safety Grant Program	Federal	US Fire Administration	DHSEM	Funds to support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury and prevent death.
Flood Mitigation Assistance (FMA) Program	Federal	FEMA	DHSEM	Funds allocated to States and communities for pre-disaster mitigation to help reduce or eliminate the long-term risk of flood damage to structures insurable under the National Flood Insurance Program. This includes repetitive loss and severe repetitive loss.
Floodplain Management Services	Federal	DOD-USACE	DHSEM	Technical and planning assistance at the local, regional, or national level needed to support effective floodplain management.
Forest Land Enhancement Program	Federal	USDA, NRCS	EMNRD	Provides educational, technical, and financial assistance to help landowners implement sustainable forestry management objectives.
Forest Legacy Program	Federal	USFS	EMNRD	Provides funding to protect private forest lands that are environmentally, economically, and socially critical. This program reduces development in the wildland-urban interface.
Greenhouse Gas Reduction Fund (GGRF)	Federal	EPA		The program is designed to combat the climate crisis by mobilizing financing and private capital for greenhouse gas- and air pollution-reducing projects in communities across the country.
Grid Resilience Program (GRIP)	Federal	DOE		Enhance grid flexibility and improve the resilience of the nation's power grid against threats of extreme weather and climate change.
Hazard Mitigation Grant	Federal	FEMA	DHSEM	Funds allocated to States and communities for implementing long-term hazard mitigation measures following a major disaster

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Program (HMGP)				declaration. HMGP Post Fire funds are available for FMAG declarations.
Hazardous Materials Emergency Preparedness (HMEP) Grant Program	Federal	DOT	SHSEM	Funding available to help facilitate preparedness in transporting hazardous materials. The program recognizes Local Emergency Planning Committees (LEPCs) as applicants to maximize funding impact in regional partnerships.
Healthy Forests Reserve Program (HFRP)	Federal	NRCS		Assist landowners, on a voluntary basic, in restoring, enhancing and protecting forestland resources on private lands through easements.
High Hazard Potential Dam Rehabilitation Program (HHDR)	Federal	FEMA		Provides assistance for technical, planning, design and other pre-construction activities related to the repair, replacement, reconstruction, or removal activities associated with rehabilitation of an eligible high hazard potential dam.
Highway Bridge Replacement and Rehabilitation Program	Federal	FHWA	NMDOT	Provides funding to enable states to improve the condition of highway bridges through replacement, rehabilitation and systematic preventive maintenance. Also includes the National Historic Covered Bridge Preservation Program.
HOME Disaster Relief	Federal	HUD	DHSEM	Funds are available to support impacted households not located in communities that receive HOME funds directly from the U.S. Department of Housing and Urban Development (HUD).
HOME Investments Partnership Program	Federal	HUD		Funds allocated to States, local government and consortia for permanent and transitional housing (including support for property acquisition and rehabilitation) for low-income persons.
Homeland Security Grant Program (HSGP)	Federal	Department of Homeland Security	DHSEM	Homeland security activities identified in the state and local strategic plans. Funding supports threat & hazard and risk identification for natural, technological, and human-caused hazards. Some prevention activities may be considered mitigation.
Hospital Preparedness Program (HPP)	Federal	HHS	DOH	HPP is the primary source of federal funding for health care system preparedness and response and, in collaboration with public health, prepares

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<b>Cooperative Agreement Hospital Preparedness Program (HPP) Cooperative Agreement (continued)</b>				health care delivery systems to save lives through the development of health care coalitions (HCCs). Under the direction of the HPP providers, the HCCs develop plans and provide training, and coordinate regional exercises.
<b>Hydrologic Research Grants</b>	Federal	NOAA		Up to \$125,000 to conduct joint research and development on pressing surface water hydrology issues common to national, regional, local operational offices. Eligible applicants are federally recognized agencies of state or local governments, quasi-public institutions such as water supply or power companies, hydrologic consultants and companies involved in using and developing hydrologic forecasts.
<b>Indian Housing Assistance - Housing Improvement Program (HIP)</b>	Federal	DOI-BIA		Housing Improvement Program (HIP) is a home repair, renovation, replacement and new housing grant program administered by the Bureau of Indian Affairs (BIA) and federally recognized Indian tribes for American Indians and Alaska Native (AI/AN) individuals and families who have no immediate resource for standard housing.
<b>Individual Assistance (IA)</b>	Federal	FEMA	DHSEM	Following a disaster, funds can be used to mitigate hazards when repairing individual and family homes.
<b>In-Lieu Fee Program Mitigation Projects</b>	Federal	USACE	Community Applicants	Restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for Department of the Army permits.
<b>Land Acquisition</b>	Federal	DOI-FWS		Acquires or purchases easements on high quality lands and waters for inclusion into the National Wildlife Refuge System.
<b>Landowner Incentive Program</b>	Federal	USFWS	EMNRD	Collaboration with Forestry Division and private landowners to protect the habitat of at-risk species on private lands. Landowner involvement is voluntary.

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
Mapping Standards Support	Federal	DOI/USGS		Expertise in mapping and digital data standards to support the National Flood Insurance Program.
National Dam Safety Program	Federal	FEMA		Technical assistance, training, and grants to help improve State dam safety programs.
National Digital Orthophoto Program	Federal	DOI-USGS		Develops topographic quadrangles for use in mapping of flood and other hazards.
National Earthquake Hazards Reduction Program (NEHRP)	Federal	FEMA; DOI-USGS		Funds allocated to States or local jurisdictions towards training, planning and technical assistance to support enhanced earthquake risk assessments in local hazard mitigation plans and other earthquake hazard mitigation and preparedness activities.
National Earthquake Hazard Reduction Program (NEHRP) in Earth Sciences	Federal	NSF		Research into basic and applied earth and building sciences.
National Earthquake Hazard Reduction Program	Federal	DOI-USGS		NEHRP's work encompasses research, development and implementation activities. Research helps to advance our understanding of why and how earthquakes occur and impact the natural and built environments. The program develops strategies, tools, techniques and other measures that can reduce the adverse effects of earthquakes and facilitates and promotes implementation of these measures, thereby strengthening earthquake resilience among at-risk communities.
National Flood Insurance Program (NFIP)	Federal	FEMA	DHSEM	Provides affordable insurance to property owners and encourages communities to adopt and enforce floodplain management regulations
National Flood Insurance Program: Technical Mapping Advisory Council	Federal	DOI-USGS		Technical guidance and advice to coordinate FEMA's map modernization efforts for the National Flood Insurance Program (NFIP).

## APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

Name	Level	Source Agency	Managing State Agency	Purpose of Funding
<b>National Training and Education (NTE)</b> <b>National Training and Education (NTE) (continued)</b>	Federal	FEMA		Educational and training programs through online Course Catalog, which provides searchable, integrated information on courses provided or managed by FEMA's Center for Domestic Preparedness (CDP), Emergency Management Institute (EMI), and National Training and Education Division (NTED).
<b>National Weather Service (NWS)</b>	Federal	NOAA - NWS		NWS offers storm spotter training, along with weather and flooding safety guides. Funding may also be available to support severe weather signage in parks or other public places.
<b>National Wildlife Wetland Refuge System</b>	Federal	USFWS		Provides funding for the acquisition of lands into the federal wildlife refuge system.
<b>Non-Structural Alternatives to Structural Rehabilitation of Damaged Flood Control Works</b>	Federal	DOD-USACT		Direct planning and construction grants for non- structural alternatives to the structural rehabilitation of flood control works damaged in floods or coastal storms.
<b>North American Wetland Conservation Fund</b>	Federal	USFWS		Provides funding for wetland conservation projects to stimulate public/private partnerships for the protection, restoration and management of wetland habitats.
<b>NRCS Conservation Programs</b>	Federal	USDA, NRCS		Provides funding through a number of programs for the conservation of natural resources.
<b>Office of Disaster Assistance</b>	Federal	SBA		Provides financial assistance through low interest disaster loans to businesses of all sizes, private non-profit organizations, homeowners, and renters to repair or replace real estate, personal property, machinery & equipment, inventory and business assets that have been damaged or destroyed in a declared disaster.
<b>Partners for Fish and Wildlife</b>	Federal	USFWS		Provides financial and technical assistance to landowners for wetland restoration projects in "Focus Areas" of the state.

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
Planning Assistance to States	Federal	USACE		Provides assistance to states in planning for the development, utilization, and conservation of water and related land resources.
Pre-Disaster Mitigation Loan Program	Federal	SBA		Provides low-interest loans to small businesses for mitigation projects.
Pollution Prevention Grant: Environmental Justice in Communities	Federal	EPA		Technical assistance for businesses to specifically target and improve human health and the environment in disadvantaged communities.
Pollution Prevention Grant: Environmental Justice Through Safer and More Sustainable Products	Federal	EPA		Technical assistance to businesses to increase the supply, demand, and use of safer and more sustainable products.
Post-Disaster Economic Recovery Grants and Assistance	Federal	DOC-EDA		Provides funds to assist with the long-term economic recovery of communities, industries, and firms adversely impacted by disasters.
Pre-Disaster Mitigation (PDM)	Federal	FEMA	DHSEM	Congressionally directed funding for local governments, tribes and states to plan for and implement sustainable cost-effective measures designed to reduce risk to individuals and property from future natural hazards.
Preparedness (Non-Disaster) Grants	Federal	FEMA	DHSEM	Provides financial assistance to state and local governments with preparedness program. Funds are allocated to enhance the capacity of state and local emergency responders to prevent, respond to, and recover from weapons of mass destruction terrorism incidents involving chemical, biological, radiological, nuclear, and explosive devices and cyber-attacks.

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NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<b>Project Modifications for Improvement of the Environment</b>	Federal	DOD-USACE		Provides funds for ecosystem restoration by modifying structures and/or operations or water resources projects constructed by the USACE or restoring areas where a USACE project contributed to the degradation of an area.
<b>Protection of Essential Highways, Highway Bridge Approaches, and Public Works</b>	Federal	USACE		Technical assistance to ensure bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other nonprofit public services endangered by flood-caused erosion.
<b>Public Assistance</b>	Federal	FEMA	DHSEM	Funds allocated to States and communities to repair damaged infrastructure and public facilities and help restore government or government-related services.
<b>Public Assistance (PA) Section 406 funds</b>	Federal	FEMA	DHSEM	Following a disaster, funds can be used to mitigate hazards when repairing damage to a public structure or infrastructure. Wildfire mitigation is also eligible under emergency protection if life is in imminent danger.
<b>Public Health Emergency Preparedness (PHEP) Cooperative Agreement</b>	Federal	CDC	DOH	Helps health departments build and strengthen their abilities to effectively respond to a range of public health threats, including infectious diseases, natural disasters, and biological, chemical, nuclear, and radiological events. Preparedness activities funded by the PHEP cooperative agreement specifically target the development of emergency-ready public health departments that are flexible and adaptable.
<b>Public Housing Capital Fund</b>	Federal	HUD		Funding available towards public housing agencies for modernization needs resulting from natural disasters including elevation, flood proofing, and retrofitting.
<b>Public Project Revolving Funds (PPRF)</b>	State	NFMA	NFMA	Funding towards public projects such as infrastructure improvements, road projects, water system upgrades, fire and law enforcement equipment, public buildings, and more. Market-rate loans and loans at subsidized rates are available for disadvantaged communities

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
Repetitive Flood Claims Program	Federal	FEMA	DHSEM	Provides funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).
Risk MAP Program	Federal	FEMA, NFIP		Establishes or updates floodplain mapping and multi-hazard risk products.
Rural Development Assistance - Housing	Federal	USDA-Rural Housing Service		Provides grants and loans for infrastructure and public safety development and enhancement in rural areas.
Rural Development Assistance - Utilities	Federal	USDA-Rural Development		Provides funds towards needed infrastructure or infrastructure improvements to rural communities. These include water and waste treatment, electric power and telecommunications services.
Section 108 Loan Guarantee Program	Federal	HUD		Loan towards public entities for community and economic development (including mitigation measures).
Section 502 Loan Guaranteed Loan Program	Federal	USDA-RHS		Provides loans, loan guarantees, and technical assistance to very low- and low-income applicants to purchase, build, or rehabilitate a home in a rural area.
Section 504 Loans for Housing	Federal	USDA-RHS		Repair loans, grants and technical assistance to low-income senior homeowners living in rural areas to repair their homes and remove health and safety hazards.
Silver Jackets	Federal	USACE		Provides funding for flood related studies, public awareness, risk analysis, and flood response plans. Construction of small flood control projects.
Small Flood Control Projects (USACE Section 205)	Federal	USACE		Authorizes use of USACE to conduct feasibility studies and construction of small flood control projects.
Societal Dimensions of Engineering, Science, and Technology Program	Federal	NSF		Funding towards research and educational activities on topics such as ethics, values, and assessment, communication, management and perception of risk.

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
<b>Soil Survey</b>	Federal	USDA-NRCS		Maintains soil surveys of counties or other areas to assist with farming, conservation, mitigation or related purposes.
<b>State Water Resources Research Act Program</b>	Federal	USGS	New Mexico Water Resources Research Institute	Federal-State partnership that plans, facilitates, and conducts research to aid in the resolution of State and regional water problems.
<b>Stream Gauging and Flood Monitoring Network</b>	Federal	DOE-USGS		Operation of a network of over 7,000 streams gauging stations that provide data on the flood characteristics of rivers.
<b>Surface Transportation Program</b>	Federal	USDOT/FHWA		Funding allocated for activities including safety construction and transportation enhancements. Transportation enhancements encompass a broad range of safety education, environmental and historically related activities.
<b>Transfers of Inventory Farm Properties to Federal and State Agencies for Conservation Purposes</b>	Federal	USDA-FSA		Transfers title of certain inventory farm properties owned by FSA to Federal and State agencies for conservation purposes (including the restoration of wetlands and floodplain areas to reduce future flood potential)
<b>Transportation Enhancement program</b>	Federal	FHA		Provides opportunities for non-traditional transportation related activities. Projects should go above and beyond standard transportation activities and be integrated into the surrounding environment in a sensitive and creative manner that contributes to the livelihood of the communities, promotes the quality of our environment, and enhances the aesthetics of our roadways. Projects undertaken with enhancement funds are eligible for reimbursement of up to 80 percent of allowable costs.
<b>Urban &amp; Community Forestry Program Cost Share Grants</b>	State	DEC		Assistance to communities towards comprehensive planning, management, and education to create healthy urban and community forests.

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NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Urban Waters Small Grants	Federal	EPA		Funding is allocated to improve urban water quality through activities that also support community revitalization and other local priorities, this can include green infrastructure.
United States Geological Survey (USGS)	Federal	USGS		USGS issues competitive grants and cooperative agreements to support research in earthquake hazards, the physics of earthquakes, earthquake occurrence, and earthquake safety policy.
USDA Conservation Programs	Federal	USDA/FSA		These programs <sup>1</sup> work to address a large number of farming and ranching related conservation issues including drinking water protection, reducing soil erosion, wildlife habitat preservation, preservation and restoration of forests and wetlands, aiding farmers whose farms are damaged by natural disasters.
Volcano Hazards Program	Federal	DOS-USGS		Technical assistance provided through volcano hazard warnings and operation of four volcanoes observatories to monitor and assess volcano hazard risk.
Water and Waste Disposal Direct Loans and Grants	Federal	USDA		Financial assistance offered through grant programs to develop water and waste disposal systems in rural areas and towns with a population not in excess of 10,000.
Water Quality Improvement Project (WQIP) Program	State	DEC		Competitive, reimbursement grant program for projects that reduce polluted runoff, improve water quality and restore habitat.
Watershed Processes and Water Resources – National Research Initiative Standard Research (Part T)	Federal	USDA		Sponsors research that addresses two areas: (1) understanding fundamental watershed processes; and (2) developing appropriate technology and management practices for improving the effective use of water (consumptive and nonconsumptive) and protecting or improving water quality for agriculture and forestry production.

<sup>1</sup> Programs include Conservation Reserve Program, Conservation Reserve Enhancement Program, Emergency Conservation Program, Emergency Forest Restoration Program, Farmable Wetlands Program, Grassland Reserve Program, Source Water Protection Program.

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Name	Level	Source Agency	Managing State Agency	Purpose of Funding
<b>Watershed Protection and Flood Prevention Program</b>	Federal	USDA-NRCS		Technical and financial assistance for installing works of improvement to protect, develop, and utilize land or water resources in small watersheds under 250,000 acres.
<b>Watershed Surveys and Planning</b>	Federal	USDA-NRCS		Provides technical assistance and funding for local and state governments to protect watersheds, and conduct surveys and planning studies for appraising water and related resources, and service formulating alternative plans for conservation use and development.
<b>Watershed Surveys and Planning</b>	Federal	USDA-NRCS		Surveys and planning studies for appraising water and related resources and formulating alternative plans for conservation use and development. Grants and advisory/counseling services to assist with planning and implementation improvement.
<b>WaterSMART – Drought Response Program</b>	Federal	USDA		Innovative research in understanding fundamental processes that affect the quality and quantity of water resources at diverse spatial and temporal scales, ways on improving water resource management in agriculture, forested, and rangeland watersheds, and developing appropriate technology to reach those goals.
<b>Wastewater Infrastructure Engineering Planning Grants</b>	State	DEC		Provides funds for municipalities to help pay for initial planning of water quality projects eligible for the Clean Water State Revolving Fund.
<b>Wetlands Protection – Development Grants</b>	Federal	EPA		Provides funds to support the development and enhancement of state and tribal wetlands protection programs.
<b>Wetlands Reserve Program</b>	Federal	USDA, NRCS		Financial and technical assistance to protect and restore wetlands through easements and restoration agreements.
<b>Wildlife Habitat Incentive Program (WHIP)</b>	Federal	USDA, NRCS		Voluntary program for conservation-minded landowners who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and tribal land.



# ADOPTION RESOLUTIONS