June 2024

Lincoln County, Nevada
Hazard Mitigation Plan

Prepared By:
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List of Commonly Used Acronyms

Acronym	Meaning
BFE	Base Flood Elevation
BRIC	Building Resilient Infrastructure and Communities
CFR	Code of Federal Regulations
DMA	Disaster Mitigation Act
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
FMA	Flood Mitigation Assistance
GIS	Geographic Information System
HHPD	Rehabilitation Of High Hazard Potential Dam Grant Program
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
IBC	International Building Code
NCEI	National Centers for Environmental Information
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PDA	Preliminary Damage Assessment
RAPT	Resilience Analysis and Planning Tool
SFHA	Special Flood Hazard Area
MPC	Mitigation Planning Committee
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	United States Geologic Survey
WUI	Wildland/Urban Interface

Section 1 – Introduction, Assurances, and Adoption

1.1 Introduction

Mitigation is commonly defined as sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects. Hazard mitigation planning provides communities with a roadmap to aid in the creation and revision of policies and procedures, and the use of available resources, to provide long-term, tangible benefits to the community. A well-designed hazard mitigation plan provides communities with realistic actions that can be taken to reduce potential vulnerability and exposure to identified hazards.

This Multi-Jurisdictional Natural Hazard Mitigation Plan (HMP) was prepared to provide sustained actions to eliminate or reduce risk to people and property from the effects of natural and man-made hazards. This plan documents Lincoln County and its participating jurisdictions planning process and identifies applicable hazards, vulnerabilities, and hazard mitigation strategies. This plan will serve to direct available community and regional resources towards creating policies and actions that provide long-term benefits to the community. Local and regional officials can refer to the plan when making decisions regarding regulations and ordinances, granting permits, and in funding capital improvements and other community initiatives.

Specifically, this hazard mitigation plan was developed to:

- Update the 2016 HMP
- Build for a safer future for all citizens
- Foster cooperation for planning and resiliency
- Identify, prioritize, and mitigate against hazards
- Assist with sensible and effective planning and budgeting
- Educate citizens about hazards, mitigation, and preparedness
- Comply with relevant federal requirements

This plan has been designed to be a living document, a document that will evolve to reflect changes, correct any omissions, and constantly strive to ensure the safety of all citizens.

1.2 Assurances

In an effort to reduce natural disaster losses, the United States Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in order to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act). DMA 2000 amended the Stafford Act by repealing the previous Mitigation Planning section (409) and replacing it with a new Mitigation Planning section (322). Section 322 of the DMA makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for Federal mitigation grant funds. This SHMP was prepared to meet the requirements of the DMA 2000, as defined in regulations set forth by the Interim Final Rule (44 Code of Federal Regulations (CFR) Part 201.4).

All adopting jurisdictions certify that they will comply with all applicable Federal statutes and regulations during the periods for which they receive grant funding, in compliance with 44 CFR 13.11(c), and will amend this plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

This hazard mitigation plan was prepared to comply with all relevant requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, as amended by the Disaster Mitigation Act of 2000. This plan complies with all the relevant requirements of:

- Code of Federal Regulations (44 CFR) pertaining to hazard mitigation planning
- Federal Emergency Management Agency (FEMA) planning directives and guidelines
- Interim final, and final rules pertaining to hazard mitigation planning and grant funding
- Relevant presidential directives
- Office of Management and Budget circulars
- Any additional and relevant federal government documents, guidelines, and rules.

1.3 Authorities

The HMP relies on the authorities given to participating jurisdictions by its citizens and encoded in local and state law. This plan is intended to be consistent with all policies and procedures that govern activities related to the mitigation programing and planning. In all cases of primacy, State of Nevada and local laws, statutes, and policies will supersede the provisions of the plan.

1.4 Plan Adoption

Upon review and approved pending adoption status by FEMA Region IX, adoption resolutions will be signed by the participating jurisdictions. FEMA approval documentation and jurisdictional adoption resolutions may be found in Appendix A.

Administration and oversight of the hazard mitigation program is the responsibility of the Lincoln County Emergency Management Office. The plan will be reviewed annually and will be updated every five years, or as required by changing hazard mitigation regulations or guidelines.

Section 2 – Documentation of the Planning Process

2.1 Planning Process

The process established for this planning effort is based on the Disaster Mitigation Act of 2000 planning and update requirements and the FEMA associated guidance for local hazard mitigation plans. To accomplish this, the following planning process methodology was followed:

- Inform, invite, and involve other mitigation plan stakeholders throughout the state, including federal agencies, state agencies, regional groups, businesses, non-profits, underserved communities, and local emergency management organizations.
- Conduct a thorough review of all relevant current and historic planning efforts.
- Collect data on all related state plans and initiatives, local plans' hazard risk, local plans' mitigation strategies and actions, state owned facilities, flood plains, Repetitive Loss/Severe Repetitive Loss properties, hazard events, on-going and completed mitigation actions, and mitigation program changes since the development of the previous plan.
- Conduct a review of all related and relevant state and local plans for integration and incorporation.
- Develop the planning and project management process, including methodology, review procedures, details about plan development changes, interagency coordination, planning integration, and the organization and contribution of stakeholders.
- Develop and update the profile of Lincoln County.
- Complete a risk and vulnerability assessment using data from the FEMA and other federal and state agency resources. Analyses were conducted at the state level, county by county, of state-owned facilities, and county by county drawing on local assessments.
- Develop a comprehensive mitigation strategy effectively addressing Lincoln County's hazards and mitigation program objectives. This included identifying state and local capabilities, reviewing pre and post disaster policies and programs, identifying objectives and goals, identifying mitigation actions and projects, and assessing mitigation actions and projects.
- Determination and implementation of a plan maintenance cycle, including a timeline for plan upgrades and improvements.
- Submission of the plan to FEMA for review and approval.

2.2 Hazard Mitigation Planning Equity

Planning equity refers to the principle of fairness and justice in planning and development processes. It emphasizes the equitable distribution of resources, opportunities, and benefits among all members of a community, particularly those who have historically been marginalized or disadvantaged. The concept of planning equity recognizes that planning decisions can have significant impacts on different groups of people and aims to ensure that these decisions promote social justice and inclusivity. It involves addressing spatial inequalities, such as disparities in access to housing, transportation, public services, green spaces, and employment opportunities.

Planning equity entails involving diverse stakeholders in decision-making processes, including community members, advocacy groups, and underrepresented populations. It seeks to empower marginalized communities by giving them a voice in shaping the development and planning policies that directly affect their lives.

Planning equity and hazard mitigation planning are closely related, as both aim to create more resilient and inclusive communities. As part of this planning effort, the following intersections were considered between planning equity and hazard mitigation planning:

- Vulnerability assessment: Planning equity recognizes that certain communities, particularly marginalized and disadvantaged populations, may be more vulnerable to hazards due to social, economic, and environmental factors. When conducting a vulnerability assessment as part of hazard mitigation planning, it is important to consider equity issues and identify areas or groups that may experience disproportionate impacts.
- Engaging marginalized communities: Planning equity emphasizes the inclusion and participation of diverse stakeholders, including marginalized communities, in decision-making processes. In hazard mitigation planning

it is crucial to engage these communities to understand their unique needs, concerns, and perspectives regarding hazards.

- Addressing social disparities: Hazard mitigation planning can help address social disparities by considering the unequal distribution of resources and opportunities in the context of hazards. This can involve implementing mitigation measures that specifically target vulnerable populations, such as affordable housing in safer areas or improved access to emergency services and transportation for underserved communities.
- Equitable distribution of resources: Planning equity promotes the equitable distribution of resources, and this principle can be applied to hazard mitigation planning. It involves ensuring that mitigation measures and investments are allocated fairly, with consideration given to communities that have historically received less attention or investment. This can help reduce existing disparities and enhance the resilience of marginalized communities.

By integrating planning equity into hazard mitigation planning, it becomes possible to develop strategies and actions that not only reduce the risks associated with hazards but also promote social justice, inclusivity, and resilience for all members of the community.

As part of this planning process, planners considered potential inequities within the region and encouraged the participation of potentially vulnerable citizens and communities. This process began with recognizing that disparities exist within the region, including health outcomes and living conditions for people of color, people with disabilities, and historically disadvantaged communities. It was recognized that these populations may be at greater risk to the hazards identified in this plan and may be limited in their ability to adapt, respond, and recover if an event were to occur.

As recommended in FEMA's "Guide to Expanding Mitigation," Lincoln County took a whole community approach to this planning effort, including:

- Inviting historically underserved populations to participate in the planning and decision-making processes
- Inviting faith based and community organizations, nonprofit groups, schools, and academia to be plan stakeholders

2.3 2024 Plan Update

In undertaking this planning effort, Lincoln County Emergency Management determined that wide variances in planning format and data do not allow for effective continuous planning. To provide planning continuity every effort was made during this plan update to adhere as closely as possible to elements of the previous HMP. As such, the level of analysis and detail included in this risk assessment is cumulative, allowing participating jurisdictions to have a robust base to further mold and improve their mitigation strategies over the next five years.

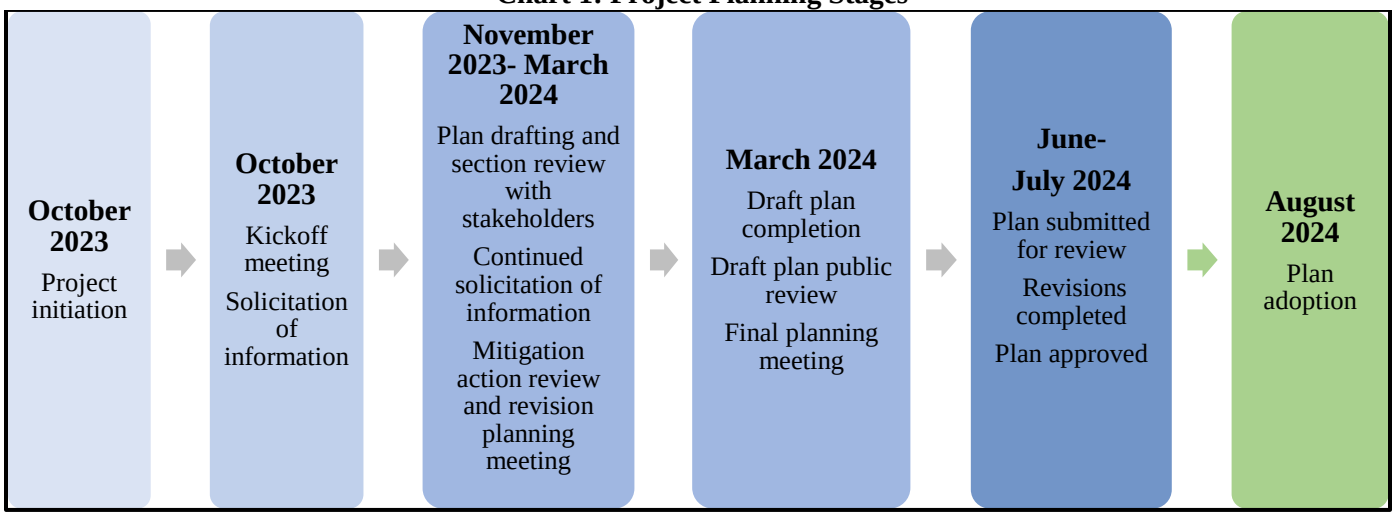
As part of this planning effort, each section of the previous mitigation plan was reviewed and revised based on current and available data. The plan was reviewed and revised against the following elements:

- Compliance with the current regulatory environment
- Completeness of data
- Correctness of data
- Capability differentials
- Current regional environment

Based on the above criteria, each section of the previous HMP was reviewed and revised as required. In addition to data revisions, the format and sequencing of the previous plan was updated for ease of use and plan clarity. Additionally, during this process, and after a thorough review and discussion with all stakeholders, it was determined that the priorities of the Lincoln County in relation to hazard mitigation planning have not changed during the five years of the previous planning cycle.

The Lincoln County HMP review and revision process began in October 2023, with the first public meeting held in October 2023. The following chart indicates the planning stages completed as part of this process:

Chart 1: Project Planning Stages



2.4 Planning Document Resources

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various other jurisdictional plans. In creating this plan, all the planning documents identified below were consulted and reviewed, often extensively. In turn, when each of these other plans is updated, they will be measured against the contents of the hazard mitigation plan.

Below is a list of the various planning efforts, sole or jointly administered programs, and documents reviewed and included in this hazard mitigation plan. While each plan can stand alone, their review and functional understanding was pivotal in the development of this plan and further strengthens and improves a jurisdiction's resilience to disasters.

- **Lincoln County 2016 Multi-Jurisdictional Natural Hazard Mitigation Plan**
  The previous HMP has been reviewed and is incorporated throughout this plan per FEMA requirements.
- **City of Caliente Comprehensive Plan**
  This plan sets policies that help the jurisdiction address critical issues facing the community, achieve goals based on priority, and coordinate public and private efforts for mutual success. It also provides the historical context, background, and current data necessary to understand issues and choose solutions as well as seek various forms of funding.
- **Comprehensive Economic Development Strategy for Lincoln County and for the City of Caliente:**
  This plan lays out a series of strategic economic development goals with an accompanying implementation plan.
- **Lincoln County Emergency Operations Plans**
  This plan is used to develop procedures for the protection of personnel, equipment, and critical records to help determine existing established policies that ensure the continuity of government and essential services during and after disasters.
- **Community Wildfire Risk Assessment and Fuel Reduction Plan for Caliente in Lincoln County, Nevada**
  This plan was used to help determine wildfire vulnerabilities and response strategies.
- **State of Nevada Hazard Mitigation Plan**
  The State of Nevada Hazard Mitigation Plan, completed by the Nevada Division of Emergency Management / Homeland Security, is intended to provide the framework for hazard mitigation. This plan set a baseline for standards and practices for hazard mitigation planning and was used as a resource for information and data.
- **Planning and Zoning Documents and Ordinances**
  These documents were reviewed, assessed, and cataloged to compile each participating jurisdiction's capabilities.

2.5 Technical Resources

The MPC employed a variety of technical resources during plan development. These technical resources were instrumental in completing an accurate vulnerability and risk assessment, and include:

- **FEMA Digital Flood Insurance Rate Maps**: FEMA's National Flood Hazard Layer data was instrumental in mapping floodplain locations and estimating potential flood impacts and loss estimates.
- **FEMA National Risk Index (NRI):** An online mapping application that identifies communities most at risk to natural hazards. The mapping service visualizes natural hazard risk metrics and includes data about expected annual losses from natural hazards, social vulnerability, and community resilience. The NRI's interactive web maps are at the county and Census tract level and made available via GIS services for custom analyses.
- **FEMA Resilience Analysis and Planning Tool (RAPT):** FEMA and Argonne National Laboratory created RAPT to support state, local, tribal, territorial analysis in identifying focus areas for building resilience, response, and recovery capabilities. RAPT is a geographic information system web map tool with clickable layers of community resilience indicators, infrastructure locations, and hazard data.
- **National Oceanic and Atmospheric Administration (NOAA)/National Centers for Environmental Information (NCEI):** Weather data and historical events were primarily provided by NCEI.
- **U.S. Army Corps of Engineers (USACE):** Dam and flood control data.
- **U.S. Department of Agriculture (USDA):** Drought and agricultural data.
- **U.S. Geological Survey:** Geologic hazard occurrence and probability data.
- **National Weather Service (NWS):** Storm event occurrence and probability data.

2.6 Mitigation Planning Committee

Project initiation began with the selection of a Mitigation Planning Committee (MPC), consisting of the Lincoln County emergency manager and representative staff from both Lincoln County and the City of Caliente. From project inception to completion, the MPC was notified at each major plan development milestone through a combination of meetings and electronic communication.

In general, all MPC members were asked to participate in the following ways:

- Attend and participate in meetings
- Assist with the collection of data
- Assure the accuracy and completeness of data
- Assist with the revision and development of mitigation actions
- Review planning elements and drafts
- Integrate hazard mitigation planning elements with other planning mechanisms

As an additional responsibility as part of the MPC, members helped establish project operating procedures and timelines, and assisted with the establishment of project milestones.

The following table represents members of the MPC:

Table 1: MPC Members

Jurisdiction and Department	Representative	Title
Lincoln County Emergency Management	Eric Holt	Emergency Manager
Lincoln County	Diane Path	County Commissioner
Lincoln County Land Use	Ty Stogsdill	Director
Lincoln County Building Department	Cory Lytle	Director
City of Caliente	George Rowe	Fire Chief
City of Pioche	Matt Elemer	Fire Chief
Grover C. Dils Medical Center	Katherine Lucchesi	Chief Operating Officer
Grover C. Dils Medical Center	Melissa Rowe	Administrator

Repeated outreach efforts were made to equity partners extending opportunities to have a representative on the MPC. Providing a voice to underserved communities were representatives from the Grover C. Dils Medical Center, who provide medical care for all members of the community. Please note that no Native America tribes were identified as having a Tribal Reservation in Lincoln County.

2.7 Stakeholders

Lincoln County acknowledges that effective hazard mitigation planning should involve a diverse group of stakeholders, including government agencies, private sector entities, private non-profit organizations, quasi-governmental authorities, and special districts. The coordination and cooperation of these stakeholders assists with all aspects of plan development, including:

- Data collection
- Risk analysis
- High and Significant Hazard dam information
- Statewide capability assessment
- Mitigation action review, revision, and development
- Plan implementation

The Lincoln County MPC provided the opportunity for a wide variety of stakeholders to participate in the planning process, including jurisdictional National Flood Insurance Program (NFIP) coordinators, agencies involved in regulating and overseeing development, neighboring communities, agencies, businesses, academia, non-profits, underserved or marginalized communities, and other interested parties to be involved in the mitigation planning process.

Local building departments played a critical role in creating and reviewing this HMP. Their expertise was used to help identify local vulnerabilities and develop building-related mitigation measures (please see section 5.3)

Jurisdictional NFIP coordinators played a key role in mitigation planning at the community level. These coordinators were actively engaged and for their expertise on flood risk, mitigation strategies, and NFIP compliance (please see Section 5.4).

2.8 Adopting Jurisdictions

In order to have an approved hazard mitigation plan, DMA 2000 requires that each jurisdiction participate in the planning process. Each jurisdiction choosing to participate in the development of the plan was required to meet detailed participation requirements, which included the following:

- When practical and affordable, participation in planning meetings
- Provision of information to support the plan development
- Identification of relevant mitigation actions
- Review and comment on plan drafts
- Formal adoption of the plan

Based on the above criteria, the following jurisdictions participated in the planning process, and will adopt the approved hazard mitigation plan:

Table 2: Adopting Jurisdictions

Jurisdiction	Requirements Met	Name	Title
Lincoln County	x	Eric Holt	Emergency Manager
City of Caliente	x	Steve Rowe	Mayor

2.9 Community Outreach

As part of the overall planning process, the community was provided with numerous opportunities to contribute and comment on the creation and adoption of the plan. These opportunities included:

- Advertised meeting invitations
- Comment period upon completion of draft plan
- Online survey

Experience has indicated that public meetings, no matter how well advertised, generally do not generate either participation or interest in the planning process. Even so, open meetings were held at easily accessible community locations. To help generate community interest and participation, a parallel online outreach strategy was undertaken. An online HMP survey was created, the Lincoln County Hazard Mitigation Plan Survey. This online survey portal allowed community members to provide feedback and input on the HMP update using a series of guided questions and open comment fields. Community members commented through this survey, and these comments are both incorporated in this HMP and are included in Appendix B.

Input from the general public provided the MPC with a clearer understanding of local concerns, helped confirm identified hazards, helped shape proposed mitigation actions, and provided elected and Tribal officials with a guide and tool to set local, regional, and Tribal ordinances and regulations. This public outreach effort was also an opportunity for adjacent jurisdictions and entities to be involved in the planning process. Additionally, as citizens were made more aware of potential hazards and the local process to mitigation against their impacts, it was believed that they would take a stronger role in making their homes, neighborhoods, schools, and businesses safer from the potential effects of natural hazards.

2.9 Planning Meetings

Two in-person meetings were conducted for the 2024 HMP update. All of the meetings were held in a publicly accessible location and advertised as open to the public. These meeting were conducted to discuss the mitigation planning process as well as gain public support and input for the plan update. The following is a brief synopsis of those meetings.

- **HMP Update Kick-Off and Public Information Meeting – October 10, 2023:** Lincoln County hosted a kick-off meeting for the MPC, stakeholders, and the public. At the meeting, MPC members, plan stakeholders, and the public were invited to voice any concerns, ask questions, and provide input on the mitigation plan update. Additionally, MPC members were tasked with collecting contact information, hazard history, facility information, and other pertinent information from participating jurisdictions.
- **HMP Plan Review, Capability Review, and Mitigation Strategy Review Meeting – May 7, 2024:** Lincoln County had a virtual planning meeting for the MPC. Attendees reviewed and revised, as necessary, the hazards list and vulnerability assessment. MPC members also reviewed the mitigation strategy to ensure it was in-line with the current planning environment.
- **HMP Update Final Review Meeting – June 20, 2024:** Lincoln County hosted a public final plan review meeting for the MPC, stakeholders, and the public. At the meeting, MPC members, jurisdictional representatives, plan stakeholders, and the public were invited to voice any concerns, ask questions, and provide input on the mitigation plan update. Additionally, members of the public were invited to review a draft copy of the HMP update posted to jurisdictional and county websites for two weeks prior to the final meeting, and prior to its submission to FEMA Region IX.

Section 3 – Regional Profile and Development Trends

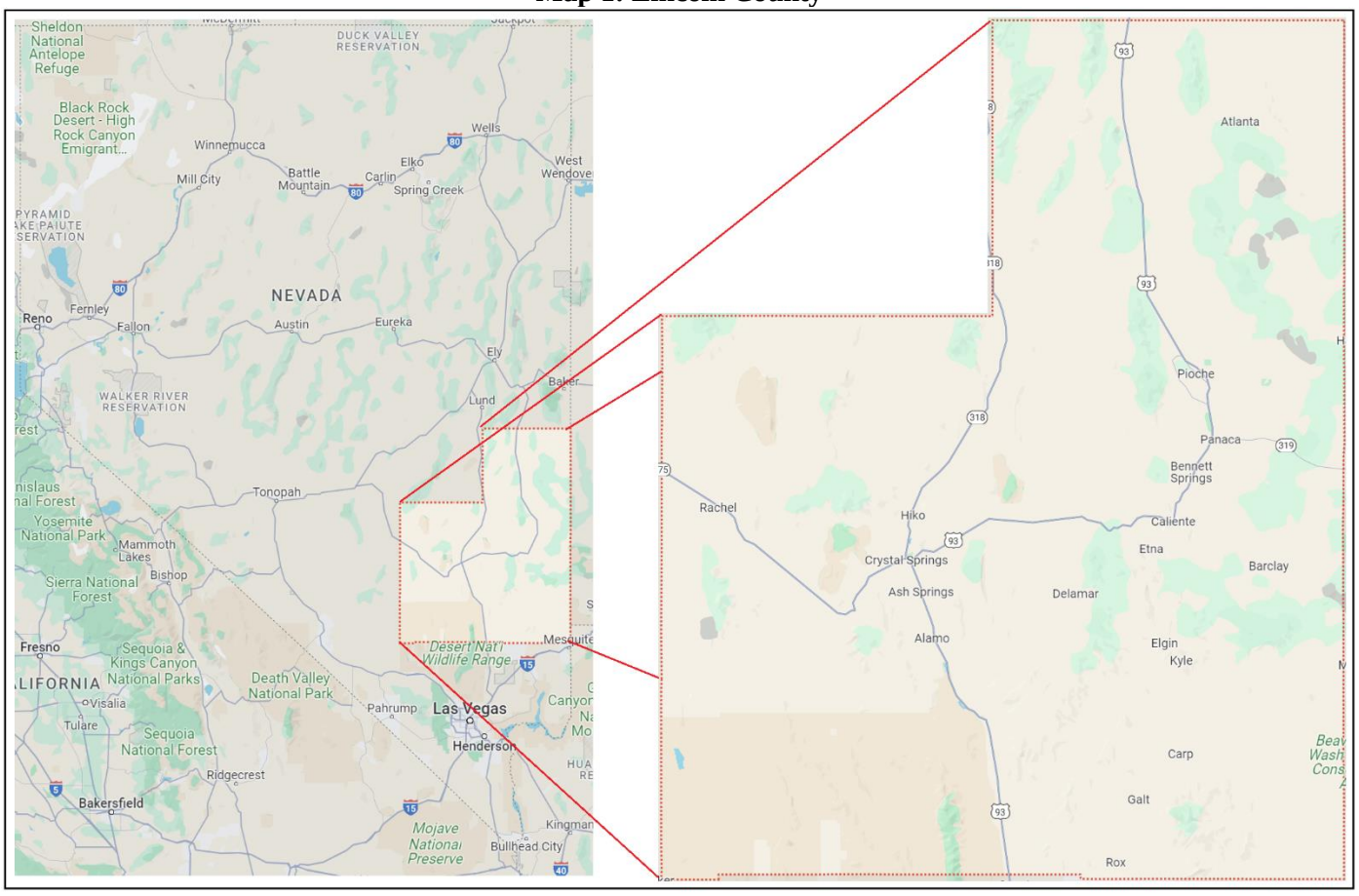
3.1 Introduction

Data concerning development trends and conditions is of great importance in determining regional and local risk and vulnerability to identified hazards, especially in locations which are susceptible to identified hazards. In general, any increase in population or development in hazard susceptible areas tends to increase both the risk and the vulnerability to that hazard. As such, the information presented in this chapter details relevant population and building statistics for the region on a local level basis. This data will then be used to determine and refine potential hazard vulnerability in succeeding sections.

3.2 Regional Maps

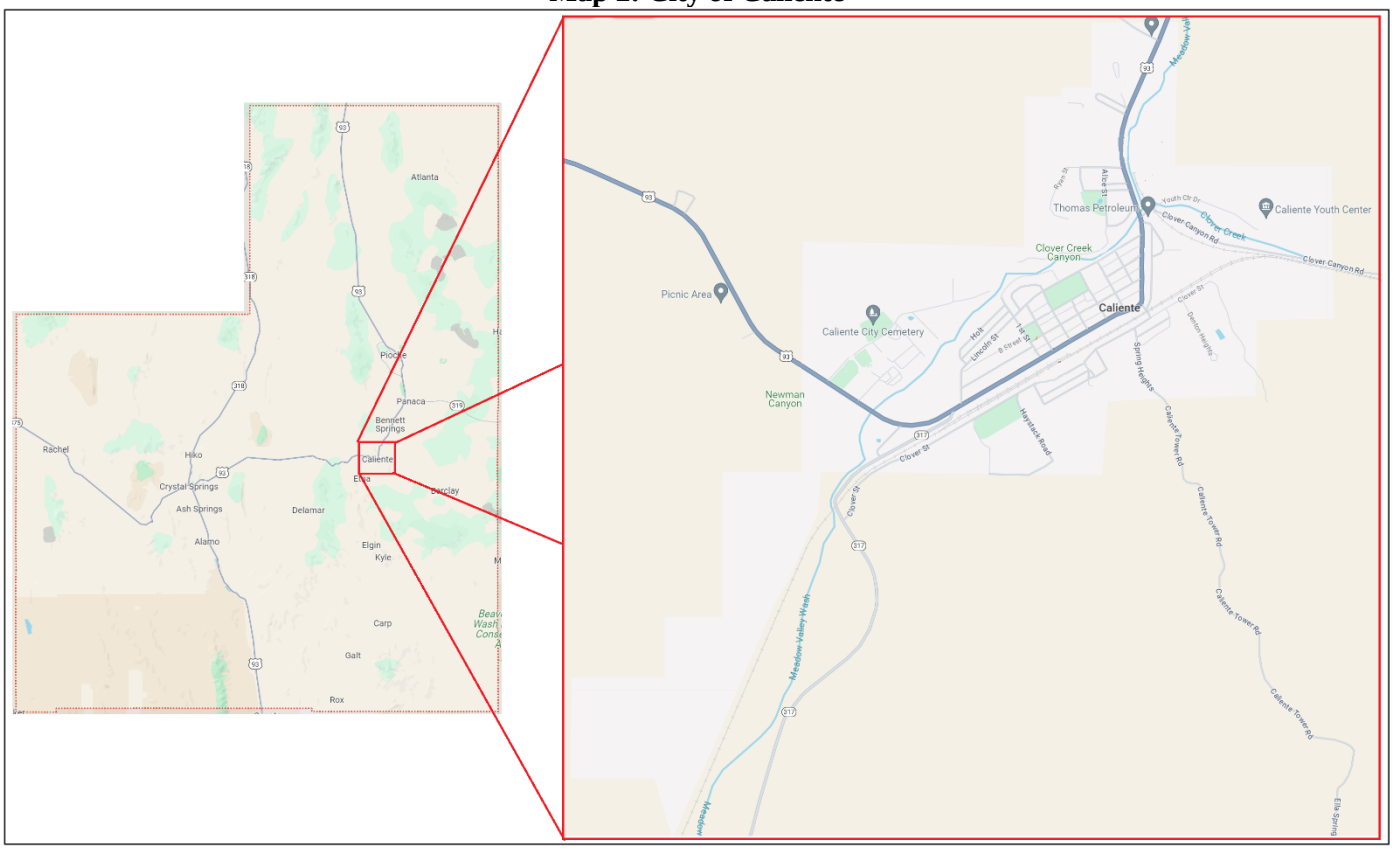
The following map details the locations of Lincoln County relative to the State of Nevada:

Map 1: Lincoln County



The following map details the City of Caliente**:**

Map 2: City of Caliente



3.3 Population Data

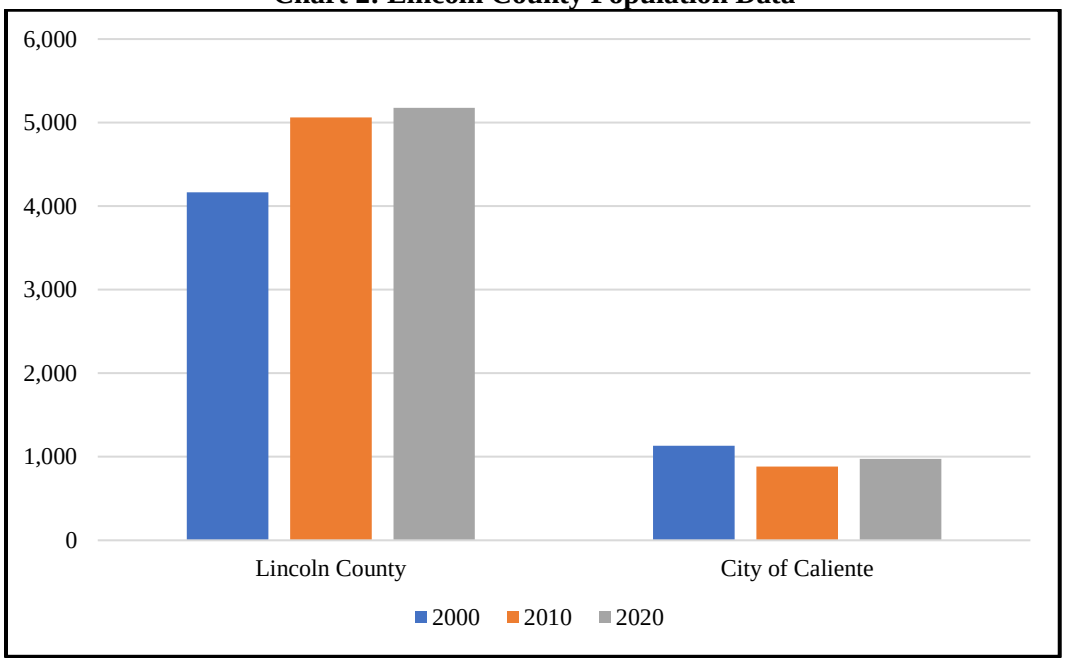
Lincoln County has seen population growth within the over the 20-year period from 2000 to 2020, as indicated by data collected from the United State Census Bureau. The following table, and associated chart, presents population data for Lincoln County and the City of Caliente.

Table 3: Lincoln County Population Data

Jurisdiction	Population			Percentage Population Change 2000-2020	Total Land Area (Sq. Mi.)	Population Density
	2000	2010	2020			
Lincoln County	4,165	5,060	5,177	24.3%	10,637	<1
City of Caliente	1,132	883	974	-14.0%	55	18

Source: US Census Bureau

Chart 2: Lincoln County Population Data



Source: US Census Bureau

3.4 Social Vulnerability

As a subset of the population data, Lincoln County has socially vulnerable and at-risk populations, populations that may have difficulty with medical issues, poverty, extremes in age, and communications due to language barriers. Several principles may be considered when discussing potentially at-risk populations, including:

- Not all people who are considered at risk are at risk
- Outward appearance does not necessarily mark a person as at risk
- The hazard event will, in many cases, affect at risk population in differing ways

The National Response Framework defines at risk populations as "populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care." The following table presents information on potential at risk populations within Lincoln County and the City of Caliente using 2020 census data.

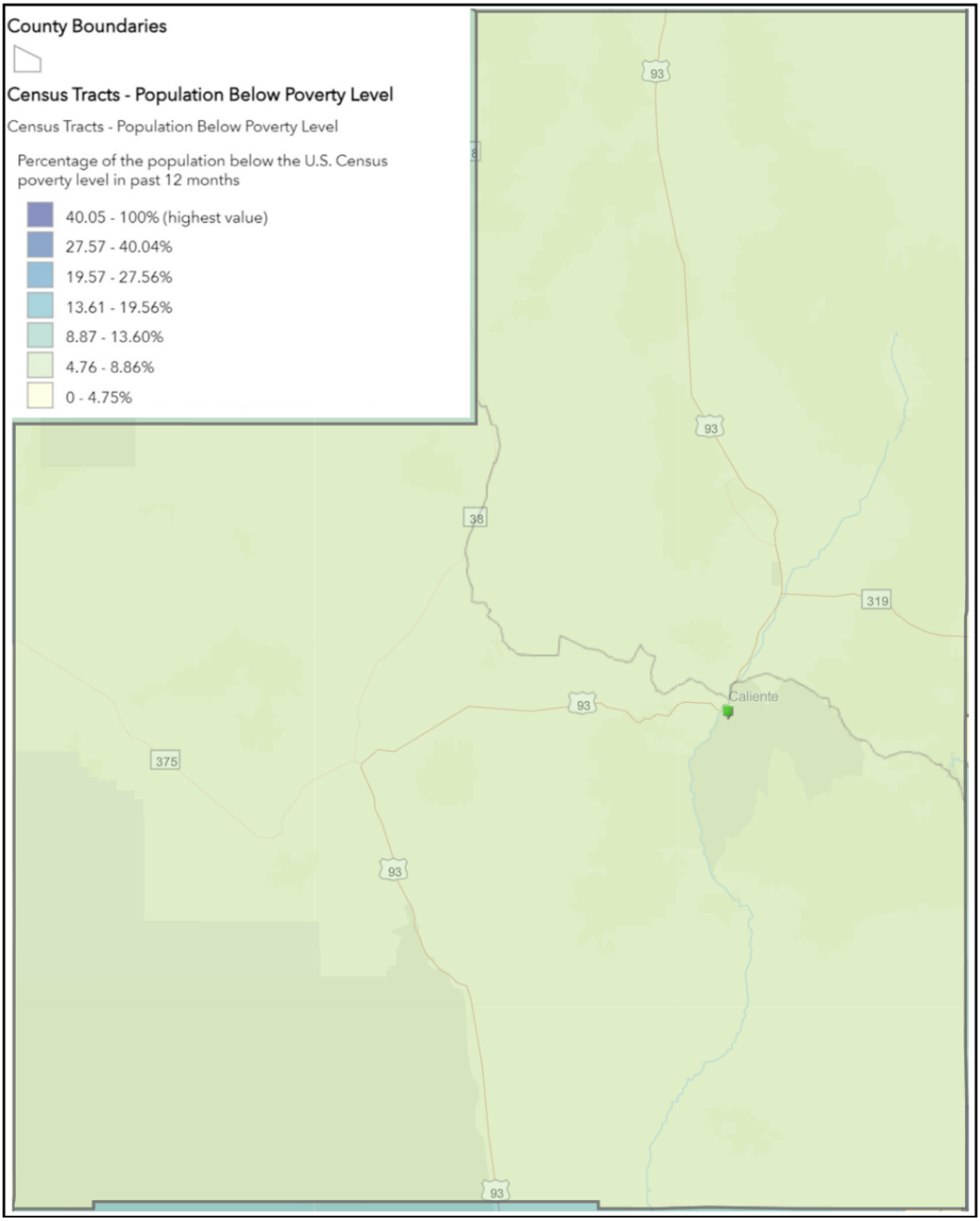
Table 4: Lincoln County Vulnerable Population Data

Jurisdiction	Percentage of Population 5 and Under	Percentage of Population 65+	Percentage of Population Speaking Language Other Than English	Percentage of Population Living Below Poverty Level	Persons with a Disability, Under the Age of 65
Lincoln County	5.9%	24.8%	6.0%	13.9%	12.4%
Caliente	5.1%	25.9%	5.6%	11.4%	12.1%

Source: US Census Bureau

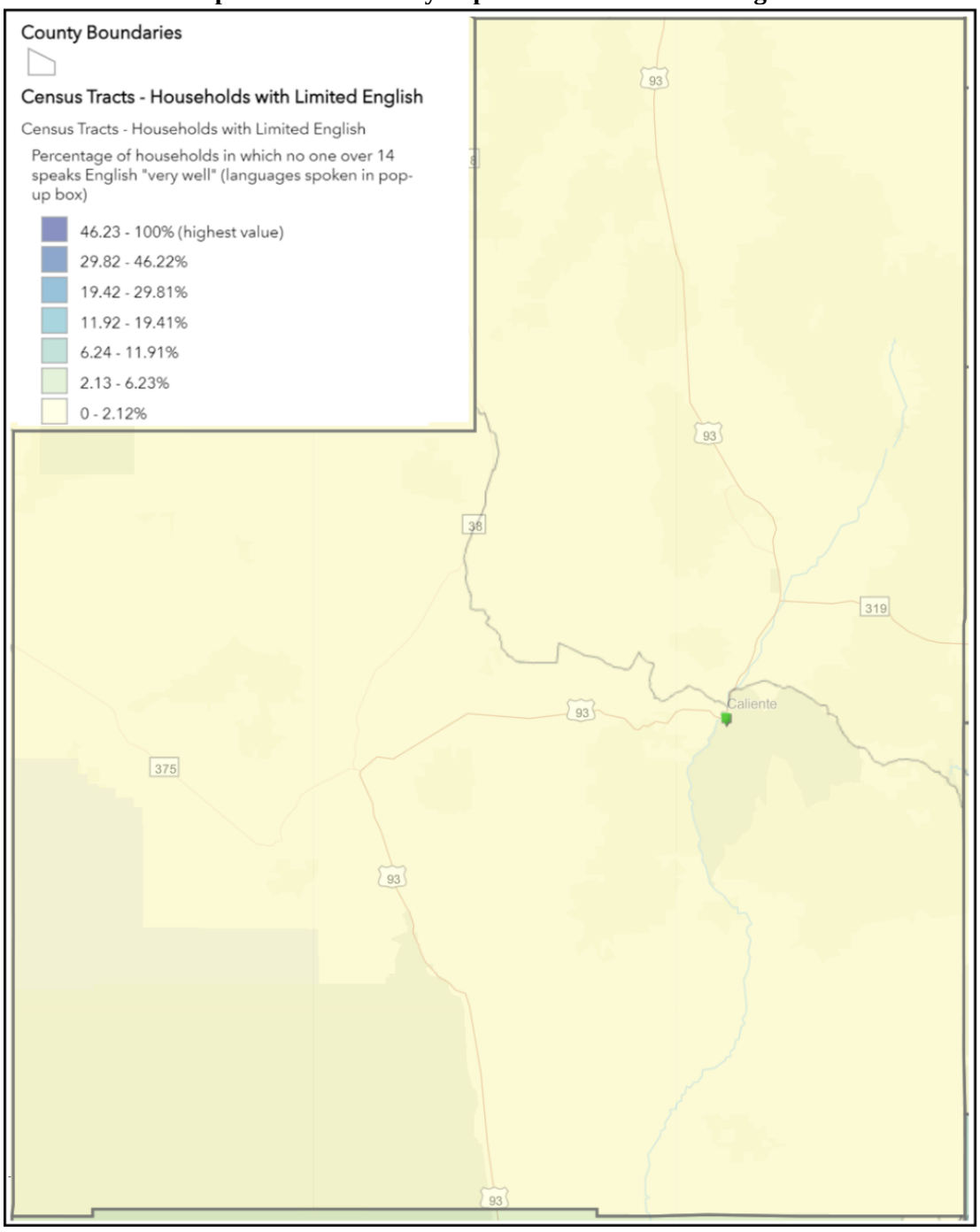
The following maps, from FEMA RAPT and using Census data, illustrate potentially at-risk populations within Lincoln County.

Map 3: Lincoln County Population Below the Poverty Level



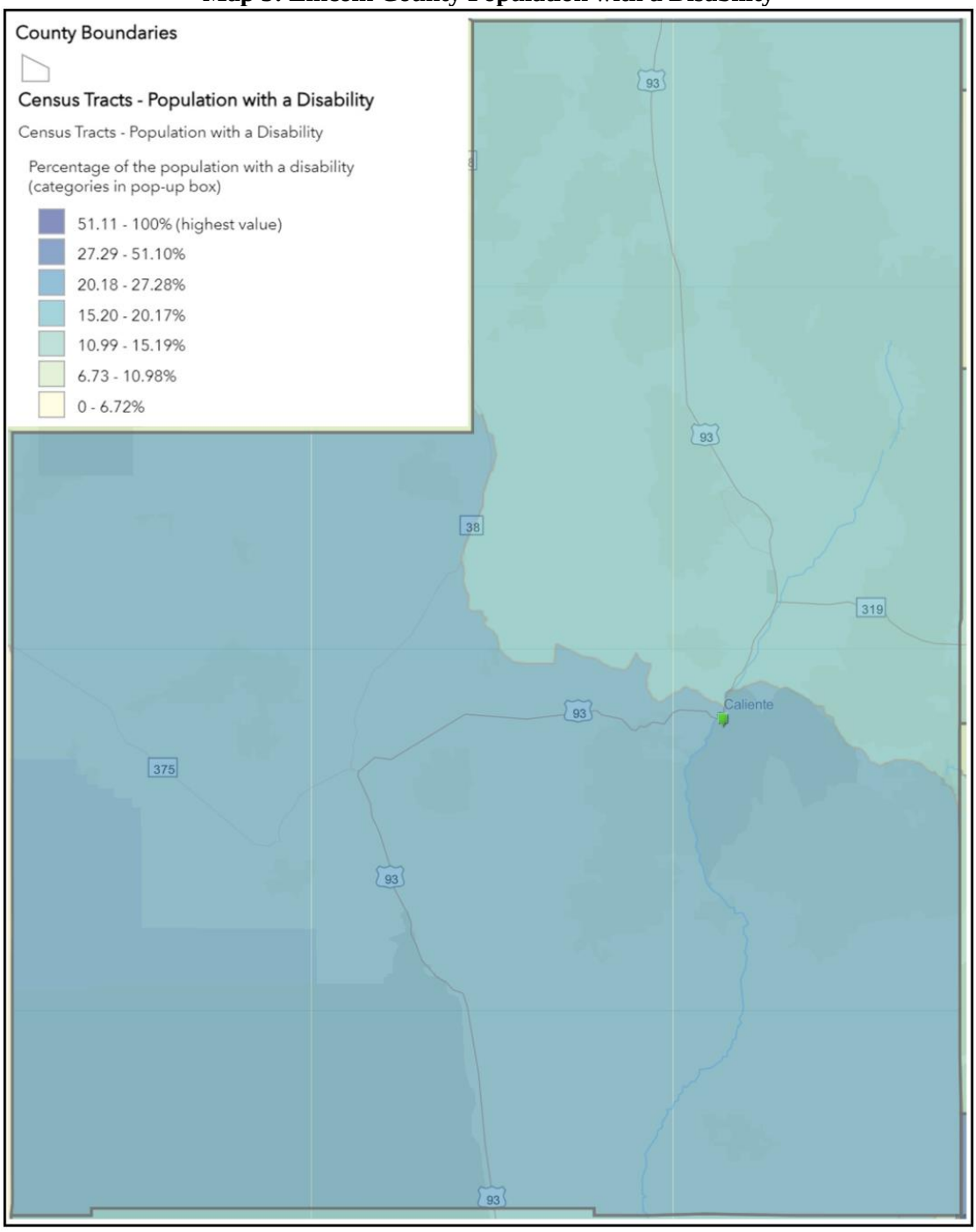
Source: FEMA RAPT

Map 4: Lincoln County Population with Limited English



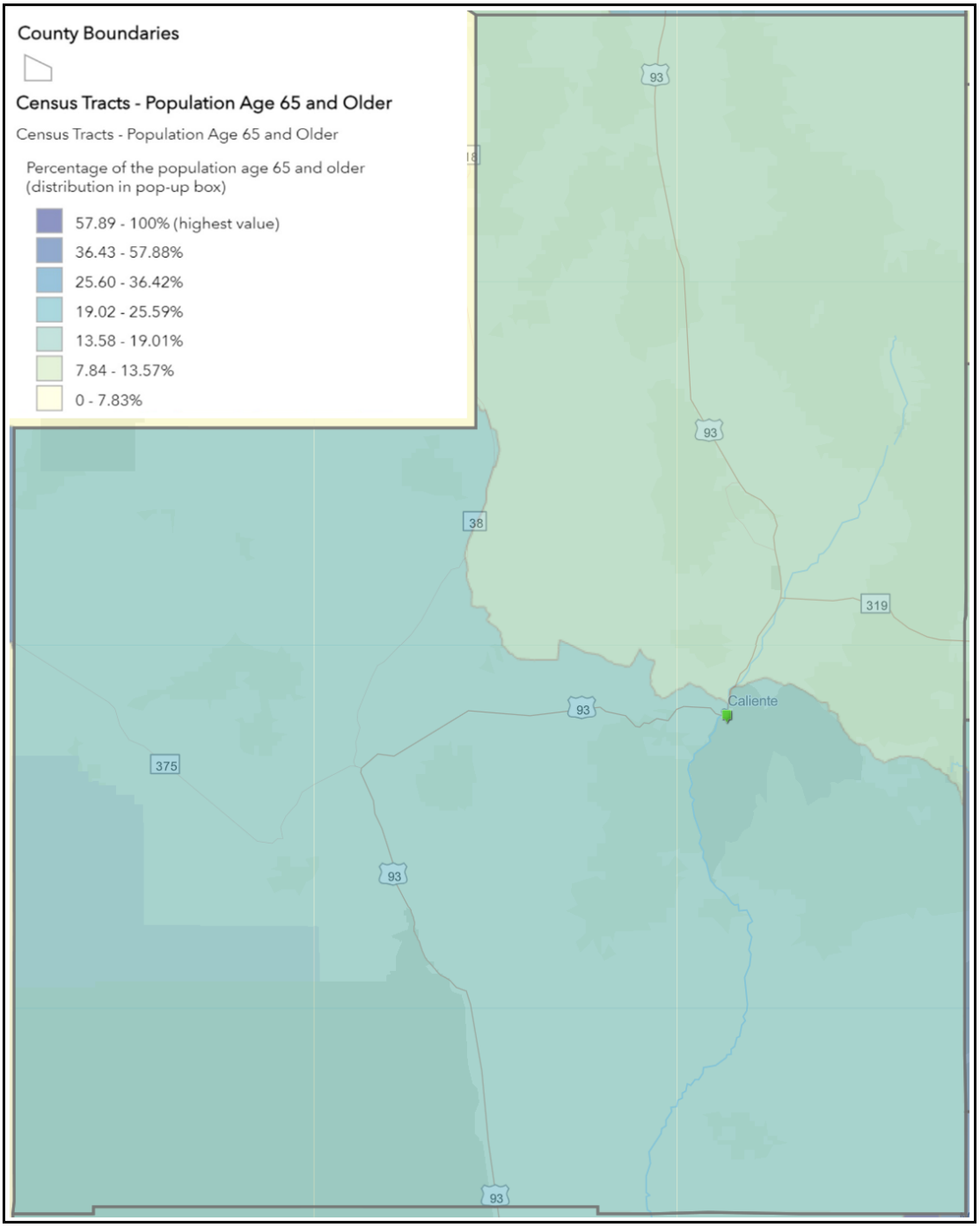
Source: FEMA RAPT

Map 5: Lincoln County Population with a Disability



Source: FEMA RAPT

Map 6: Lincoln County Population Over the Age of 65

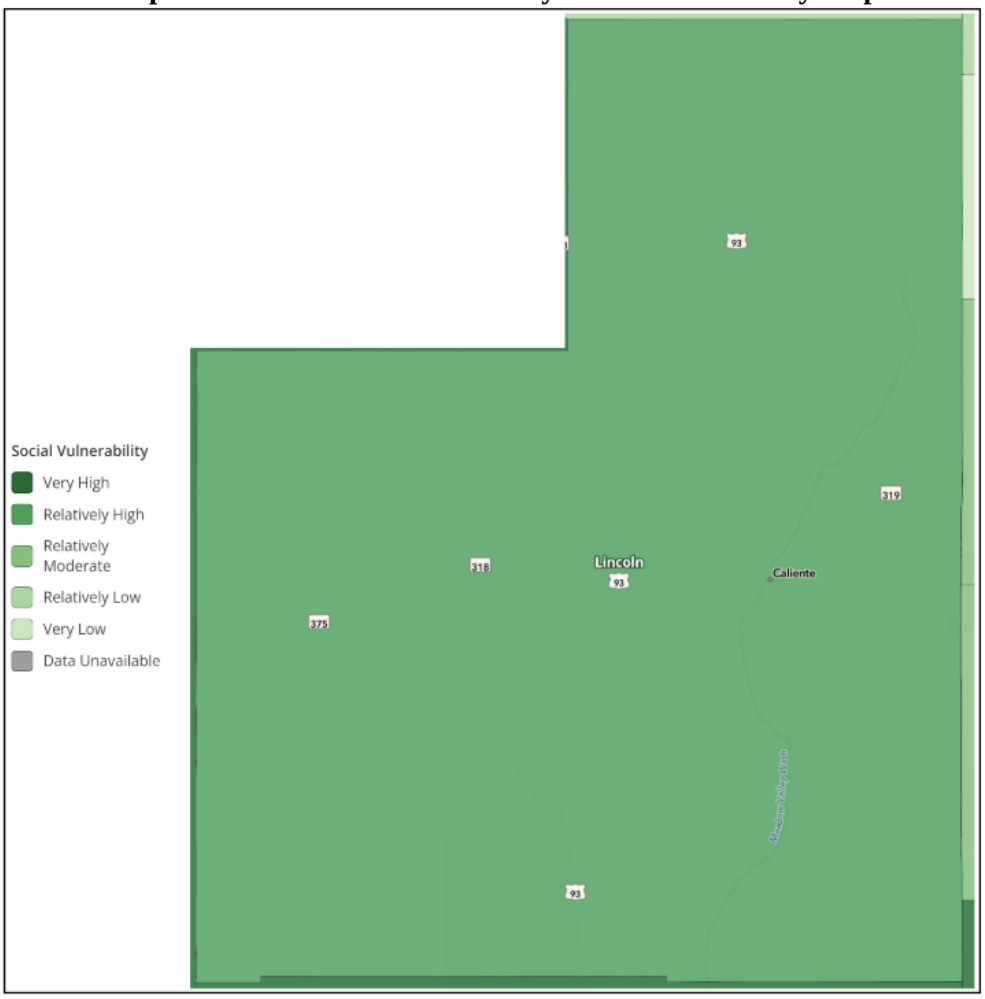


Source: FEMA RAPT

Using data from the Centers for Disease Control and Prevention (CDC)/Agency for Toxic Substances and Disease Registry Social Vulnerability Index FEMA's NRI creates and maps a Social Vulnerability score. In this context, social vulnerability is the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood. This score represents the relative level of a community's social vulnerability compared to all other communities at the same level. A qualitative rating that describes the community in comparison to all other communities at the same level, ranging from "Very Low" to "Very High" is used quantify Social Vulnerability. Census tracts with the social vulnerability score highest qualify for designation as a community disaster resilience zone. Census tracts designated as a community disaster resilience zone may receive special technical assistance, planning assistance, and a 90% federal funding match (as opposed to the standard 75% federal match) for mitigation projects.

Data concerning social vulnerability is reported by county and by census tract, which can be analogous with jurisdictions. The following map details the social vulnerability for Lincoln County:

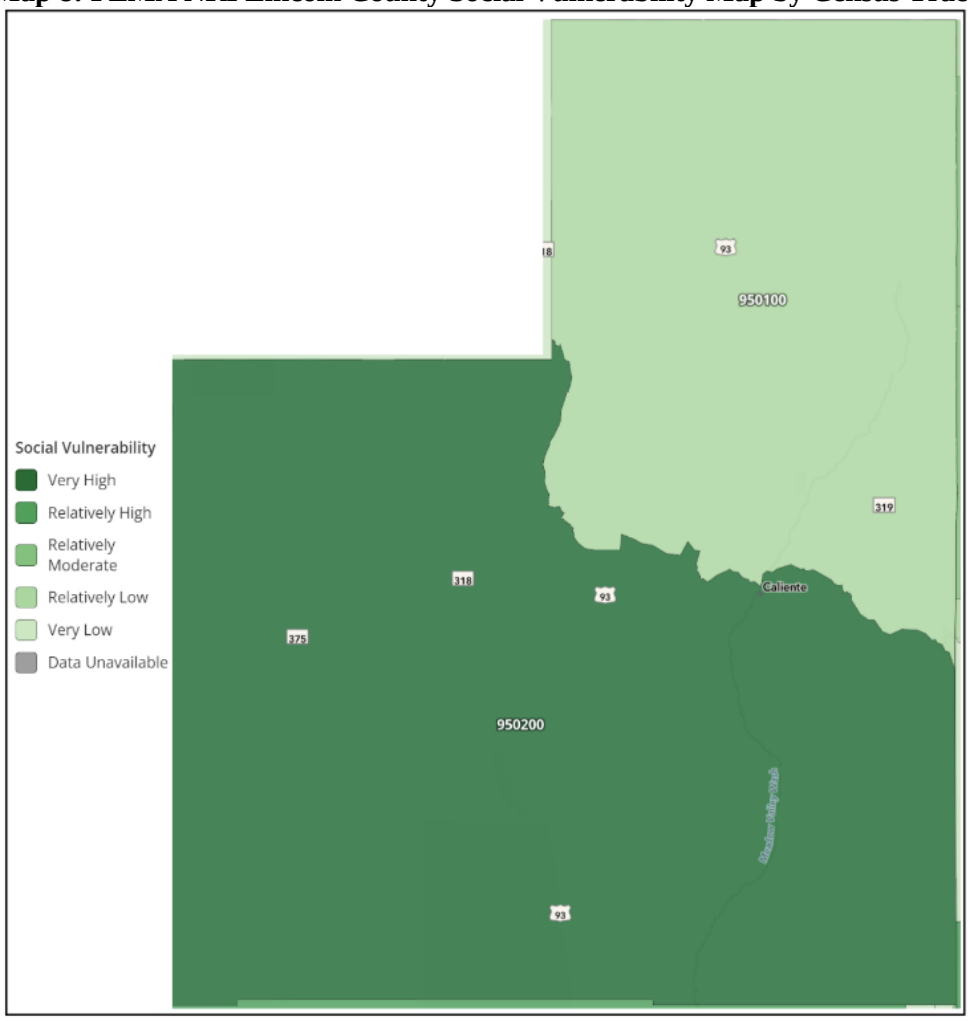
Map 7: FEMA NRI Lincoln County Social Vulnerability Map



Source: FEMA

To help understand the social vulnerability of the City of Caliente, mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions. The following map indicates the Social Vulnerability scores for census tracts within Lincoln County:

Map 8: FEMA NRI Lincoln County Social Vulnerability Map by Census Tract



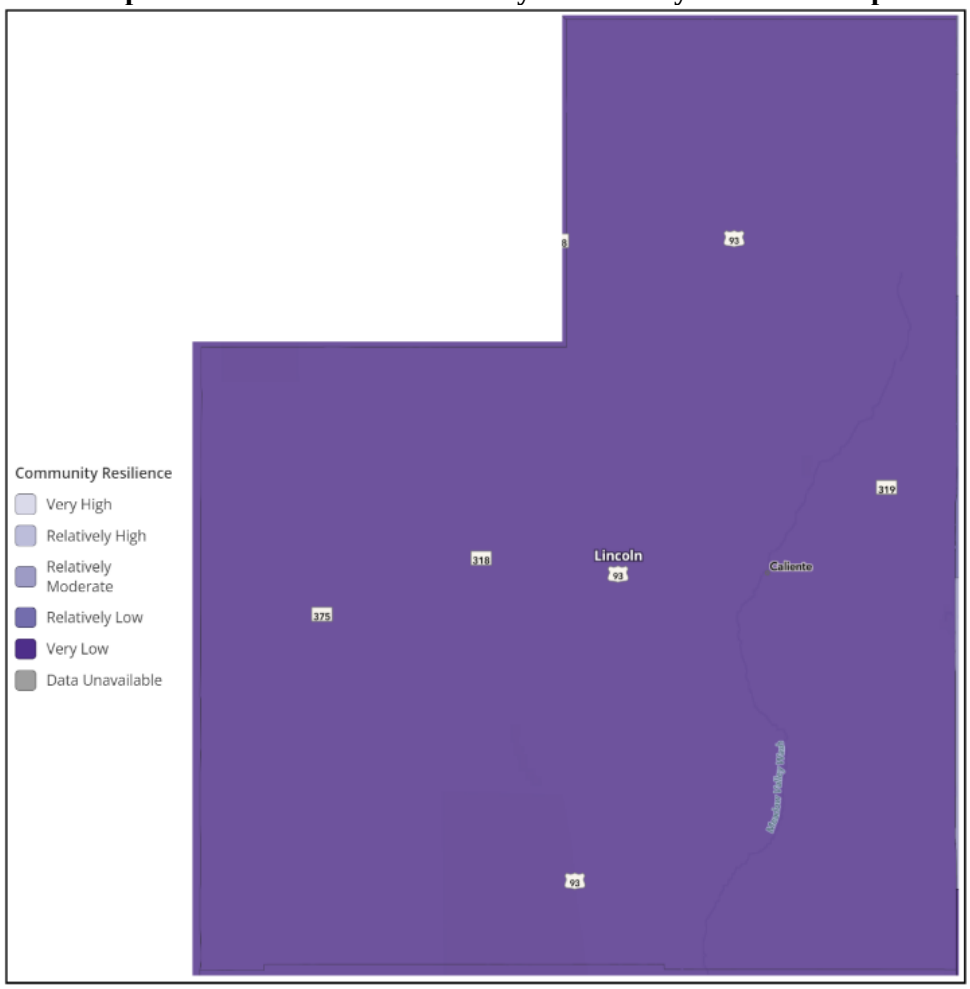
Source: FEMA

Census tracts with the social vulnerability score highest qualify for designation as a community disaster resilience zone. Census tracts designated as a community disaster resilience zone may receive special technical assistance, planning assistance, and a 90% federal funding match (as opposed to the standard 75% federal match) for mitigation projects. Currently there are no designated community disaster resilience zones in Lincoln County.

Community resilience is the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. Factors that are considered when calculating community resilience include governance, infrastructure, education, and other capabilities that help communities deal with hazards on their own. As a consequence reduction risk component of the NRI, a community resilience score and rating represent the relative level of a community's resilience compared to all other communities at the same level. A community resilience score is inversely proportional to a community's risk.

Data concerning community resilience is reported on the county level and by census tract, which can be analogous with jurisdictions. The following maps detail community resilience by both county and census tract for Lincon County:

Map 9: FEMA NRI Lincoln County Community Resilience Map



Source: FEMA

To help understand the community resilience of the City of Caliente mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions. The following map indicates the Community Resilience scores for census tracts within Lincoln County:

Map 10: FEMA NRI Lincoln County Community Resilience Map by Census Tract

Source: FEMA

3.5 Regional Population Migration

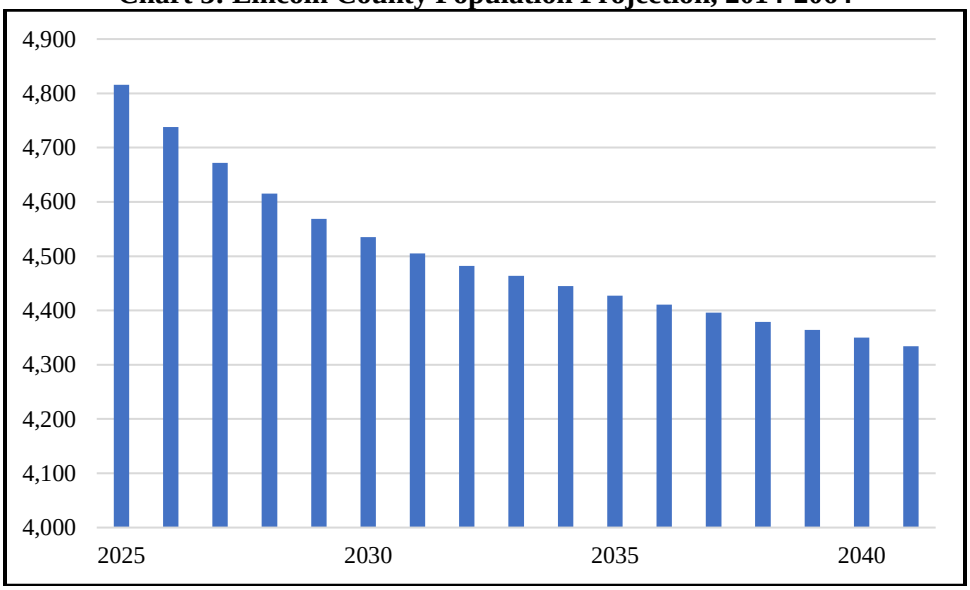
Lincoln County is experiencing a significant population movement as people increasingly migrate from rural areas to urban centers. This transformation reflects broader demographic trends witnessed across the United States. Demographic research indicates that this migration is occurring due to the following factors:

- Economic Opportunity: A primary driver of the population movement from rural to urban areas is the quest for better economic prospects. Urban centers such as Las Vegas, the largest city in the region, offer a diverse range of employment opportunities in sectors like manufacturing, healthcare, finance, and technology. These opportunities often come with higher wages and better access to educational and healthcare facilities compared to rural locales.
- Access to Education and Training: Urban centers are often home to educational institutions, including colleges, universities, and vocational schools. Young people from rural areas often migrate to these urban settings to pursue higher education and vocational training. This educational mobility is a key factor in the rural-to-urban population shift.

The rural-to-urban population movement has significant implications for Lincoln County. Communities may experience declining populations, school closures, and reduced economic activity.

The following chart, using data from the Nevada Department of Taxation Nevada County Population Projects publication, indicates -decreasing population for Lincoln County through 2041.

Chart 3: Lincoln County Population Projection, 2014-2064



Source: Nevada Department of Taxation

3.6 Regional Housing Data

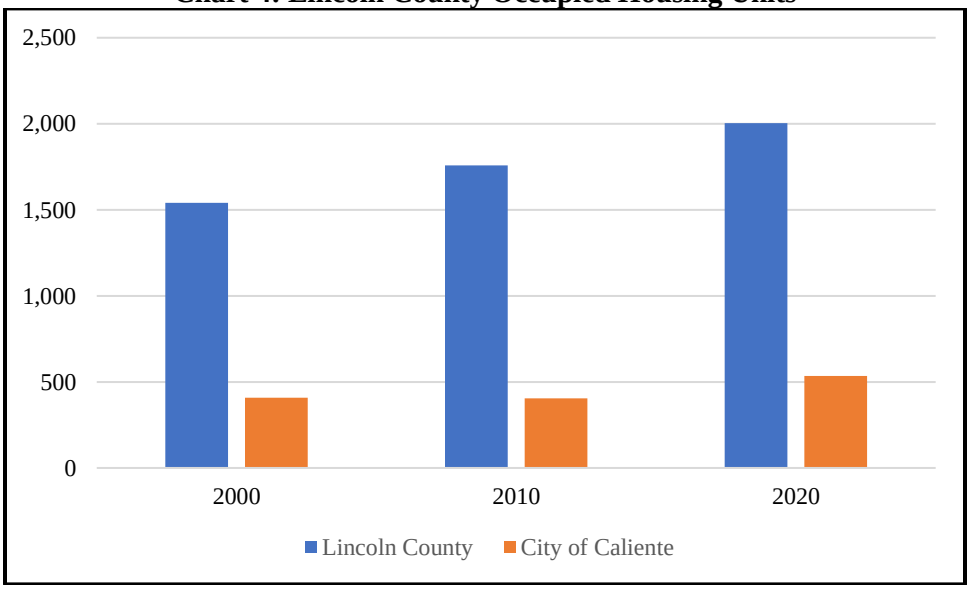
Closely tracking population data, but tending to lag population changes, housing data is a good indicator of changing demographics and growth. The following table and associated chart, using data from the U.S. Census, present occupied housing unit information for Lincoln County.

Table 5: Lincoln County Housing Data

County	Occupied Housing Units			Numeric Change 2000-2020	Percentage Change 2000-2020
	2000	2010	2020		
Lincoln County	1,540	1,759	2,003	463	30.1%
Caliente	408	405	534	126	30.9%

Source: US Census Bureau

Chart 4: Lincoln County Occupied Housing Units



Source: US Census Bureau

FEMA's Hazus is a nationally standardized risk modeling methodology that uses GIS-based data to identify areas with high risk for natural hazards. Hazus also details the number of buildings and the replacement value of those buildings

within the defined area. The following data, from Hazus, indicates the total number of buildings, the replacement valuation (excluding contents), and the percentage of buildings identified as residential properties for Lincoln County:

Table 6: Lincoln County Hazus Structure Information

Location	Number of Buildings	Replacement Value	Percentage Residential
Lincoln County	3,249	$1,550,000,000	49.8%
Census Tract 950100	-	$744,949,082	-
Census Tract 950200 (Caliente)	-	$805,192,926	-

Source: FEMA Hazus

Note: Repeated attempts to run a specific report for the City of Caliente were met with system failure. As such, Data from the FEMA NRI was used to determine valuations by Census Tract.

Of particular concern when considering housing data is mobile home residences. Data from the NOAA National Severe Storms Laboratory reports that people living in mobile homes are especially at risk for injury and death as even anchored mobile homes can be seriously damaged when winds gust over 80 miles per hour. Additionally, study data from Michigan State University reported that the two biggest factors related to wind event fatalities were housing quality (measured by mobile homes as a proportion of housing units) and income level. When a tornadic wind strikes, a county with double the number of mobile homes as a proportion of all homes will experience 62% more fatalities than a county with fewer mobile homes, according to the study data. The following indicates the percentage of mobile homes for each Lincoln County:

Table 7: Lincoln County Mobile Home Data

Jurisdiction	Number of Mobile Homes	Percentage Of Housing Stock as Mobile Homes
Lincoln County	308	15.4%
City of Caliente	33	6.2%

Source: United States Census Bureau

3.7 School District Data

The following table presents school enrollment information for 2016 (data compiled from the last plan), and 2023 (the most recent available data):

Table 8: School Enrollment Information

School	2016 Enrollment	2023 Enrollment	Change in Enrollment 2016 - 2023	Percentage Change in Enrollment 2016 - 2023
Pahranagat Valley ES	126	167	41	32.5%
Caliente ES	110	82	-28	-25.5%
Panaca ES	133	202	69	51.9%
Pioche ES	83	61	-22	-26.5%
Meadow Valley MS	75	82	7	9.3%
Pahranagat Valley MS	68	60	-8	-11.8%
Lincoln HS	172	160	-12	-7.0%
Pahranagat Valley HS	115	102	-13	-11.3%
CO Bastian	203	43	-160	-78.8%

Source: Nevada Department of Education

3.8 Critical Facilities and Community Lifelines

Certain facilities and community lifelines have a net positive value on the community as they contribute to the public good by facilitating the basic functions of society. These locations help maintain order, public health, education, and help the economy function. Additionally, components are integral to disaster response and recovery operations. For Lincoln County and its participating jurisdictions, the table below lists the identified locations:

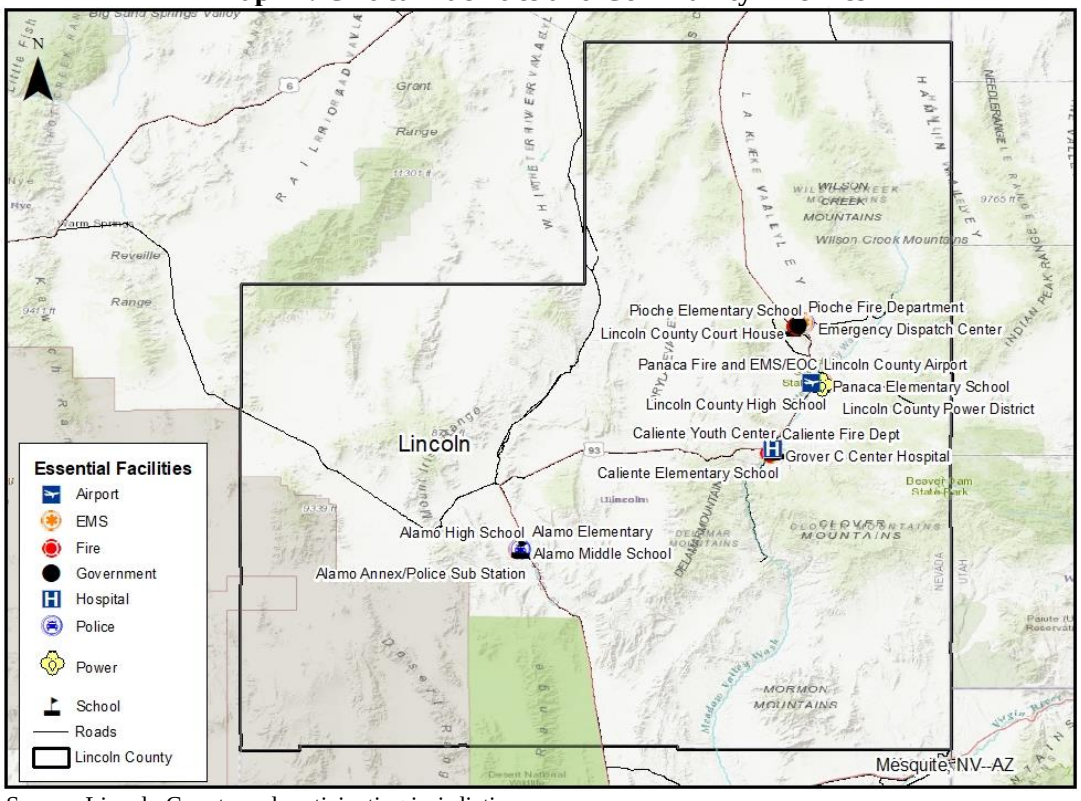
Table 9: Lincoln County Critical Facilities and Community Lifelines

Location	Function	City
Pahranagat Valley Fire and Ems	Fire, EMS	Alamo
Alamo Annex / Police Sub Station	Government, Law Enforcement	Alamo
Alamo Elementary	School	Alamo
Alamo Middle School	School	Alamo
Alamo High School	School	Alamo
City Hall	Fire	Caliente
Caliente Fire Dept	Fire	Caliente
Caliente Elementary School	School	Caliente
Caliente Youth Center	School	Caliente
Grover C Dils Medical Center	Hospital	Caliente
Panaca Fire and Ems/ EOC	Fire, EMS, Emergency Operations Center	Panaca
Panaca Elementary School	School	Panaca
Meadow Valley Middle School	School	Panaca
Lincoln County High School	School	Panaca
Lincoln County Power District	Infrastructure	Panaca
Lincoln County Airport	Transportation	Panaca
Lincoln County Court House	Government	Pioche
Pioche Elementary School	School	Pioche
Pioche Fire Department	Fire	Pioche
Lincoln County Sheriff Office	Law Enforcement	Pioche
Emergency Dispatch Center	Communications	Pioche
Lincoln County Road Department	Infrastructure	Pioche

Source: Lincoln County and participating jurisdictions

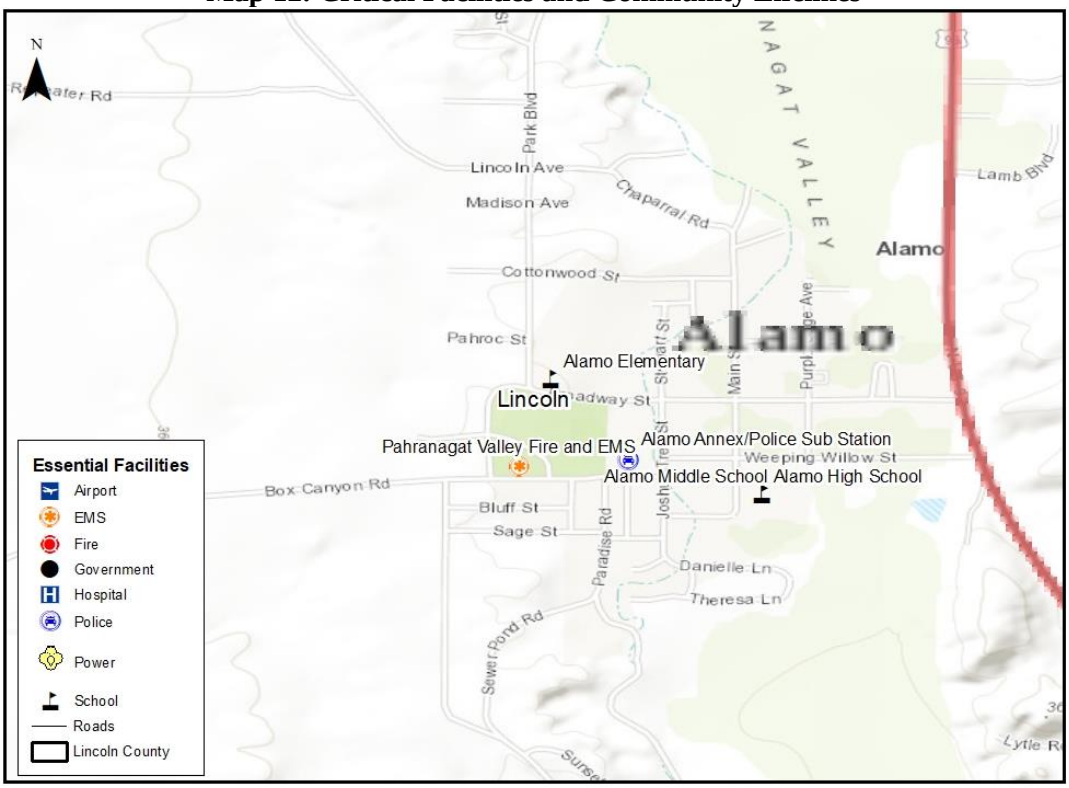
The following maps detail these locations:

Map 11: Critical Facilities and Community Lifelines



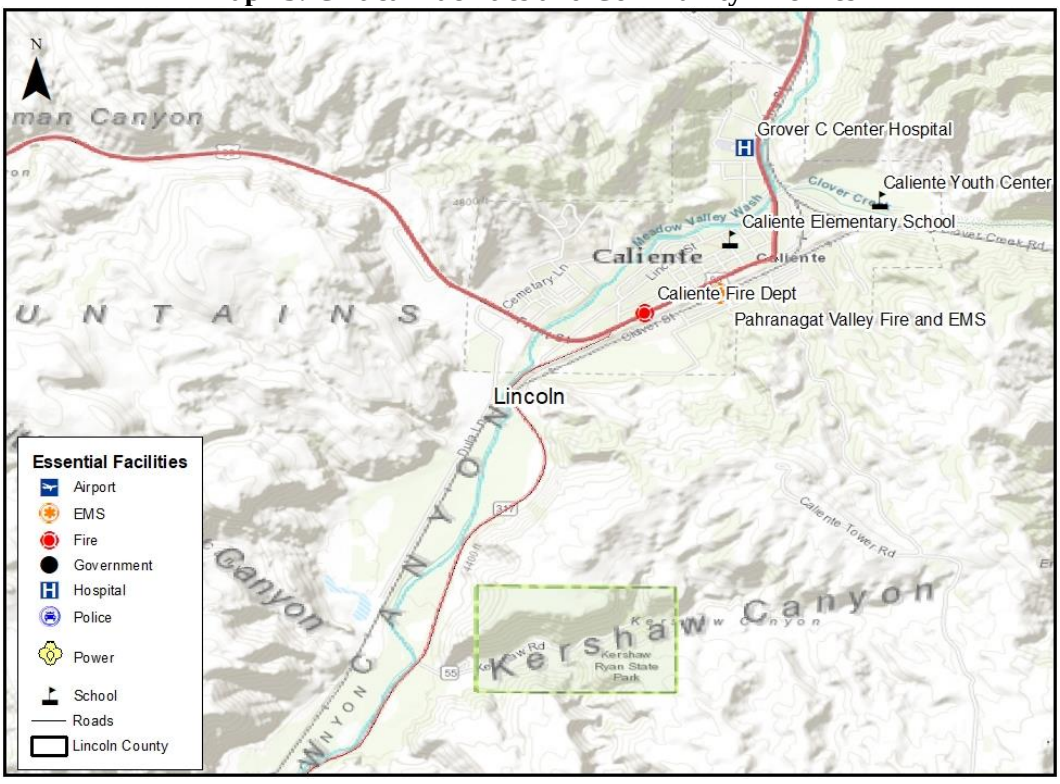
Source: Lincoln County and participating jurisdictions

Map 12: Critical Facilities and Community Lifelines



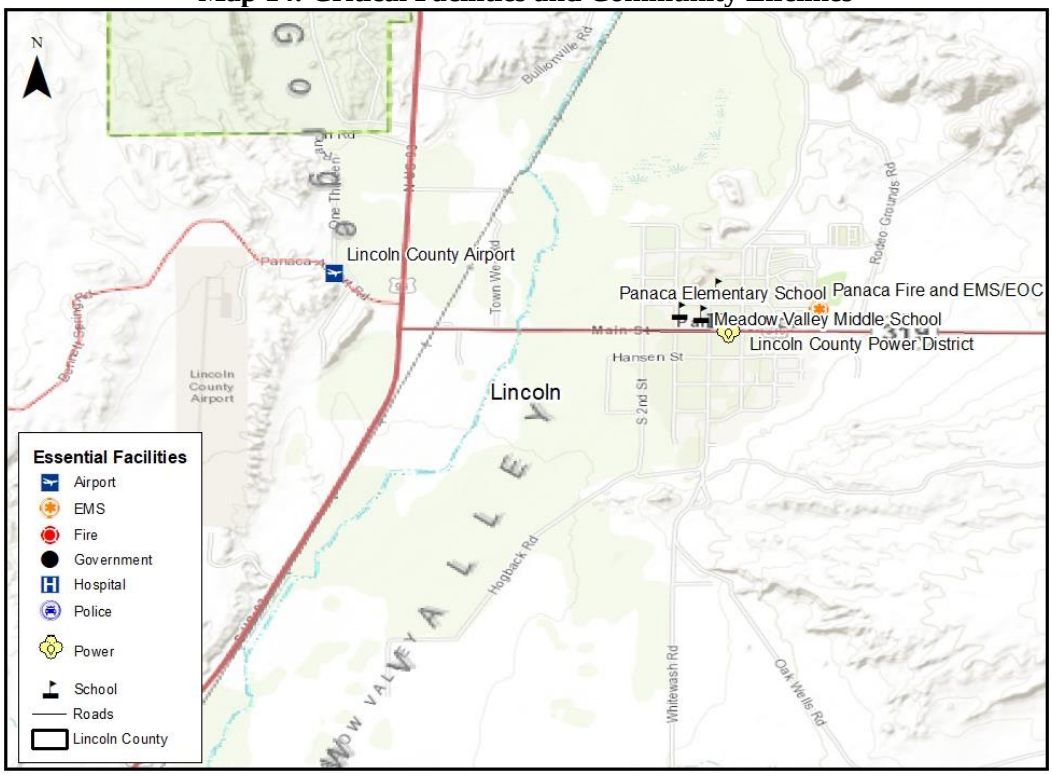
Source: Lincoln County and participating jurisdictions

Map 13: Critical Facilities and Community Lifelines



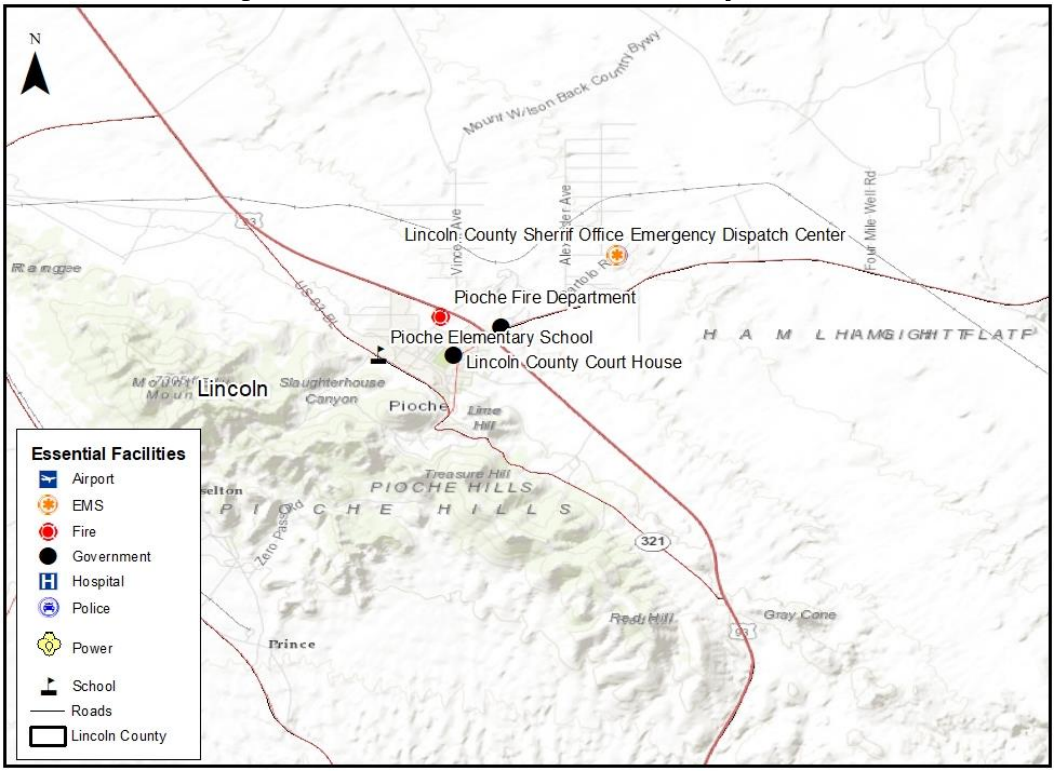
Source: Lincoln County and participating jurisdictions

Map 14: Critical Facilities and Community Lifelines



Source: Lincoln County and participating jurisdictions

Map 15: Critical Facilities and Community Lifelines



Source: Lincoln County and participating jurisdictions

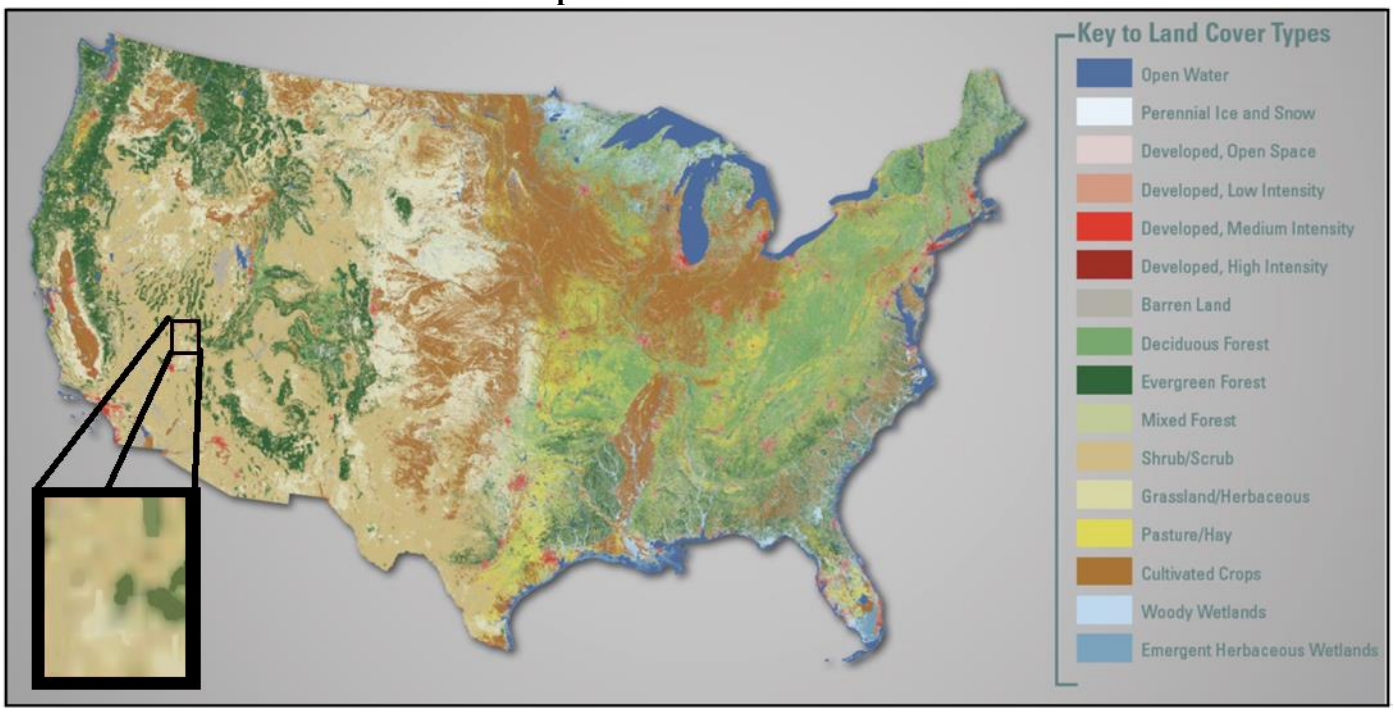
3.9 Regional Land Use

Land use in a region has a profound and lasting impact on future development. The way land is allocated and utilized can shape the economic, social, and environmental aspects of a region for decades. Land use affects that can impact future development include:

- Economic Development: Land use decisions influence the location and type of economic activities in a region. Zoning regulations that encourage the development of industrial zones can attract manufacturing businesses, while zoning for commercial and residential areas can promote retail and housing development. These decisions can have long-term implications for job creation, revenue generation, and overall economic health.
- Transportation and Infrastructure: Land use planning is closely tied to transportation infrastructure. The location of roads and other transportation facilities is determined in part by land use decisions. Well-planned land use can lead to efficient transportation networks, reducing congestion, and improving mobility. Poorly planned land use, on the other hand, can result in traffic congestion and increased infrastructure costs.
- Housing and Urbanization: Land use policies influence the availability and affordability of housing in a region. Zoning regulations, for example, can determine the density of residential areas and the types of housing permitted. Inadequate or restrictive land use policies can lead to housing shortages and higher costs, while well-planned policies can support diverse housing options and affordability.
- Resilience to Climate Change: Land use planning plays a critical role in a region's ability to adapt to climate change. Smart land use decisions can reduce vulnerability to natural disasters, such as flooding and wildfires, by avoiding high-risk areas and implementing resilient building codes and infrastructure.
- Long-Term Costs: Land use decisions can affect the long-term costs of development. Efficient land use planning can reduce the need for costly infrastructure extensions and maintenance, while inefficient or sprawling development can strain municipal budgets.

As indicated by the following map from the USGS 2021 Nation Land Cover Database, land cover in Lincoln County consists largely of shrub/scrub and evergreen forests, with no large cities or urban areas.

Map 16: Nevada Land Cover



Source: USGS 2021 Nation Land Cover Database

Rural areas tend to retain their rural nature over time, but there are several factors that can influence the evolution of these areas, including:

- Economic Conditions: The economic viability of agriculture can vary significantly over time due to factors like crop prices, weather patterns, and changes in agricultural technology. Economic challenges may lead some farmers to sell their land for non-agricultural uses or to consolidate their operations, potentially affecting the rural landscape.

- Urbanization and Development: In some cases, rural areas may experience suburbanization or the expansion of nearby urban centers. This can result in residential and commercial development encroaching on agricultural land. However, the extent of this development depends on local zoning and land use regulations.
- Infrastructure Development: The construction of new transportation infrastructure, such as highways or railroads, can influence land use patterns. Improved infrastructure may make it easier to transport agricultural products to markets or to access rural areas for development.
- Government Policies: Government policies, including agricultural subsidies, land use regulations, and conservation programs, can impact the way rural and agricultural land is used. For example, conservation programs may encourage farmers to preserve land for wildlife habitat rather than development.
- Local Planning and Zoning: Local governments play a key role in land use planning and zoning regulations. These policies can determine whether agricultural land can be converted to non-agricultural uses, such as residential or commercial development. Some areas may have strict zoning that preserves agricultural character, while others may allow more flexibility.
- Population Trends: Demographic trends, including population growth or decline, can influence the demand for land in rural areas. If there is an influx of new residents seeking a rural lifestyle, it can drive demand for residential development in formerly agricultural areas.

Based on the available data, it is likely that Lincoln County will retain its mostly rural character during the life of this plan. Based on demographic data, Lincoln County and the City of Caliente will see a decreased risk to identified hazards due to shrinking populations.

3.10 Regional Infrastructure Development

Infrastructure repair can have a significant impact on regional development, both positive and negative. The specific effects depend on the scale of the repair projects, the quality of the infrastructure, and the overall economic and social context of the region, and may include:

- Improved Connectivity: Repairing and upgrading infrastructure, such as roads, bridges, and ports, can enhance connectivity within and between regions. This improved connectivity can reduce transportation costs, facilitate the movement of goods and people, and attract businesses and investments to the region.
- Economic Growth: Functional infrastructure supports economic activities. When infrastructure is repaired, it can create jobs directly in the construction and maintenance sectors. Additionally, it can indirectly stimulate economic growth by providing a reliable foundation for businesses to operate and expand, leading to increased production and trade.
- Enhanced Productivity: Well-maintained infrastructure can increase productivity by reducing downtime and transportation delays. This, in turn, can make regional industries more competitive and efficient.
- Attracting Investment: Regions with modern and well-maintained infrastructure are often more attractive to investors. Businesses are more likely to invest in regions with reliable transportation, utilities, and communication networks, as it reduces operational risks and costs.
- Quality of Life: Infrastructure repair can enhance the quality of life for residents by providing access to essential services such as clean water, sanitation, healthcare, and education. This can contribute to improved human development indicators and overall well-being.
- Resilience and Disaster Mitigation: Infrastructure repair can include upgrades to make infrastructure more resilient to natural disasters and climate change impacts. This can help protect communities and assets and reduce the long-term costs of recovery and reconstruction.
- Social Equity: Infrastructure repair can address disparities in access to essential services. It can benefit marginalized communities by providing them with equal access to transportation, utilities, and public facilities.

However, it is important to note that there can be negative impacts as well, including:

- Disruption During Construction: Repair projects can disrupt communities and businesses during the construction phase, leading to short-term challenges.

- Costs and Budget Constraints: Large-scale infrastructure repair projects can be costly, and they may strain regional budgets or lead to increased taxes or debt.
- Environmental Concerns: If not done carefully, infrastructure repair projects can have adverse environmental impacts, such as habitat disruption or water pollution.

Recent significant state, county, and local infrastructure projects within Lincoln County include:

- The Nevada Department of Transportation completed the filling of age-related cracking of the roadway surface on approximately 125 miles of U.S. 93 and state routes 266, 267 and 375 in Lincoln County.
- The USDA provided Lincoln County Fire District a $100,000 loan and $50,000 grant to replace two aged fire trucks with a newer vehicle. This purchase increased water capacity, reduced maintenance costs, and provided mutual aid to neighboring areas in Lincoln County.
- The Department of the Interior awarded the Caselton Mine & Mill and Impacted Watersheds Restoration project $1,700,000 to focus on three washes the have been impacted by historic mining. Restoration will ensure these washes are not only made whole but made resilient. This project is a partnership between the Bureau of Land Management, the Nevada Department of Environmental Protection, and the Nature Conservancy.
- The Bureau of Land Management has designated a 25,069-acre solar energy zone within Lincoln County's Dry Lake Valley. Permitting and development of utility-scale solar energy projects are expected to be expedited zone. The Dry Lake Valley North solar energy zone is immediately adjacent to the Nevada Energy 500kV transmission line and is very proximate to the Lincoln County Power District's #1 69kV transmission line. In addition, the Southern Nevada Water Authority is proposing to construct a 238kV transmission line adjacent to the solar energy zone.

3.11 Agricultural Data

Agriculture forms a small part of both the economic and social fabric of Lincoln County. USDA National Agricultural Statistics Service data from 2007, 2012, and 2017 (the latest available data) was used to develop an understanding of the agricultural footprint within the county, as detailed in the following table:

Table 10: Lincoln County Regional Agricultural Data

Jurisdiction	Year	Number of Farms	Farm Acreage	Market Value of Products Sold
Lincoln County	2007	98	46,271	$15,339,000
	2012	185	-	$23,215,000
	2017	166	66,257	$21,980,000

Source: USDA National Agricultural Statistics Service

3.12 Potential Impacts of Climate Change

For hazards related to weather patterns, climate change may cause significant changes in patterns and event frequency. There is a scientific consensus that climate change is occurring, and recent climate modeling results indicate that extreme weather events may become more common. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events, including:

- Longer and more intense heat waves
- An increased risk of wildfires
- Higher wind speeds
- Greater rainfall intensity, but less rainfall frequency

According to the United States Environmental Protection Agency's "What Climate Change Means for Nevada:"

- The changing climate is likely to increase the need for water but reduce the supply.
- Higher temperatures increase rates of water evaporation from soils, plants, and surface waters.
- Soils are likely to be drier, and periods without rain are likely to become longer, making droughts more severe.

- The continuing decline in snowpack could limit the supply of water for some purposes.
- Drought conditions are likely to increase and persist.
- Less water is likely to be available for ranches or farmers who irrigate crops.
- Higher temperatures and drought are likely to increase the severity, frequency, and extent of wildfires.
- Warmer weather can increase the production of ground-level ozone.
- High air temperatures can cause heat stroke and dehydration.

Additionally, the Nevada State Climate Initiative fact sheet provides specific details about how climate change will continue to impact the state of Nevada. The following table details trends in climate change and provides a confidence level on those trends continuing:

Table 11: Potential Impacts of Climate Change for Lincoln County

Event	Historical Trends	Projected Trends and Confidence	Confidence
Heat	Temperatures are increasing. Urban areas are warming faster than rural areas.	Average temperatures will rise. Heat waves will increase in frequency and severity.	High
Precipitation	Precipitation has not increased or decreased.	It's not clear how precipitation will change. The average across recent models suggests a slight increase in precipitation over central and northern Nevada.	Low
Drought	Increasing evaporative demand due to higher temperatures has worsened droughts.	Drought will increase in frequency and severity, in part due to higher temperatures, even if precipitation remains the same or increases slightly.	High
Loss of Snow	Snowpack decreased between 1955 and 2016.	There will be a shift from snow to rain during the winter, and snow will melt earlier in the winter and spring.	High
Floods	There were no historical trends in flooding.	Flooding will be more frequent owing to a shift from snow to rain and more intense storms, even if precipitation does not increase.	High
Wildfire	Wildfire size and severity have been increasing.	Warmer temperatures will increase wildfire risk.	High

Source: Nevada Climate Initiative

Section 4 – Hazard Identification and Risk Assessment

4.1 Introduction

The goal of this hazard mitigation is to reduce the future impacts of hazards, including deaths and injuries, property damage, and disruption to local and county economies, and to further reduce the amount of public and private funds spent to assist recovery. To complete this goal, hazard mitigation decision-making in this plan has been based on a robust risk assessment, completed to identify natural, human caused, and technological hazards that represent a risk to Lincoln County. The following provide a definition of the risk assessment terms used during this assessment:

- **Hazard:** An act or phenomenon that has the potential to produce harm or other undesirable consequences to a person or thing.
- **Exposure:** The people, property, systems, or functions that could be lost to a hazard. Generally, exposure includes what lies in the area the hazard could affect.
- **Vulnerability:** Vulnerability is susceptibility to physical injury, harm, damage, or economic loss. It depends on an asset's construction, contents, and economic value of its functions.
- **Risk:** A function of hazard, vulnerability, and exposure. It refers to the likelihood of an event resulting in an adverse condition that causes injury or damage.

In order to accomplish this assessment, all relevant natural, human caused, and technological hazards, potential vulnerabilities, and exposures were identified. As potential hazards, vulnerabilities, and exposure are identified Lincoln County can continue to develop a strategy to identify and prioritize mitigation action to defend against these potential risks.

4.2 Declared Federal Disasters

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. §§ 5121-5206) provides for the Federal support of State and local governments and their citizens when impacted by an overwhelming disaster. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, establishes the process for requesting a Presidential disaster declaration and defines the type of assistance available.

If it is apparent that a Presidential disaster declaration may be necessary to assist in the recovery of an impacted area, Lincoln County and FEMA Region IX will conduct a Preliminary Damage Assessment (PDA). This assessment is used to determine:

- The extent of the event.
- The impact of the event on individuals and public facilities.
- The types of federal assistance that may be needed.

Once the PDA is complete, and if a determination is made that the damages exceed available State of Nevada resources, the Governor may submit through FEMA Region IX a declaration request to the President.

A major disaster declaration provides a wide range of federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work. Not all programs, however, are activated for every disaster. The determination of which programs are authorized is based on the types of assistance specified in the Governor's request and the needs identified during the initial and subsequent PDAs. FEMA disaster assistance programs may include:

- Individual Assistance
- Public Assistance
- Hazard Mitigation

To recognize and encourage mitigation, FEMA considers the extent to which mitigation measures contributed to the reduction of disaster damages. This could be especially significant in those disasters where, because of mitigation, the estimated public assistance damages fell below the per capita indicator.

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. The MPC reviewed the historical federal disaster declarations to assist in hazard identification. The following table details Disaster Declarations for Lincoln County:

Table 12: Lincoln County Presidentially Declared Disasters

Designation	Declaration Date	Incident Type	Individual Assistance	Public Assistance
DR-4708- NV	04/27/2023	Severe Winter Storms, Flooding, Landslides, and Mudslides	-	-
DR-4523-NV	04/04/2020	Covid-19 Pandemic	-	-
DR-1583-NV	03/07/2005	Heavy Rains and Flooding	$8,897,067	$3,950,493

Source: FEMA
-: Not reported

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Emergency Declarations supplement State and local or Indian tribal government efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe. The total amount of assistance provided for in a single emergency may not exceed $5,000,000. The following types of assistance are available under an Emergency Declaration:

- Public Assistance, Categories A (debris removal) and B (emergency protective measures)
- Individual Assistance, the Individuals and Households Program

The MPC reviewed the historical federal disaster declarations to assist in hazard identification. The following table details Emergency Declarations for Lincoln County.

Table 13: Lincoln County Emergency Declarations

Designation	Declaration Date	Incident Type	Public Assistance
EM-3443-NV	03/13/2020	Covid-19	$834,941
EM-3243-NV	9/13/2005	Hurricane Katrina Evacuation	$1,110,010
EM-3204-NV	02/23/2005	Nevada Snow	$2,448,149
EM-3202-NV	02/17/2005	Nevada Record and/or Near Record Snow	$1,690,912

Source: FEMA

The Governor, or the Governor's Authorized Representative, may submit a request for a fire management assistance declaration as required. FEMA will approve declarations for fire management assistance when it is determined that a fire or fire complex on public or private forest land or grassland threatens such destruction as would constitute a major disaster.

The MPC reviewed the historical fire management declarations to assist in hazard identification. Research indicates that there have been no fire management declarations for Lincoln County in the past 15 years.

4.3 Identified Potential Hazards

One of the first steps in developing a hazard assessment is to identify the hazards that have a reasonable risk of occurring. Proper identification allows for appropriate and well-planned action in order to mitigate the extent and cascading impacts of an incident. Furthermore, while not all disaster contingencies can be planned for, applying an all-hazards approach to the mitigation process does yield greater awareness and better preparedness for unforeseen hazard incidents overall.
The MPC met to discuss previously identified hazards and deliberate on any changes or additions to the regional hazard profile. A thorough and comprehensive revision of data for each hazard was completed as part of this plan update. Additionally, this plan has worked, as per FEMA recommendations, to merge similar hazards together with the aim of both simplifying the usage of the plan and reducing duplication of effort.

The MPC confirmed the following natural hazards that may impact the Lincoln County:

Table 14: Lincoln County Identified Natural Hazards

Hazard	Included in 2016 HMP	Notes
Dam Failure	Yes	-
Drought	Yes	-
Earthquake	Yes	-
Extreme Heat	No	Added due to changing conditions
Flood	Yes	-
Strong Wind	Yes	
Wildfire	Yes	Renamed with greater focus on wildfires

Based on discussion with the MPC, a lack of identified risk or history, and geographic improbability, numerous FEMA identified hazards such as coastal erosion and hurricane were not included in the scope of this plan. Additionally, the following natural hazards included in the State of Nevada HMP were not included for the enumerated reasons:

- **Avalanche:** There have been no recorded damaging avalanches in Lincoln County. Additionally, the State of Nevada 2018 HMP indicates that Lincoln County does not have an avalanche risk. Due to the lack of documented history, and unlikelihood of occurrence, the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.
- **Expansive Soils:** Information from the United States Geological Service (USGS) Swelling Clays Map of the Conterminous United States indicates that the majority of Lincoln County has soils with little or no clay, and thus no swelling potential. As such, the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.
- **Land Subsidence:** There have been no recorded incidences of subsidence events in Lincoln County. Additionally, geologic maps indicate that Lincoln County has no areas of Karst topography, a known contributor to subsidence. Due to a lack of documented history and indicated risk, the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.
- **Landslide:** There have been no recorded damaging landslide events in Lincoln County. Additionally, the 2018 State of Nevada HMP indicates that Lincoln County possesses no susceptibility for landslides.
- **Tornadoes:** Data from the NCEI indicates that over the 20-year period from 1993-2022 (full dataset years), Lincoln County has recorded two tornadoes rated at EF0 (the lowest rating for a tornado) and one tornado rated at EF1 with no resulting damage, deaths, or injuries. Due to the lack of recorded impacts, and unlikelihood of occurrence, the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.
- **Severe Winter Weather:** Data from the NCEI indicates that from 1950 through present Lincoln County has recorded one severe winter weather event with no recorded damages or deaths or injuries. As such, the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.
- **Tsunami/Seiche:** Due to the lack of geologic features that contribute to this hazard the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.
- **Volcano:** There have been no geologically recent recorded damaging volcanic events in Lincoln County in recent history. Additionally, the 2018 State of Nevada HMP indicates Lincoln County has no risk to volcanoes. Due to a lack of documented history and indicated risk, the MPC opted to not allocate potential resources or funding to mitigate against this hazard in favor of prioritizing other hazards.

4.4 Hazard Planning Significance

For the purposes of this plan, hazard planning significance refers to the relevance of the identified hazard to the jurisdictions of Lincoln County when calculating risk and vulnerability. In order to help quantify the planning significance for a hazard, data was reviewed on two levels, federal (National Risk Index data) and local (researched plan data relevant to occurrence and vulnerability on a county and local level). This allowed for a comparison between data sets for each hazard type and allowed for a summation at the county level. It is recognized that inconsistencies in methodologies and data make it difficult to make a direct comparison across all data levels. However, as possible, collected data was translated into a unified model that accounted for any variability in data and methodologies.
The result of this assessment provides a larger scale snapshot of how Lincoln County jurisdictions view risk and allowed for integration of hazard data into the HMP.

For natural hazards, data from this plan was vetted by the Lincoln County Emergency Manager and participating jurisdictions to ensure it matched local conditions. Additionally, Lincoln County utilized FEMA's National Risk Index (NRI) which provides a method of understating high and local level jurisdictional vulnerability. FEMA's NRI dataset and online tool was used to help determine local community risk for identified natural hazards in this HMP.

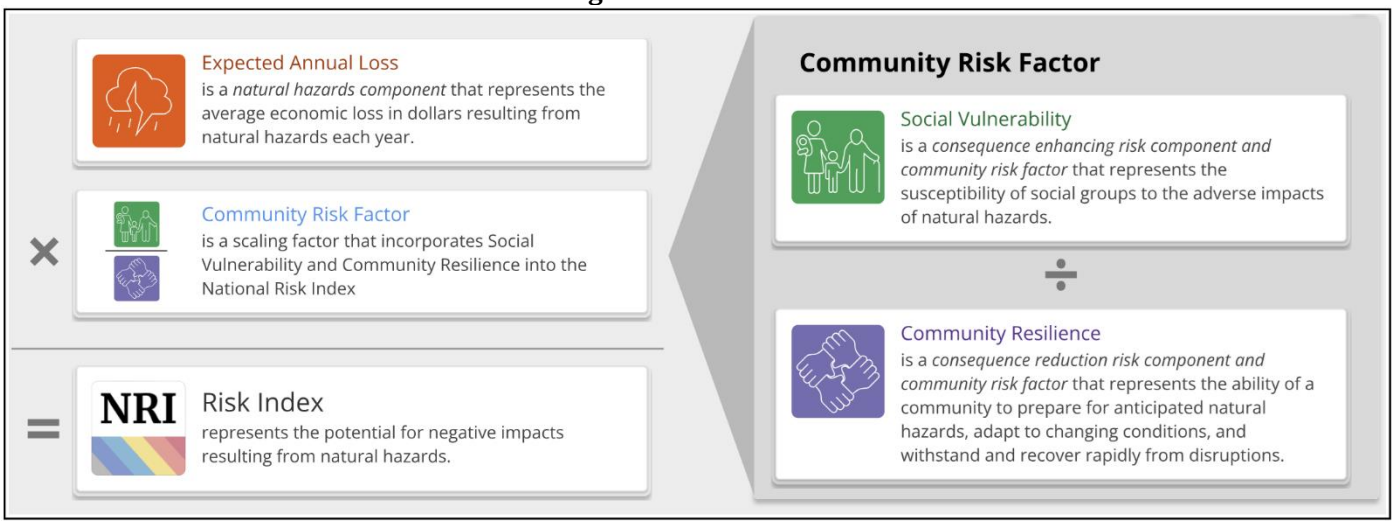
The risk equation behind the Risk Index includes three components, Expected Annual Loss (EAL), social vulnerability (previously discussed), and community resilience (previously discussed). The dataset supporting EAL provides estimates measured in 2022 U.S. dollars. The datasets supporting the social vulnerability and community resilience components have been standardized using a minimum-maximum normalization approach prior to being incorporated into the NRI risk calculation.

As part of the NRI, EAL represents the average economic loss in dollars resulting from a hazard each year. It quantifies loss for relevant consequence types, buildings, people, and agriculture. An EAL score and rating represent a community's relative level of expected losses each year when compared to all other communities at the same level. EAL is calculated using an equation that includes exposure, annualized frequency, and historic loss ratio risk factors. Exposure is a factor that measures the building value, population, and agriculture value potentially exposed to a natural hazard occurrence. Annualized frequency is a factor that measures the expected frequency or probability of a hazard occurrence per year. Historic loss ratio is a factor that measures the percentage of the exposed consequence type value (building, population, or agriculture) expected to be lost due to an occurrence. EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk.

To calculate Risk Index values, the NRI generates a Community Risk Adjustment to scale EAL values up or down, depending on their community risk factors, increasing with social vulnerability and decreases with community resilience. For a jurisdiction, a higher social vulnerability results in a higher Risk Index value while higher community resilience results in a lower Risk Index value.

Using these three components, Risk Index values are calculated for each jurisdiction (county and Census tract). The calculated Risk Index values form an absolute basis for measuring Risk within the NRI, and they are used to generate Risk Index percentiles and ratings across communities. The risk equation behind the NRI is as follows:

Figure 1: FEMA NRI



Source: FEMA

For both the Risk Index and EAL there is a qualitative rating that describes the nature of a community's score in comparison to all other communities at the same level, ranging from "Very Low" to "Very High." Because all ratings are relative, there are no specific numeric values that determine the rating.

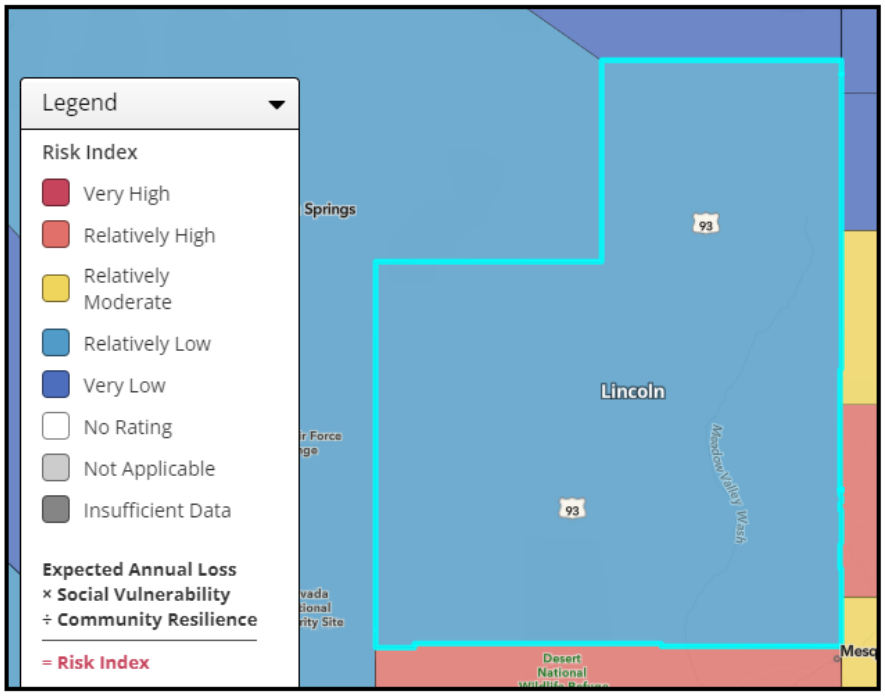
The National Risk Index provides relative Risk Index percentiles and ratings based on data for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience. Separate percentiles and ratings are also

provided for each component: Expected Annual Loss, Social Vulnerability, and Community Resilience. For the Risk Index and Expected Annual Loss, percentiles and ratings can be viewed as a composite score for all hazards or individually for each of the 18 hazard types.

A community's score is represented by its percentile ranking among all other communities at the same level for Risk, Expected Annual Loss, Social Vulnerability and Community Resilience. For example, if a given Census tract's Risk Index percentile for a hazard type is 84.32 then its Risk Index value is greater than 84.32% of all US Census tracts. These scores are then assigned a qualitative rating that describes the community in comparison to all other communities at the same level, ranging from “Very Low” to “Very High.” To determine Risk and Expected Annual Loss ratings, a methodology known as k-means clustering or natural breaks is applied to each value. This approach divides all communities into five groups such that the communities within each group are as similar as possible (minimized variance) while the groups are as different as possible (maximized variance). A cubed root transformation is applied to both Risk and Expected Annual Loss values before k-means clustering. Without the transformation, these values are heavily skewed by an extreme range of population and building value densities between urban and rural communities. By applying a cube root transformation, the National Risk Index controls for this characteristic and provides ratings with greater differentiation and usefulness.

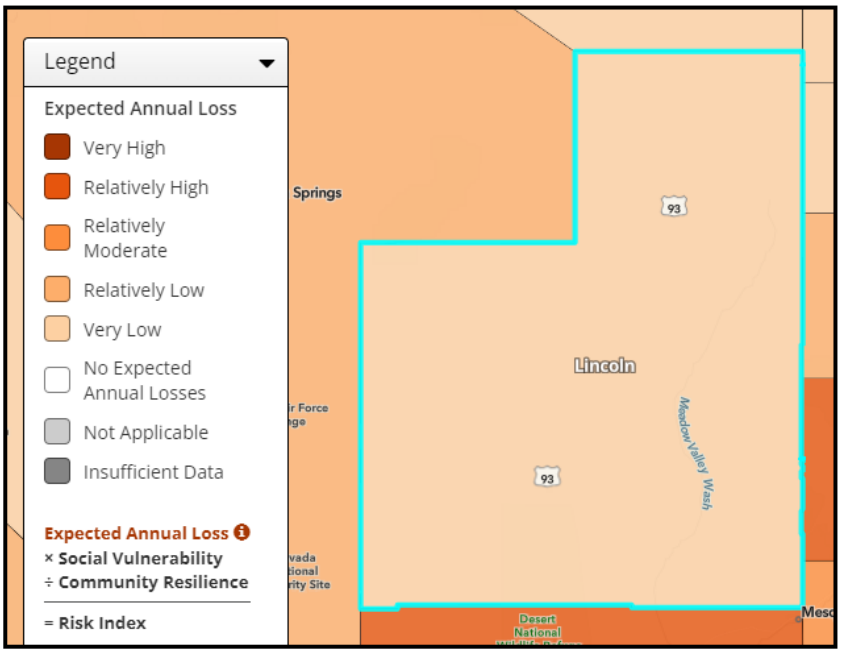
The following maps indicate the composite NRI and EAL for Lincoln County:

Map 17: Lincoln County FEMA NRI



Source: FEMA NRI

Map 18: Lincoln County FEMA EAL

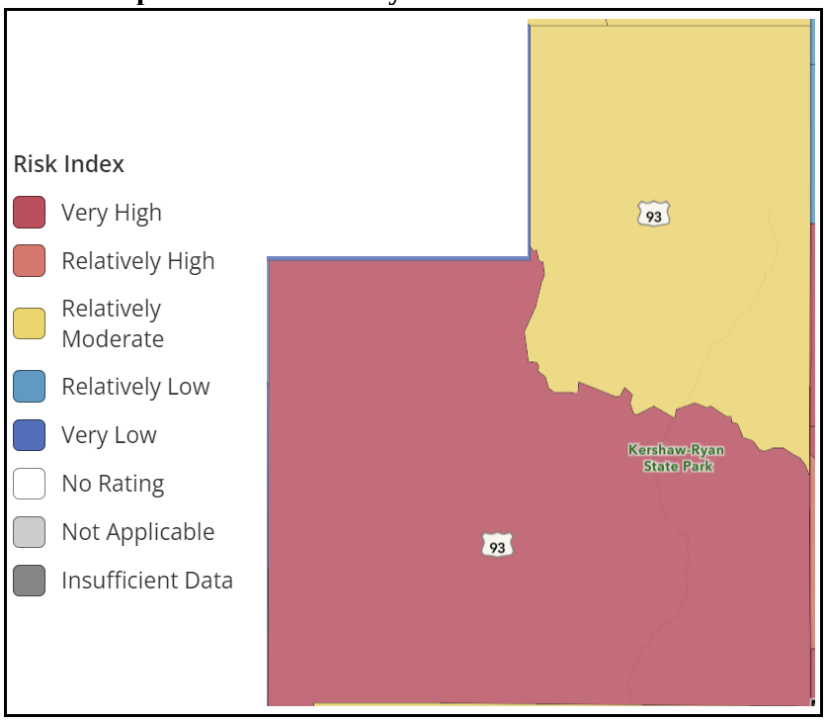


Source: FEMA NRI

To help understand the risk and vulnerability to the identified hazards in this HMP for Caliente, risk index and EAL mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

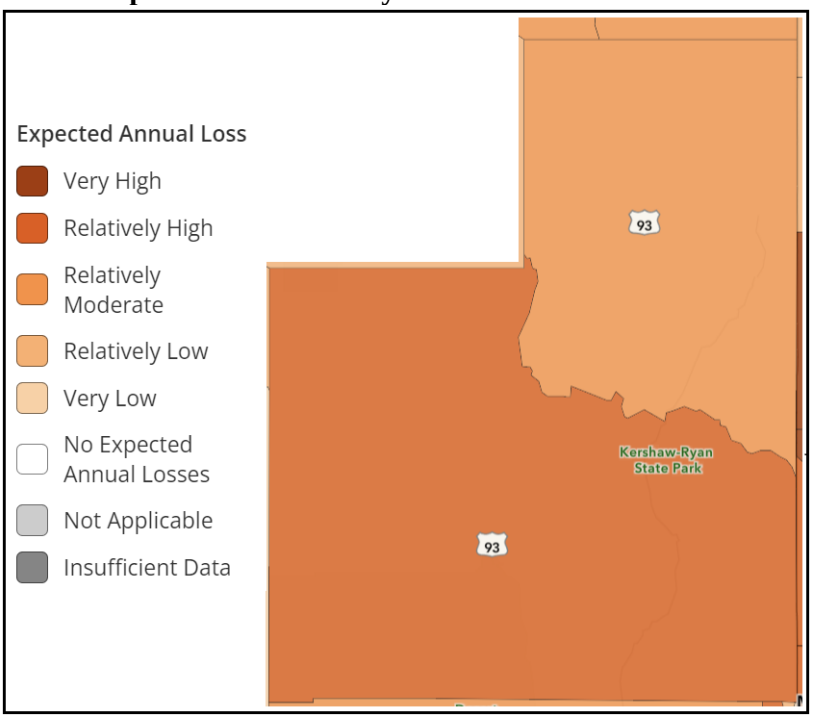
The following maps indicate the composite NRI and EAL for Lincoln County census tracts:

Map 19: Lincoln County Census Tract FEMA NRI



Source: FEMA NRI

Map 20: Lincoln County Census Tract FEMA NRI



Source: FEMA NRI

The following table indicates the FEMA NRI for Lincoln County and Caliente for all identified natural hazards and a identified hazard specific rating for the hazards identified in this plan.

Table 15: Lincoln County Identified Hazard FEMA Risk Index by Jurisdiction

Hazard	Jurisdiction	
	Lincoln County	Caliente
All Hazards	Relatively Low	Very High
Dam Failure	No Rating	No Rating
Drought	Relatively Moderate	Relatively High
Earthquake	Relatively Low	Relatively Moderate
Extreme Heat	Relatively Low	Relatively Moderate
Flood	Relatively Moderate	Very High
Strong Wind	Very Low	Relatively Low
Wildfire	Relatively Moderate	Relatively High

Source: FEMA NRI

The following table, based on FEMA EAL analysis, indicates each participating jurisdiction's estimated annual losses for identified hazards.

Table 16: Lincoln County Identified Hazard FEMA Expected Annual Loss by Jurisdiction

Hazard	Jurisdiction	
	Lincoln County	Caliente
All Hazards	Relatively Low	Very High
Dam Failure	No Rating	No Rating
Drought	Relatively Moderate	Relatively High
Earthquake	Relatively Low	Relatively Moderate
Extreme Heat	Relatively Low	Relatively Moderate
Flood	Relatively Moderate	Very High
Strong Wind	Very Low	Relatively Low
Wildfire	Relatively Moderate	Relatively High

Source: FEMA NRI

In order to gain an understanding of vulnerability, the following table details the estimated FEMA NRI valuation, population, and agricultural by census tract for Lincoln County:

Table 17: Lincoln County Identified Population and Valuation by Census Tract

Census Tract	Population	Building Valuation	Agricultural Valuation
950100	2,402	$744,949,082	$12,842,346
950200	2,047	$805,192,926	$12,367,239

Source: FEMA NRI

Where appropriate, differences in vulnerability to identified hazards are noted in each individual hazard section.

4.5 Hazard Occurrence and Assessment Data

NOAA's NCEI Storm Events Database was used as the primary source of information for previous occurrences of storm events. Twenty-year data sets from were used, where applicable, for hazard occurrence and impact data. Where data sets were unavailable for a hazard, local reporting from participating jurisdictions was relied upon.

It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or National Weather Service (NWS) office. When reporting an event oftentimes the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages. Most of the events from NCEI are not associated with a federal emergency or disaster. If the event occurred at the same time as an event that was later determined to be a federal emergency or disaster, it is included with the NCEI data even if it occurred in a county not included in the federal declaration.

Data was also obtained and utilized using Hazus-MH, Version 2.2 SP1, a program administered by the FEMA used to model losses. Modelling for hazards uses Hazus analysis to estimate losses and projected impacts from historical and annualized hazard events. Hazus default data was used in the analysis, including the 2020 Census and other State and Federal government facility databases.

4.6 Jurisdictional Critical Facilities, Assets, and Community Lifelines

Certain facilities and assets, such as infrastructure and community lifelines, have a net positive value on the community as they contribute to the public good by facilitating the basic functions of society. These facilities maintain order, public health, education, and help the economy function. Additionally, there are infrastructure and facilities integral to disaster response and recovery operations. Conversely, some infrastructure and facilities are of extreme importance due to the negative externalities created when they are impacted by a disaster. What fits these definitions will vary slightly from community to community, but the definitions remain as a guideline for identifying critical facilities and infrastructure. Lincoln County and the City of Caliente maintain critical facility details under separate cover for security purposes. For this HMP, it is assumed that all critical facilities are at equal risk to non-point hazard occurrence but may have varying risk to point hazard occurrence (dam failure and flood). Data concerning critical facilities potentially impacted by these point hazards, as available, is detailed under the respective hazard section.

Each hazard section provides a discussion on potentially vulnerable community lifelines. Community lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security, and include safety, health, energy, communication, transportation, and water systems.

4.7 Hazard Profiles

Each identified hazard is profiled in the subsequent sections, with the level of detail varying based on available information. Sources of information are cited in the detailed hazard profiles below.

For hazards that have a higher chance of occurrence for specific jurisdictions throughout Lincoln County, a discussion is provided as to the differing levels of potential vulnerability. All other hazards have been determined to have an equal chance of occurrence for all participating jurisdictions.

The following hazards are presented in alphabetical order, and not by planning significance, for ease of reference. Please note that natural hazards are presented in order first, followed by human caused and technological hazards.

4.8 Dam Failure

4.8.1 Hazard Description

A dam is a barrier across flowing water that obstructs, directs, or slows down the flow, often creating a reservoir, lake, or impoundment. Most dams have a section called a spillway or weir, over or through, which water flows, either intermittently or continuously. Dams commonly come in two types, embankment (the most common) and concrete (gravity, buttress, and arch), as well as sizes. They also serve a number of purposes and provide essential benefits, including drinking water, irrigation, hydropower, flood control, and recreation.

Large or small, dams have a powerful presence that is frequently overlooked until a failure occurs. Dams fail in two ways, a controlled spillway release done to prevent full failure, or the partial or complete collapse of the dam itself. In each instance, an overwhelming amount of water, and potentially debris, is released. Dam failures are rare, but when they do occur, they can cause loss of life and immense damage to property, critical infrastructure, and the environment.

Possible reasons for dam failure include but are not limited to:

- Sub-standard construction materials/techniques
- Spillway design error
- Geological instability caused by changes to water levels during filling or poor surveying
- Sliding of a mountain into the reservoir
- Poor maintenance, especially of outlet pipes
- Human, computer, or design error
- Internal erosion, especially in earthen dams
- Earthquakes
- Terrorism

There are three classifications of dam failure, hydraulic, seepage, and structural. The following is an explanation of each these failure classifications:

- **Hydraulic:** This failure is a result of an uncontrolled flow of water over and around the dam structure as well as the erosive action on the dam and its foundation. The uncontrolled flow causing the failure is often classified as wave action, toe erosion, or gullying. Earthen dams are particularly susceptible to hydraulic failure because earthen materials erode more quickly than other materials, such as concrete and steel. This type of failure constitutes approximately 40% of all dam failures.
- **Seepage:** Seepage is the velocity of an amount of water controlled to prevent failure. This occurs when the seepage occurs through the structure to its foundation, where it begins to erode within. This type of failure accounts for approximately 4% of all dam failures.
- **Structural:** A failure that involves the rupture of the dam or the foundation by water movement, earthquake, or sabotage. When weak materials construct dams (large, earthen dams) are the primary cause of this failure. Structural failure occurs with approximately 30% of dam failures.

4.8.2 Location & Extent

The Nevada Department of Natural Resources oversees all dam safety programs. These programs are responsible for developing and maintaining an inventory of dams, classifying dams, and ensuring the compliance of all regulated dams.

Dams in the State of Nevada are ranked by Dam Hazard Classification, which is determined by the potential for infrastructure and property damage downstream if a dam failure were to occur. Current Dam Hazard Classifications are:

Table 18: Dam Hazard Potential Classification

Hazard Potential	Class	Definition	Inspection Timeline	Number of Regional Dams in Category
High	C	Failure or mis-operation will result in probable loss of life.	Three Years	5
Significant	B	Failure or mis-operation results in no probable loss of life but can cause major economic loss, disruption of lifeline facilities or impact the public's health, safety, or welfare.	Five Years	0
Low	A	Failure or mis-operation results in no probable loss of human life and low economic losses.	Not inspected, downstream conditions are reassessed to determine if conditions have changed to necessitate reclassification	10

Source: KDA-DWR

The U.S. Army Corps of Engineers National Inventory of Dams (NID) program indicates that there are 15 dams in Lincoln County, of which 10 are classified as low hazard. Additionally, the NID provides a condition assessment on each dam. The definition of dam condition assessment are as follows:

- **Satisfactory:** No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions in accordance with state engineer's rules and regulations for dams or tolerable risk guidelines.
- **Fair:** No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic incidents may result in a dam safety deficiency. Risk may be in the range to take further action.
- **Poor:** A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A poor condition is used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary.
- **Unsatisfactory:** A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

As low hazard dams were determined by the MPC to be of minimal concern, the following table details information concerning the five identified high hazard dams within the county:

Table 19: Lincoln County Dams

NID Number	Nearest Jurisdiction	Name	Owner	Hazard Potential Classification	Risk Assessment	Condition Assessment	Emergency Action Plan
NV10001	Caliente	Pine Canyon Dam	USACE	High	Low	-	Yes
NV00116	Ursine	Eagle Valley Reservoir Dam	Nevada Department of Wildlife	High	-	Poor	Yes
NV10002	Caliente	Mathews Canyon Dam	USACE	High	Moderate	-	Yes
NV00117	Panaca	Echo Canyon Dam	Nevada Department	High	-	Fair	Yes

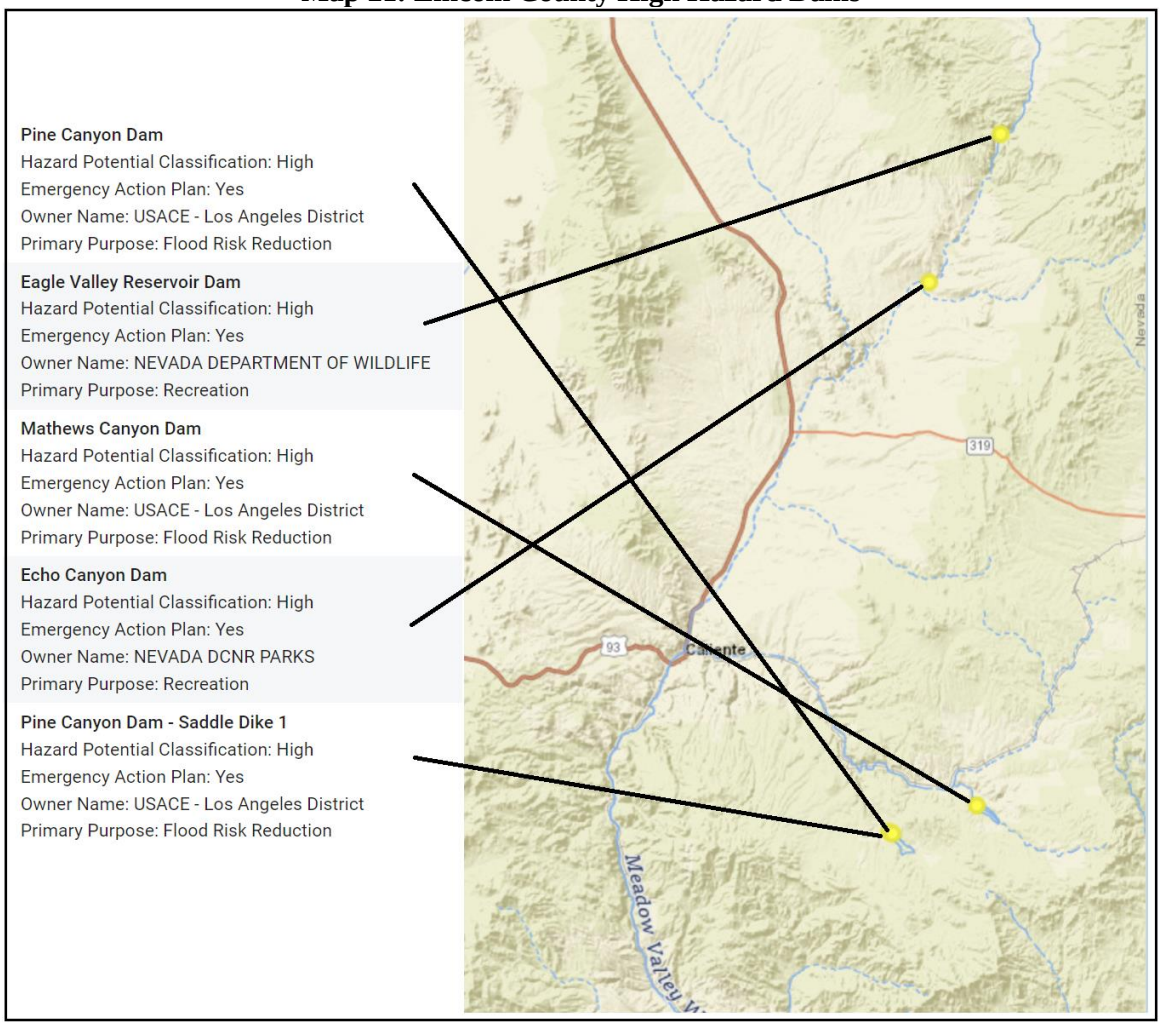
Table 19: Lincoln County Dams

NID Number	Nearest Jurisdiction	Name	Owner	Hazard Potential Classification	Risk Assessment	Condition Assessment	Emergency Action Plan
			of Conservation and Natural Resources				
NV10001S001	Caliente	Pine Canyon Dam – Saddle Dike	USACE	High	Low	-	Yes

-: Data not available

The following map, from the National Inventory of Dams, indicates the location of high hazard dams within Lincoln County:

Map 21: Lincoln County High Hazard Dams



Source: National Inventory of Dams

4.8.3 Previous Occurrences

Data from the National Performance of Dams Program at Stanford University indicates Lincoln County has had no reported failure dam incidents resulting in a fatality.

However, in March of 2023 LCOEM recommended voluntary evacuations for Dry Valley and Panaca due to a potential breach of Echo Dam. During this event, three of the four rock barriers in the emergency spillway washed out or were damaged. Had the fourth barrier failed it could have led to a dam failure event and major downstream flooding.

4.8.4 Probability of Future Incidents

Despite no historical occurrences of dam failure resulting in an uncontrolled release of the reservoir, there remains a significant concern due to the large number of high hazard dams in the county. The probability of dam failure events is not easily measured, but may aligned with:

- The probability of future flood events
- Preventative measure taken by dam owners and operators, maintenance and repair
- Frequent condition inspections
- Proper operating procedures

The Nevada Department of Natural Resources conducts routine monitoring and inspection of dams within the state on the previously identified schedule, with priority placed on those dams which pose the greatest potential threat. However, to fully determine the probability of a future event, a full engineering inspection would need to be completed on each dam, something beyond the scope of this plan.

Dams undergoing repair and/or reconstruction are required to be designed to pass at least the 1%-annual-chance rainfall event with one foot of freeboard. The most critical and hazardous dams are required to meet a spillway design standard much higher than passing the runoff from a 1%-annual-chance rainfall event. Although not all the dams have been shown to withstand the 1%-annual-chance rainfall event, most of the dams meet this standard due to original design requirements or recent spillway upgrades.

4.8.5 Projected Changes in Hazard Location, Intensity, Frequency, and Duration

As indicated by the United State Environmental Protection Agency's "What Climate Change Means for Nevada," Lincoln County is likely to see less available water for both storage and recreation. A warming climate will continue to decrease the snowpack, which has been steadily declining since the 1950s. Combined with the predicted decrease in annual rainfall, it is likely that smaller amounts of water will be available for storage in lakes and reservoirs (often behind dams). Additionally, the changing climate and resultant higher temperatures is likely to increase the rate of water usage while concurrently increasing evaporation from surface waters. As such, it is expected that the amount of water stored behind dams in Lincoln County will potentially decrease, lessening the potential impact of tis hazard.

A potential outcome of changing climate in Lincoln County is an increase in extreme precipitation events which may lead to more severe floods and a greater risk of dam failure. Additional projected greater periods of drought conditions and high heat may result in ground cracking, a reduction of soil strength, erosion, and subsidence in earthen dams or levees.

The 2018 National Climate Assessment report indicates that much of the water infrastructure in the northeast portion of the United States, including dams, is nearing the end of its planned life expectancy. As indicated in the report:

- "Aging and deteriorating dams and levees also represent an increasing hazard when exposed to extreme or, in some cases, even moderate rainfall. Several recent heavy rainfall events have led to dam, levee, or critical infrastructure failures, including the Oroville emergency spillway in California in 2017, Missouri River levees in 2017, 50 dams in South Carolina in October 2015 and 25 more dams in the state in October 2016, and New Orleans levees in 2005 and 2015. The national exposure to this risk has not yet been fully assessed."

At present there is no comprehensive assessment of the climate-related vulnerability and risks to existing dams. Additionally, there are no common design standards concerning the repair or modification of existing dams nor for the designed and construction of new dams operated in the face of changing climate risk.

Land use trends can significantly impact a community's vulnerability to dam failure. The way land is developed and used in proximity to dams can influence the potential consequences of failure, affecting the safety of residents and

infrastructure. Development in potential dam failure inundation areas without adequate consideration for flood risk increases vulnerability. Increased urbanization and population density near dams can intensify the consequences of failure. Higher population density means more people and assets are at risk, leading to greater potential for loss of life and property damage. However, Lincoln County and the City of Caliente are both seeing a decrease in population, potentially lowering the vulnerability to a dam failure event.

The location of critical infrastructure, such as hospitals, schools, and emergency services, in close proximity to dams or levees can heighten vulnerability. Infrastructure assets may be at risk of damage or disruption, impacting the community's ability to respond effectively to a failure. However, Lincoln County and the City of Caliente are not projecting any major infrastructure projects or growth in the number of structures, potentially lowering the vulnerability to a dam failure event.

4.8.6 Vulnerability and Impact

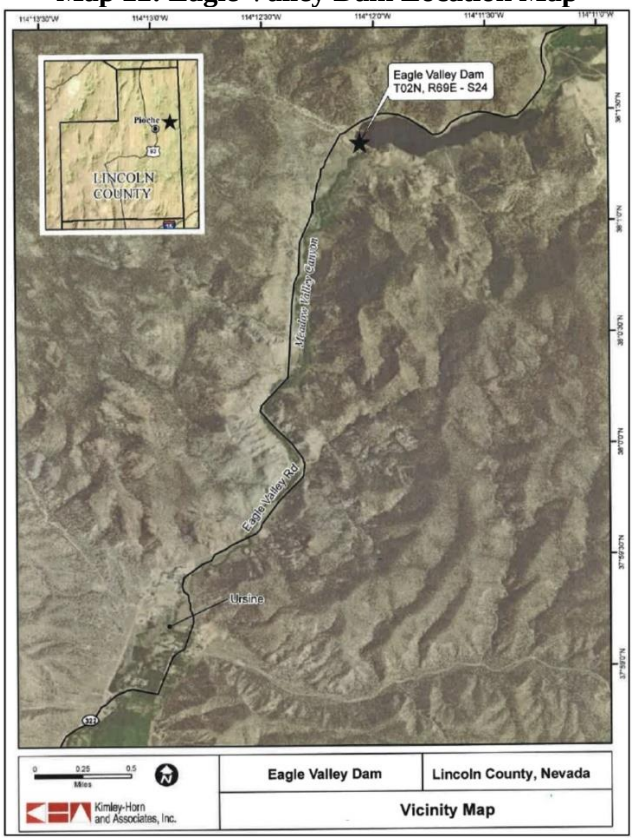
Dams in the State of Nevada with a High Hazard classification are required to have an Emergency Action Plan. An Emergency Action Plan (EAP) delineates:

- Incidents that can lead to emergency conditions and failure
- Downstream locations that could be affected by a failure event
- Actions to be taken to minimize property damage, infrastructure loss, and loss of life

In general, the dam owner is responsible for development and maintenance of the Emergency Action Plan.

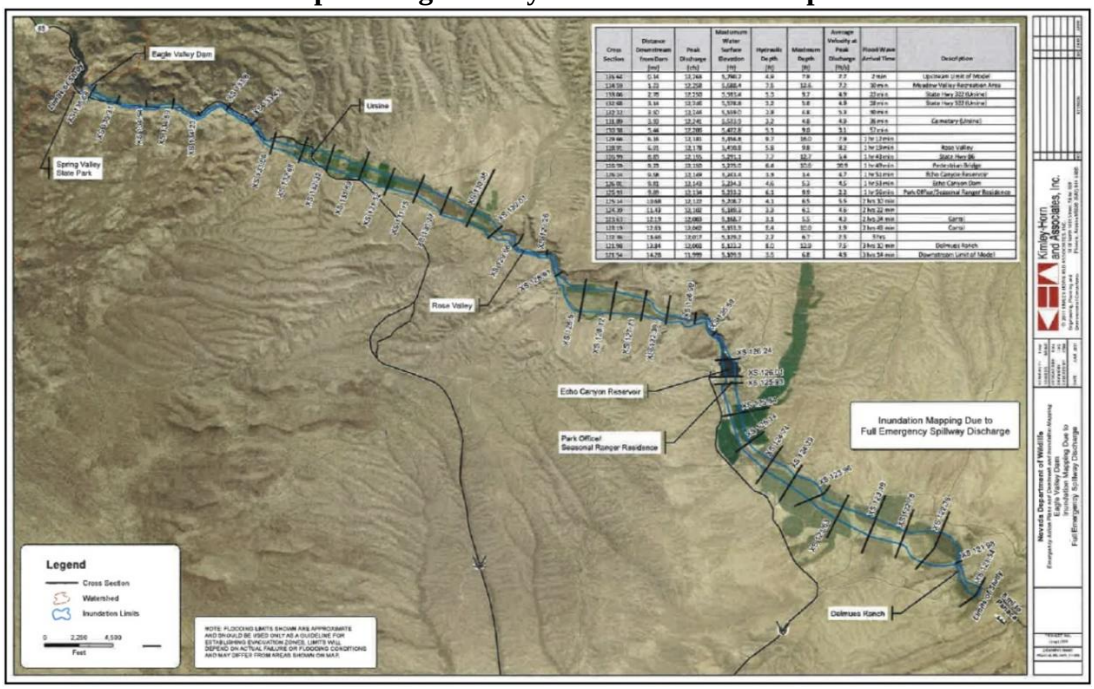
In order to understand the potential risk to Lincoln County, efforts were made to review all available Emergency Action Plans. As of this plan, only the Eagle Valley Dam plan was available for review. The following maps indicate potential dam failure inundation areas for the Eagle Valley Dam:

Map 22: Eagle Valley Dam Location Map



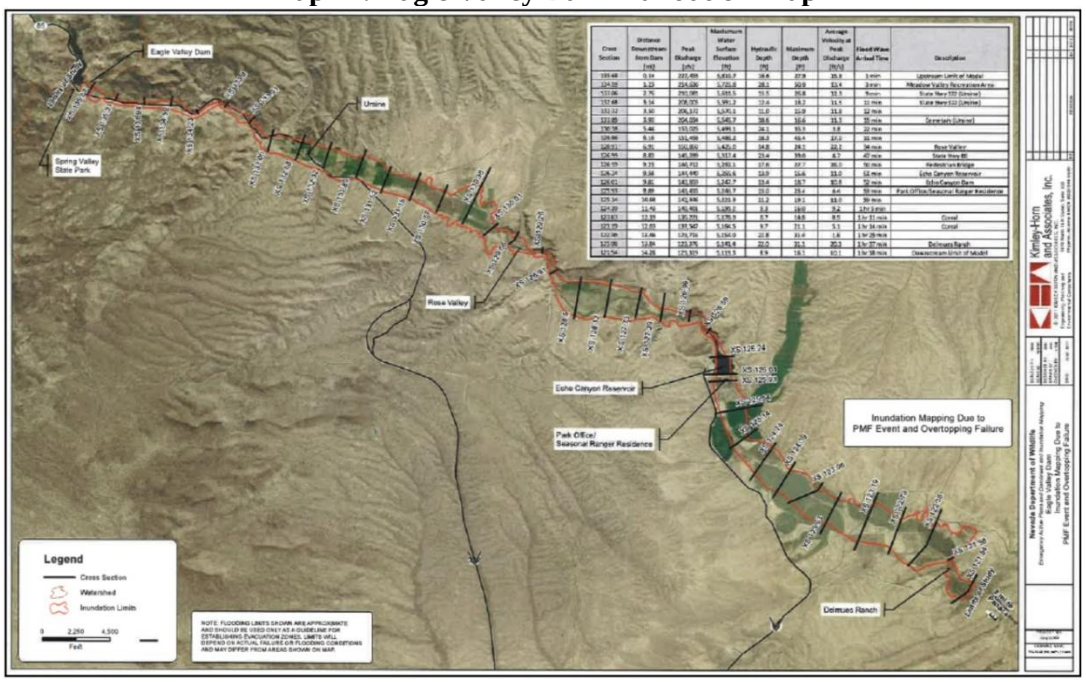
Source: Lincoln County

Map 23: Eagle Valley Dam Inundation Map



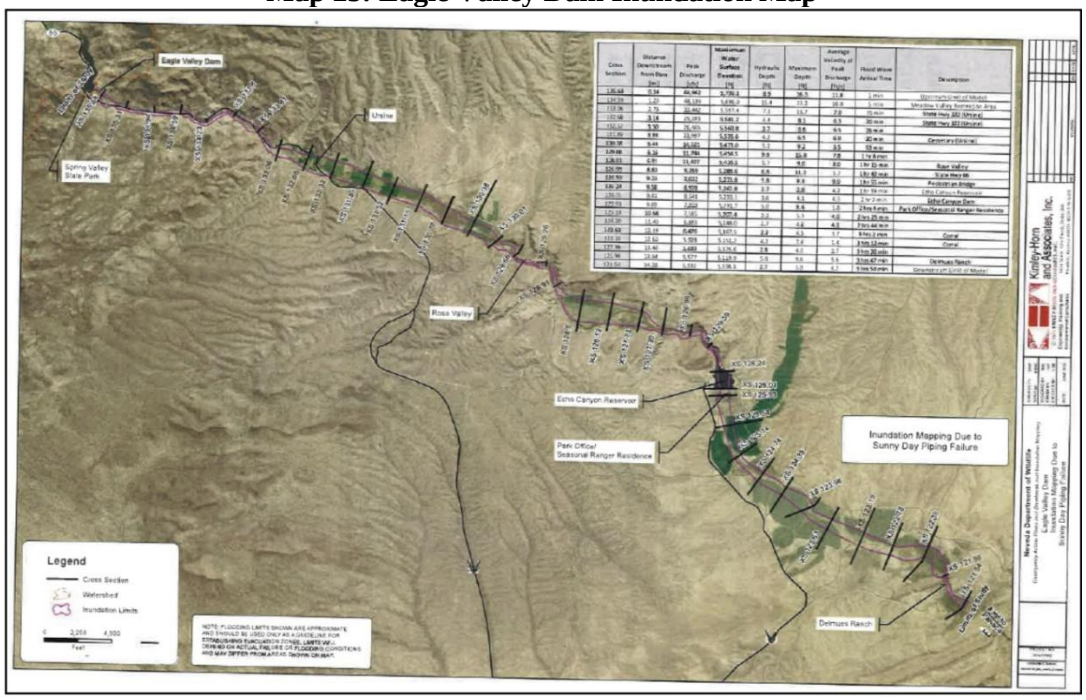
Source: Lincoln County

Map 24: Eagle Valley Dam Inundation Map



Source: Lincoln County

Map 25: Eagle Valley Dam Inundation Map



Source: Lincoln County

Data concerning vulnerability for the three federally operated high hazard dams within Lincoln County was available through the National Inventory of Dams. The following table details known information concerning the condition and risk assessment for these federally operated dams:

Table 20: Lincoln County Federally Operated Dam Condition and Risk Assessments

Dam Number	Dam Name	Risk Assessment	Maximum People at Risk	Maximum Buildings at Risk	Maximum Economic Risk
NV10001	Pine Canyon Dam	Low	1,561	608	$110,538,866
NV10001S001	Pine Canyon Dam–Saddle Dike 1	Low	1,439	565	$68,994,334
NV10002	Mathews Canyon Dam	Moderate	1,937	760	$67,334,565

Source: National Inventory of Dams

A dam failure event can have devastating and wide-ranging impacts on both people and communities. The severity of these impacts depends on the volume of water released and the location of the dam in relation to communities, and may include:

- Loss of Life: The sudden release of a large volume of water can result in flooding downstream, leading to drowning and casualties. The loss of life can be particularly high if a dam failure occurs in highly populated areas or when people are unable to evacuate in time.
- Long Term Displacement: People living downstream may be forced to evacuate their homes leading to displacement and requiring long-term shelter assistance.
- Economic Consequences: Both property damage and the disruption of transportation and utilities could affect local economies.
- Psychological Trauma: Survivors of dam failure events may experience psychological trauma, including post-traumatic stress disorder, anxiety, and depression. Witnessing the loss of lives and property can have long-lasting emotional effects on individuals and communities.

The environmental impact of dam or levee failures depends on the circumstances of the failure. After a failure occurs, the resulting flooding and moving debris can affect wildlife and natural habitats. The spread of pollution and hazardous materials can have negative impacts on the environment. Ecosystems and natural habitats may be destroyed, causing the migration or death of local wildlife. Depending on the timing and location of the failure, it can result in rapid changes

in water temperature downstream. This can be harmful to temperature-sensitive aquatic species and ecosystems. Dam failures can disrupt natural ecological processes, such as nutrient cycling, sediment transport, and flow regimes. These disruptions can have cascading effects on ecosystems.

Any jurisdictional facility within an identified inundation zone of a dam failure will be immediately impacted, potentially causing a cessation of all operations at that location. The extent of the impact depends on multiple factors concerning the extent of the failure, and may include:

- Structural Damage: Facilities located downstream could sustain severe structural damage. Floodwater can inundate buildings, causing structural failures, collapsing walls, and damaging foundations. This can render facilities inoperable or unsafe for use.
- Equipment Damage: Critical facilities often house valuable and sensitive equipment that can be severely damaged or destroyed by floodwaters and debris carried by the flood. This can include electrical systems, machinery, data centers, and communication equipment.
- Disruption of Operations: The flooding caused by a dam failure can disrupt the normal operations of critical facilities, including hospitals, emergency response centers, power plants, and water treatment plants. This disruption can have cascading effects on public services and infrastructure.
- Long-Term Recovery: The recovery process could be lengthy and resource intensive. It may involve rebuilding damaged infrastructure, restoring functionality, and implementing measures to prevent future vulnerabilities.

Government and emergency operations may be immediately impacted, especially if any major or critical facilities are within the inundation area of failure. The extent of the impact depends on multiple factors concerning the extent of the failure, and may include:

- Emergency Response and Management: Jurisdictional response agencies may be called upon to respond to a failure event. They must coordinate rescue operations, evacuations, and disaster response efforts to mitigate the immediate risks to human life and property.
- Public Health and Safety: Jurisdictional public health agencies would provide support for public health needs during and after a dam failure, including responding to injuries, managing emergency shelters, and addressing potential health risks from contaminants or waterborne diseases.
- Financial Impact: A dam failure event can strain state budgets due to the costs associated with emergency response, infrastructure repair, environmental cleanup, and long-term recovery efforts. Local governments may need to allocate additional funds to address these needs.

Potentially Vulnerable Community Lifelines

A dam of levee failure can impact various community lifelines, critical systems and services that communities rely on for their functioning. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table 21: Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	$199
Loss of Wastewater Services	$66
Loss of Water Services	$138
Loss of Communications/Information Technology Services	$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

The failure of a dam or levee can have significant and wide-ranging impacts on transportation infrastructure, affecting roads, bridges, railways, and other critical components of transportation systems. However, it is important to note that, as of this plan, neither the State of Nevada nor Lincoln County have delineated community lifelines and their associated values in dam failure inundation zones. As such, the following discussion does not allow for a determination of specifically vulnerable community lifelines. Potential impacts may include:

- Flooding and Erosion: Dam failures can lead to rapid and extensive flooding, causing erosion of roadways and bridge foundations. This can result in the collapse or significant damage to roads and bridges, disrupting transportation routes.
- Extended Downtime: The repair of transportation infrastructure, especially major roads and bridges, can take a significant amount of time. During this period, transportation networks may be partially or entirely unavailable.

The cost to conduct maintenance on a road can vary significantly depending on the types of work required. However, the average estimate for repairs on a per mile basis in 2019 was $14,750 per mile. The cost to replace a road can vary significantly based on several factors, including the type of road, local labor and material costs, the complexity of the project, and the specific requirements of the replacement. As a rough estimate, road construction costs can range from $1,000,000 to $10,000,000 per mile.

Bridges crossing rivers can pose significant concerns during flooding events due to the increased risk of structural failure. Floodwater caused by a dam failure can exert powerful hydraulic forces on bridge structures, with the flow of water, debris, and floating objects impacting the bridge's substructure and foundation. Scouring, the removal of soil or sediment around bridge foundations can increase during a flood event increasing the risk of failure. Floodwater can also cause the deformation and misalignment of bridge components. As water levels rise and fall, the structural elements may undergo stress and strain, potentially leading to long-term damage and misalignment. The following table details all bridges within Lincoln County:

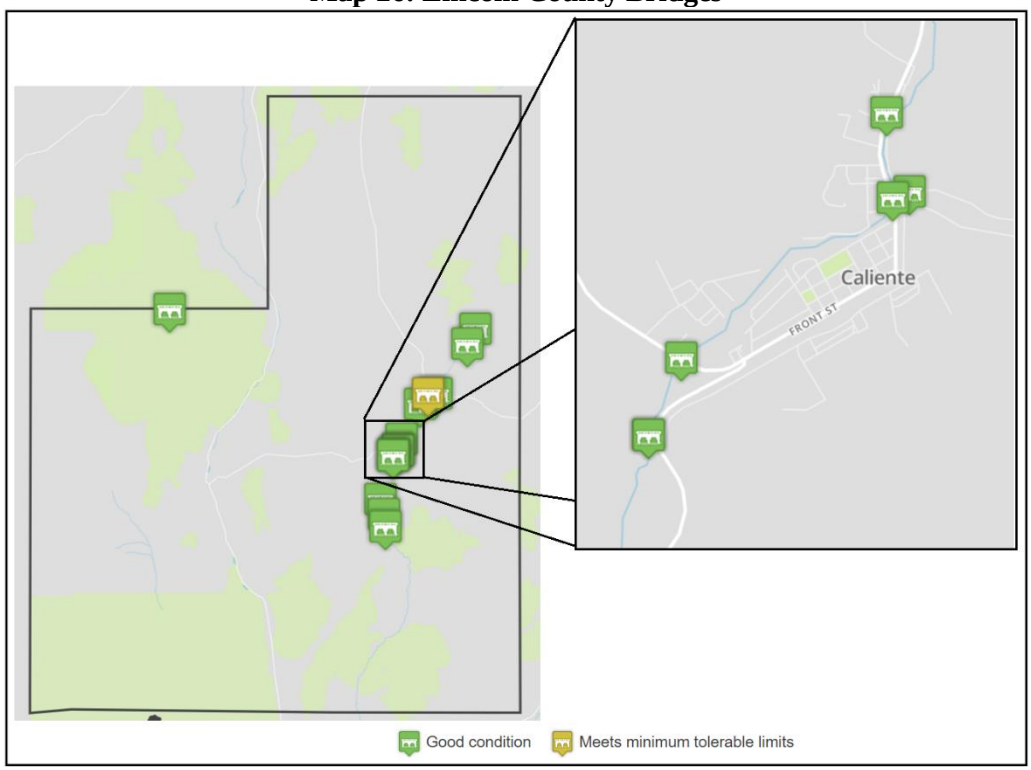
Table 22: Lincoln County Bridges

Bridge	Overall Status	Bridge Condition	Average Daily Traffic
SR 319/Panaca Road over Meadow Valley Wash	Meets minimum tolerable limits	Good	1,600
SR 319/Panaca Road over dry wash	Good/Fair	Good	600
Seaman Road over Cherry Creek	Good/Fair	Good	50
SR 319 Panaca Road over flood control channel	Good/Fair	Good	600
US 93 over Comet Creek	Good/Fair	Good	1,400
Youth Center Drive over Clover Creek	Good/Fair	Good	83
US 93 over Meadow Valley Wash	Good/Fair	Good	600
US 93 over Meadow Valley Wash	Good/Fair	Good	1,400
Rose Valley Road over Meadow Valley Wash	Good/Fair	Good	50
US 93 over Meadow Valley Wash	Good/Fair	Fair	1,400
US 93 over Antelope Canyon Wash	Good/Fair	Fair	1,400
Ursine Road over Eagle Valley Creek	Good/Fair	Fair	132
UPRR over SR 317 Rainbow Canyon Road	Good/Fair	No report	100
UPRR over SR 317	Good/Fair	No report	220
UPRR over SR 317 Rainbow Canyon Road	Good/Fair	No report	100
UPRR over SR 317 Rainbow Canyon Road	Good/Fair	No report	220
UPRR over SR 317 Rainbow Canyon Road	Good/Fair	No report	100

Source: Data Central

The following map, with a detailed map for the City of Caliente, indicates the locations of these bridges:

Map 26: Lincoln County Bridges



Source: Data Central

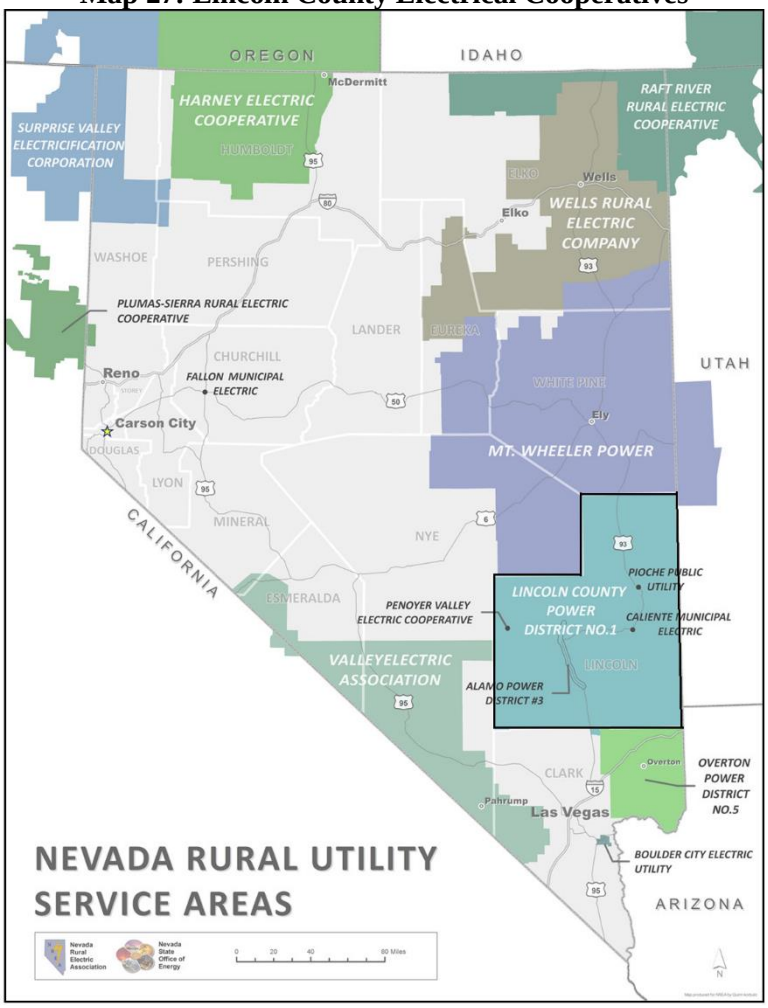
Of particular concern are structurally deficient bridges, which may be at increased risk of failure during an event. No bridges within Lincoln County or the City of Caliente have been identified as being structurally deficient.

The failure of a dam can have significant impacts on power utilities, affecting both the generation and distribution of electrical power. Here are some potential consequences:

- Power Line Disruption: Dam or levee failures can cause flooding and erosion, potentially damaging power lines and transmission towers. This can result in the disruption of electricity transmission from power generation facilities to distribution networks.
- Substation Impact: Substation Flooding: Flooding from a dam or levee failure can impact electrical substations, which play a crucial role in transforming and distributing electricity. Substation failures can lead to widespread power outages.
- Grid Instability: The sudden loss of a significant power source can lead to voltage and frequency fluctuations. This instability can affect the overall reliability of the power grid.
- Emergency Shutdowns: In the event of a dam or levee failure, power utilities may need to implement emergency shutdowns of affected power plants and electrical infrastructure to prevent further damage and ensure the safety of personnel.

Lincoln Couty has the following electrical utility providers:

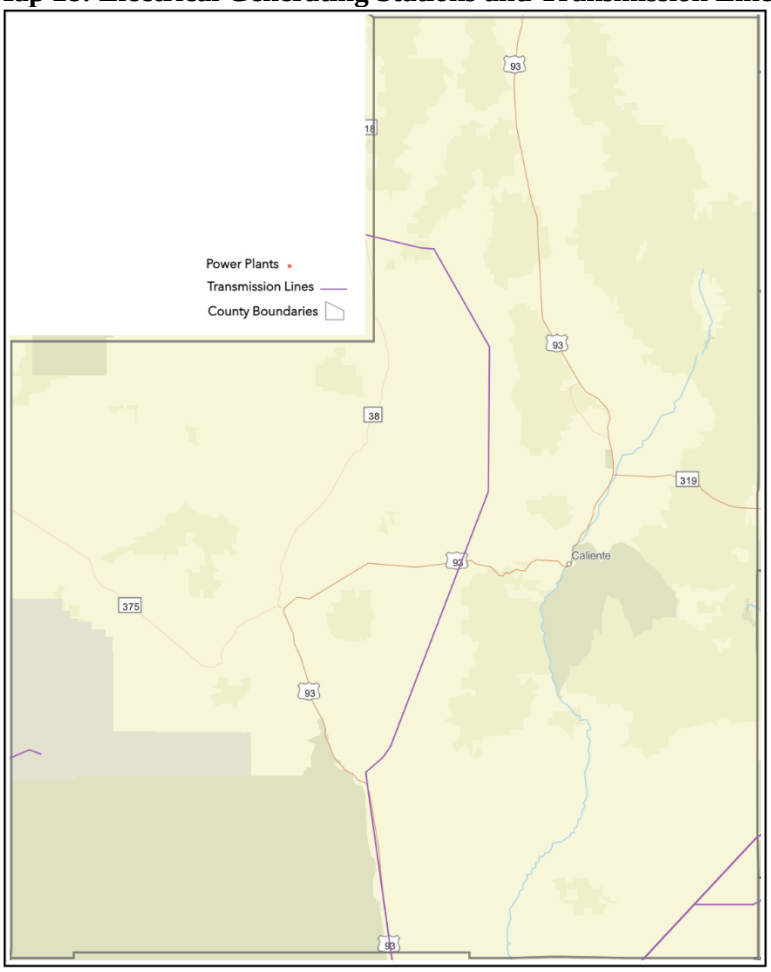
Map 27: Lincoln County Electrical Cooperatives



Source: Nevada Rural Electric Association

No electrical generation facilities were identified in Lincoln County. However, one major transmission line does cross the county, as illustrated in the following map:

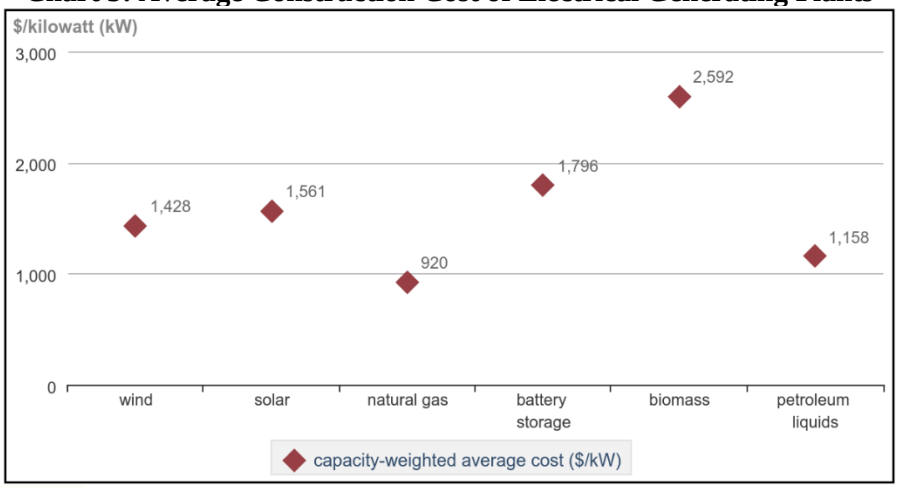
Map 28: Electrical Generating Stations and Transmission Lines



Source: FEMA RAPT

Data concerning the construction costs of electrical generating plants from the U.S. Energy Information Administration indicates the following average per kW cost, by generating plant type, for new construction:

Chart 5: Average Construction Cost of Electrical Generating Plants



Source: U.S. Energy Information Administration

The cost to replace electrical lines can vary widely based on several factors, including the type of electrical lines, the distance of the replacement, local labor and material costs, the complexity of the project, and any specific requirements or challenges involved. Additionally, costs can be significantly different for residential, commercial, or industrial

projects. Additionally, urban and rural locations may have varying cost factors. As a rough estimate, the cost to replace electrical lines can range from a few thousand dollars to several thousand dollars per mile.

Lincoln County is served by the Grover C. Dils Medical Center in Caliente, which has 20 inpatient beds. While this facility may see a rapid increase in dam failure injuries during an event, it is considered unlikely that this increase will impact or overload capacity except in the case of a catastrophic failure. In the event of a catastrophic failure, patients will need to be transported to adjacent regions to receive treatment.

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table 23: Dam Failure Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Heavy flooding can cause power loss, property damage, injury, and death, and the displacement of populations. Standing water can also pose a public health risk due to the reproduction of disease vectors such as mosquitos.
Impact on Responders	Heavy flooding may cause inaccessibility of roadways for first responders as well as damage of materials and resources. First responders will also have to facilitate evacuation measures to move people from the flooded area.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Flooding caused by dam failure may create power outages, debris damage, and road closures.
Delivery of Services	Delivery of services may be disrupted due to flood-damaged bridges and roadways. Transit systems may face closures due to public safety concerns. The ability to deliver food, drinking water, and services will be heavily disrupted. Flooding may also interrupt communications and transportation due to power failure and accessibility challenges.
Property, Facilities, and Infrastructure	Flooding from failures impact roads and bridges, businesses, hospitals, and other critical entities. Water and sewer systems may also be damaged. Homes and businesses may be completely destroyed if situated close to the failure point.
Impact on Environment	Flooding and moving debris can affect natural areas and wildlife, spreading pollution and hazardous materials. Ecosystems and natural habitats may be completely destroyed, causing migration or death of wildlife.
Economic Conditions	There is a fiscal impact on the government after a failure due to disruption of travel and commerce routes and employee's ability to travel to work. Recourses at all levels are utilized impacting the ability to access resources long-term.
Public Confidence in Governance	Direct, immediate, and effective actions must be taken in order to maintain public confidence. Response activities must include all levels of government.

4.9 Drought

4.9.1 Hazard Description

Drought is defined as an abnormally dry period lasting months or years when an area has a deficiency of water and precipitation in its surface and or underground water supply. It is, however, a normal, seasonal, and recurrent feature of climate that occurs in virtually all climate zones—typically in late spring through early fall. The duration of drought varies widely. There are cases when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind, and there are other cases when drought spans multiple years, or even decades. The hydrological imbalance can be grouped into the following non-exclusive categories:

- Agricultural: When the amount of moisture in the soil no longer meets the needs of previously grown crops
- Hydrological: When surface and subsurface water levels are significantly below their normal levels
- Meteorological: When there is a significant departure from the normal levels of precipitation
- Socio-Economic: When the water deficiency begins to significantly affect the population

When below average, little or no rain falls, soil can dry out, and plants can die. If unusually dry weather persists and water supply problems develop, the period is defined as a drought. Human activity such as over-farming, excessive irrigation, deforestation, and poor erosion controls can exacerbate a drought's effects. It can take weeks or months before the effects of below average precipitation on bodies of water are observed. Depending upon the region, droughts can happen more quickly, and be noticed sooner, or have their effects naturally mitigated. The more humid and wet an area is, the faster the effects will be realized. A naturally dry region, which typically relies more on subsurface water will take more time to actualize its effects.

Periods of drought can have significant environmental, agricultural, health, economic, and social consequences. The effects vary depending upon vulnerability and regional characteristics. Droughts can also reduce water quality through a decreased ability for natural rivers and streams to dilute pollutants and increase contamination. The most common effects are diminished crop yield, increased erosion, dust storms, ecosystem damage, reduced electricity production due to reduced flow through hydroelectric dams, shortage of water for industrial production, and increased risk of wildland fires.

4.9.2 Location and Extent

All of Lincoln County, including the City of Caliente, is susceptible to drought conditions. However, the specific susceptibility to drought depends on various factors, including climate patterns, land use practices, and water management strategies.

Droughts are regularly monitored by multiple federal agencies using a number of different indices. One of the best indicators of historic drought periods is provided by the U.S. Drought Monitor. The U.S. Drought Monitor provides a summary of drought conditions across the United States, including Lincoln County. Often described as a blend of art and science, the map is updated weekly by combining a variety of data-based drought indices and indicators, along with local expert input, into a single composite drought indicator. The following table details the U.S. Drought Monitor categories:

Table 24: U.S. Drought Monitor Categories

Rating	Described Condition
None	No drought conditions
D0	Abnormally Dry
D1	Moderate Drought
D2	Severe Drought
D3	Extreme Drought

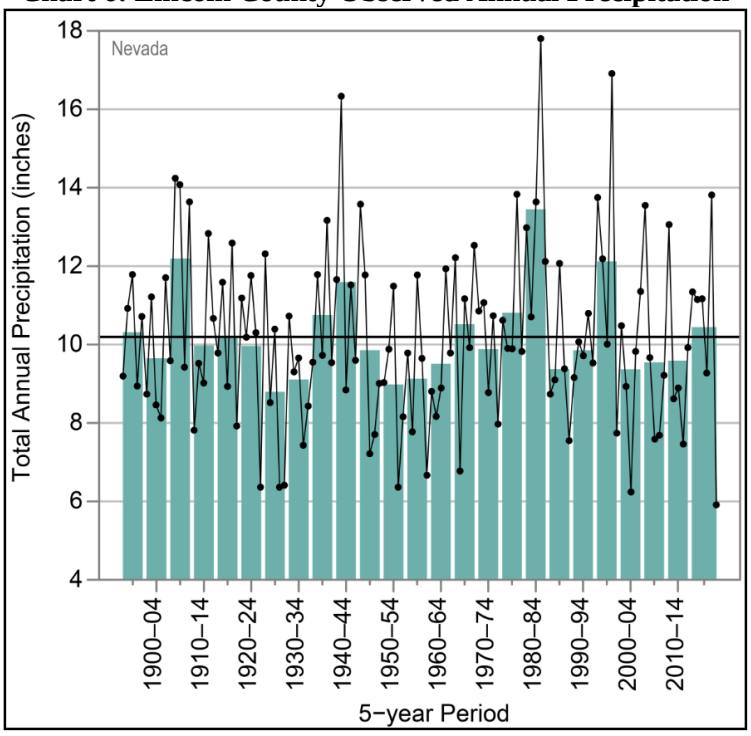
Table 24: U.S. Drought Monitor Categories

Rating	Described Condition
D4	Exceptional Drought

Source: U.S. Drought Monitor

Precipitation data is collected by the NWS throughout the State of Nevada. Additional rainfall data is also collected by the NWS through citizen weather rainfall sites. The following chart indicates annual precipitation averages for Lincoln from 1895 to 2020:

Chart 6: Lincoln County Observed Annual Precipitation



Source: NOAA NCEI State Climate Summary 2022 for Nevada

Current drought conditions, which change weekly based, may be found on the U.S. Drought Monitor website.

4.9.3 Previous Occurrences

Comprehensive data on droughts, drought impacts, and drought forecasting is extremely limited and often inaccurate. Due to the complexity of drought monitoring and the large areas droughts impact, agencies have difficulty quantifying and standardizing drought data.

One of the best indicators of historic drought periods is provided by the U.S. Drought Monitor, which lists weekly drought conditions for the Lincoln County. Historical data was gathered from the U.S. Drought Monitor weekly reports for the 10-year period between 2014 and 2023 (with the years 2014 and 2023 being full dataset years). This data was compiled and aggregated to provide a yearly estimate of the percentage of Lincoln County in each Drought Monitor category.

Table 25: Percentage Area in U.S. Drought Monitor Category

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2023	38.9%	61.1%	40.5%	19.3%	6.1%	0.0%
2022	0.0%	100.0%	100.0%	99.3%	68.7%	18.2%
2021	0.0%	100.0%	100.0%	99.9%	90.7%	71.6%
2020	25.5%	74.5%	46.7%	43.6%	36.4%	16.1%
2019	58.2%	41.8%	23.8%	0.6%	0.0%	0.0%
2018	0.0%	100.0%	81.9%	0.0%	0.0%	0.0%

Table 25: Percentage Area in U.S. Drought Monitor Category

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2017	79.1%	20.9%	1.1%	0.0%	0.0%	0.0%
2016	26.2%	73.8%	16.7%	0.8%	0.0%	0.0%
2015	0.0%	100.0%	100.0%	23.2%	0.4%	0.0%
2014	0.0%	100.0%	100.0%	68.9%	5.6%	0.0%

Source: U.S. Drought Monitor

As a result of drought conditions, Lincoln County can potentially expect the following impacts for each of the identified drought monitor categories that have impacted the county over the last 10 years:

Table 26: Lincoln County Drought Impacts

Category	Historically Observed Impacts
D0	Low soil moisture
	Fire danger increase
D1	Livestock need supplemental feed and water
	Consideration of drought and water restrictions
D2	Dust storms occur
	Wildfire occurrence increase
	Well water decreases
D3	Fire danger is extreme
D4	Federal lands may close for fire precautions

This hazard is regional in nature, and occurrences for the City of Caliente are not unique from Lincoln County as a whole.

4.9.4 Probability of Future Events

Historically, drought has affected Lincoln County on a reoccurring basis. In reviewing historical data from the U.S. Drought Monitor weekly reports for Lincoln County from 2014 through 2023 a weekly average can be created indicating the percentage time in each Drought Monitor category. This average can be used to extrapolate the potential likelihood of future drought conditions.

Table 27: Estimated Weekly Probability of Lincoln County Being in U.S. Drought Monitor Category

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
22.8%	77.2%	61.1%	35.6%	20.8%	10.6%

Data: U.S. Drought Monitor

Lincoln County can experience rapid droughts, with a sudden onset of intense dry periods following a period of normal precipitation. While these conditions may last only a few months, they can result in agricultural losses, water supplies shortages, and low stream and river volume.

While predicting drought provides many challenges, NOAA's National Integrated Drought Information System provides the Drought Early Warning System to improve drought early warning capacity. The system is a network of regional and national partners that share information and coordinate actions to help communities in the region cope with drought. Developing and implementing the system allows Nevada, and Lincoln County to quickly respond to emerging drought conditions Through developing regional systems, the National Integrated Drought Information System is building the foundation for a nationwide system to improve drought forecasting.

4.9.5 Projected Changes in Hazard Location, Intensity, Frequency, and Duration

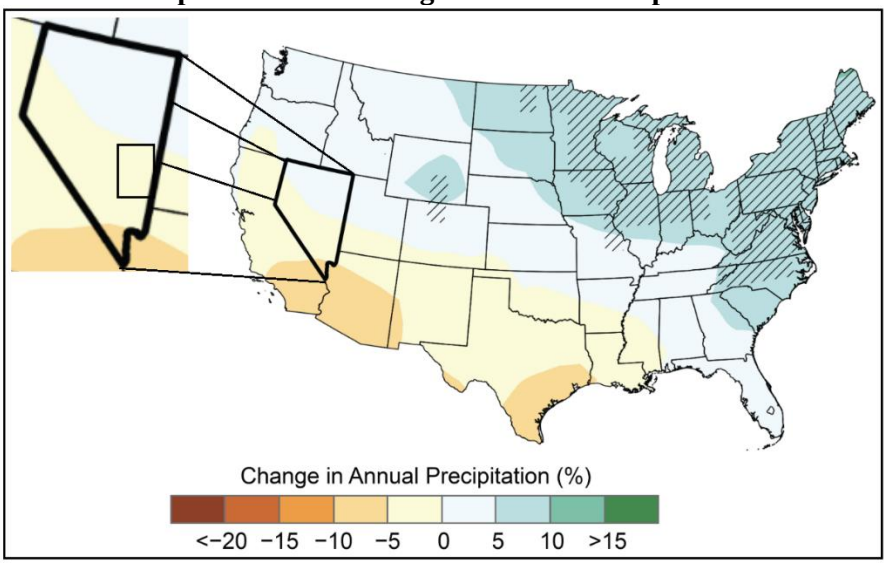
According to the National Institutes of Health National Center for Biotechnology Information publication Global Drought Trends and Future Projections "Drought is one of the most difficult natural hazards to quantify and is divided into categories (meteorological, agricultural, ecological and hydrological), which makes assessing recent changes and future scenarios extremely difficult." However, using long term data estimates of future drought conditions can be

determined through a combination of climate modeling, historical data analysis, and scientific assessments. This modelling takes into account factors such as temperature, precipitation, soil moisture, and other relevant variables.

Current modelling from the NOAA State Climate Summary 2022 for Nevada suggests that projections of annual precipitation for Nevada are uncertain, but warmer temperatures are likely to decrease the amount of water in the mountain snowpack and increase water demand. Additionally, higher temperatures will also increase the evaporation rate, which will reduce streamflow and soil moisture. As such, the intensity of future droughts is likely to increase.

The following map indicates the expected annual decrease in precipitation for Lincoln County

Map 29: Lincoln Change in Annual Precipitation



Source: NOAA NCEI State Climate Summary 2022 for Nevada

4.9.6 Vulnerability and Impact

Droughts are rarely a direct cause of death, though the associated heat, dust, and stress can all contribute to increased mortality. However, drought can severely challenge a public water supplier through depletion of the raw water supply and greatly increased customer water demand. Even if the raw water supply remains adequate, problems due to limited treatment capacity or limited distribution system capacity may be encountered. Water supply planning is the key to minimizing the effects of drought on the population. Public water suppliers should continue to work to identify vulnerabilities and develop infrastructure, conservation plans, and partnerships to reduce the likelihood of running out of water during a drought.

At greater risk may be the vulnerable populations, including the especially young, the elderly, and those below the poverty level. Hazard occurrences can exacerbate existing vulnerabilities and create new challenges. Vulnerable populations may have pre-existing health conditions that make them more susceptible to heat-related illnesses and dehydration, both of which can be exacerbated during droughts. Persons on fixed incomes and with limited resources may face difficulties in adapting their homes to withstand hazard conditions or may lack financial resources to cope with the increased costs of food, water, and energy. Details concerning potentially vulnerable populations may be found in Section 3.4.

In general, critical facilities and infrastructure are not directly vulnerable to losses as a result of drought. However, there is a potential that operations could be impacted by power failures caused by either increased utility demand or damaged power delivery infrastructure. In addition, drinking water infrastructure may be specifically vulnerable to the impacts of drought. Any decrease in groundwater supplies would stress this infrastructure and may cause shortages or rationing.

Drought conditions can cause significant agricultural impacts. In addition to obvious losses in yields in both crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of wildfires

increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk. Mapping from the United States Department of Agriculture was reviewed to determine total agricultural losses, by county, due to drought conditions from 1989 to 2021. Mapping data indicated no recorded losses.

Although environmental losses are difficult to quantify, increasing public awareness and concern for environmental quality has forced public officials to focus greater attention and resources on these effects. Environmental losses are the result of damage to plant and animal species, wildlife habitat, and air and water quality, wildfires, degradation of landscape quality, loss of biodiversity, and soil erosion. Some of the effects are short-term and conditions quickly return to normal following the end of the drought. Other environmental effects linger for some time or may even become permanent. Wildlife habitat, for example, may be degraded through the loss of wetlands, lakes, and vegetation. However, many species will eventually recover from it if it is a temporary aberration. However, the degradation of landscape quality, with increased soil erosion, may lead to a more permanent loss of biological productivity of the landscape.

Governmental operations and facilities will likely experience minimal impacts from drought conditions, unless there are substantial power, communications, or water outages. However, reduced water availability would likely have an immediate impact on firefighting efforts in urban and suburban areas as fire suppression equipment requires a minimum level of water pressure to activate.

Potentially Vulnerable Community Lifelines

Water utilities are particularly vulnerable to drought conditions due to the direct impact on water availability and supply. The May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table 28: Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Wastewater Services	$66
Loss of Water Services	$138

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

Water utilities can be affected by drought through:

- Reduced Water Availability: The reduction in water availability directly impacts the amount of water that water utilities can draw from local sources.
- Lower Reservoir Levels: Lower reservoir levels can affect the ability to meet water demand during periods of high usage.
- Declining Groundwater Levels: Lower groundwater levels make it more challenging for utilities to extract water.
- Water Quality Challenges: Lower water levels can lead to higher concentrations of contaminants, minerals, and sediments in the available water sources, requiring more extensive and costly treatment processes.
- Increased Treatment Costs: Treating water from depleted or lower-quality sources during drought conditions may require additional treatment steps, technologies, or chemicals, leading to increased operational costs for water utilities.
- Competition for Water Resources: During droughts, there is increased competition for limited water resources among various users, including agriculture, industry, and households. Water utilities may face challenges in securing sufficient water supplies amid this heightened competition.
- Impact on Water Infrastructure: Reduced water flow in rivers and streams can expose water infrastructure, such as pipelines, to the risk of corrosion.
- Water Use Restrictions: To conserve water during droughts, authorities may implement water use restrictions and conservation measures. These restrictions can impact water utilities' revenue and their ability to meet customer demand.

The following have been identified as water and wastewater utility providers in Lincoln County:

- Lincoln County Water District
- Alamo Sewer and Water
- City of Caliente – Public Utilities
- Panaca Farmstead Association
- Pioche Public Utilities

Using data from the 2021 Lincoln County Water District Resource Plan, the following table indicates the number of private and public water wells within the county:

Table 29: Lincoln County Wells

Well Type	Number
Public	140
Private	497

Source: Lincoln County Water District Water Resource Plan, 2021

Drought can severely challenge a public water supplier through depletion of the raw water supply and greatly increased customer water demand. Even if the raw water supply remains adequate, problems due to limited treatment capacity or limited distribution system capacity may be encountered. Water supply planning is the key to minimizing the effects of drought on the population. Public water suppliers should continue to work to identify vulnerabilities and develop infrastructure, conservation plans, and partnerships to reduce the likelihood of running out of water during a drought.

Communities and citizens served by private wells rather than water supply districts may be at higher risk to drought conditions, and may see the following impacts:

- Lowering of Water Table: Drought conditions can lead to a lowering of the water table, which is the level at which groundwater is located. Private wells that rely on groundwater may experience reduced yields or, in extreme cases, may run dry.
- Decreased Well Recharge: Drought reduces the amount of precipitation, leading to decreased recharge of groundwater. Private wells depend on a sustainable recharge rate to maintain a consistent and reliable water supply.
- Increased Competing Demands: During a drought, increased water demand for agricultural irrigation, municipal water supply, and other uses can create competition for the available groundwater. Private wells may face challenges due to this increased demand.
- Water Quality Concerns: Lower groundwater levels during droughts can lead to changes in water quality. Concentrations of minerals, contaminants, and pollutants may increase, affecting the suitability of water for drinking and other uses.

Should it be required to drill a private well deeper to accommodate for drought conditions impacting the level of the water table, on average, the cost to drill a private water well in the United States can range from $15 to $45 per foot. However, it's important to note that this is a general estimate, and actual costs can vary based on geological and hydrogeological conditions and well depth.

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table 30: Drought Consequence Analysis

Subject	Potential Impacts
Impact on the Public	If the drought coincides with warmer months, vulnerable populations may face an increased risk of dehydration, death, heat-related illness, heat stroke. Lower quantities of water may also increase the likelihood of contamination due to higher concentrations of bacteria. During droughts, dry soils and wildfires increase the number of airborne particles, such as pollen and smoke, which can worsen chronic respiratory illnesses.
Impact on Responders	Reduced water availability would likely complicate firefighting efforts in urban and suburban areas where wildfire-fighting tactics such as chemical retardants and controlled burns are less suitable. Some fire suppression equipment requires a minimum level of water pressure to activate. If the drought coincides with warm months, first responders may face increased risk of heat-related injuries or death.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. While the expectation is minimal, this threat may impact an agency's ability to implement their continuity plan based on the hazard's potential to impact power, communications, or water outages. Critical life-saving activities and fire suppression will be directly impacted by these outages.
Delivery of Services	Droughts may impact the delivery of goods and services if there are shortages of raw materials.
Property, Facilities, and Infrastructure	Drought conditions may threaten levels or quality of municipal public water supplies or impact small communities and/or private potable water wells.
Impact on Environment	The potential of drought-related impacts could have significant impacts on supplies of animal feed, livestock, meat and dairy products, and processed grain products, and on crop production. Drought conditions may also increase the potential for fires. Drought is also associated with insect infestations, plant disease, wind erosion of soil, and decrease in levels of water produced by natural aquifers.
Economic Conditions	The economic impacts from a drought could be significant. Droughts have the potential to drain state, and local resources, which will have a significant fiscal impact on the local government.
Public Confidence in Governance	Droughts can adversely affect the public, first responders, infrastructure, agriculture, economy, and overall operations. Direct, effective, and timely response by all levels of government is required for public confidence in the state's governance, especially in recognizing and mitigating economic impacts of the drought.

FEMA NRI

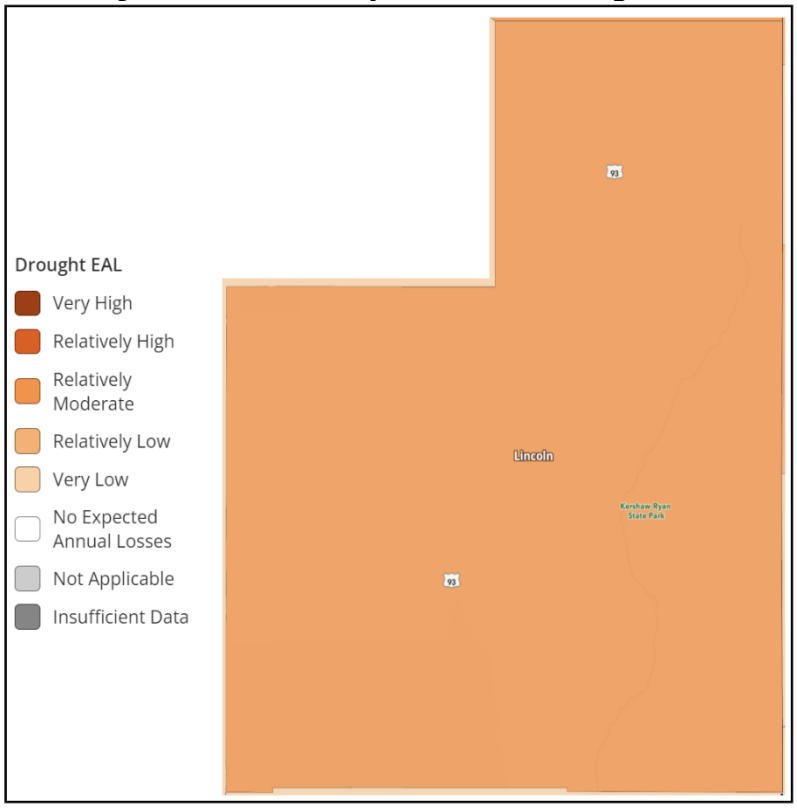
Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the following map was created indicating the potential risk to Lincoln County from drought:

Map 30: Lincoln County FEMA NRI Drought Risk

Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for drought for Lincoln County:

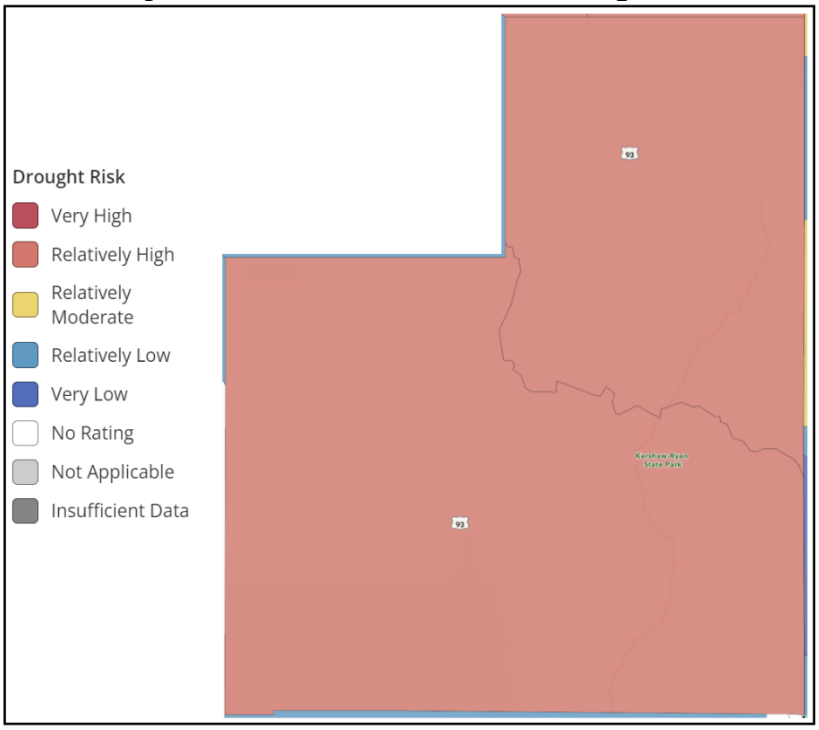
Map 31: Lincoln County FEMA NRI Drought EAL



Source: FEMA NRI

To help understand the risk and vulnerability to drought conditions of participating jurisdictions mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

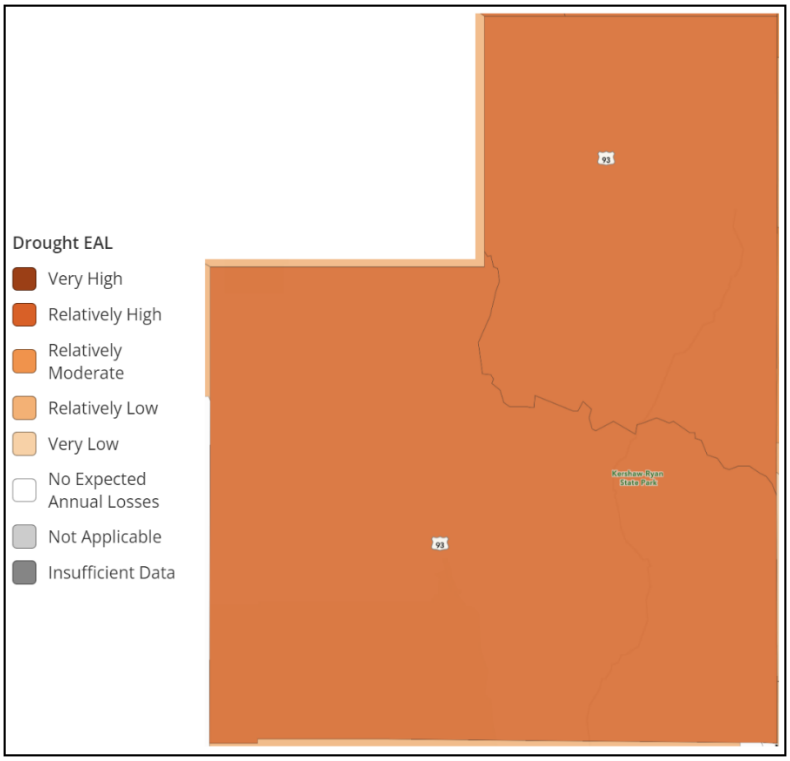
Map 32: FEMA NRI Jurisdictional Drought Risk



Source: FEMA NRI

The following map indicates the EAL for drought for participating jurisdictions (as indicated by census tract) within Lincoln County:

Map 33: FEMA NRI Jurisdictional Drought EAL



Source: FEMA NRI

The following table indicates the FEMA NRI and EAL analysis for each participating Lincon County jurisdiction for drought:

Table 31: Lincoln County Region H FEMA NRI and EAL for Drought

Jurisdiction	Risk Index	EAL
Lincoln County	Relatively Moderate	Relatively Moderate
Caliente	Relatively High	Relatively High

Source: FEMA NRI

4.10 Earthquake

4.10.1 Hazard Description

An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves that are typically caused by the rupturing of geological faults. A fault is a fracture or zone of fractures between two blocks of rock. Faults allow the blocks to move relative to each other, which, when rapidly occurring, causes an earthquake. When stresses in the crust exceed the strength of the surrounding rock, a rupture or break may occur fault plane. The point of origin of an earthquake is known as the hypocenter, which may be deep beneath the surface. The point at the surface directly above the hypocenter is known as the epicentre. Seismic waves radiate out from the hypocenter causing the ground to shake. These waves can travel long distance, but in general are strongest near the epicenter.

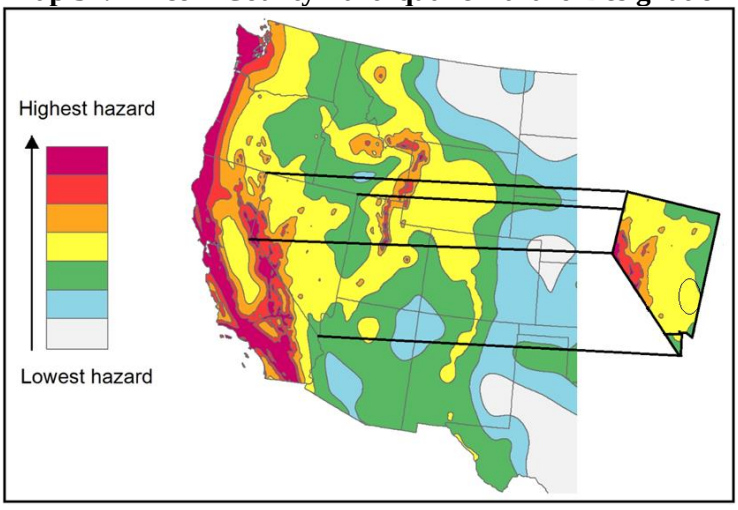
Earthquakes tend to occur along faults, which can be divided into three categories:

- Normal Fault: Resulting from pulling or tension with the overlying block moving down the dip of the fault plane
- Thrust (Reverse) Fault: Resulting from squeezing or compression, with the overlying block moving up the dip of the fault plane
- Strike-Slip (Lateral) Fault: Resulting from either type of stress, with the blocks moving horizontally past one another

4.10.2 Location and Extent

Lincoln County is located within the North American tectonic plate, a major tectonic plate that covers a significant portion of North America. Lincoln County is situated near plate boundaries, where tectonic activity is more pronounced. The following map from the USGS, indicates the earthquake hazard potential for Lincoln County:

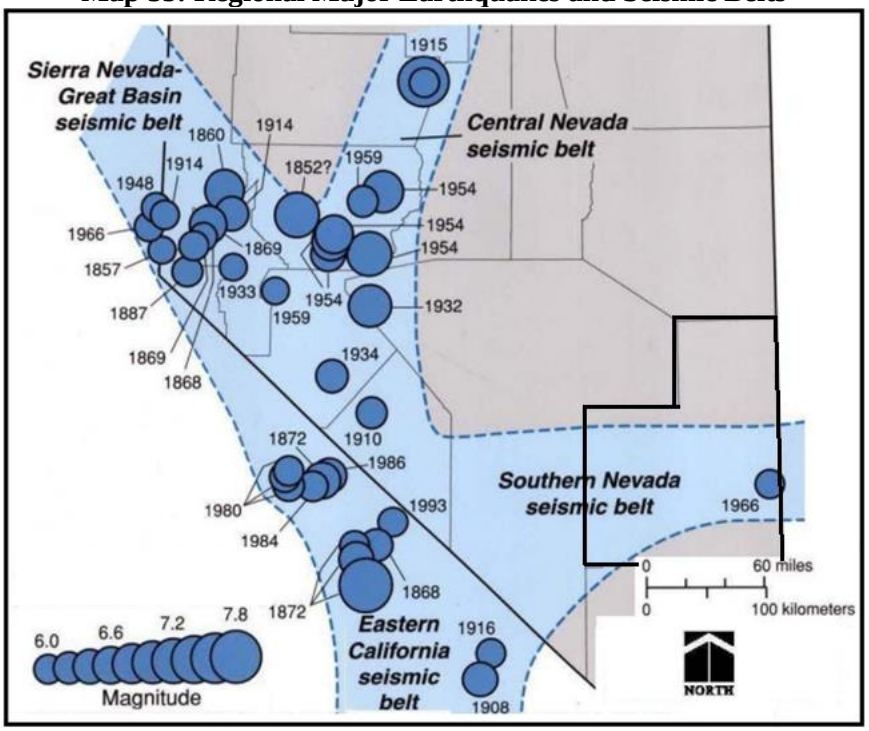
Map 34: Lincoln County Earthquake Hazard Designation



Source: USGS

The following map, from the Nevada Bureau of Mines and Geology, details regional seismic belts and major historic earthquakes:

Map 35: Regional Major Earthquakes and Seismic Belts



Source: Nevada Bureau of Mines and Geology

Two scales are used when referring to earthquake activity. Estimating the total force of an earthquake is the Richter scale, and the observed damage from an earthquake is the Modified Mercalli Intensity Scale. Additionally, both Peal Ground Acceleration (%g) and Velocity (cm/s) can be used to measure and quantify force and movement. Peak Ground Acceleration (PGA) is a measure of the maximum acceleration experienced by a point on the Earth's surface during an earthquake. It quantifies the intensity of ground shaking at a specific location and is a crucial parameter for assessing seismic hazard. PGA is typically measured in units of gravity (g), where 1 g is approximately equal to the acceleration due to Earth's gravity (about 9.81 meters per second squared or 32.2 feet per second squared). So, if the PGA at a location is 0.2 g, it means the ground acceleration during the earthquake was 20% of the acceleration due to gravity. PGA can vary significantly from one location to another during the same earthquake event. Factors that influence PGA include the earthquake's magnitude, depth, distance from the epicenter, and local geological conditions.

The following table equates the above referenced earthquake scales.

Table 32: Earthquake Magnitude Scale Comparison

Mercalli Scale Intensity	Verbal Description	Richter Scale Magnitude	Acceleration (%g)	Velocity (cm/s)	Witness Observations
I	Instrumental	1 to 2	0.17%	<0.1	None
II	Feeble	2 to 3	1.40%	1.1	Noticed only by sensitive people
III	Slight	3 to 4	1.40%	1.1	Resembles vibrations caused by heavy traffic
IV	Moderate	4	3.90%	3.4	Felt by people walking, rocking of free-standing objects
V	Rather Strong	4 to 5	9.20%	8.1	Sleepers awakened; bells ring
VI	Strong	5 to 6	18.00%	16	Trees sway, some damage from falling objects
VII	Very Strong	6	34.00%	31	General alarm, cracking of walls
VIII	Destructive	6 to 7	65.00%	60	Chimneys fall and some damage to building

Table 32: Earthquake Magnitude Scale Comparison

Mercalli Scale Intensity	Verbal Description	Richter Scale Magnitude	Acceleration (%g)	Velocity (cm/s)	Witness Observations
IX	Ruinous	7	124.00%	116	Ground crack, houses begin to collapse, pipes break
X	Disastrous	7 to 8	>124.0%	>116	Ground badly cracked, many buildings destroyed. Some landslides
XI	Very Disastrous	8	>124.0%	>116	Few buildings remain standing, bridges destroyed.
XII	Catastrophic	8 or greater	>124.0%	>116	Total destruction; objects thrown in air, shaking and distortion of ground

Earthquakes can occur anywhere in Lincoln County including the City of Caliente.

4.10.3 Previous Occurrences

Since records have been kept, Lincoln County has experienced no earthquakes greater than 5.0 on the Richter Scale within the county borders. However, the State of Nevada has had numerous earthquakes greater that 6.0 on the Richer Scale, with ground movement felt within Lincoln County, including:

Table 33: Lincoln County Major Earthquakes, 1872 - 2022

Event Date	Location	Richter Scale Magnitude	Approximate Distance from Lincoln County
05/15/2020	Tonopah	6.5	170 miles
02/21/2008	Elko (Wells)	6.0	275 miles
12/16/1954	Fairview Peak	7.1	300 miles
08/24/1954	Fallon	6.8	300 miles
07/06/1954	Fallon	6.1	300 miles
01/30/1934	Mina	6.2	200 miles

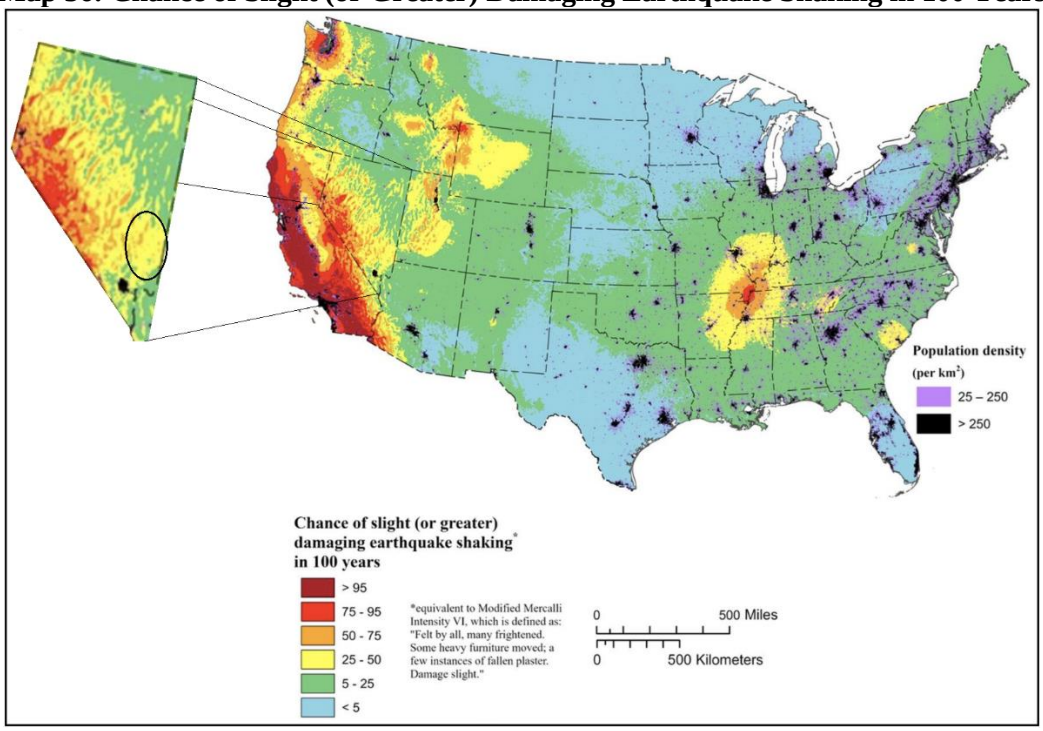
Source: University of Nevada, Reno and Nevada Bureau of Mines and Geology

This hazard is regional and widespread in nature, and occurrences for the City of Caliente are not unique from Lincoln County as a whole.

4.10.4 Probability of Future Events

Predicting the occurrence of earthquakes is tremendously challenging due to the large number of factors involved. However, mapping from the USGS can help detail future earthquake probability. The following map, from the USGS, illustrates potential earthquake probability for Lincoln County:

Map 36: Chance of Slight (or Greater) Damaging Earthquake Shaking in 100 Years



Source: USGS

Additionally, the University of Reno and the Nevada Bureau of Mines and Geology indicate the following percentage risk of experiencing an earthquake for select Lincoln County jurisdictions:

Table 34: FEMA HAZUS Probability of Earthquake

Community	Richter Scale 5.0	Richter Scale 5.5	Richter Scale 6.0	Richter Scale 6.5	Richter Scale 7.0
Alamo	70-80	~50	20-25	6-8	<.5
Caliente	50-60	~35	10-15	4	<.5
Pioche	30-40	~20	6-10	2-3	<.5

Source: University of Nevada, Reno and Nevada Bureau of Mines and Geology

The probability of a future occurrence of this hazard is not unique to any to either the City of Caliente or Lincoln County as a whole.

4.10.5 Projected Changes in Location, Intensity, Frequency, and Duration

Due to the very long-term nature of geological process, including earthquakes, the seismic hazard for Lincoln County is not to change during the life of this plan.

4.10.6 Vulnerability and Impact

Although earthquakes occur infrequently in Lincoln County, a large magnitude quake could cause significant impacts. In a larger magnitude earthquake, ground movement can lead to building and infrastructure collapse. Additionally, concurrent hazards caused by earthquakes may include fire, hazardous material release, landslides, tsunamis (if in an offshore environment), and dam failure. As a result, and related to the impacts of building and infrastructure damage and collapse, deaths and injuries are likely.

Structures in Lincoln County may be particularly vulnerable to the effect of a moderate to large earthquake as seismic design criteria are not required for either new building construction or old building renovation. Of particular concern to are unreinforced masonry buildings. An unreinforced masonry building is constructed of brick or masonry with no steel reinforcing bars. Because these buildings were not built using modern building codes, they are much more likely to experience damage or collapse during an earthquake. Currently, no surveys exist as to the extent of these buildings within Lincoln County, or the state as a whole.

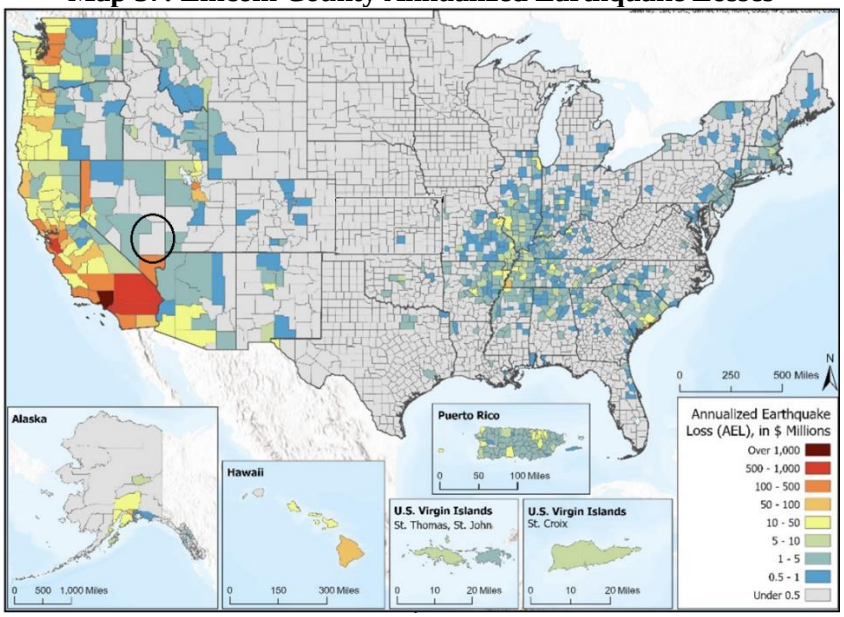
Critical facilities are at potential risk to earthquakes, especially those that store or transport handle hazardous materials. Unauthorized releases from these facilities may cause health impacts, environmental damage, or force road or area closures. Infrastructure is also at high risk to earthquakes, as extensive ground movement can either compress or rupture the infrastructure (pipelines, underground utilities) or cause a collapse (above ground utilities, bridges). Roads and other transportation infrastructure damaged during an earthquake would initially be unusable until inspected for structural integrity.

Recent earthquakes worldwide depict a pattern of steadily increasing damage and losses that are due to significant growth in earthquake-prone urban areas and vulnerability of older building stock, including buildings constructed within the past 20 years. In 2017 FEMA released the Hazus Estimated Annualized Earthquake Losses for the United States that reported recent earthquakes show a pattern of steadily increasing damages and losses due to:

- Significant growth in earthquake-prone urban areas
- Vulnerability of the older building stock

Data in the report details the Annualized Earthquake Loss measures, the annualized earthquake losses in any single year. The following maps details Annualized Earthquake Loss values for Lincoln County:

Map 37: Lincoln County Annualized Earthquake Losses



Source: FEMA Hazus

Using available HAZUS data, the following potential losses from a worst-case scenario 2,500-year 6.7 Magnitude earthquake. However, these assumed vulnerabilities should be viewed as theoretical due to the tremendous number of variables involved in a potential earthquake event.

Table 35: Lincoln County Probabilistic 6.7 Magnitude Earthquake Damages

County	Total Earthquake Losses	Displaced Households
Lincoln County (including Caliente)	<$500,000	0

Source: FEMA Hazus

All City and county facilities and assets are vulnerable to earthquakes. However, the risk to local and county operations, facilities, and assets from earthquakes can vary significantly depending on the location and the level of seismic activity. Potential risks to operations, facilities, and assets from earthquakes include:

- Structural Damage: Earthquakes can cause significant structural damage to government buildings, including state capitol buildings, offices, and infrastructure such as bridges and roads. The extent of damage depends on the earthquake's magnitude, depth, and proximity to populated areas.
- Injury and Loss of Life: Earthquakes can result in injuries and loss of life among government employees, particularly if buildings are not constructed to withstand seismic forces or if there are insufficient emergency evacuation plans and procedures in place.
- Disruption of Government Operations: Earthquakes can disrupt the normal functioning of government operations. Damaged buildings may need to be evacuated or temporarily closed for repairs, which can affect the delivery of services.
- Communication Disruptions: Seismic activity can damage communication infrastructure, including telephone lines and data networks. This can hinder the ability to communicate internally and with the public during and after an earthquake.
- Power Outages: Earthquakes can lead to power outages by damaging electrical infrastructure such as substations and power lines. Government buildings may lose power, affecting critical operations and services.
- Loss of Records and Data: Earthquakes can result in the loss of important records and data stored in government buildings. This can have legal and operational implications.
- Emergency Response: Government agencies may need to activate emergency response plans, deploy first responders, and coordinate relief efforts in the aftermath of a significant earthquake.
- Budgetary Impact: The costs associated with repairing and retrofitting government buildings and infrastructure after an earthquake can be substantial and may strain state budgets.

Potentially Vulnerable Community Lifelines

Earthquakes can impact various community lifelines, critical systems and services that communities rely on for their functioning. Vulnerabilities arise due to the stress that an earthquake places on infrastructure, resources, and operational processes. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table 36: Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	$199
Loss of Wastewater Services	$66
Loss of Water Services	$138
Loss of Communications/Information Technology Services	$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

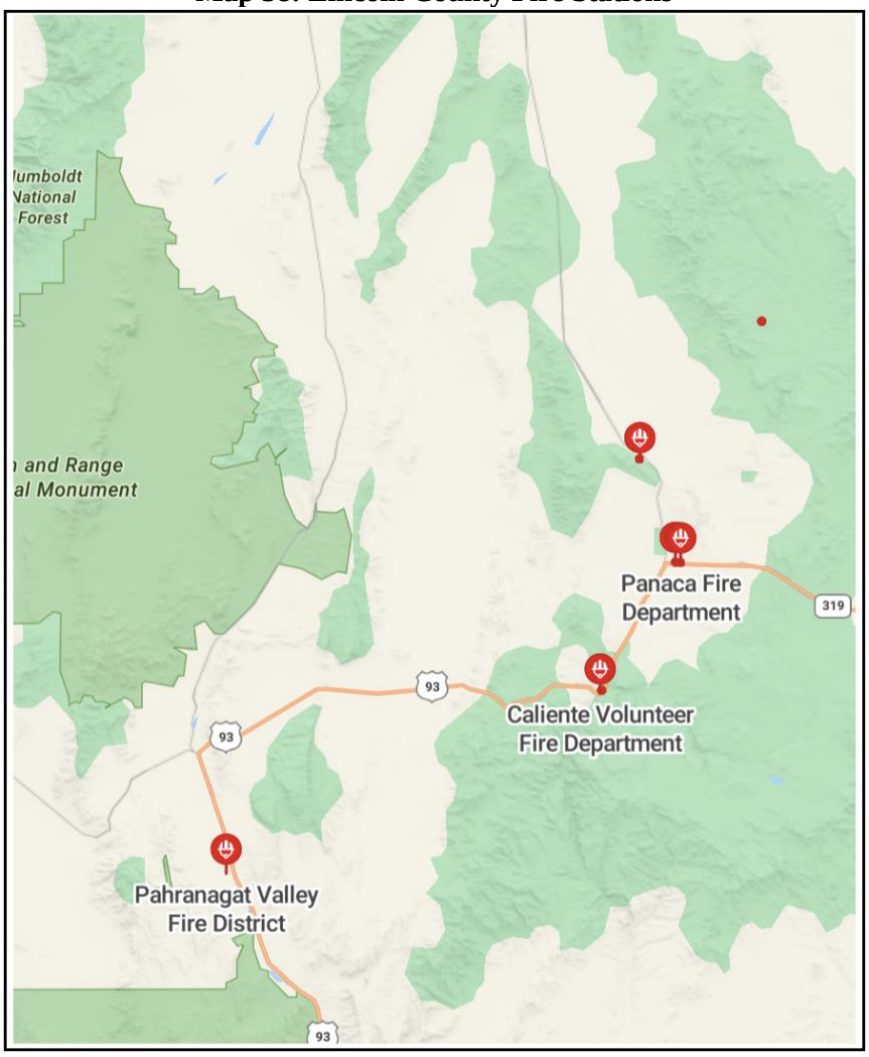
Earthquakes can have various impacts on emergency response efforts, affecting the ability of emergency services to effectively manage and address the consequences of the storm. Some potential impacts include:

- Increased Call Volume: Earthquake events typically result in a surge in emergency calls, overwhelming call centers and emergency hotlines. This can lead to delays in response times and increased stress on emergency services.
- Infrastructure Damage: Earthquakes can cause buildings, trees, and power lines to fall, leading to building closures and road blockages and posing multiple safety hazards. Infrastructure damage may slow down emergency response and increase the complexity of rescue operations.
- Search and Rescue Challenges: Earthquakes can generate large amounts of debris, making search and rescue operations more challenging. Impacted areas may hide hazards beneath the surface, and debris fields can complicate helicopter or drone operations.
- Evacuations: Earthquakes may necessitate evacuations, requiring emergency responders to manage shelters for displaced individuals. Providing adequate shelter, food, and medical care becomes a priority.

- Resource Allocation: Emergency response agencies must strategically allocate resources to address the most urgent needs during and after an earthquake. This includes deploying personnel, equipment, and supplies to the most affected areas.

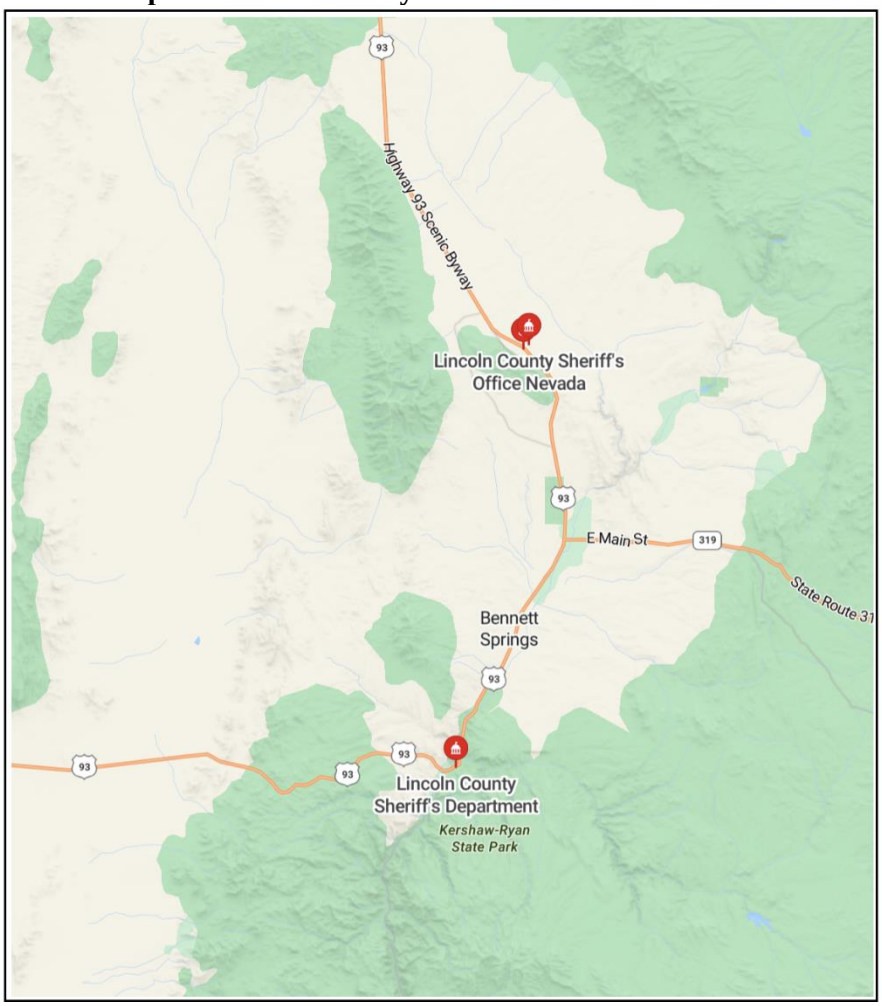
The following detail the location of fire and law enforcement stations throughout Lincoln County, which may be impacted by an earthquake event:

Map 38: Lincoln County Fire Stations



Source: Lincoln County

Map 39: Lincoln County Law Enforcement Locations



Source: Lincoln County

Earthquakes can have significant impacts on roads, leading to various issues and challenges. Earthquakes can cause the following impacts:

- Damage to Roads and Highways: Earthquakes can cause cracking, buckling, and even complete collapse of roads and highways, making them impassable. This can disrupt the flow of traffic and hinder rescue and recovery efforts.
- Bridge Failures: Bridges are particularly vulnerable to seismic activity due to their structural complexity. Earthquakes can cause bridge piers to shift or collapse, decks to crack, or even entire spans to fail, severing critical transportation routes.
- Railway Disruptions: Earthquakes can damage railway tracks, bridges, tunnels, and signaling systems, leading to disruptions in train services. This not only affects passenger travel but also impacts the transportation of goods and materials.

The cost to conduct maintenance on a road can vary significantly depending on the types of work required. However, the average estimate for repairs on a per mile basis in 2019 was $14,750 per mile. The cost to replace a road can vary significantly based on several factors, including the type of road, local labor and material costs, the complexity of the project, and the specific requirements of the replacement. As a rough estimate, road construction costs can range from $1,000,000 to $10,000,000 per mile.

Earthquakes can impact electrical utilities in various ways, potentially leading to disruptions in service. These impacts include:

- Damage to Power Plants: Seismic activity can damage power plants, particularly older facilities that may not be designed to withstand strong earthquakes. Damage to generators, turbines, cooling systems, and other critical components can lead to the shutdown of power generation facilities, reducing the supply of electricity.
- Transmission Line Failures: Earthquakes can cause transmission towers to collapse, conductors to break, and insulators to fail, disrupting the flow of electricity from power plants to substations and distribution networks. This can lead to widespread power outages over large geographic areas.
- Substation Damage: Substations, which serve as hubs for electricity distribution and voltage regulation, can suffer damage to transformers, switchgear, and other equipment during earthquakes. This can disrupt the distribution of electricity to homes, businesses, and other consumers.
- Damage to Distribution Networks: Earthquakes can damage distribution poles, transformers, and power lines, causing localized power outages in affected areas. Fallen power lines can also pose safety hazards and increase the risk of electrical fires.
- Secondary Effects: Power outages resulting from earthquakes can have cascading effects on critical services such as water supply, transportation, healthcare, and emergency response, further exacerbating the impact of the disaster on affected populations.

Mapping detailing the location of electrical generation plants and high-capacity transmission may be found in Maps 27 and 28, on pages 47 and 48.

The cost to replace electrical lines can vary widely based on several factors, including the type of electrical lines, the distance of the replacement, local labor and material costs, the complexity of the project, and any specific requirements or challenges involved. Additionally, costs can be significantly different for residential, commercial, or industrial projects. Additionally, urban and rural locations may have varying cost factors. As a rough estimate, the cost to replace electrical lines can range from a few thousand dollars to several thousand dollars per mile. Data concerning the construction costs of electrical generating plants may be found in Chart 5 on page 48.

Lincoln County is served by the Grover C. Dils Medical Center in Caliente, which has 20 inpatient beds. Depending on the severity of the earthquake, this facility may see a rapid increase in injuries during an event. In the event of a catastrophic eathquake, patients will need to be transported to adjacent regions to receive treatment.

All jurisdictional citizens and structures are vulnerable to earthquake events. Using FEMA NRI census tract data, along with U.S. Census data, the following table represents the population and building valuation for each participating jurisdiction:

Table 37: Lincoln County Identified Population and Valuation by Jurisdiction

Jurisdiction	Population	Building Valuation
Lincoln County	5,177	$1,550,142,008
Caliente	974	$805,192,926

Source: FEMA NRI and U.S. Census Bureau

At greater risk may be the vulnerable populations of each participating jurisdiction, including the especially young, the elderly, and those below the poverty level. Hazard occurrences can exacerbate existing vulnerabilities and create new challenges. Vulnerable populations may have pre-existing health conditions that can be exacerbated by lack of medical care. Limited mobility or access to medical care can also increase their vulnerability. Persons on fixed incomes and with limited resources may face difficulties in evacuating and finding temporary shelter.

The following table details potentially vulnerable populations by participating jurisdictions:

Table 38: Lincoln County Potential at Risk Population Data

Jurisdiction	Population 5 and Under (2020)	Population Over 65 (2020)	Speak a Language Other Than English (2020)	Estimated People in Poverty (2020)
Lincoln County	5.9%	24.8%	6.0%	13.9%
Caliente	5.1%	25.9%	5.6%	11.4%

Source: United States Census Bureau 2020

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

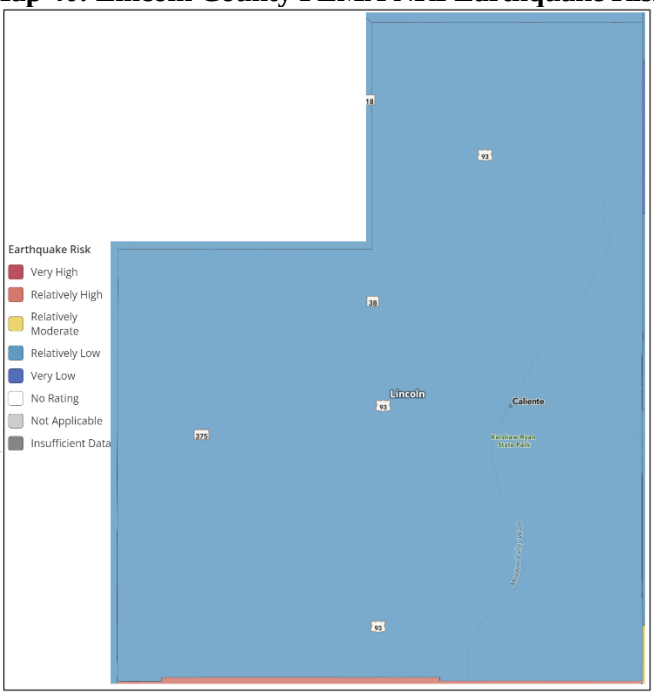
Table 39: Earthquake Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Earthquakes may cause injury or death to people from vehicle accidents, falling objects, or structural failure. There may be a large number of people seeking treatment for traumatic injuries. Ground shaking may result in broken service lines or pipelines, triggering the release of hazardous materials or waste materials.
Impact on Responders	The extent of the damage to infrastructure such as roads and bridges and communications can greatly impact first responders' ability to access or transport victims. Equipment, facilities, or other assets may be damaged and restrict first responders' capacity to respond to calls for assistance.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Earthquakes could potentially impact critical infrastructure resulting in power outages, access to roadways or public transportation, damage to facilities or infrastructure, including alternate locations.
Delivery of Services	Delivery of services may be impacted by dangerous transportation conditions, causing food, water, and resource systems to be delayed or halted. Waterway infrastructure may be damaged or malfunction, stopping barge and ship traffic.
Property, Facilities, and Infrastructure	Unreinforced masonry structures are inherently vulnerable to seismic forces. All critical facilities and transportation corridors and pipelines can be impacted. Ground shaking can lead to the collapse of buildings and bridges, and disrupt gas, lifelines, electric, and phone service.
Impact on Environment	Earthquakes have the potential to trigger secondary hazards such as fire, flash flooding, hazardous materials release, slope failure, dam failures, and tsunamis, all potentially devastating to the environment. These secondary hazards can completely wipe out habitats and environments, cause significant injury to animals or livestock, or contaminate certain components of the environment.
Economic Conditions	Earthquakes pose a fiscal impact on the local and county governments, even if some of those costs can be recouped through federal grant reimbursements. Local, county, and state resources may be drained by response and recovery efforts. Additionally, a severe earthquake would affect the ability of businesses to maintain operations. If the private sector is not able to re-establish operations this would also impact the state economy.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence. If the state takes a long time to begin recovery operations, or for the public to see recover operations, this will have a negative impact on the public's confidence in the state's governance.

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the following map was created indicating the potential risk to participating Lincoln County from earthquakes:

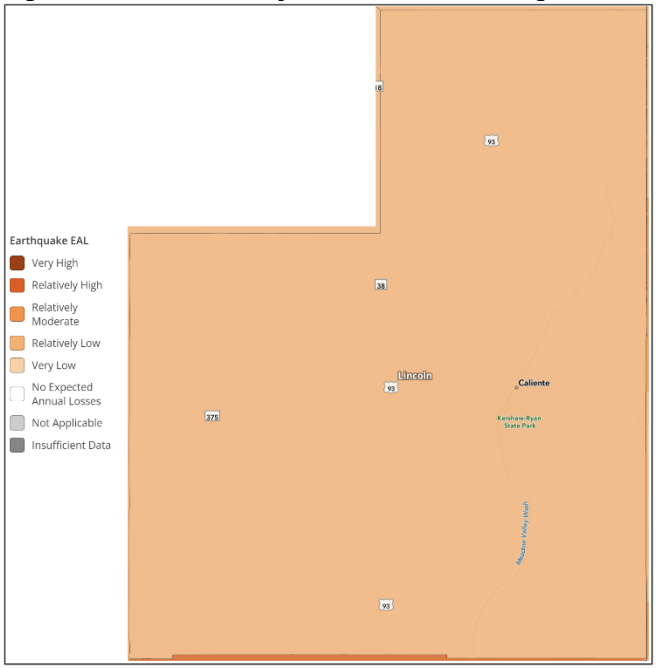
Map 40: Lincoln County FEMA NRI Earthquake Risk



Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for earthquakes for Lincoln County:

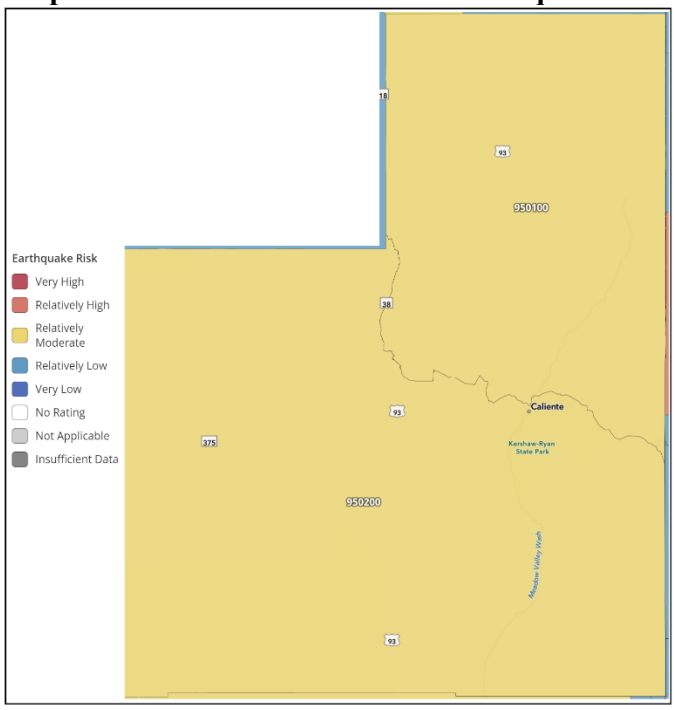
Map 41: Lincoln County FEMA NRI Earthquake EAL



Source: FEMA NRI

To help understand the risk and vulnerability to earthquake conditions of participating jurisdictions mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

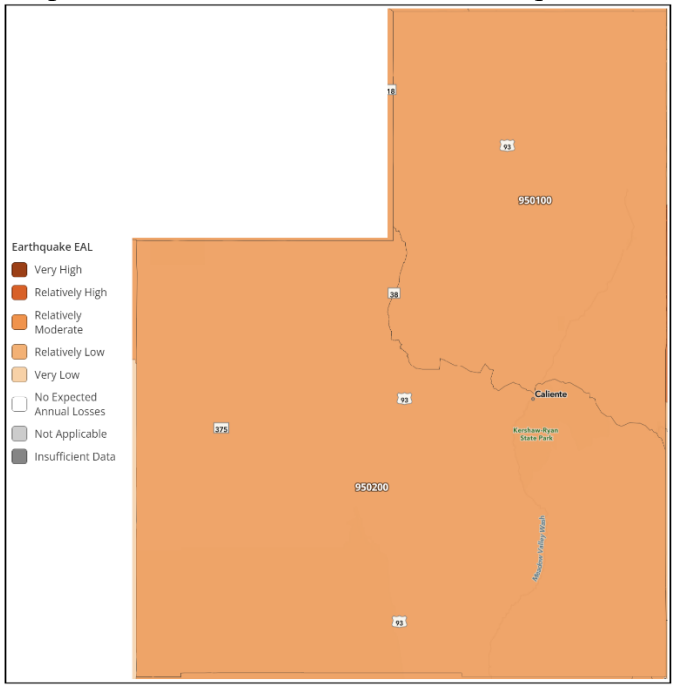
Map 42: FEMA NRI Jurisdictional Earthquake Risk



Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for earthquake for participating jurisdictions (as indicated by census tract) within Lincoln County:

Map 43: FEMA NRI Jurisdictional Earthquake EAL



Source: FEMA NRI

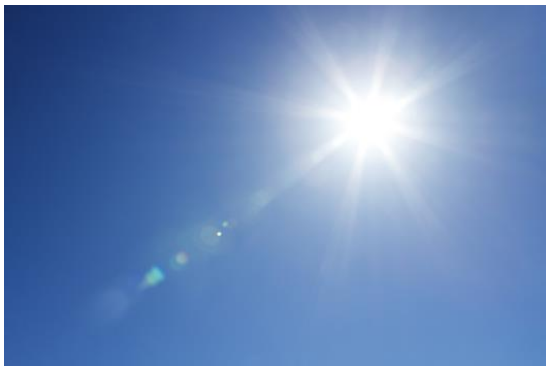
The following table indicates the FEMA NRI and EAL analysis for each participating Lincon County jurisdiction for earthquake:

Table 40: Lincoln County FEMA NRI and EAL for Earthquake by County

Jurisdiction	Risk Index	EAL
Lincoln County	Relatively Low	Relatively Low
Caliente	Relatively Moderate	Relatively Moderate

Source: FEMA NRI

4.11 Extreme Heat



4.11.1 Hazard Description

Extreme heat events occur when climate conditions produce temperatures well outside of the predicted norm. These extremes can have severe impacts on human health and mortality, natural ecosystems, agriculture, and other economic sectors.

The Center for Disease Control identifies the following six groups as being especially vulnerable to extreme temperatures:

- Older Adults (aged 65)
- Infants and Children
- Individuals with Chronic Conditions
- Low-income Individuals
- Athletes
- Outdoor workers

4.11.2 Location & Extent

The temperatures of Lincoln County are largely influenced by its location in the large, arid region that covers much of the western United States. Lincoln County has a desert climate, characterized by hot, arid summers and cool, dry winters. Summers in Lincoln County are extremely hot, with temperatures regularly reaching well over 100°F (38°C) during the day. The following table, from the Nevada State Climatologist, indicates the average number of days per year with a temperature over 100°F:

Table 41: Lincoln County Average Number of Days per Year with Temperature Above 100°F

Community	Average number of days
Elgin	29.81
Caliente	13.84
Pioche	1.49
Pahranagat	28.36

Source: Nevada State Climatologist

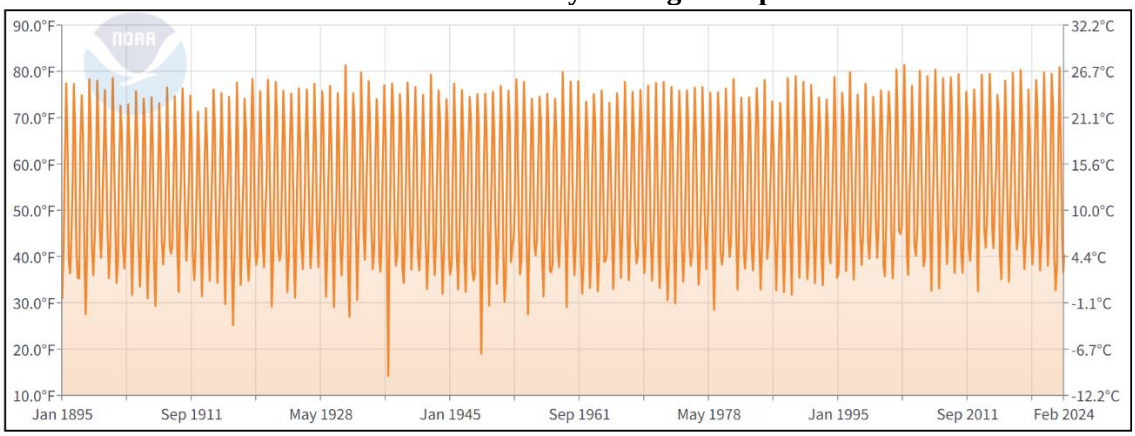
Winters are cooler, but still relatively mild compared to other parts of the United States, with daytime temperatures often hovering around 50-60°F (10-15°C).

All of Lincoln County is at risk to extreme heat, defined as:

- Extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when an area of high atmospheric pressure traps moisture laden air near the ground.

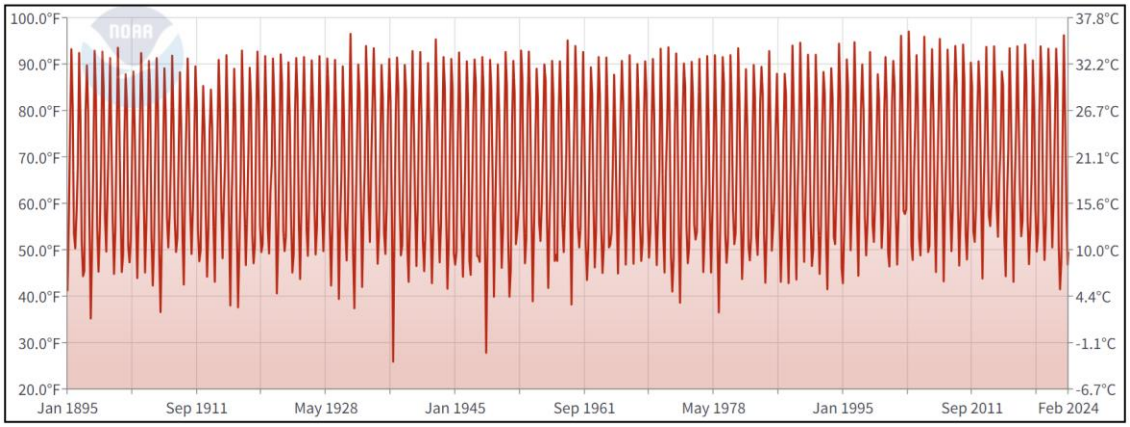
The following charts, from NOAA, indicates the average temperature for Lincoln County:

Chart 7: Lincoln County Average Temperature



Source: NOAA

Chart 8: Lincoln County Maximum Temperature



Data from NOAA indicates that Lincoln County experienced a record high temperature of 113°F (48.9°C) on July 13, 1936.

Extreme heat can occur anywhere in Lincoln County, including the City of Caliente.

4.11.3 Previous Occurrences

The following table presents NCEI identified extreme heat temperature events and the resulting damage totals in Lincoln County from 2003 to 2022, with the years 2003 and 2022 being full dataset years, for the region. Data was reviewed regionally as the extreme heat events covered large areas.

Table 42: Lincoln County NCEI Excessive Heat Events, 2003 - 2022

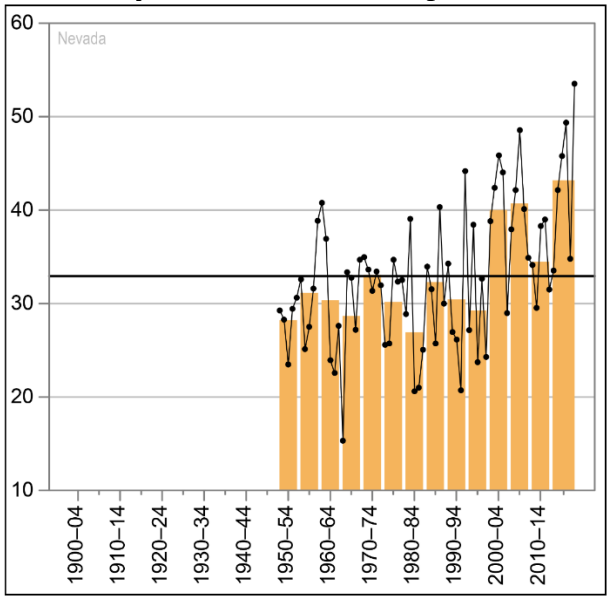
Event Type	Number of Events	Property Damage	Deaths	Injuries
Excessive Heat	13	$0	0	0

Source: NOAA NCEI

It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or NWS office. When reporting an event oftentimes the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages. Additionally, deaths and injuries may be underreported as they may be a result of a concurrent event, such as a person driving unsafely during heavy rain and passing away.

The following chart details the annual number of hot days (maximum temperature of 95°F or higher) for the State of Nevada from 1950 to 2020. Data indicates that since 2000, the number of very hot days has been well above average, and the highest number occurred during the 2015 to 2020 period

Chart 9: Number of Days with Maximum Temperature of 95° F or Higher

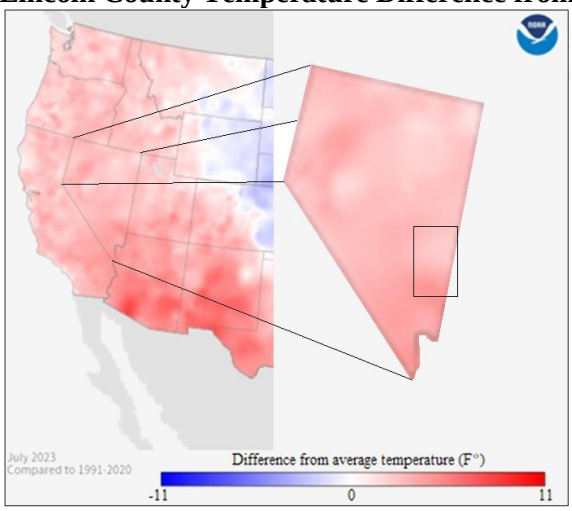


This hazard is regional and widespread in nature, and occurrences for the City of Caliente of Lincoln County are not unique.

4.11.4 Probability of Future Events

Predicting the probability of extreme temperature occurrences is tremendously challenging due to the large number of factors involved. Available data suggests that both the average high temperatures and the record high temperature will likely increase over the coming years as indicated by the following map:

Map 44: Lincoln County Temperature Difference from Average



Source: NOAA

According to NOAA NCEI data, the observed annual number of warm nights (minimum temperature of 70°F or higher) for Nevada from 1950 to 2020 has been above average since 2000, and the highest number occurred during the 2015 to 2020 period, indicating likely continued increase.

Data from the NCEI indicates that Lincoln County can expect on a yearly basis, relevant to extreme heat events.

Table 43: Lincoln County Extreme Temperature Probability Summary

Data	Days
Number of Days with NCEI Reported Excessive Heat Event (1950-2023)	13
Average Events per Year	<1

Source: NCEI

The probability of the future occurrence of this hazard is not unique to any participating jurisdiction.

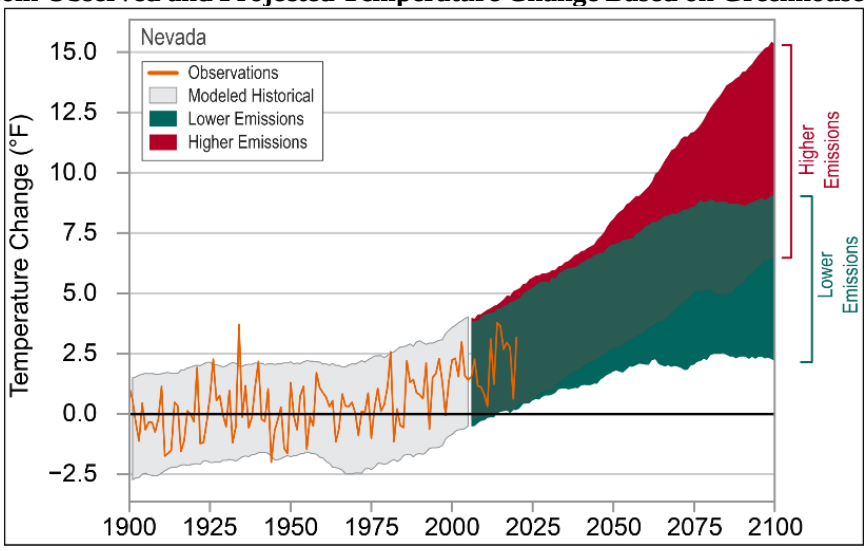
4.11.5 Projected Changes in Location, Intensity, Frequency, and Duration

When discussing extreme temperatures, climate change should be considered as it may markedly change future events. Recent climate modeling results indicate that extreme temperature events may become more common for Lincoln County, especially heat. Temperatures in Nevada have risen almost 2.4°F since the beginning of the 20th century, and over the last 26 years the annual number of very hot days has been above average. The highest 5-year average occurred during the 2015–2020 period, partly because of very high annual values in 2017, 2018, and 2020. In addition to a general daytime warming, Nevada has experienced an above average number of warm nights since 2000.

Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events including longer and hotter heat waves. Additionally, rising temperatures can harm air quality and amplify existing threats to human health. Warmer weather can increase the production of ground-level ozone, a pollutant that causes lung and heart problems. Heat stress is expected to increase as climate change brings hotter summer temperatures and more humidity. Certain people are especially vulnerable, including children, the elderly, the sick, and those living below the poverty line.

The following chart indicates the projected temperature change for Nevada utilizing two global climate models. One model utilizes information in which greenhouse gas emissions continue to increase (higher emissions), with the other model utilizing information in which greenhouse gas emissions increase at a slower rate (lower emissions). Temperatures, detailed by the orange line, have risen 2.4° F since the beginning of the early 1900s. Based on both the higher emission and lower emission models, continued warming is projected throughout this century.

Chart 10: Lincoln Observed and Projected Temperature Change Based on Greenhouse Gas Emissions



Source: NOAA NCEI State Climate Summary 2022 for Nevada

The Nevada State Climate Initiative fact sheet provides specific details about how climate change has already and will continue to impact the state of Nevada. It highlights historical trends and future projections for some major climate variables and how they may affect public health, water resources, the environment, hospitality, and agriculture. The following table details how climate change will most likely impact the citizens of Lincoln County in relation to extreme heat:

Table 44: Potential Impact of Climate Change, Heat Waves

Area of Impact	Historical Trends
Public Health	Increasing heat wave frequency and severity would increase the risk of illness, hospitalization and death. Heat waves have also been associated with more preterm births. Longer growing seasons could contribute to a longer allergy season.
Water Resources	Higher temperatures lead to increased evaporative demand, which reduces water levels. Higher temperatures and lower water levels can lead to poor water quality.
Environment	Warmer temperatures will make current habitats unsuitable for some plant and animal species. There could be negative impacts on wildlife, including higher mortality and even some local extinctions.
Recreation and Hospitality	Higher temperatures could make outdoor recreation less pleasant or safe and might deter summertime visits to Nevada.
Agriculture and Ranching	Increasing temperatures can negatively affect the health of farmers and ranchers. Heat also impacts livestock health and milk production. There could be negative impacts on plant health and crop production. Warmer temperatures and longer growing seasons provide opportunities to grow new crops but may also benefit invasive species and pests.

Source: Nevada Climate Initiative

4.11.6 Vulnerability and Impact

While difficult to quantify, the impacts of future extreme temperature may have far reaching impacts. The incidence of wildfires increases substantially during extended periods of extreme heat, which in turn places both human and wildlife populations at higher levels of risk. Although environmental impacts are difficult to quantify, losses to plant and animal species, wildlife habitat, and air and water quality, wildfires, degradation of landscape quality, loss of biodiversity, and soil erosion may result from extended periods of extreme temperatures.

A primary concern with this hazard is human health safety issues, as extreme temperatures can be a direct cause of death. Specific at-risk groups include outdoor workers, farmers, young children, and senior citizens. Compounding these concerns is the potential loss of electric power due to increased strain on power generation and distribution due to increased air conditioning or heating needs.

Extreme temperature impacts on humans can be measured for both heat and cold. The following table discusses potential impacts on human health related to excessive heat.

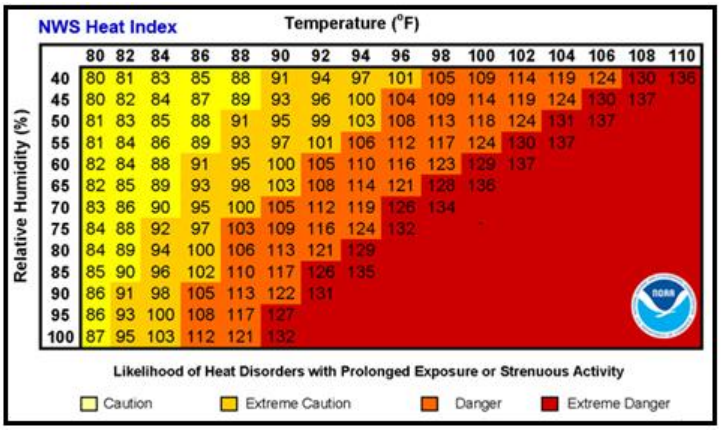
Table 45: Extreme Heat Impacts on Human Health

Heat Index Temperature	Potential Impact on Human Health
80-90° F	Fatigue possible with prolonged exposure and/or physical activity
90-105° F	Sunstroke, heat cramps, and heat exhaustion possible
105-130° F	Heatstroke/sunstroke highly likely with continued exposure

Source: National Weather Service Heat Index Program

Exposure to direct sun can increase Heat Index values by as much as 15°F. The zone above 105°F corresponds to a Heat Index that may cause increasingly severe heat disorders with continued exposure and/or physical activity. The following graph, from the NWS, indicates Heat Index values.

Chart 11: Heat Index



Source: NWS

Extreme heat can cause significant damage to the local environment by dehydrating vegetation and wildlife, which may result in cascading effects to the surrounding environment, such as drought, wildfires, mudslides, or landslides. Extreme temperatures may severely decrease the yield of the agricultural sector. The yield of cash crops may be reduced, livestock may be adversely impacted by extreme heat, or grazing losses may be incurred by farmers or ranchers; potentially resulting in decreased food security. In the event of significant agricultural losses caused by extreme heat or drought, some assistance may be available to impacted farms or ranches.

Extreme temperatures can pose various risks to local and county operations, and may include:

- Health and Safety Risks: High temperatures, especially during heatwaves, can pose significant health risks to government employees. Heat-related illnesses such as heat exhaustion and heatstroke can occur, potentially leading to hospitalizations or fatalities. Cold temperatures can also lead to cold-related illnesses and injuries, such as frostbite and hypothermia.
- Emergency Response: Government agencies may need to respond to extreme weather events, such as providing emergency shelter during heatwaves or responding to weather-related accidents and emergencies. These responses can strain resources and personnel.
- Budgetary Impact: The costs associated with responding to and mitigating the effects of extreme temperatures can strain state budgets. This includes expenses related to emergency response, infrastructure repairs, and healthcare.

Potentially Vulnerable Community Lifelines

Extreme heat can impact various community lifelines, critical systems and services that communities rely on for their functioning. Vulnerabilities arise due to the stress that extreme temperatures place on infrastructure, resources, and operational processes. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table 46: Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	$199
Loss of Wastewater Services	$66
Loss of Water Services	$138
Loss of Communications/Information Technology Services	$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

Extreme heat can have significant impacts on roads, leading to various issues and challenges, and can cause the following impacts:

- Softening of Asphalt: High temperatures can cause asphalt to soften and become more susceptible to deformation. This leads to the development of ruts and potholes as the road surface loses its stability.
- Rutting and Raveling: The combination of high temperatures and heavy traffic loads can result in rutting, where depressions or grooves form in the road surface. Raveling, the disintegration of the asphalt surface, may also occur.
- Expansion and Contraction: Materials like concrete and asphalt expand in high temperatures and contract in cooler temperatures. This expansion and contraction can lead to cracking and deterioration of the road surface over time.
- Freeze-Thaw Cycles: Fluctuations between freezing and thawing can lead to the formation of ice within the road structure. The expansion of water as it freezes can result in cracks and damage to the road surface.
- Frost Heaving: During freeze-thaw cycles, moisture in the soil beneath the road can freeze, causing the ground to heave upward. This can result in uneven surfaces and damage to the road structure.

The cost to conduct maintenance on a road can vary significantly depending on the types of work required. However, the average estimate for repairs on a per mile basis in 2019 was $14,750 per mile. The cost to replace a road can vary significantly based on several factors, including the type of road, local labor and material costs, the complexity of the project, and the specific requirements of the replacement. As a rough estimate, road construction costs can range from $1,000,000 to $10,000,000 per mile.

Extreme heat can impact electrical utilities in various ways, potentially leading to disruptions in service. These impacts include:

- Power Outages: High temperatures can strain electrical systems, leading to increased demand for cooling systems like air conditioners. This heightened demand can overload power grids, resulting in power outages.
- Transformer Overheating: Transformers, which are crucial components in power distribution, can overheat in extreme temperatures. This can lead to malfunctions, reduced efficiency, or even failures, causing power disruptions.
- Equipment Failure: Electrical equipment, such as cables and switches, may experience higher resistance and increased stress during extreme heat, increasing the likelihood of equipment failures.
- Reduced Efficiency in Power Plants: Power generation facilities may experience reduced efficiency during heatwaves due to elevated ambient temperatures. This can affect the output of power plants and potentially lead to supply shortages.
- Communication Disruptions: Extreme heat can impact communication infrastructure. Extreme heat can lead to equipment failures in communication systems.

In order to reduce plan duplication, mapping concerning electrical generation plants, high-capacity transmission lines, and electrical utility providers may be found in Maps 27 and 28, on pages 47 and 48. Utility repair and replacement cost estimation provides may be found in Chart 5 on page 48.

Lincoln County is served by the Grover C. Dils Medical Center in Caliente, which has 20 inpatient beds. While this facility may see a rapid increase in patients during a high heat event, it is considered unlikely that this increase will impact or overload capacity. However, extreme heat events can increase the demand for emergency shelters, particularly in cases of widespread power outages. Setting up and managing these shelters can strain resources.

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

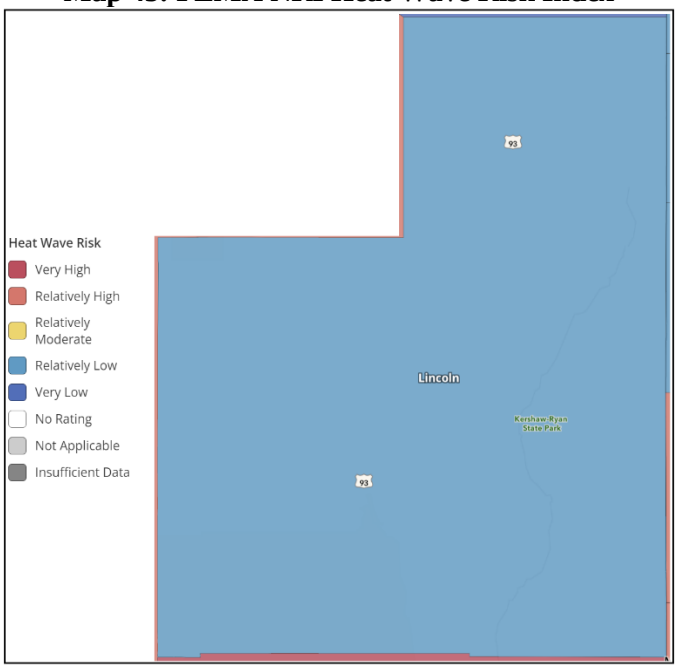
Table 47: Extreme Temperature Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Extreme temperatures can have severe consequences for health, particularly for the elderly and young. Loss of electricity may impact air conditioning leading to poorly tolerated indoor temperatures. Physical effects of extreme heat can cause major health problems and may lead to injury or death.
Impact on Responders	Without proper mitigation efforts, responders may be susceptible to temperature related illness. Extreme heat may also damage instruments or equipment necessary for response activities. First responders may face dangerous road conditions leading to accidents and prolonged response times.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. This hazard may impact an agency's ability to implement continuity operations due to power outages. If the activation of alternate facilities was required, continuity of operations may be difficult due to lack of computer/network access during power outages.
Delivery of Services	Extreme heat can impact efficient delivery or inability of goods or services due to potential health impacts on workers. Equipment and vehicles may be damaged, and the delivery of services may be delayed due to poor travel conditions
Property, Facilities, and Infrastructure	Facility integrity is at risk with regards to power cables and stations being overused and limiting operations. This could lead to limits on facility heating or cooling.
Impact on Environment	Extreme heat can cause significant damage to the local environment and result in habitat loss, invasive species, and changes in migration. Extreme heat may severely decrease the yield of cash crops. Livestock are adversely affected by extreme heat and may suffer medical problems or death.
Economic Conditions	Extreme heat may drain local resources. Under some conditions, some of the costs can be recouped through federal grant reimbursements.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence.

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the following map was created indicating the potential risk to Lincoln County from extreme heat:

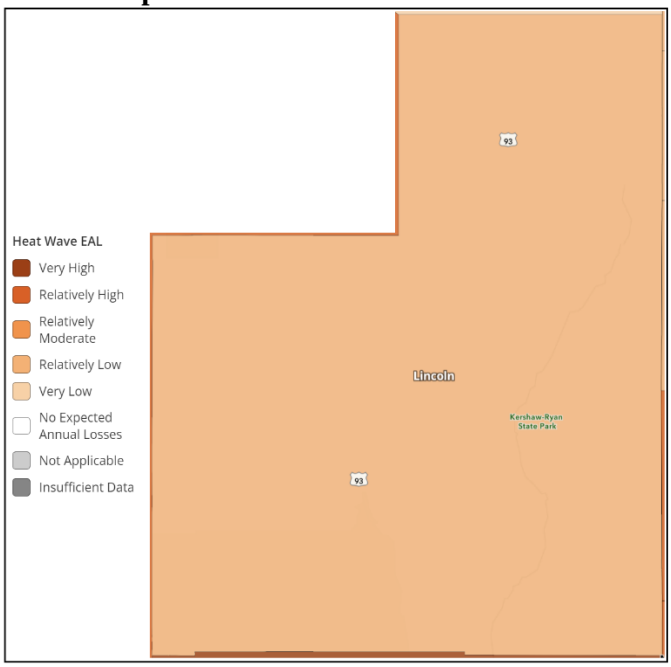
Map 45: FEMA NRI Heat Wave Risk Index



Source: FEMA NRI

The following maps indicate the EAL for heat waves for Lincoln County:

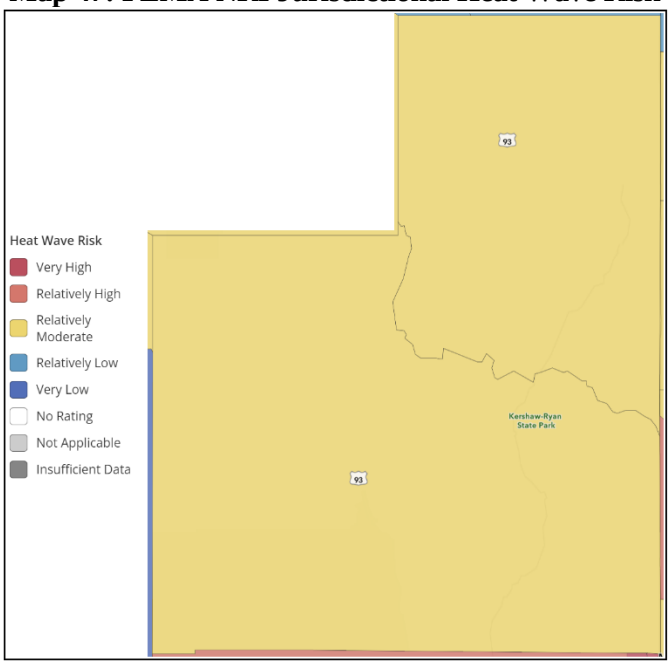
Map 46: FEMA NRI Heat Wave EAL



Source: FEMA NRI

To help understand the risk and vulnerability to extreme heat conditions of participating jurisdictions, mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

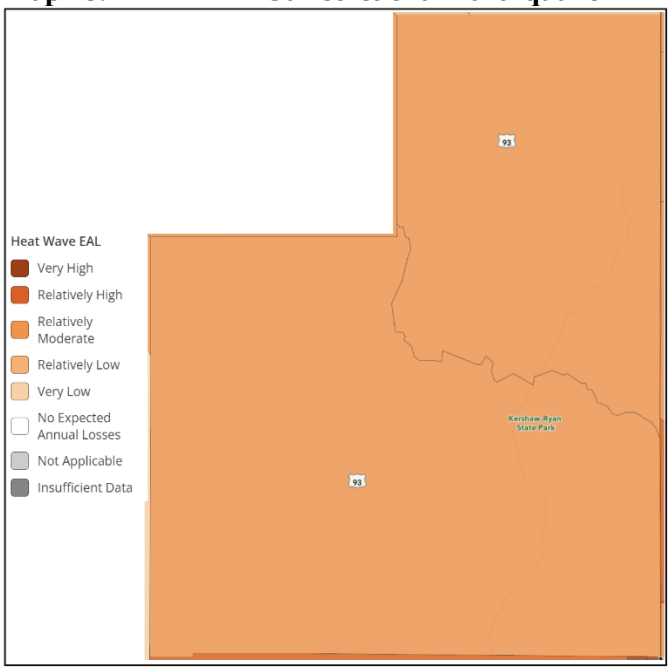
Map 47: FEMA NRI Jurisdictional Heat Wave Risk



Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for earthquake for participating jurisdictions (as indicated by census tract) within Lincoln County:

Map 48: FEMA NRI Jurisdictional Earthquake EAL



Source: FEMA NRI

The following table indicates the FEMA NRI and EAL analysis for each participating Lincon County jurisdiction for extreme heat:

Table 48: Lincoln County FEMA NRI and EAL for Extreme Heat by County

Jurisdiction	Risk Index	EAL
Lincoln County	Relatively Low	Relatively Low
Caliente	Relatively Moderate	Relatively Moderate

Source: FEMA NRI

All jurisdictional citizens and structures are vulnerable to extreme temperature events. Using FEMA NRI census tract data, along with U.S. Census data, the following table represents the population and building valuation for each participating jurisdiction:

Table 49: Lincoln County Identified Population and Valuation by Jurisdiction

Jurisdiction	Population	Building Valuation
Lincoln County	5,177	$1,550,142,008
Caliente	974	$805,192,926

Source: FEMA NRI and U.S. Census Bureau

At greater risk may be the vulnerable populations of each participating jurisdiction, including the especially young, the elderly, and those below the poverty level. Hazard occurrences can exacerbate existing vulnerabilities and create new challenges. Vulnerable populations may have pre-existing health conditions that make them more susceptible to heat-related illnesses and dehydration. Limited mobility or access to medical care can also increase their vulnerability. Persons on fixed incomes and with limited resources may face difficulties in cooling their homes.

The following table details potentially vulnerable populations by participating jurisdictions:

Table 50: Lincoln County Potential at Risk Population Data

	Population 5 and Under (2020)	Population Over 65 (2020)	Speak a Language Other Than English (2020)	Estimated People in Poverty (2020)
Lincoln County	5.9%	24.8%	6.0%	13.9%
Caliente	5.1%	25.9%	5.6%	11.4%

Source: United States Census Bureau 2020

4.12 Flood

4.12.1 Hazard Description

Flooding is the overflow or accumulation of water on normally dry land, often caused by heavy rainfall, snowmelt, or the failure of natural or artificial barriers. Flooding can lead to the inundation of homes, roads, farmland, and other areas, causing damage to property, disruption of daily life, and potential threats to human safety and the environment.

A floodplain is a flat or gently sloping area adjacent to a river, stream, or other water body. These areas act as a buffer during periods of heavy rainfall or snowmelt, absorbing excess water and preventing it from rushing downstream too quickly. In its common usage, a floodplain refers to areas inundated by the 100-year flood, the flood that has a 1% chance of being equaled or exceeded in any given year, and the 500-year flood, the flood that has a 0.2% chance of being equaled or exceeded in any given year. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the NFIP.

4.12.2 Location and Extent

A variety of factors affect the severity of flooding within Lincoln County. These include topography, weather characteristics, development, and geology. Intense flooding will create havoc in any jurisdiction affected.

Flash Flooding

Flash flooding occurs during heavy or extended periods of rain, generally when the ground is unable to rapidly absorb the water. Most flash flooding in Lincoln County is caused by intense and stationary thunderstorms. Heavy sustained rain can create rapid flooding very quickly, and flooding can occur miles away from where the rain fell. Factors that can contribute to the severity of flash flooding include rainfall intensity, duration, drainage condition, and ground conditions (paved or unpaved). Flash floods are particularly dangerous to people and property, as six inches of moving water can knock a person down and two feet can lift a vehicle. As there is often little warning of a flash flood event, they are the cause of most flood fatalities.

Riverine Flooding

Riverine flooding refers to the overflow of water from a river or a stream onto adjacent land areas. This type of flooding occurs when the water level in a river or stream rises significantly and exceeds its banks, inundating the surrounding areas. The severity of riverine flooding can be influenced by the amount and intensity of rainfall in the watershed, the size, shape, and slope of the river or stream channel, and the presence of dams on the river system.

Urban Flooding

FEMA defines urban flooding as ‘the inundation of property in a built environment, particularly in more densely populated areas, caused by rain falling on increased amounts of impervious surfaces and overwhelming the capacity of drainage systems.” In Lincoln County, urban flooding has consistently increased due to a number of factors, including the filling for development of natural wetlands and waterways, the reduction of permeable surfaces, and the aging and insufficient capacity of stormwater systems.

To establish floodplains, FEMA adopted the Base Flood Elevation (BFE), which is the computed elevation that floodwater is anticipated to rise during a flood that has a1% chance of occurring in any given year. The BFE establishes the regulatory requirement for the elevation or floodproofing of structures, and the relationship between the BFE and a given structure’s elevation determines the flood insurance premium through the NFIP.

FEMA, through the Risk Mapping, Assessment, and Planning (Risk MAP) program, works with partners to assess and map these flood risks producing Flood Insurance Rate Maps (FIRMs). As an additional benefit, the FIRMs serve as the basis for NFIP regulations and flood insurance purchase requirements.

SFHAs are defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance flood is also referred to as the base flood or 100-year flood. The FIRM depicts the SFHA, including the 1%-annual-chance flood. These areas are labeled on the map as zone, as explained in the following table:

The following table details FEMA's FIRM flood zone classifications.

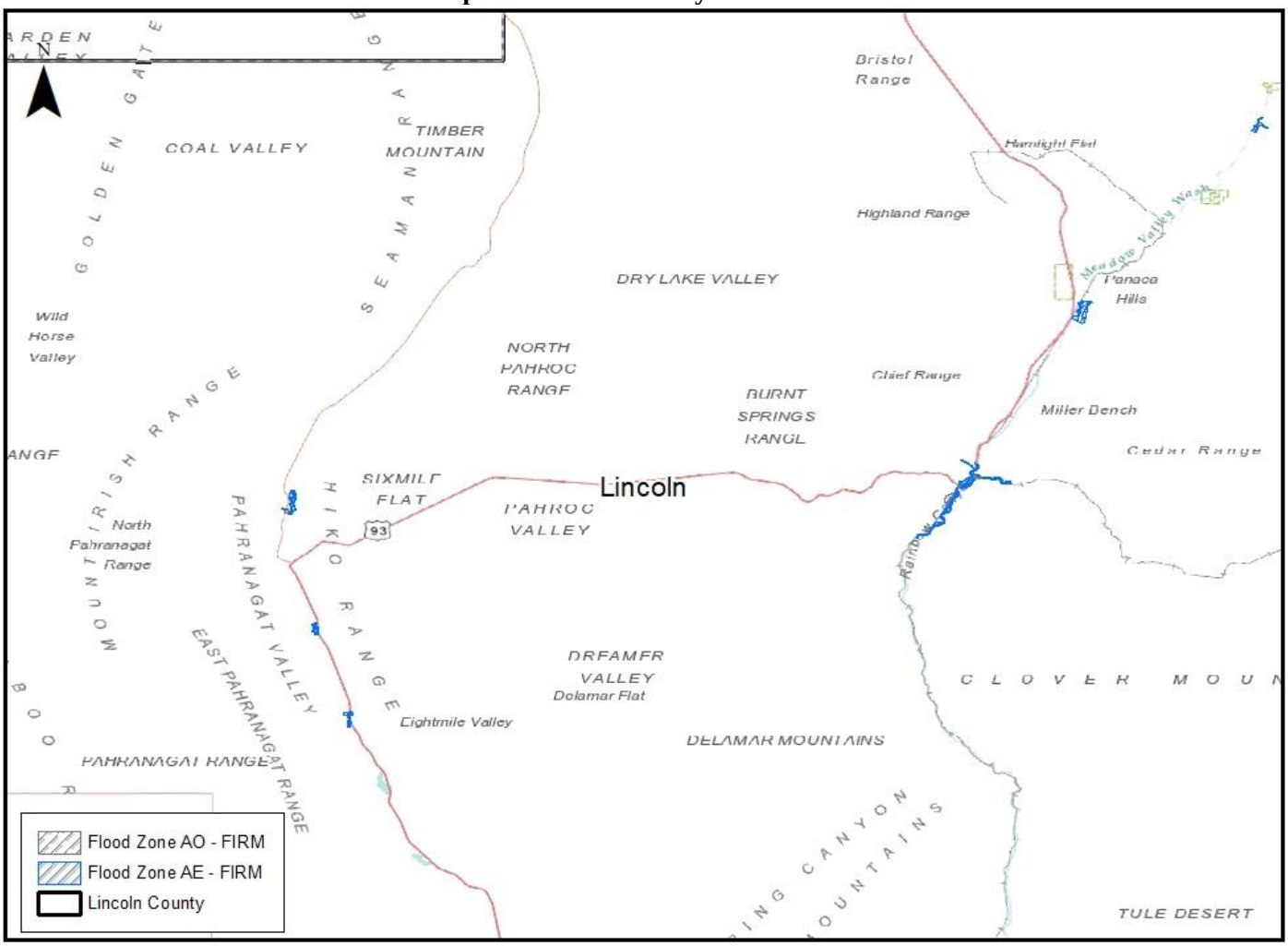
Table 51: Flood Zone Classifications

Zone	Description
A	The 1%-annual-chance or base floodplain. There are six (6) types of A Zones.
AE	The base floodplain where base flood elevations are provided.
AH	Shallow flooding base floodplain. BFEs are provided.
AO	The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
AR	The base floodplain that results from the decertification of a previously accredited flood protection system that is in the process of being restored to provide a 1%-annual-chance or greater level of flood protection.
A99	Area to be protected from base flood by levees or Federal Flood Protection Systems under construction. BFEs are not determined.
B or Shaded X	Areas between the limits of the base flood and the 0.2% annual-chance (or 500-year) flood.
C or Unshaded X	Areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2% annual-chance flood

Source: FEMA

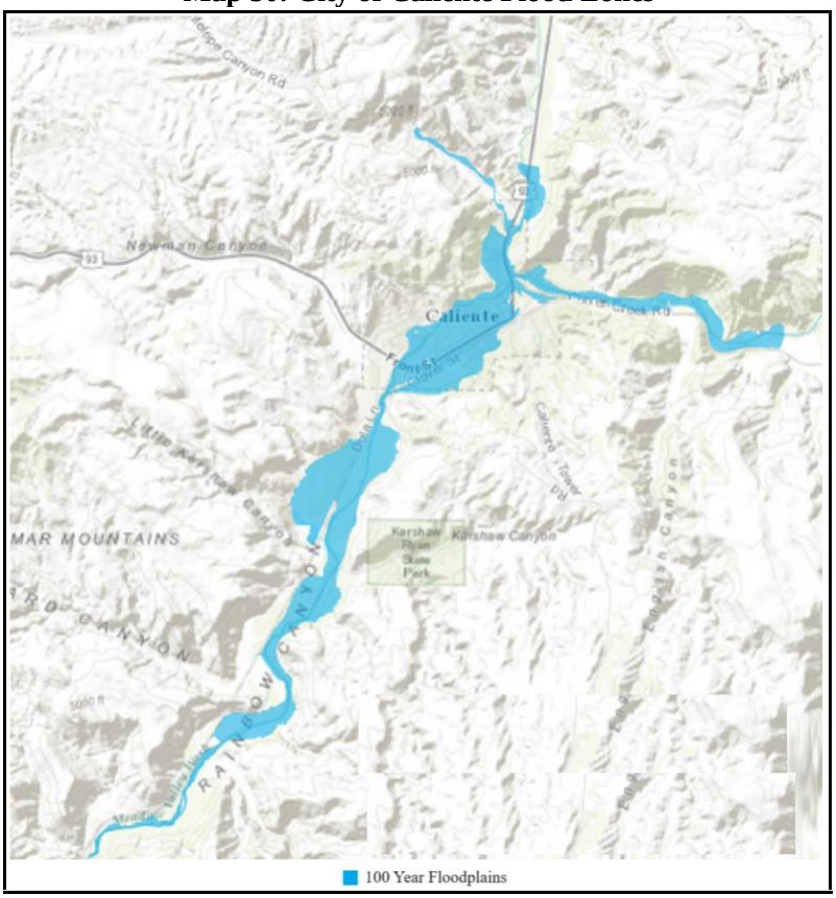
The following maps use FEMA FIRM data to depict the location of identified flood zones within Lincoln County.

Map 49: Lincoln County Flood Zones



Source: FEMA

Map 50: City of Caliente Flood Zones



Source: FEMA

The major areas of flooding within Lincoln County, including the City of Caliente, have been identified as follows:

- The Meadow Valley Wash, which is formed by the confluence of the Spring Valley Creek and the Patterson Wash. This wash flows 95 miles south through Ursine, Panaca, and Caliente where it merges with Clover Creek then flows through Rainbow Canyon to the Muddy River. The Meadow Valley Wash 100-year flood event at Caliente has an estimated peak discharge of 13,088 cfs.
- The mountains to the east of Panaca are a potential threat in the event of a severe thunderstorm. In the mid-thirties, a series of wooden drop structures were constructed along the washes in this range as well as a major diversion levee from the northern edge of town to a point south of town. These structures and other problem areas were addressed in a drainage study by Leslie and Associates in 2007. Lincoln County has not been able to address the results of this study due to financial issues.
- The Clover Creek Wash, which flows westward and merges with the Meadow Valley Wash at Caliente. The Clover Creek Wash 100-year flood event has an estimated peak discharge of 15,000 cfs.
- The White River, which flows southward through the towns of Hiko, Ash Springs, and Alamo. The White River 100-year flood event at Alamo has an estimated peak discharge of 10,080 cfs. Flash flooding in the Alamo area is of concern because of the mountains to the west and the large amount of drainage area that collects runoff and directs it towards Alamo. The existing dikes and diversions that were constructed some years back are in dire need of maintenance and in some cases, reconstruction. A large amount of these dikes and/or irrigation channels has, over the years, been converted to piping. This no longer allows for the conveyance of any runoff water and even a minor storm can wreak havoc and cause a serious flooding issue. This has the potential for major property damage in a severe storm event.

4.12.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Lincoln County has experienced two Presidential Disaster Declarations related to flooding in the five-year period since the previous HMP, reflected in the following table.

Table 52: State of Lincoln County Presidentially Declared Disasters, Flood

Designation	Declaration Date	Incident Type	Individual Assistance	Public Assistance
DR-4708- NV	04/27/2023	Severe Winter Storms, Flooding, Landslides, and Mudslides	-	-
DR-1583-NV	03/07/2005	Heavy Rains and Flooding	$8,897,067	$3,950,493

Source: FEMA
Note: -: Data unavailable

On April 13, 2023, Governor Joe Lombardo requested a major disaster declaration due to severe winter storms, flooding, landslides, and mudslides during the period of March 8-19, 2023. The Governor requested a declaration for Public Assistance for nine counties and five tribal nations and Hazard Mitigation statewide. During the period of March 27-30, 2023, joint federal, state, tribal, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On April 27, 2023, President Biden declared that a major disaster exists in the State of Nevada. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe winter storms, flooding, landslides, and mudslides in Douglas, Eureka, Lincoln, Lyon, Mineral, and Storey Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

In addition to the Presidentially Declared Disasters, the following table presents NCEI identified flood events in Lincoln County from 1950 to 2023:

Table 53: Lincoln County NCEI Flood Events, 2009 - 2023

Event Type	Number of Days with Events	Property Damage	Deaths and Injuries
Flood	7	$20,180,000	0
Flash Flood	58	$1,636,000	0

Source: NCEI

Recent events of note include:

- July 14, 2021: Major flash flooding along a section of Highway 93 locally known as The Narrows closed the highway from Interstate 15 to Caliente for a day and a half so several feet of dirt could be cleared from the highway. Damages were estimated at $100,000.
- July 14, 2018: There was flash flooding in the Pioche and Panaca areas, including an eight mile stretch of Highway 322 east of Pioche. Highway 93 was starting to wash out near mile marker 113. At Cathedral Gorge State Park, a guardrail was taken out by flood water, and the campground was inundated with four feet of water. Damages were estimated at $250,000.
- January 11, 2005: Heavy rains and rapid snow melt caused extensive flooding along the Virgin River and the Muddy Rivers in southern Lincoln and northeast Clark counties. Over 200 homes in the Overton, Mesquite, Caliente, and Littlefield areas were damaged or destroyed by flood waters. Several hundred people were evacuated and spent several nights in shelters and several roads throughout the region were washed away. A

train carrying kitchen supplies had also overturned due to the weakening of the dirt beneath the tracks. Damages were estimated at $20,000,000.

It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or NWS office. When reporting an event oftentimes the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages.

4.12.4 Probability of Future Incidents

Based on historical occurrences, Lincoln County will continue to experience flood events on an annual basis. The definition of each flood zone's classification is used for the purpose of calculating the yearly probability of a riverine flood. Jurisdictions with property in a 100-year floodplain can expect a 1% annual chance of flooding within the designated areas. Jurisdictions with property in a 500-year floodplain can expect a 0.2% annual chance of flooding within the designated areas. FEMA FIRMs can be consulted to provide assistance in determining flooding probability for jurisdictions within Lincoln County.

The following tables, using data from the NCEI, indicate the yearly probability of a flood or flash flood event, the number of deaths or injuries, and estimated property damage for each county in Lincoln County.

Table 54: Lincoln County NCEI Flood Event Probability Summary,

Days with Event	Average Events per Year	Deaths / Injuries	Average Deaths / Injuries per Year	Property Damage	Average Property Damage per Year
7	<1	0	0	$20,180,000	$276,438

Source: NCEI

Table 55: Lincoln County NCEI Flash Flood Event Probability Summary,

Jurisdiction	Days with Event	Average Events per Year	Deaths / Injuries	Average Deaths / Injuries per Year	Property Damage	Average Property Damage per Year
Lincoln County	58	1	0	0	$1,636,000	$22,411
Caliente	12	<1	0	0	$434,000	$8,189

Source: NCEI

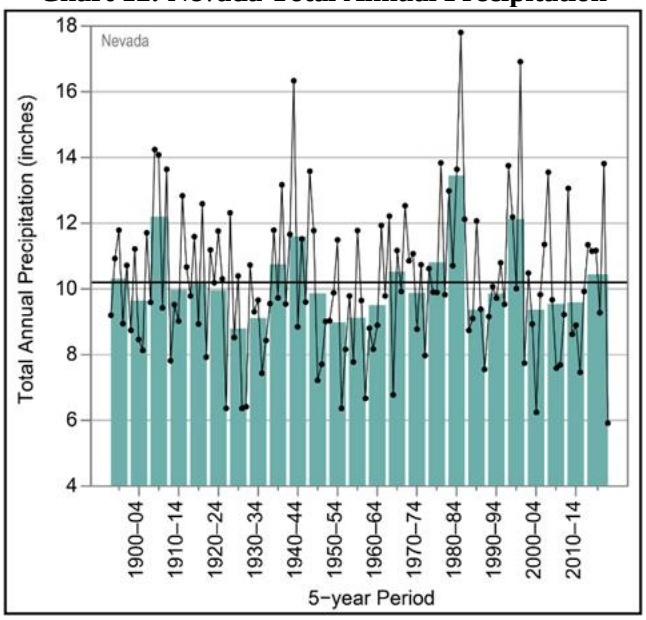
4.12.5 Projected Changes in Location, Intensity, Frequency, and Duration

The location, intensity, frequency, and duration of flooding are influenced by a combination of natural and human-induced factors.

Continued urbanization, deforestation, and changes in land use can alter natural drainage patterns. The conversion of natural landscapes to impervious surfaces, such as roads and buildings, reduces the ability of the land to absorb water, leading to increased runoff and the potential for urban flooding. Alterations to river channels, including channelization and dam construction, can influence the flow of water. Modifications may lead to changes in river behavior, affecting the potential for both upstream and downstream flooding. Poorly planned infrastructure, inadequate stormwater management, and the lack of effective drainage systems in urban areas can contribute to localized flooding. The increase in impervious surfaces reduces natural infiltration, leading to more runoff during rainfall events.

Potentially impacting the future of flood events, **t**he NOAA NCEI State Climate Summary 2022 for Nevada indicates that total annual precipitation has been near or below average since 2000. And while seasonal precipitation patterns vary across the state, most locations receive the majority of their precipitation during the winter months. However, eastern and southern areas can experience intense summer rainfall from the North American Monsoon system. The flowing charts detail the annual precipitation for the State of Nevada

Chart 12: Nevada Total Annual Precipitation

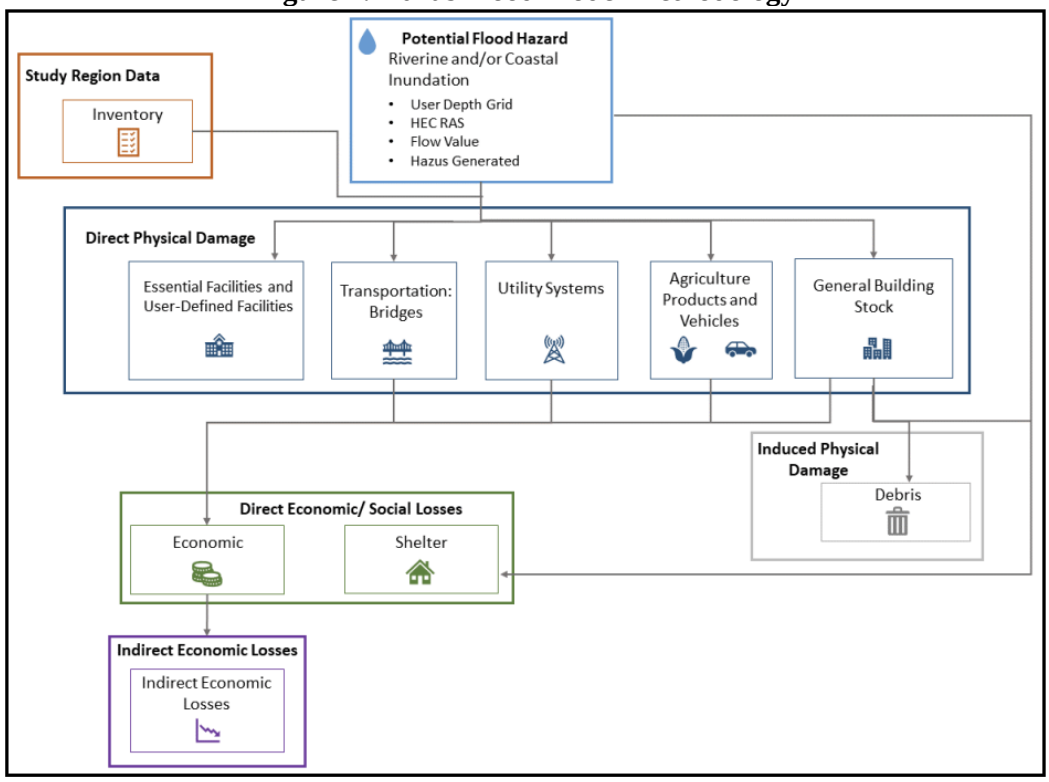


Source: NOAA NCEI Summary 2022 for Nevada

4.12.6 Vulnerability and Impact

For purposes of this plan, a Hazus Flood Model was generated to provide an estimate of the consequences to a flood. The resulting loss estimate generally describes the scale and extent of damage and disruption that may result from the modeled flood event. The Hazus software uses GIS technologies for performing analyses with inventory data and displaying losses and consequences on applicable tables and maps. The following figure provides a graphic representation of the modules that the Hazus Flood Model Methodology is comprised of, and their interrelation in deriving estimates.

Figure 2: Hazus Flood Model Methodology



Source: FEMA

The results of the Hazus analysis were utilized to estimate potential losses for flooding. The intent of this analysis was to enable Lincoln County to estimate where flood losses could occur and the degree of severity using a consistent methodology. The Hazus model helps quantify risk along known flood-hazard corridors as well as lesser streams and rivers that have a drainage area of ten square miles or more.

Hazus determines the displaced population based on the inundation area, not necessarily impacted buildings. As a result, there may be a population vulnerable to displacement even if the structure is not vulnerable to damage. Individuals and households will be displaced from their homes even when the home has suffered little or no damage either because they were evacuated or there was no physical access to the property because of flooded roadways.

Flood sheltering needs are based on the displaced population, not the damage level of the structure. Hazus determines the number of individuals likely to use government-provided short-term shelters through determining the number of displaced households as a result of the flooding. To determine how many of those households and the corresponding number of individuals will seek shelter in government-provided shelters, the number is modified by factors accounting for income and age. Displaced people using shelters will most likely be individuals with lower incomes and those who do not have family or friends within the immediate area. Since the income and age factors are taken into account, the proportion of displaced population and those seeking shelter will vary from county to county.

Additionally, Hazus takes into account flood depth when modeling damage (based on FEMA's depth-damage functions). Generated reports capture damage by occupancy class (in terms of square footage impacted) by damage percent classes. Occupancy classes include agriculture, commercial, education, government, industrial, religion, and residential. Damage percent classes are grouped by 10% increments up to 50%. Buildings that sustain more than 50% damage are considered to be substantially damaged.

The Hazus analysis also provides an estimate of the repair costs for impacted buildings as well as the associated loss of building contents and business inventory. Building damage can also cause additional losses to a community by restricting a building's ability to function properly. Income loss data accounts for losses such as business interruption and rental income losses as well as the resources associated with damage repair and job and housing losses. These losses are calculated by Hazus using a methodology based on the building damage estimates.

The damaged building counts generated by Hazus are susceptible to rounding errors and are likely the weakest output of the model due to the use of census blocks for analysis. Generated reports include this disclaimer: "Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results." Additionally, losses are not calculated for individual buildings, but instead are based on the performances of entire classes of buildings obtained from the general building stock data. In the flood model, the number of grid cells (pixels) at each flood depth value is divided by the total number of grid cells in the census block. The result is used to weight the flood depths applied to each specific occupancy type in the general building stock. First floor heights are then applied to determine the damage depths to analyze damages and losses.

The following table provides the HAZUS results for displaced households, damaged buildings, destroyed buildings, and total economic loss for Lincoln County:

Table 56: Lincoln County Hazus Flood Scenario Displaced Population Building Damages

Displaced Households	Damaged Buildings	Destroyed Buildings	Total Economic Loss
21	0	0	$17,830,000

Source: FEMA Hazus

Especially critical is timely evacuation orders, and adherence to those orders. If evacuation is not heeded, or flood waters rise quickly enough, citizens could drown or become trapped for extended periods of time with no access to services or medical care. Of special concern are long term care and medical facilities where it can take longer to evacuate, or evacuation may be impossible. Additionally, lower income citizens may not have the means to relocate,

whether it be lack of transportation or lack of resources to afford temporary shelter. Expected impacts of flooding on citizens may include:

- Loss of Life: Flooding is one of the leading causes of weather-related fatalities worldwide. Fast-rising floodwaters can lead to drowning and other water-related accidents, resulting in the tragic loss of lives.
- Injuries: Floods can cause injuries due to waterborne diseases, contaminated floodwaters, debris, and accidents during evacuation or rescue operations.
- Displacement: Many people may be forced to evacuate their homes during floods and will require emergency shelter or temporary housing. Prolonged displacement can be emotionally and economically challenging.
- Health Risks: Floodwaters often contain pollutants, sewage, and hazardous materials. Exposure to contaminated water can lead to waterborne diseases, infections, and other health risks.
- Mental Health Effects: Survivors of floods may experience a range of emotional and psychological challenges, including post-traumatic stress disorder, anxiety, depression, and grief.
- Food and Water Shortages: Floods can contaminate water supplies and disrupt the distribution of food. This can lead to shortages of clean drinking water and essential food items.
- Impact on Vulnerable Populations: Vulnerable populations, including the elderly, children, people with disabilities, and those living in poverty, are often disproportionately affected by floods due to limited resources and mobility challenges.
- Long-Term Consequences: Some flood impacts, such as mold growth, structural damage, and land degradation, can have long-term consequences that persist even after the floodwaters recede.

Especially critical is timely evacuation orders, and adherence to those orders. If evacuation is not heeded, or flood waters rise quickly enough, citizens could drown or become trapped for extended periods of time with no access to services or medical care. Of special concern are long term care and medical facilities where it can take longer to evacuate, or evacuation may be impossible. Additionally, lower income citizens may not have the means to relocate, whether it be lack of transportation or lack of resources to afford temporary shelter. Expected impacts of flooding on citizens may include:

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- Long-Term Consequences: Some flood impacts, such as mold growth, structural damage, and land degradation, can have long-term consequences that persist even after the floodwaters recede.

Floods can have significant and often costly impacts on facilities and critical infrastructure. These impacts can disrupt essential services, damage infrastructure, and pose safety risks. The extent of the impact depends on factors such as the severity of the flood, the preparedness of the infrastructure, and the effectiveness of flood management measures. Here are some of the common impacts of floods on facilities and critical infrastructure:

- Structural Damage: Floodwaters can cause extensive damage to buildings, including critical infrastructure such as power plants, water treatment facilities, hospitals, and transportation hubs. The force of moving water can weaken foundations, erode structural elements, and compromise the integrity of buildings.
- Electrical and Mechanical Systems: Floodwaters can damage electrical systems, including transformers, switchgear, and electrical panels, leading to power outages and the disruption of critical services. Mechanical systems, such as heating, ventilation, and air conditioning, may also be affected.
- Water and Wastewater Infrastructure: Floods can overwhelm water supply and wastewater treatment systems. Contamination of drinking water sources can lead to water shortages and health risks, while damage to wastewater treatment plants can result in the discharge of untreated sewage into water bodies.
- Transportation Networks: Floods can damage roads, bridges, railways, and airports, making transportation difficult or impossible.
- Communication Infrastructure: Floods can disrupt telecommunications and internet services, hindering communication among emergency responders and the public. Loss of communication can impede coordination and response efforts.
- Healthcare Facilities: Damage to healthcare infrastructure can limit the capacity to provide medical care during a crisis.
- Energy Infrastructure: Floods can damage power generation facilities, including hydroelectric dams and power plants, leading to power outages and potential safety hazards.

To mitigate the impacts of floods on facilities and critical infrastructure, proactive measures are essential. These measures include proper land use planning, floodplain management, improved building codes and construction standards, early warning systems, flood-resistant infrastructure design, and effective emergency response plans.

Environmental impacts from flooding can be far reaching. Of particular concern is flood related runoff, potentially carrying sewage, pesticides, or hazardous chemicals, which can cause long lasting environmental harm. Expected negative outcomes could include changes in habitat, a decrease of available food, and an increase in the spread of vector-associated disease due to standing water.

Floods can pose significant risks to local operations, as they can result in a wide range of immediate and long-term consequences including:

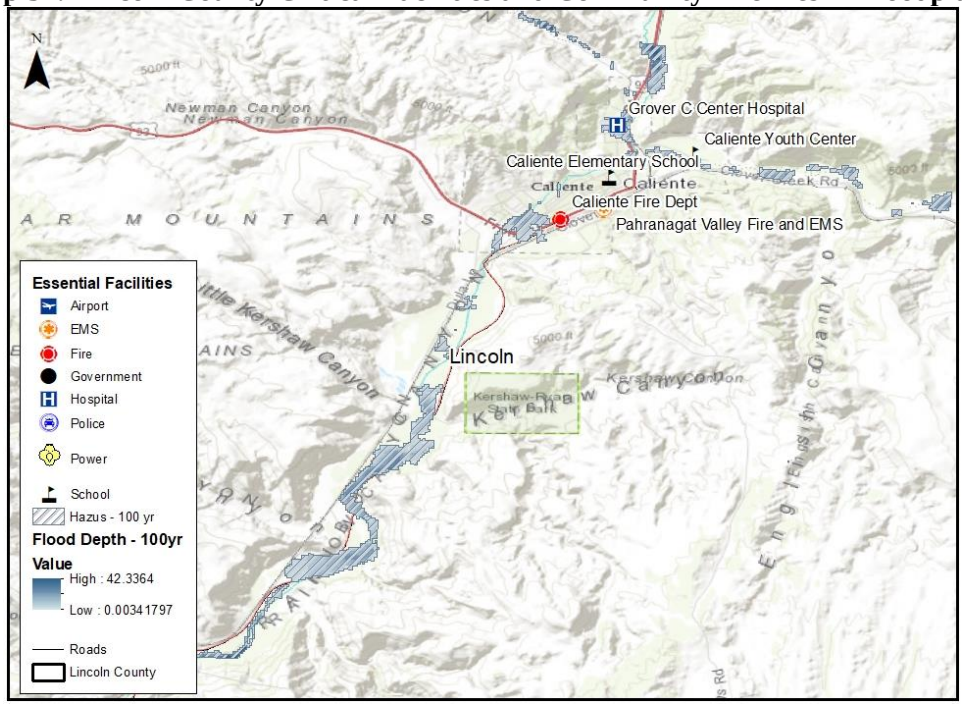
- Emergency Response and Management: Multiple counties and local jurisdictions may be mobilized to respond to floods. They would coordinate rescue operations, evacuations, and disaster response efforts to mitigate immediate risks to human life and property.
- Infrastructure Damage and Maintenance: Transportation and public works departments may need to assess and repair damage to roads, bridges, and other critical infrastructure affected by floodwaters and debris. This can strain resources and disrupt transportation networks.
- Environmental Oversight and Regulation: Health departments mat be responsible for assessing the environmental impact of floods, monitoring water quality, and coordinating cleanup efforts. They may also be involved in addressing long-term environmental consequences.
- Water Resource Management: Water resource agencies may need to manage and allocate water resources differently in the aftermath of floods, especially if the flood affects water supplies, water quality, or flood control systems.
- Public Health and Safety: Public health departments may provide support for public health needs during and after a flood, managing emergency shelters and addressing potential health risks from contaminants or waterborne diseases.
- Long-Term Recovery: County emergency management agencies play a critical role in long-term recovery efforts, including securing federal disaster assistance, providing financial support to affected communities, and helping with the rebuilding and restoration of infrastructure.

Potentially Vulnerable Community Lifelines

Flooding can impact various community lifelines, critical systems and services that communities rely on for their functioning. Vulnerabilities arise due to the stress that flooding can place on infrastructure, resources, and operational processes.

The following maps detail the location of community lifelines and critical facilities in identified 100-year floodplains:

Map 51: Lincoln County Critical Facilities and Community Lifelines in Floodplains



Source: Lincoln County, participating jurisdictions, and FEMA

Flooding can have significant and widespread impacts on road infrastructure. The extent of the damage depends on factors such as the severity and duration of the flood, the type of flooding (river overflow, flash flooding), and the design and resilience of the road infrastructure. Impacts may include:

- Structural Damage: Floodwaters can erode road surfaces, weaken foundations, and damage bridges and culverts. The force of flowing water can undermine the structural integrity of roads and cause washouts.
- Road Surface Erosion: The erosion caused by floodwaters can remove the top layer of road surfaces, leading to potholes, cracks, and a general deterioration of the road condition.
- Subsidence and Sinkholes: The infiltration of water into road foundations can cause subsidence or create sinkholes.
- Debris Accumulation: Floodwaters often carry debris such as logs, branches, and sediment. The accumulation of debris on roads can impede drainage systems, block culverts, and hinder the flow of water.
- Road Closures: Flooding can result in the closure of roads due to safety concerns. High water levels, washouts, or structural damage may make roads impassable, leading to disruptions in transportation.
- Loss of Road Markings and Signs: Floodwaters can wash away road markings and signs, reducing visibility and creating safety hazards for motorists.
- Long-Term Damage: Even after floodwaters recede, long-term damage to road infrastructure may persist. Subsurface waterlogging, soil destabilization, and residual structural weaknesses can contribute to ongoing deterioration.

The cost to conduct maintenance on a road can vary significantly depending on the types of work required. However, the average estimate for repairs on a per mile basis in 2019 was $14,750 per mile. The cost to replace a road can vary significantly based on several factors, including the type of road, local labor and material costs, the complexity of the

project, and the specific requirements of the replacement. As a rough estimate, road construction costs can range from $1,000,000 to $10,000,000 per mile.

Flooding can have substantial and often severe impacts on electrical utilities, disrupting power generation, transmission, and distribution systems. The consequences of flooding on electrical utilities can vary depending on factors such as the depth and duration of the flooding and the type of infrastructure affected, and may include:

- Substation and Power Plant Damage: Floodwaters can inundate electrical substations and power plants, damaging critical equipment such as transformers, switchgear, and control systems. Substantial damage to these facilities can lead to prolonged outages.
- Electrical Equipment Short-Circuits: Water infiltration into electrical equipment can cause short-circuits, leading to equipment failure and potentially causing fires. This can result in widespread power outages and safety hazards.
- Transmission Line Disruptions: Floodwaters can impact the stability of transmission towers and lines. Structural damage or collapse of transmission infrastructure can disrupt the flow of electricity over long distances.
- Distribution Network Damage: Localized flooding can damage distribution infrastructure, including power lines, poles, and transformers. This can lead to outages in specific neighborhoods or communities.
- Transformer Submersion: Floodwaters can submerge transformers, which are critical components in power distribution. Submersion can cause these transformers to malfunction or fail, leading to service interruptions.
- Underground Cable Damage: Underground power cables can be damaged by flooding, especially in areas with subterranean infrastructure. Water infiltration can compromise cable insulation, leading to electrical faults and outages.
- Loss of Fuel Supply: Natural gas power plants may face challenges in maintaining a stable fuel supply if transportation routes are disrupted due to flooding.

In order to reduce plan duplication, mapping concerning electrical generation plants, high-capacity transmission lines, and electrical utility providers may be found in Maps 27 and 28 on pages 47 and 48. Utility repair and replacement cost estimation provides may be found in Chart 5 on page 48.

The Hazus model indicated that the following number of critical facilities are estimated to be damaged or suffer loss of use from the flood scenario.

Table 57: Lincoln Hazus Flood Scenario Number of Critical Facilities Damaged or Impacted

Emergency Operations Centers	Fire Stations	Hospitals	Police Stations	Schools
0	0	0	0	0

Source: FEMA Hazus

Lincoln County is served by the Grover C. Dils Medical Center in Caliente, which has 20 inpatient beds. While this facility may see a rapid increase in injuries during a flooding event, it is considered unlikely that this increase will impact or overload capacity.

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table 58: Flood Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Significant flooding events can lead to the damage and loss of homes, property, and businesses. Flash flooding and excessive rainfall may lead to dangerous conditions on roadways. Closures of medical facilities is a major public health concern if flooding

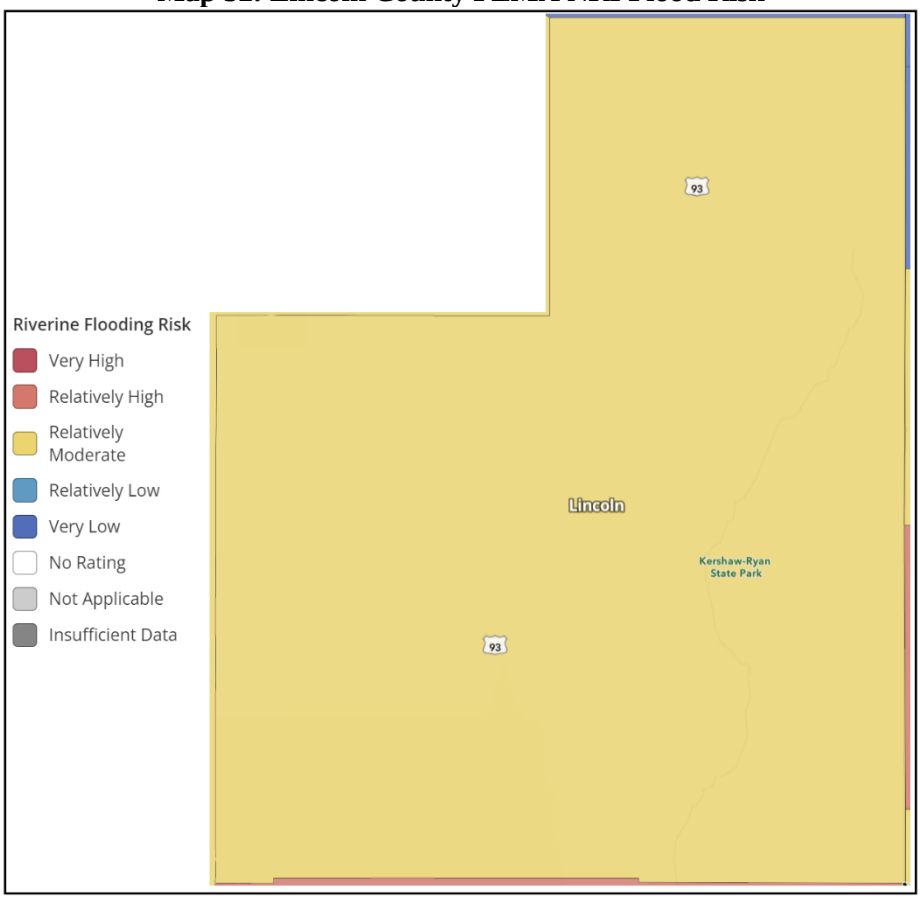
Table 58: Flood Consequence Analysis

Subject	Potential Impacts
	damages those facilities. Water sources may become contaminated, and water or sewer systems may be disrupted. Vector-associated disease may increase.
Impact on Responders	Fire, police, and emergency responders may be called on to evacuate people from impacted areas, as well as close roads, attend to the injured, and direct traffic away from the flooded area and roads. First responders may face challenges with transportation and access to a location. Flash floods and mudslides due to heavy rainfall can also injure first responders, as well as delay response operations.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Floods which create power outages, debris damage, and road closures are not uncommon. This threat may impact an agency's ability to maintain continuity of operations based on the incidents impact on power, communications and the potential to damage equipment and records within primary and alternate facilities.
Delivery of Services	Flooding can cause road and bridge closures, as well as disrupt transit services, impacting the ability to deliver goods and services. Exposure to flood waters may also damage or destroy physical goods such as food, clothing, and hygiene products.
Property, Facilities, and Infrastructure	Flooding can cause significant property destruction. Floods can disrupt normal daily activities due to the potential impact on schools, hospitals, and other public infrastructure. Transportation infrastructure can be damaged which could impact the freedom of movement or provision of utilities. Water sources can become contaminated. Water and sewer systems may be disrupted. Solid-waste collection and disposal may also be impacted, causing dangerous public health risks.
Impact on Environment	Rising waters from flooding impact the environment by spreading pollution, inundating water and wastewater treatment plants, and disrupting wildlife. Standing water following a flood event can facilitate the spread of vector-associated diseases.
Economic Conditions	Significant and repeated flooding can lower property value throughout the state, which can have a deleterious effect on the tax base. Furthermore, flooding drains response resources, which can be costly during a large flooding event for disaster reimbursement
Public Confidence in Governance	Ineffective flooding response can decrease the public's confidence in the ability to respond and govern. Multi-level government response requires direct actions that must be immediate and effective to maintain public confidence. Efficiency in response and recovery operations is critical in keeping public confidence high.

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the following map was created indicating the potential risk to Lincoln County from flood:

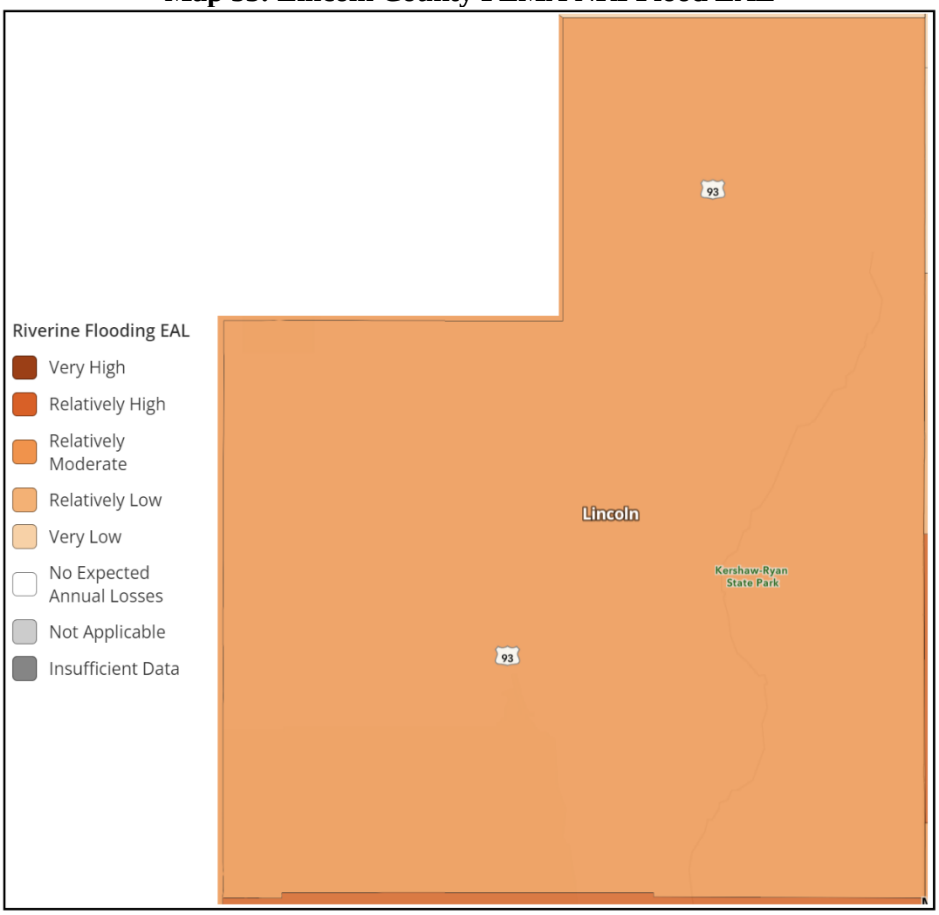
Map 52: Lincoln County FEMA NRI Flood Risk



Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for floods for Lincoln County:

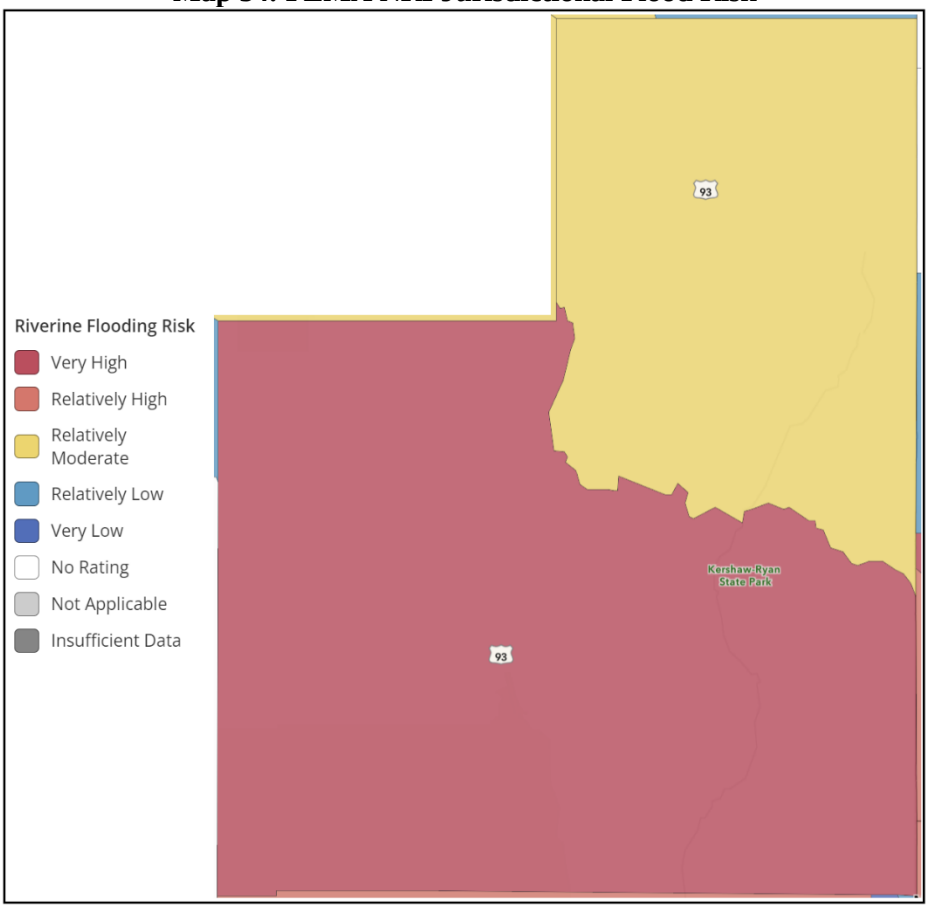
Map 53: Lincoln County FEMA NRI Flood EAL



Source: FEMA NRI

To help understand the risk and vulnerability to flooding of participating jurisdictions, mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

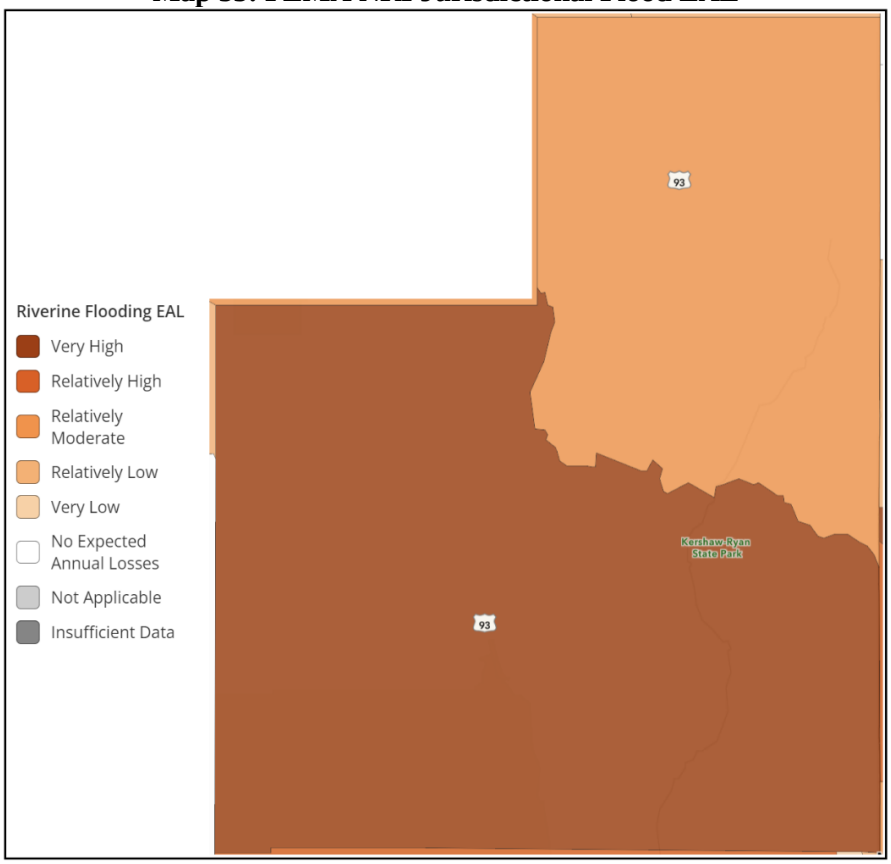
Map 54: FEMA NRI Jurisdictional Flood Risk



Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for floods for participating jurisdictions (as indicated by census tract) within Lincoln County:

Map 55: FEMA NRI Jurisdictional Flood EAL



Source: FEMA NRI

The following table indicates the FEMA NRI and EAL analysis for each participating Lincoln County for flood:

Table 59: Lincoln County FEMA NRI and EAL for Flood by County

Jurisdiction	Risk Index	EAL
Lincoln County	Relatively Moderate	Relatively Moderate
Cowley	Relatively High	Relatively High

4.12.7 National Flood Insurance Program Communities

The NFIP is a federal program, managed by FEMA, which exists to provide flood insurance for property owners in participating communities, to improve floodplain management practices, and to develop maps of flood hazard areas. The following table presents NFIP participating communities.

Table 60: Lincoln County NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
Allen County			
Lincoln County	02/22/1983	03/01/1984	08/05/2010
Caliente	03/29/1974	06/01/1982	08/05/2010

4.12.8 FEMA Flood Policy and Loss Data

Lincoln County flood policy information was sourced from FEMA's Flood Insurance Data and Analytics. The number of flood insurance policies in effect may not include all structures at risk of flooding, and it is likely that some properties are under-insured. The flood insurance purchase requirement is for flood insurance in the amount of federally backed mortgages, not the entire value of the structure. Additionally, contents coverage is not required. The following table shows the details of NFIP policy statistics for Lincoln County:

Table 61: Lincoln County NFIP Coverage

Jurisdiction	Number of Policies in Force	Total Coverage
Lincoln County	69	$12,054,200
Caliente	12	$2,769,800

Source: FEMA Flood Insurance Data and Analytics

The following table details the change in the number of NFIP coverage from 2018 to 2023 for Lincoln County:

Table 62: Lincoln County NFIP Coverage Changes

	2018	2023	Change 2013 - 2023
Number of Policies	114	69	(-45)
Amount of Coverage	$21,246,600	$12,054,200	(-$9,192,400)

Source: FEMA

4.12.9 Repetitive Loss Structures

The NFIP defines a Repetitive Loss property as:

- Any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. At least two of the claims must be more than 10 days apart.

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended, 42 U.S.C. 4102a. A Severe Repetitive Loss property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
- For which at least two separate claims 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.

For both of the above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than ten days apart.

No Repetitive Loss or Severe Repetitive Loss properties were identified in Lincoln County:

4.13 Strong Wind

4.13.1 Hazard Description

Winds are horizontal flows of air that blow from areas of high pressure to areas of low pressure. Wind strength depends on the difference between the high- and low-pressure systems and the distance between them. Therefore, a steep pressure gradient results from a large pressure difference or short distance between places and causes strong winds.

Strong and/or severe winds often precede or follow frontal activity, including cold fronts, warm fronts, and drylines. Generally, in the southwestern United States, frontal winds can remain at 20–30 mph for several hours and reach peak speeds of more than 60 mph. Winds equal to or greater than 57 mph are referred to as severe winds.

In addition to strong and/or severe winds caused by large regional frontal systems, local thermal winds are caused by the differential heating and cooling of the regional topography. In a valley/mountain system, as the rising ground air warms it continues upslope as wind and is replaced by inflow from outside the valley. The intensity of the resulting wind depends on a number of factors, including the shape of the valley, amount of sunlight, and presence of a prevailing wind.

4.13.2 – Location and Extent

Severe winds can rapidly descend on an area, but in many cases are predictable. Most weather forecasts focus on more than just temperature but on quickly changing conditions that may lead to the onset of strong winds. All of Lincoln County is susceptible to strong winds.

To measure wind speed and its correlating potential for damage, experts use the Beaufort scale as shown below.

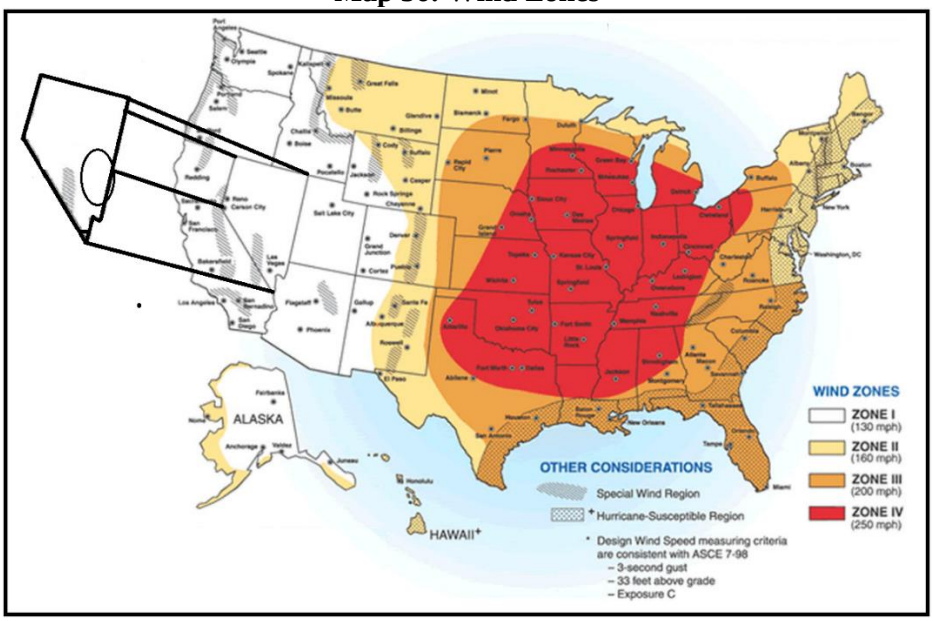
Table 63: Beaufort Scale

Beaufort Number	Wind Speed (mph)	Effects on Land
0	Under 1	Calm, smoke rises vertically
1	1-3	Smoke drift indicates wind direction, vanes do not move
2	4-7	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Leaves, small twigs in constant motion. Light flags extended.
4	13-18	Dust, leaves and loose paper raised up; small branches move
5	19-24	Small trees begin to sway
6	25-31	Large branches of trees in motion, whistling heard in wires
7	32-38	While trees in motion, resistance felt in walking against the wind
8	39-46	Twigs and small branches broken off trees
9	47-54	Slight structural damage occurs, slate blown from roofs
10	55-63	Seldom experienced on land, trees broken, structural damage occurs
11	64-72	Very rarely experienced on land, usually with widespread damage
12	73 or higher	Violence and destruction

Source: NOAA

The following maps from FEMA indicate the highest possible expected wind speeds for Lincoln County.

Map 56: Wind Zones



Source: FEMA

4.13.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. No presidential disasters have been declared in Lincoln County due to strong wind events.

The following table presents NCEI identified strong wind events and the resulting damage totals in Lincoln County, as wind events tend to cover large areas, from 1950 to 2023:

Table 64: NCEI Lincoln County Thunderstorm Events

Jurisdiction	Event Type	Number of Days with Events	Property Damage	Deaths and Injuries	Highest Windspeed
Lincoln County	High Wind	51	$303,000	0	72 knots
	Thunderstorm Wind	29	$27,000	0	66 knots

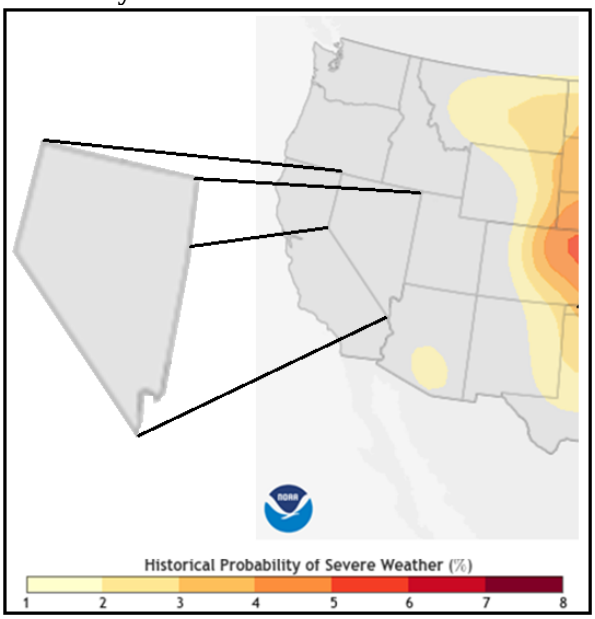
Source: NCEI

It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or NWS office. When reporting an event oftentimes the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages. Additionally, deaths and injuries may be underreported as they may be a result of a concurrent event, such as a person driving unsafely during heavy rain and passing away.

4.13.4 Probability of Future Events

Predicting the probability of severe thunderstorm occurrence, often the driver of strong winds, is tremendously challenging due to the large number of factors involved and the random nature of formation. The following map from NOAA provides a snapshot for the probability of a severe weather event on a summer day.

Map 57: Historic Probability of a Severe Weather Summer Event in Lincoln County



Source: NOAA

Based on historical occurrences, Lincoln County will continue to experience strong winds events on an annual basis. The following tables, using data from the NCEI, indicate the yearly probability of a severe thunderstorm component event, the number of deaths or injuries, and estimated property damage for each county in Lincoln County.

Table 65: Lincoln County NCEI Strong Wind Probability Summary,

Jurisdiction	Days with Event	Average Events per Year	Deaths / Injuries	Average Deaths / Injuries per Year	Property Damage	Average Property Damage per Year
Lincoln County	80	1	0	0	$330,000	$4,521

Source: NCEI

4.13.5 Projected Changes in Location, Intensity, Frequency, and Duration

Climate change can have several impacts on string winds, although the precise details can vary depending on regional climate patterns and other factors. In general, it is believed that climate change can alter the timing and seasonality of severe weather, one component of which may be strong winds. In some cases, this may mean stronger wind events occurring earlier or later in the year.

Climate change can lead to increased temperatures and moisture levels in the atmosphere, which can provide favorable conditions for the development of strong winds. This can result in a higher frequency of wind events and an increase in their intensity. Changes in atmospheric circulation patterns associated with climate change can lead to stronger winds within thunderstorms. This can result in more powerful wind gusts, increasing the risk of wind damage and downed trees and power lines.

It is important to note that while there is evidence linking climate change to changes in weather patterns that can influence strong winds, predicting specific events remains challenging. Climate models provide valuable insights into long-term trends, but individual wind events are influenced by a complex interplay of factors.

4.13.6 Vulnerability and Impact

Strong winds can have a wide range of effects on people, often posing significant risks to life, property, and general well-being. In the absence of proper shelter, strong winds can cause serious injury. In general, if potentially exposed persons take shelter in a solid, well-constructed structure protection would be provided. However, old or poorly

constructed facilities may be more prone to damage, potentially increasing the impact on economically disadvantaged populations. Some of the potential effects of strong on people may include:

- Death and Injury: Strong winds driving debris can cause injuries or fatalities.
- Power Outages: Strong winds resulting in fallen trees can lead to power outages, disrupting daily life, and potentially affecting essential services, such as medical equipment and refrigeration.
- Displacement: People may need to evacuate their homes or be temporarily displaced due to wind damage, requiring emergency shelter and support.
- Economic Costs: Strong winds can result in economic costs, including repair and recovery expenses, insurance claims, and potential loss of income due to property damage or work disruptions.
- Public Safety Response: Strong winds can strain public safety resources, including emergency services, law enforcement, and medical facilities.

All facilities within Lincoln County can be impacted by strong winds, including critical facilities. However, the location and construction of the facility will have a significant impact on the vulnerability. In general, older structures would be at higher risk of negative impacts. Some of the potential impacts include:

- Electrical Infrastructure Damage: Strong winds can damage electrical infrastructure, including power lines, transformers, and substations. This can result in widespread power outages, affecting homes, businesses, hospitals, and other critical facilities.
- Communication Disruptions: Strong winds can disrupt telecommunications infrastructure, including cell towers, data centers, and communication networks. This can impact emergency communication and coordination efforts.
- Critical Facilities: Hospitals, emergency response centers, and other critical facilities may be affected by power outages and damage to infrastructure. This can impact the ability to provide essential services during and after the storm.
- Energy Generation: Strong winds can disrupt energy generation facilities, such as wind farms, and damage conventional power plants. This can affect the availability of electricity.
- Safety Risks: Damage to infrastructure can pose safety risks to workers and the public. Fallen power lines, damaged buildings, and debris can be hazardous.

Strong winds can pose various risks to the environment. These winds can uproot trees, damage forests, and disrupt animal habitats. They can also scatter debris and cause structural damage to buildings, which can lead to further environmental issues if hazardous materials are released.

Strong winds can pose various risks to government operations and facilities. These risks can have significant economic and operational consequences, and can include:

- Structural Damage: High winds can cause significant damage to government buildings and infrastructure. This can result in costly repairs and disruptions to government operations.
- Power Outages: Strong winds can lead to power outages by damaging electrical infrastructure such as power lines and substations. Government buildings may lose power, affecting critical operations and services.
- Communication Disruptions: Strong winds can damage communication equipment, including telephone lines and computer systems. This can hinder communication between government agencies and the public.
- Transportation Disruptions: Strong winds can make roads impassable due to debris and fallen trees. This can impact the ability of government employees to commute to work and can disrupt the delivery of goods and services.
- Emergency Response: Strong winds may require the activation of emergency response plans. This can strain resources and personnel, especially if the storms lead to widespread damage or evacuations.
- Budgetary Impact: The costs associated with repairing and restoring government buildings and infrastructure after severe thunderstorms can strain budgets.

Potentially Vulnerable Community Lifelines

Trong winds can impact various community lifelines, critical systems and services that communities rely on for their functioning. Vulnerabilities arise due to the stress that strong wind conditions place on infrastructure, resources, and operational processes. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table 66: Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	$199
Loss of Communications/Information Technology Services	$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

Strong winds can have significant impacts on electrical utilities, leading to disruptions in power supply and potential damage to infrastructure through line damage and power station operations interruption or damages. Mapping concerning electrical generation plants, high-capacity transmission lines, and electrical utility providers may be found in Maps 27 and 28 on pages 47 and 48. Utility repair and replacement cost estimation provides may be found in Chart 5 on page 48.

Communications systems within Lincoln County may have an increased vulnerability to strong wind events. Of particular concern are 911 and dispatch systems. All jurisdictions are served by a 911 and dispatch system, providing direct dispatching for:

- Law Enforcement
- Emergency Medical Services
- Fire

Strong winds can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- Physical Damage to Infrastructure: High winds can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- Interference with Signals: Strong winds can create interference that affects the transmission of signals. Wind-blown debris or vegetation may obstruct the path of radio waves, microwaves, or satellite signals, causing signal degradation or complete loss of communication.
- Power Outages: Strong winds can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.
- Structural Instability: High winds can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.
- Localized Interference: Wind can create localized interference by causing cables or wires to move or vibrate, leading to signal distortion or loss. This effect is particularly noticeable in wired communication systems such as landline phones or internet connections.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. The following data, from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency, indicates cost ranges for communications system components:

Table 67: Summary of Communication System Component Costs

Components	Examples	Cost	Expected Lifespan
Infrastructure	Towers, shelters, commercial and backup power equipment,	$$$–$$$$$	20–25 years
Fixed Station Equipment	Antennas, repeaters, towers on wheels, consoles, mobile stations, servers, computers, physical and electronic security elements (e.g., fencing, cameras, monitors, environmental conditions)	$$-$$$	3-15 years
Devices	Handheld portable radios, cellular phones, satellite phones, mobile data devices	$-$$	2-10 years
Accessories	Holsters, chargers, speakers, lapel microphone extensions, Bluetooth, vehicle kits, air cards, intercoms	$	2-10 years
Features	Encryption to protect against security risks, ruggedization to ensure reliant services, Over-the-Air-Programming, automatic roaming	$-$$$	-
Software and Data Storage	Global information system, emergency notifications, monitoring, call answering, database access, Automatic Vehicle Locator	$-$$	-

Source: U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency

Lincoln County is served by the Grover C. Dils Medical Center in Caliente, which has 20 inpatient beds. While this facility may see a rapid increase in injuries during a strong wind event, it is considered unlikely that this increase will impact or overload capacity.

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table 68: Strong Wind Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Strong winds can cause extensive property damage, loss of utility service, and injury to the public. Those most at-risk are low-income and homeless individuals without proper shelter.
Impact on Responders	First responders may be unable to access roadways due to trees or debris. Exposure to high winds may cause injuries to first responders. Vehicles and resources may be damaged, leading to impaired response activities.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Severe strong winds may impact an agency's ability to maintain continuity of operations due to power outages and wind damage. If the activation of alternate facilities was required, travel may be difficult as well as computer/network access due to long-term power outages caused by thunderstorms.
Delivery of Services	Delivery of services may be impaired by obstruction and damage to roadways and resources. The ability to deliver goods and services will be impacted locally, regionally, or statewide depending on the magnitude of the event. Goods, equipment, and vehicles may become damaged during transport.
Property, Facilities, and Infrastructure	Power lines and power generators are most at risk and impacts could result in isolated power outages or full-scale blackouts. Building and vehicle damage can occur
Impact on Environment	Waste and debris from damaged treatment infrastructure or hazardous materials facilities could contaminate sources of water and food. Debris can impact and contaminate wildlife and natural areas.
Economic Conditions	Strong winds can stress state and local resources. Even if some of the costs can be recouped through federal reimbursements (federal disaster declaration), there is a fiscal impact on the local government.

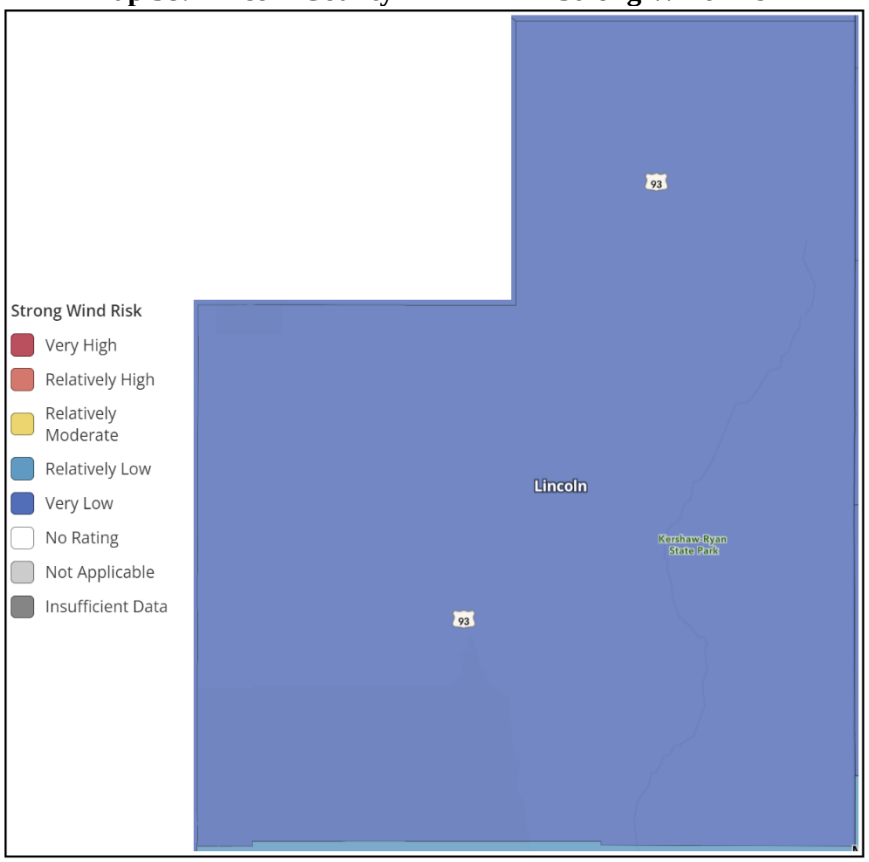
Table 68: Strong Wind Consequence Analysis

Subject	Potential Impacts
Public Confidence in Governance	Ineffective response can decrease the public's confidence in the ability to respond and govern. Governmental response across local, state, regional, and federal levels require direct actions that must be immediate and effective to maintain public confidence.

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the following map was created indicating the potential risk to Lincoln County from the components of severe thunderstorms (hail, lightning, and strong winds):

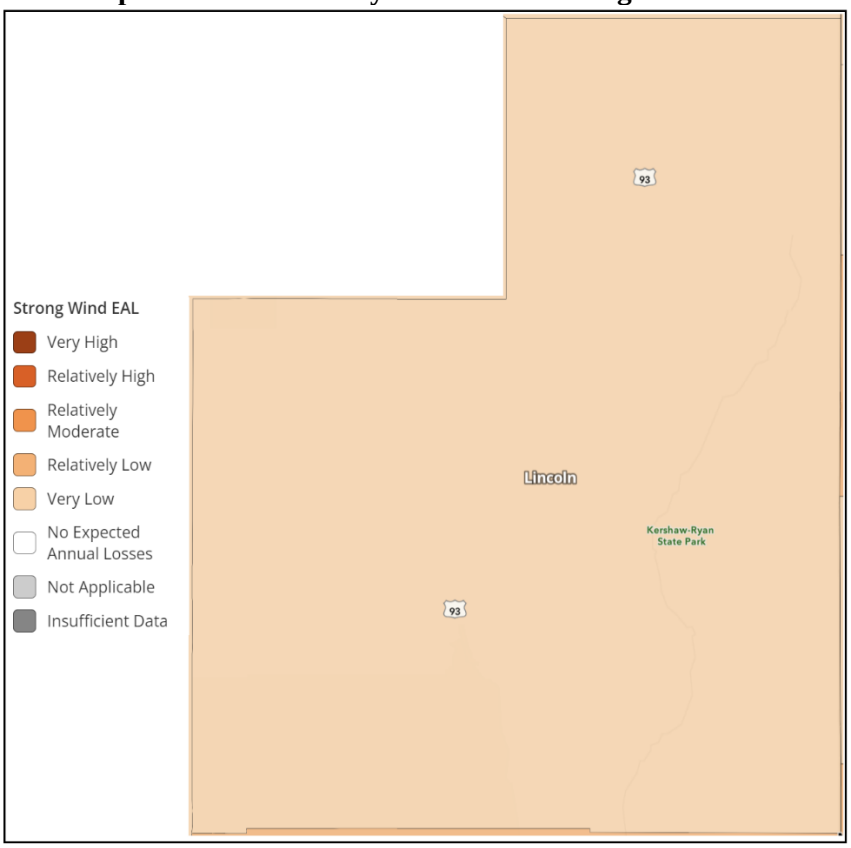
Map 58: Lincoln County FEMA NRI Strong Wind Risk



Source: FEMA NRI

As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for the strong wind for Lincoln County:

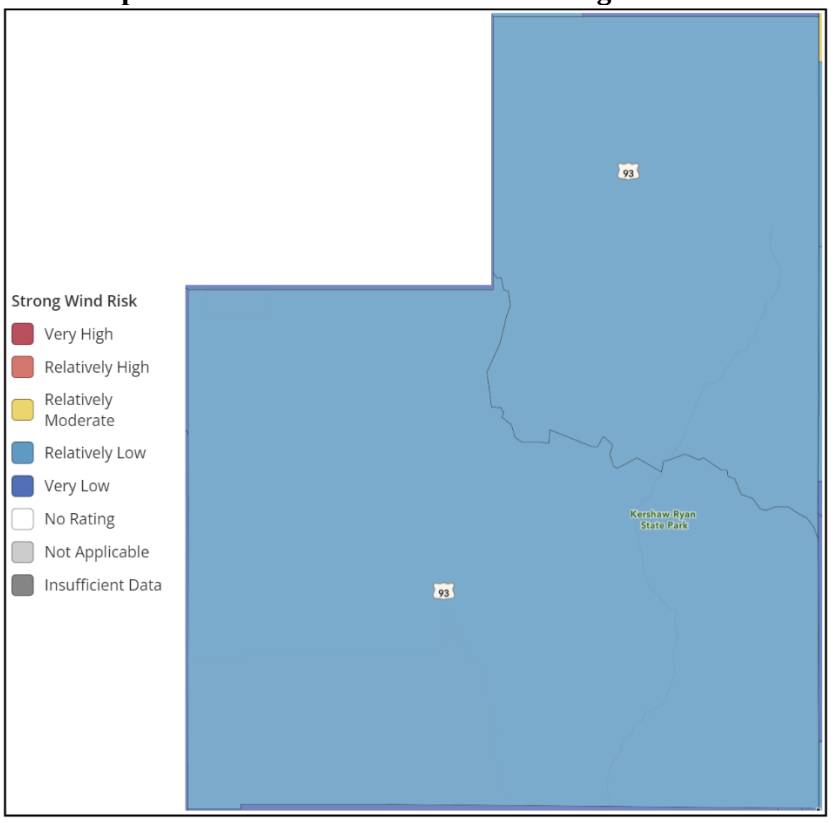
Map 59: Lincoln County FEMA NRI Strong Wind EAL



Source: FEMA NRI

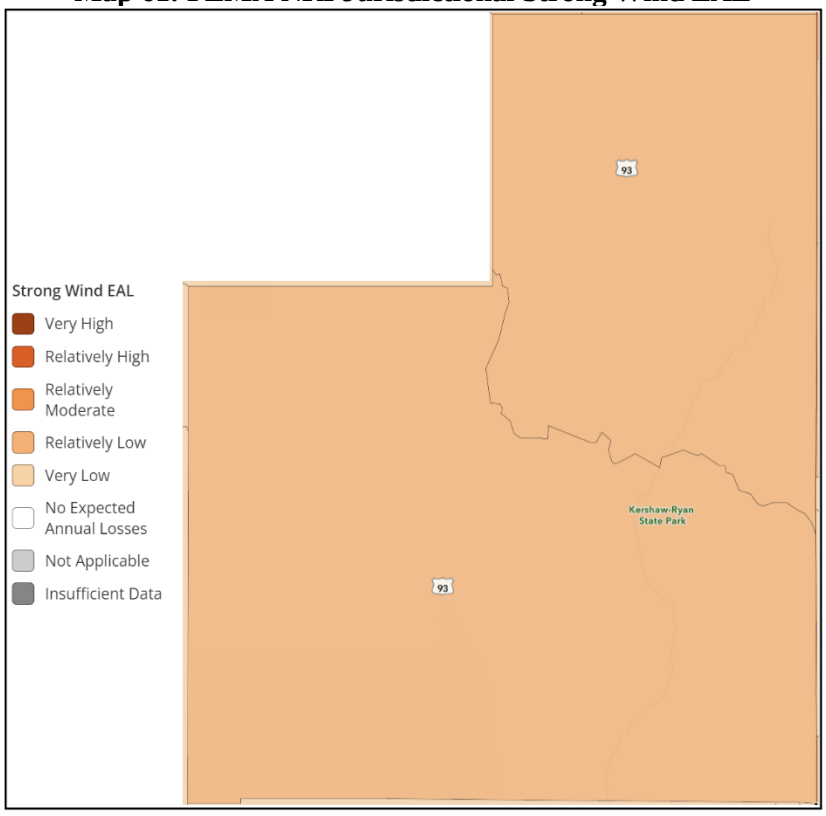
To help understand the risk and vulnerability to strong wind of participating jurisdictions mapping from the FEMA NRI was run on a census tract level. As the NRI does not generate mapping for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Map 60: FEMA NRI Jurisdictional Strong Wind Risk



Source: FEMA NRI

Map 61: FEMA NRI Jurisdictional Strong Wind EAL



Source: FEMA NRI

Table 69: Lincoln County FEMA NRI and EAL for Strong Wind

Jurisdiction	Risk Index	EAL
Lincoln County	Very Low	Very Low
Caliente	Relatively Low	Relatively Low

Source: FEMA NRI

4.14 Wildfires

4.14.1 Hazard Description

The NWS defines a wildfire as any free burning uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. They can occur naturally, by human accident, and on rare occasions by human action. Population de-concentration in the U.S. has resulted in rapid development in the outlying fringe of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, especially forests. This expansion has increased the likelihood that wildfires will threaten life and property.

According to the National Park Service there three classifications of wildfires:

- **Surface Fire:** Burning which may spread rapidly and ignite leaf litter, fallen branches and other fuels located at ground level.
- **Ground Fire:** Burning of organic matter in the soil beneath the surface.
- **Crown Fire:** Burning through the top layer (canopy) of trees. Crown fires, which can be very intense and difficult to contain, require strong winds, steep slopes, and large amounts of fuel to burn.

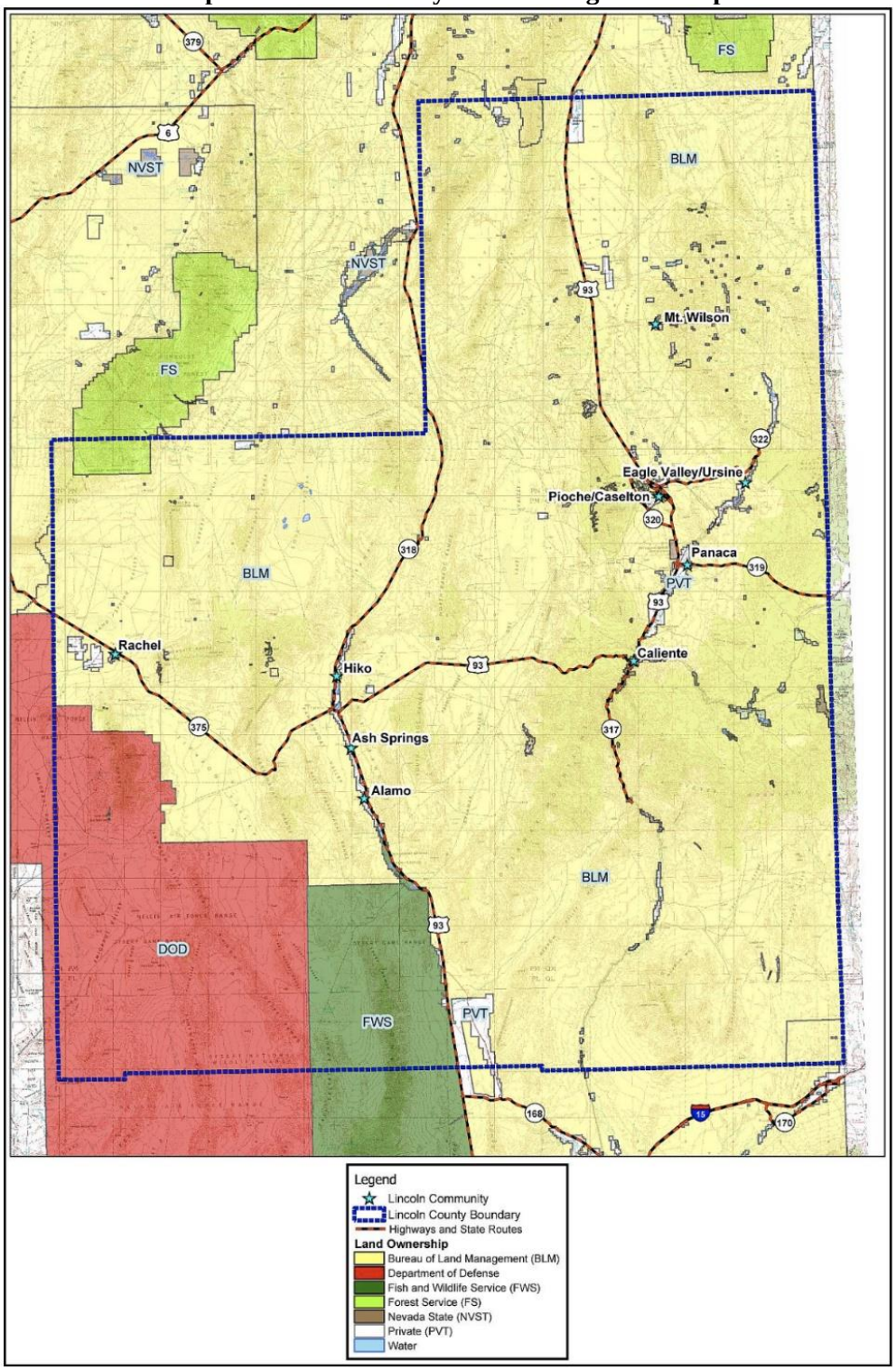
Wildfires are strongly influenced by multiple factors, including:

- **Weather:** Factors such as relative humidity, wind speed, ambient temperature and precipitation all influence the formation and growth of wildfires.
- **Topography:** Natural features, such as canyons or ridges, can increase the spread rate of a fire by funneling or drawing heated air and fire.
- **Fuel Type, Distribution and Moisture:** Available fuels, the spacing and density of available fuels, and fuel moisture content can determine spread rates and intensity of wildfires.
- **Drought Conditions:** Drought tends to increase both the likelihood and severity of wildfires.

4.14.2 – Location and Extent

Approximately 90% of land in Lincoln County is federally owned and not available for private or county use. The following map shows the land management status for Lincoln County.

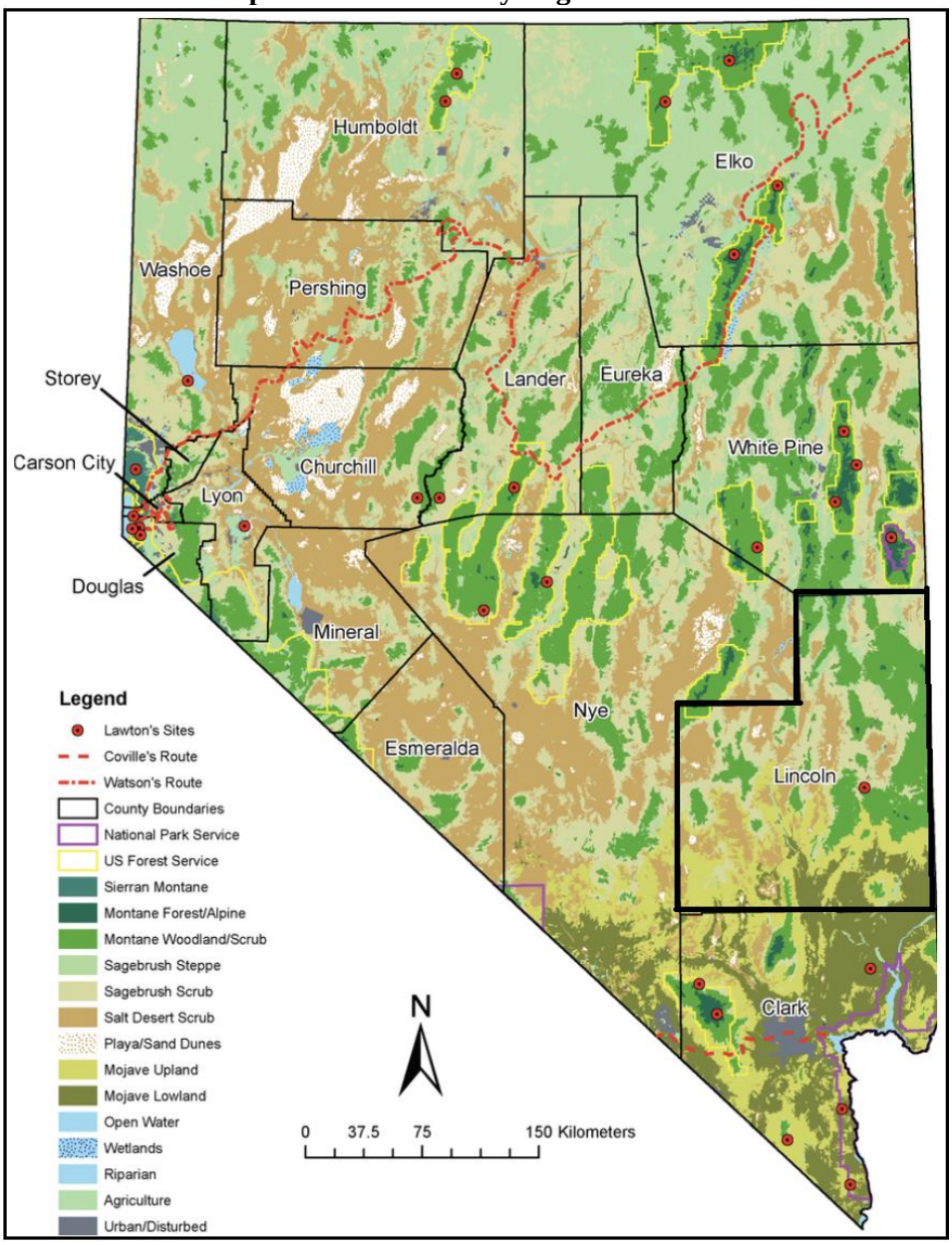
Map 62: Lincoln County Land Management Map



Source: State of Nevada

The following map indicates vegetation types within Lincoln County, with areas of grasses, forest, and crops more likely to experience a wild or brush fire:

Map 63: Lincoln County Vegetation Cover



Source: Lincoln County

The wildland/urban interface (WUI) is the area where human improvements such as homes, ranches and farms come in contact with the wildlands. The WUI creates an environment in which fire can move readily between structure and vegetation fuels, often resulting in massive fires, or conflagrations, that may lead to widespread evacuations. The expansion of the WUI in recent decades has significant implications for wildfire management and its impact. There are two types of WUI, intermixed and interface. Intermix WUI are areas where housing and vegetation intermingle, and interface WUI are areas with housing in the vicinity of dense, contiguous wildland vegetation.

The following map, from the University of Wisconsin SILVIS Labs, illustrates WUI areas throughout the Lincoln County:

Map 64: Lincoln County WUI Areas

Source: University of Wisconsin SILVIS Labs

According to the Lincoln County Fire Plan, the following are the WUI classifications for locations throughout the county:

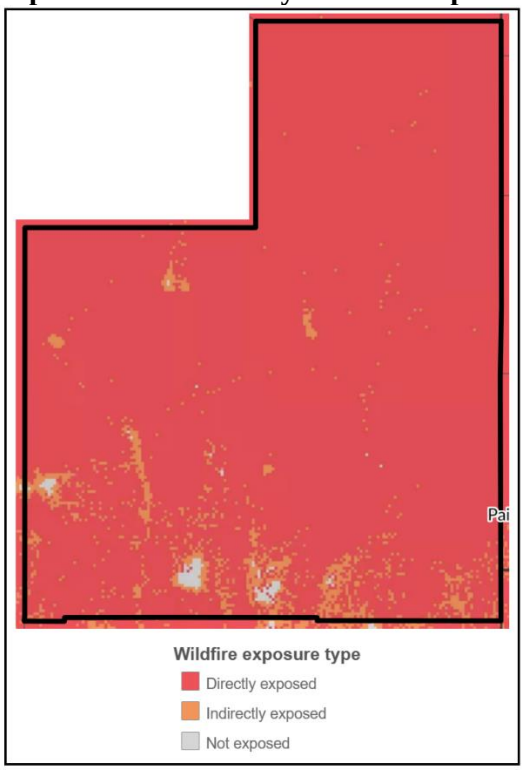
Table 70: Jurisdiction WUI Classification

Location	WUI Classification	Ignition Risk	Hazard Rating
Alamo	Intermix	Low	Low
Caliente	Intermix	High	Moderate
Eagle Valley/Ursine	Intermix	Moderate	High
Mt. Wilson	Intermix	High	Extreme
Panaca	Intermix	Moderate	Moderate
Pioche	Intermix	High	Extreme
Rachel	Intermix	Low	Moderate

Source: Lincoln County Fire Plan

Exposure is the intersection of wildfire likelihood and intensity with communities. Communities can be directly exposed to wildfire from adjacent wildland vegetation, or indirectly exposed to wildfire from embers and home-to-home ignition. Communities that are not exposed are not likely to be subjected to wildfire from either direct or indirect sources. Wildfire exposure is calculated based on wildfire likelihood and proximity to large areas of flammable wildland vegetation. Any community that is located where there is a chance wildfire could occur (in other words, where wildfire likelihood is greater than zero) is exposed to wildfire. Directly exposed homes are located in an area considered to be covered by flammable wildland vegetation. Indirectly exposed homes are located within one mile of a large area considered to be covered by flammable wildland vegetation. Non-exposed homes are located more than one mile from a large area considered to be covered by flammable wildland vegetation. The following map, from NOAA's Wildfire Risk to Communities, indicates the wildfire exposure for Lincoln County:

Map 65: Lincoln County Wildfire Exposure



Source: NOAA's Wildfire Risk to Communities

The duration of a wildfire depends on the weather conditions, how dry it is, the availability of fuel to spread, and the ability of responders to contain and extinguish the fire. Historically, some wildfires have lasted only hours, while other fires have continued to spread and grow for an entire season. They spread quickly and often begin unnoticed until they have grown large enough to signal by dense smoke. If fuel is available, and high wind speeds hit, a wildfire can spread over a large area in a very short amount of time. These factors make the difference between small upstart fires easily controlled by local fire services to fires destroying thousands of acres requiring multiple state and federal assets for containment and suppression.

The National Fire Danger Rating System allows fire managers to estimate today's or tomorrow's fire danger for a given area. It combines the effects of existing and expected states of selected fire danger factors into one or more qualitative or numeric indices that reflect an area's fire protection needs. It links an organization's readiness level (or pre-planned fire suppression actions) to the potential fire problems of the day. The following is a brief explanation of the different fire danger levels based on criteria established by the National Fire Danger Rating System.

Table 71: National Fire Danger Rating System

Rating	Description
Low	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	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.
High	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.

Table 71: National Fire Danger Rating System

Rating	Description
Very High	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	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.

Source: Wildfire Fire Assessment System

The severity of wildfire depends on several quickly changing environmental factors. It is impossible to strategically estimate the severity of a wildfire as these factors, including drought conditions and wind speed, have such a great influence on the wildfire conditions. The Characteristic Fire Intensity Scale within the Southern Wildfire Risk Assessment Summary Report specially identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on a weighted average of four percentile weather categories.

The following table details the range of wildfire intensity:

Table 72: Characteristic Fire Intensity Scale

Class	Description
Class 1- Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
Class 2- Low	Small flames, usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 3- Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
Class 4 - High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers are generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property
Class 5- Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Source: Southern Wildfire Risk Assessment Summary Report

4.14.3 Previous Occurrences

FEMA can approve declarations for fire management assistance when the Administrator determines that a fire or fire complex on public or private forest land or grassland threatens such destruction as would constitute a major disaster. There have been no fire management assistance declarations for Lincoln County in the past 15 years.

The Nevada Wildfire Intelligence Bureau of Land Management provides the following classification of fire size:

- Class A - one-fourth acre or less
- Class B - more than one-fourth acre, but less than 10 acres
- Class C - 10 acres or more, but less than 100 acres
- Class D - 100 acres or more, but less than 300 acres
- Class E - 300 acres or more, but less than 1,000 acres
- Class F - 1,000 acres or more, but less than 5,000 acres
- Class G - 5,000 acres or more

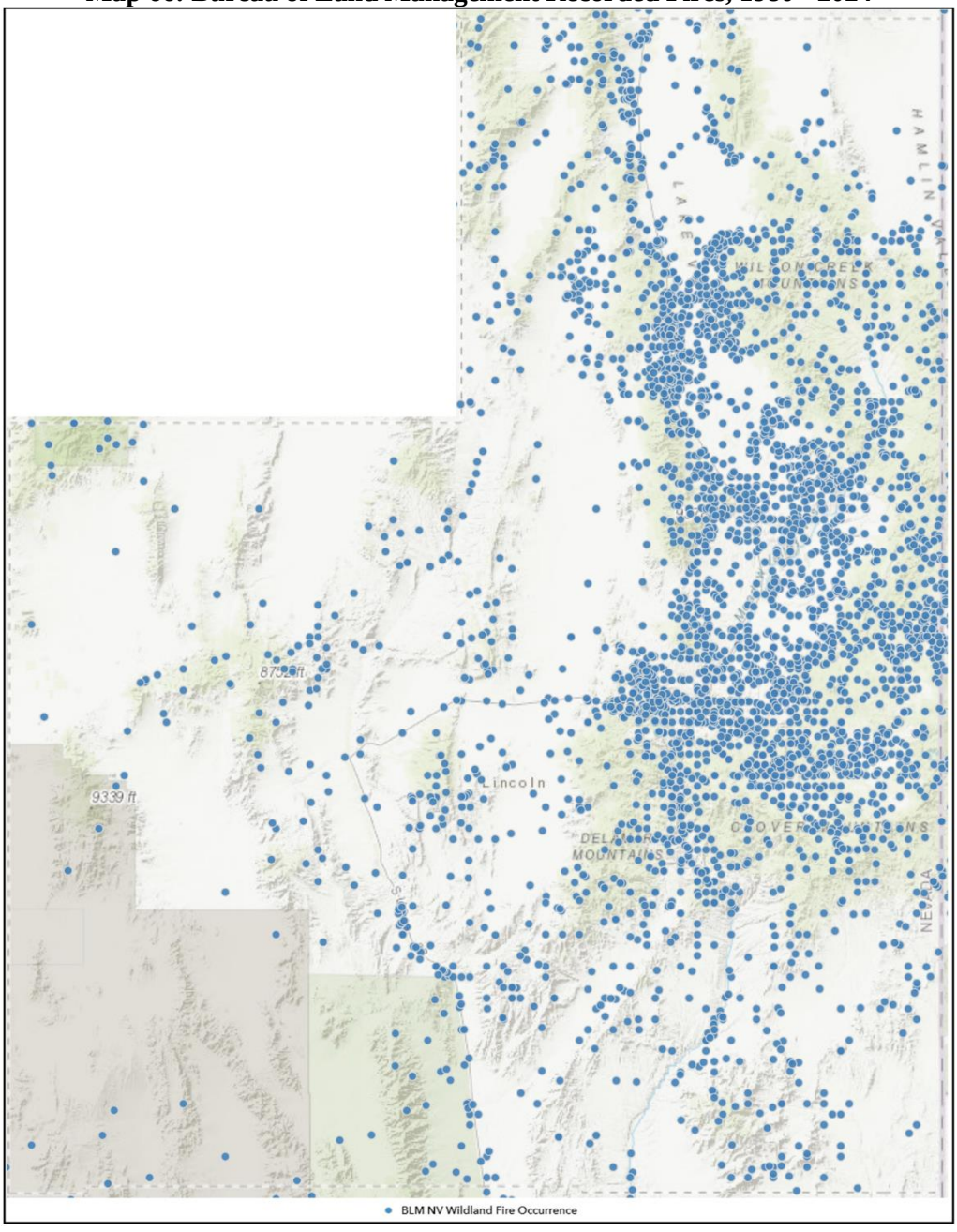
Using the above referenced fire size classification, the following table presents identified wildfire events and the resulting burned acreage in Lincoln County from the period 1980 – 2022:

Table 73: Lincoln County Wildfire Events, 1980 - 2023

Wildfire Class	Number of Events	Acres Burned
A	2,612	270
B	871	1,621
C	264	9,604
D	102	16,613
E	81	43,366
F	60	135,904
G	47	1,266,072

Source: Nevada Wildfire Intelligence Bureau of Land Management

Map 66: Bureau of Land Management Recorded Fires, 1980 - 2024

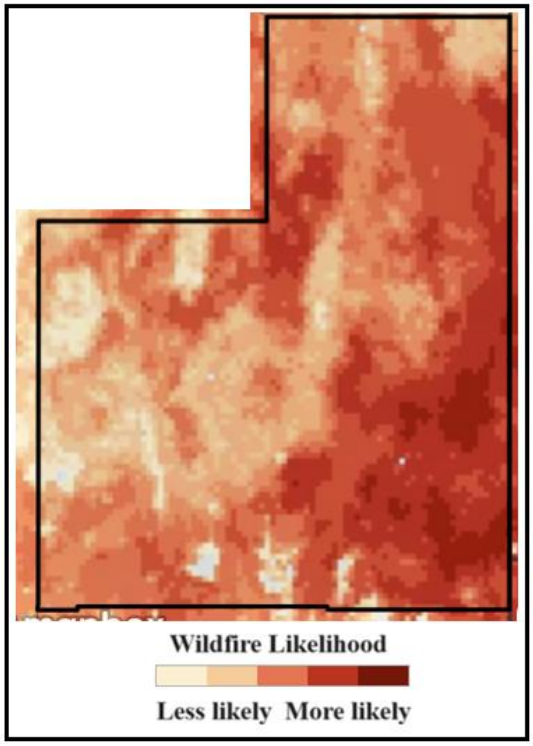


Source: Bureau of Land Management

4.14.4 Probability of Future Events

Predicting the probability of wildfire occurrences is tremendously challenging due to the large number of factors involved and the random nature of formation. NOAA's Wildfire Risk to Communities mapping, which uses the best available science to identify risk, was used to help determine the probability of future wildfires within Lincoln County. The following map indicates the likelihood of a wildfire within Lincoln County:

Map 67: Lincoln County Wildfire Likelihood



Source: NOAA's Wildfire Risk to Communities

4.14.5 Projected Changes in Location, Intensity, Frequency, and Duration

Climate change can result in a significant increase in the likelihood and severity of wildfires. The occurrence of more frequent and longer lasting droughts due to climate change can increase the availability of fuels for wildfires through the drying of vegetation. Additionally, both the increased occurrence and continued decline of native species due to lack of precipitation can cause the proliferation of invasive species which can provide quick-burning fuels that contribute to the start and spread of fire.

Climate change may impact the frequency and magnitude of wildfires in the following ways:

- Increased Frequency: Warmer temperatures and prolonged periods of drought associated with climate change create conditions that favor more frequent wildfires. Extended fire seasons are becoming the new norm in many regions.
- Greater Intensity: Higher temperatures and drier conditions can lead to more intense wildfires. These fires burn hotter and spread more rapidly, making them more challenging to control and extinguish.
- Longer Fire Seasons: Climate change is extending the length of fire seasons, leading to earlier starts and later endings. This puts additional stress on firefighting resources and increases the risk of wildfires overlapping with other disasters.
- Altered Precipitation Patterns: Changes in precipitation patterns, including more intense rainfall events followed by extended dry periods, can promote the growth of vegetation, which can then become fuel for wildfires during subsequent dry periods.
- Drought Conditions: Prolonged droughts associated with climate change reduce soil moisture levels and the availability of water sources. Dry conditions increase the susceptibility of vegetation to ignition.

- Vegetation Changes: Climate change can alter the distribution and composition of vegetation, such as the expansion of drought-tolerant species. This can change fuel availability and make ecosystems more fire prone.
- Insect Infestations: Warmer temperatures can lead to increased insect infestations in forests. Infested and dead trees provide additional fuel for wildfires.
- Wildfire Behavior: Climate change can lead to changes in wildfire behavior, including the development of fire whirls, more extreme fire behavior events, and increased spotting (the spread of embers ahead of the main fire).

Compounding the potential future impact of this hazard, local discussions indicate that a continued staffing shortage and aging equipment in the majority of regional fire departments may hamper future response activities.

4.14.6 Vulnerability and Impact

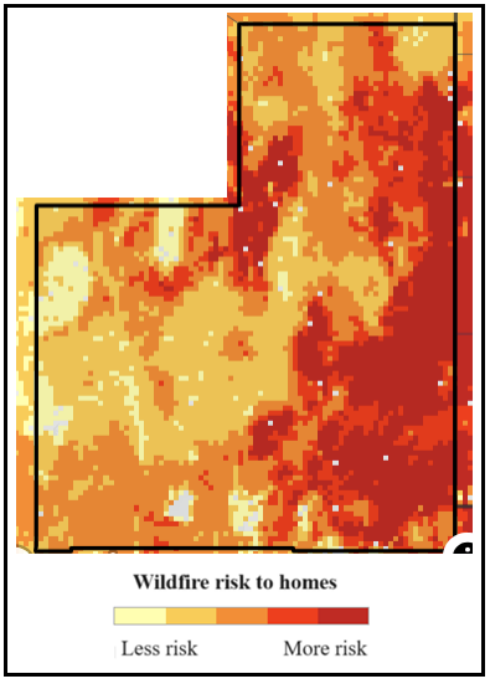
Wildfires can have significant and often devastating impacts on people and communities. These impacts can vary depending on the wildfire's intensity, size, path, and the preparedness of the affected area, and may include.

- Injuries and Fatalities: Wildfires can lead to injuries and fatalities among residents, firefighters, and emergency responders due to burns, smoke inhalation, and accidents during firefighting efforts.
- Evacuations and Displacement: Wildfire damage can force people to leave their homes, leading to temporary or even long-term displacement. Some may require emergency shelter and assistance from relief organizations.
- Property Loss: Wildfires can cause extensive property damage to homes, businesses, and vehicles.
- Health Risks: Smoke from wildfires can contain harmful pollutants, including fine particulate matter and toxic gases, which can lead to respiratory problems and exacerbate pre-existing health conditions. Vulnerable populations, such as children and the elderly, are at higher risk.
- Mental Health Impact: The trauma and stress associated with experiencing wildfire, evacuations, property loss, and the challenges of recovery can have a significant impact on mental health.
- Emergency Response Challenges: Wildfires can strain emergency response resources, including firefighting personnel, equipment, and medical facilities. First responders may be faced with a large number of emergency calls.
- Economic Costs: Wildfires result in economic costs, including property damage and insurance claims.

Additionally, wildfires can devastate communities and homes. They can cause various types of property damage, including burning structures, charring of exterior surfaces, and damage to roofs, walls, and windows. The heat generated by wildfires can weaken or melt building materials. In extreme cases, wildfires can completely destroy homes, reducing them to ashes and rubble. Homes that may not have been directly impacted by the fire may also be affected. Wildfires can damage utility infrastructure, including power lines and gas pipelines, leading to utility interruptions that affect homes and residents. They can damage or contaminate water supply infrastructure, affecting access to clean water for drinking, firefighting, and sanitation.

The following map, from NOAA’s Wildfire Risk to Communities, indicates the wildfire risk to homes in Lincoln County:

Map 68: Lincoln County Wildfire Risk to Homes



Source: NOAA's Wildfire Risk to Communities

Wildfires can have wide-ranging impacts on critical infrastructure. They can damage electrical transmission and distribution lines, transformers, and power substations. This can lead to widespread power outages, affecting homes, businesses, hospitals, and emergency response capabilities. Damage cell towers, telephone lines, and other communication infrastructure can hinder emergency response efforts, as well as the ability of individuals to call for help or communicate with loved ones. Wildfires can block roads with debris, making them impassable and hindering emergency response and evacuation efforts.

Hospitals and healthcare facilities may be damaged or rendered inoperable during wildfires, affecting the ability to provide medical care during a disaster. Fire stations, police stations, and emergency operation centers may be damaged or destroyed, impacting the ability of first responders to coordinate disaster response efforts. Damage to emergency shelters and housing facilities can disrupt services which are critical for providing temporary shelter to displaced individuals and families.

Wildfires can have varied impacts on the environment. These impacts are often destructive and can affect ecosystems, wildlife, natural resources, and even the local climate. They can destroy natural habitats, including forests, grasslands, wetlands, and shrublands. This can have devastating effects on wildlife species that depend on these ecosystems for shelter, food, and breeding. Wildfires can harm or displace wildlife, resulting in injury or death. They can force wildlife to flee their habitats, leading to displacement and potential conflicts with human populations. Animals may struggle to find suitable new habitats. Post-fire landscapes are often vulnerable to colonization by invasive plant species, which can outcompete native vegetation and disrupt ecosystem functions.

Wildfires can have significant impacts on government operations, which may include:

- Emergency Response and Public Safety: Wildfires can lead to a surge in emergency calls for services related to accidents, injuries, and damaged structures. Agencies involved in emergency response must mobilize additional resources to handle these demands.
- Emergency Operations Centers: Wildfire often require the activation of Emergency Operations Centers to coordinate emergency response efforts. These centers serve as hubs for communication, resource allocation, and decision-making during disasters.

- Infrastructure Damage: Wildfires can cause extensive damage to critical infrastructure, including roads, bridges, schools, government buildings, and utility facilities. This damage can disrupt government operations and hinder transportation and communication.
- Budgetary Impact: The costs associated with emergency response efforts, disaster recovery, and infrastructure repair can strain budgets.
- Resource Allocation: Local governments must allocate resources, including personnel, equipment, and stockpiled supplies, to support emergency response and recovery efforts.
- Communication Challenges: Wildfires can disrupt communication networks, hindering the ability of government agencies to communicate internally and with the public. This can impact emergency notifications and coordination efforts.
- Economic Impact: The destruction of infrastructure and businesses can have significant economic consequences for local communities, including job losses and reduced economic activity.
- Public Services: Wildfires can disrupt the delivery of public services, including transportation, utilities, and social services, affecting the well-being of residents.

Potentially Vulnerable Community Lifelines

Wildfires can impact various community lifelines, critical systems and services that communities rely on for their functioning. Vulnerabilities arise due to the stress that wildfires conditions place on infrastructure, resources, and operational processes. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table 74: Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	$199
Loss of Wastewater Services	$66
Loss of Water Services	$138
Loss of Communications/Information Technology Services	$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

Wildfires can have significant impacts on electrical utilities, affecting both the infrastructure and the services they provide. Some of the key impacts include:

- Damage to Power Lines and Equipment: Wildfires can cause direct damage to electrical infrastructure such as power lines, transformers, substations, and other equipment. The intense heat from the fire can melt wires, damage insulators, and compromise the structural integrity of utility poles and towers.
- Power Outages: The destruction of power lines and equipment can lead to widespread power outages in affected areas. This not only disrupts daily life for residents but can also impact critical services such as hospitals, emergency response systems, and water treatment facilities.
- Infrastructure Accessibility: Wildfires can make it difficult for utility crews to access affected areas due to road closures, damaged infrastructure, and hazardous conditions. This can delay repair and restoration efforts, prolonging the duration of power outages.
- Grid Instability: The loss of transmission lines and substations can destabilize the electrical grid, leading to voltage fluctuations, frequency variations, and potential cascading outages. Restoring grid stability after a wildfire requires careful coordination and management by utility operators.
- Safety Concerns: Wildfires pose safety risks to utility workers involved in repair and restoration efforts. In addition to the immediate dangers of fire and smoke, there may be hazards such as downed power lines, weakened structures, and unstable terrain.

In order to reduce plan duplication, mapping concerning electrical generation plants, high-capacity transmission lines, and electrical utility providers may be found in Maps 27 and 28 on pages 47 and 48. Utility repair and replacement cost estimation provides may be found in Chart 5 on page 48.

Communications systems within Lincoln County may have an increased vulnerability to wildfire events. Of particular concern are 911 and dispatch systems. All jurisdictions are served by a 911 and dispatch system, providing direct dispatching for:

- Law Enforcement
- Emergency Medical Services
- Fire

Wildfires can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- Structural Damage to Communication Towers: Wildfires can cause direct structural damage to communication towers, including cellular, television, radio, and microwave towers. Toppled or damaged towers can disrupt signal transmission and reception.
- Power Outages: Wildfires often cause power outages by damaging electrical infrastructure. Communication facilities, including cell towers and data centers, rely on a stable power supply. Power failures can lead to service interruptions.
- Fiber Optic Cable Damage: Wildfires can damage underground and aerial fiber optic cables. Severed cables can disrupt data transmission and internet connectivity.
- Equipment Damage: Communication equipment located outdoors, such as antennas, dishes, and amplifiers, can be damaged by wildfires, affecting the performance of communication systems.
- Loss of Communication Nodes: Wildfires can damage communication nodes, exchanges, and network switching centers. Loss of these critical components can lead to widespread service disruptions.
- Cellular Network Congestion: During and after a wildfire there is often an increased demand for cellular communication as individuals seek information and contact loved ones. This surge in demand can lead to network congestion and reduced service quality.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. The following data, from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency, indicates cost ranges for communications system components:

Table 75: Summary of Communication System Component Costs

Components	Examples	Cost	Expected Lifespan
Infrastructure	Towers, shelters, commercial and backup power equipment,	$$$–$$$$$	20–25 years
Fixed Station Equipment	Antennas, repeaters, towers on wheels, consoles, mobile stations, servers, computers, physical and electronic security elements (e.g., fencing, cameras, monitors, environmental conditions)	$$-$$$	3-15 years
Devices	Handheld portable radios, cellular phones, satellite phones, mobile data devices	$-$$	2-10 years
Accessories	Holsters, chargers, speakers, lapel microphone extensions, Bluetooth, vehicle kits, aircards, intercoms	$	2-10 years
Features	Encryption to protect against security risks, ruggedization to ensure reliant services, Over-the-Air-Programming, automatic roaming	$-$$$	-
Software and Data Storage	Global information system, emergency notifications, monitoring, call answering, database access, Automatic Vehicle Locator	$-$$	-

Source: U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency

Wildfires can significantly impact emergency response infrastructure, creating challenges for first responders and organizations involved in managing and mitigating the effects. Wildfires can impact emergency response through:

- Transportation Disruptions: Debris on roads can hinder the ability of emergency vehicles to navigate and reach affected areas promptly. Hazardous road conditions may result in delays in response times.
- Road Closures: Wildfires can lead to the closure of roads due to debris accumulation and hazardous conditions. This can limit access for emergency vehicles and impede the evacuation of residents.
- Communication Disruptions: Wildfires can disrupt communication networks, affecting the ability of emergency responders to coordinate and communicate effectively. Downed power lines and damage to communication infrastructure contribute to these disruptions.
- Power Outages: Wildfires downing power lines can lead to power outages. Emergency response facilities, such as command centers and fire stations, may lose power, affecting their operational capabilities.
- Resource Allocation Challenges: Wildfires often require the allocation of additional resources, including personnel, equipment, and supplies, to address immediate needs. This can strain emergency response organizations and impact their ability to respond to other concurrent incidents.
- Logistical Challenges: Wildfires may create logistical challenges for the transportation of supplies, equipment, and personnel to affected areas, hindering the overall effectiveness of emergency response efforts.
- Increased Demand for Services: Wildfires can result in an increased demand for emergency services, including medical assistance, search and rescue operations, and responses to accidents. Emergency response organizations may need to manage a higher volume of incidents simultaneously.

In order to reduce plan duplication, mapping concerning fire and police locations may be found in Maps 38 and 39 on pages 66 and 67.

Wildfires can have various impacts on water utilities and infrastructure, affecting both the supply and quality of water as well as the infrastructure used to treat and distribute it, including:

- Water Source Contamination: Wildfires can contaminate surface water and groundwater sources with ash, debris, sediment, and pollutants. When rain falls on burned areas, it can wash ash and other contaminants into rivers, lakes, and reservoirs, compromising water quality. This can pose challenges for water treatment plants in removing contaminants and ensuring the safety of drinking water supplies.
- Reduced Water Availability: Wildfires can decrease water availability in affected watersheds by altering hydrological processes such as infiltration, runoff, and groundwater recharge. The loss of vegetation and soil cover increases the risk of erosion and reduces water retention capacity, leading to decreased streamflow and lower reservoir levels. Water utilities may need to implement conservation measures and adjust water allocation plans to manage shortages during and after wildfires.
- Infrastructure Damage: Wildfires can damage water infrastructure such as pipelines, pump stations, treatment plants, and storage facilities. Direct exposure to flames, intense heat, and falling debris can cause structural damage, melting of pipes, and electrical equipment failure. In addition, the loss of vegetation and soil stability can increase the risk of landslides and mudflows, which can damage or block water conveyance systems.
- Power Outages: As mentioned earlier, wildfires can disrupt electrical utilities, leading to power outages that affect water treatment and distribution operations. Many water treatment plants rely on electricity to power pumps, motors, and treatment processes. Without power, water utilities may be unable to maintain adequate water pressure, treat water to regulatory standards, or supply water to customers.

Lincoln County is served by the Grover C. Dils Medical Center in Caliente, which has 20 inpatient beds. While this facility may see a rapid increase in wildfire injuries during an event, it is considered unlikely that this increase will impact or overload capacity except in the case of a catastrophic fire. In the event of a catastrophic fire, patients will need to be transported to adjacent regions to receive treatment.

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of community and state infrastructure. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Lincoln County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

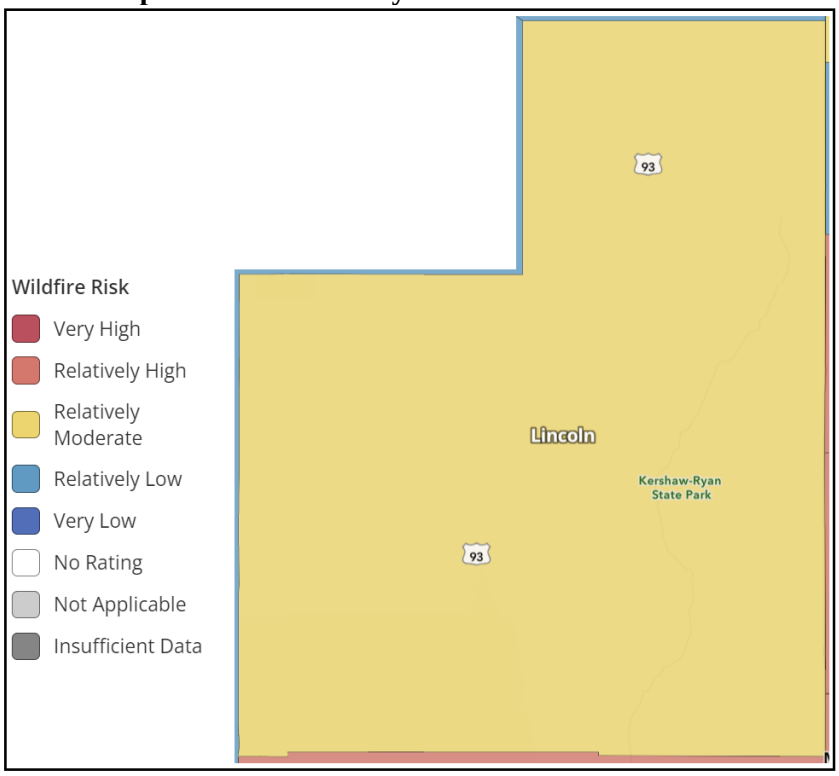
Table 76: Wildfire Consequence Analysis

Subject	Potential Impacts
Impact on the Public	People located in the immediate area of the fire face the risk injury or death if not evacuated in time. Once evacuated, they may face lengthy period of relocation. Fires can release toxic components which can cause adverse health effects including respiratory and cardiovascular system impacts. Psychological and psychiatric concerns may arise due to exposure to the traumatic event. Young children and the elderly are especially vulnerable to health issues stemming from fire and smoke exposure.
Impact on Responders	Fire, police, and emergency responders may be called to evacuate people from the fire area, close roads, create fire breaks, attend to the injured, and direct traffic. Firefighters are at a higher risk of smoke inhalation, burns, and health problems due to working in close proximity to fires and the subsequent smoke.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Wildfires may impact an agency's ability to maintain continuity of operations due to impacts on critical infrastructure.
Delivery of Services	Fires can cause disruption of services, including the ability to deliver goods and services. Impacts on operations could lead to a reduction or cessation of services. Goods and facilities may be damaged or destroyed by fire, smoke, or extremely high temperatures.
Property, Facilities, and Infrastructure	Fire can damage or completely destroy property and critical facilities, as well as lead to interruption of the power supply system. A fire of significant strength can cause major damage to buildings or farmland. Large fires may also interrupt transportation systems such as train and bus lines, creating a challenge for public transit and evacuation.
Impact on Environment	Fires can cause significant impact to the environment by spreading pollution, damaging agricultural crops, and disturbing the wildlife and natural areas. Water and soil pollution caused by fire can cause longer term threats to ecosystem health. Fire damage may also affect soil formation, nutrient cycling, and carbon sequestration and storage.
Economic Conditions	Fires can cause a fiscal impact on the local government, even if costs can be recouped by federal grants. Agriculture is a major component of the local, county and state economy, and major fires could cause significant impact. Costs may be associated with loss of income, damage to property, firefighting can be significant.
Public Confidence in Governance	Governmental response, on all levels, state and local, would require direct action that must be immediate and effective to maintain public confidence.

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the following map was created indicating the potential risk Lincoln County from tornadoes:

Map 69: Lincoln County FEMA NRI Wildfire Risk



Source: FEMA NRI

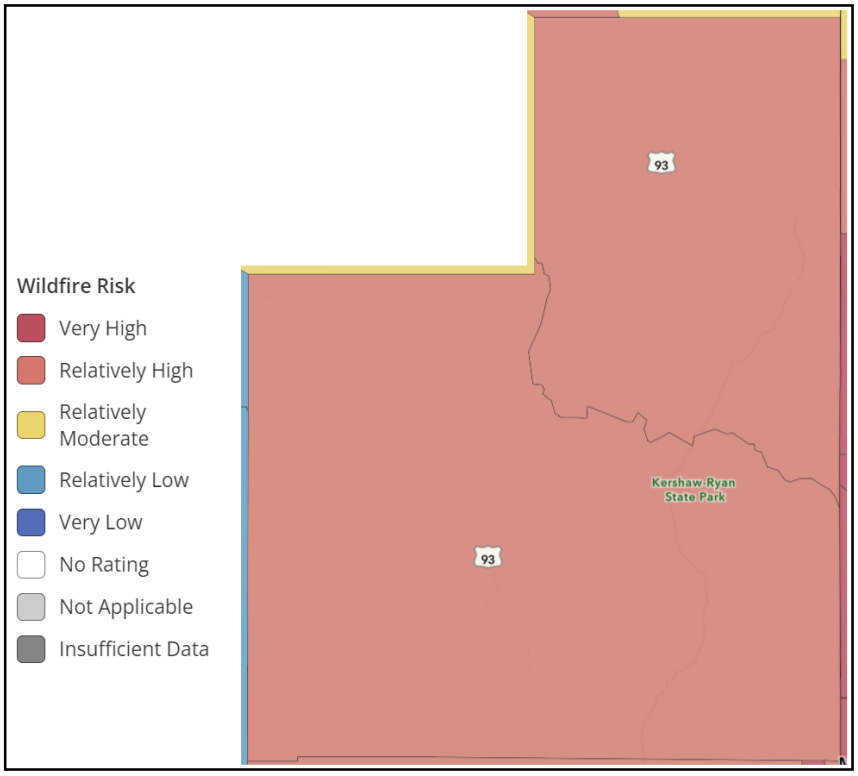
As part of the NRI, EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community's risk. The following map indicates the EAL for wildfires for Lincoln County:

Map 70: Lincoln County FEMA NRI Wildfires EAL

Source: FEMA NRI

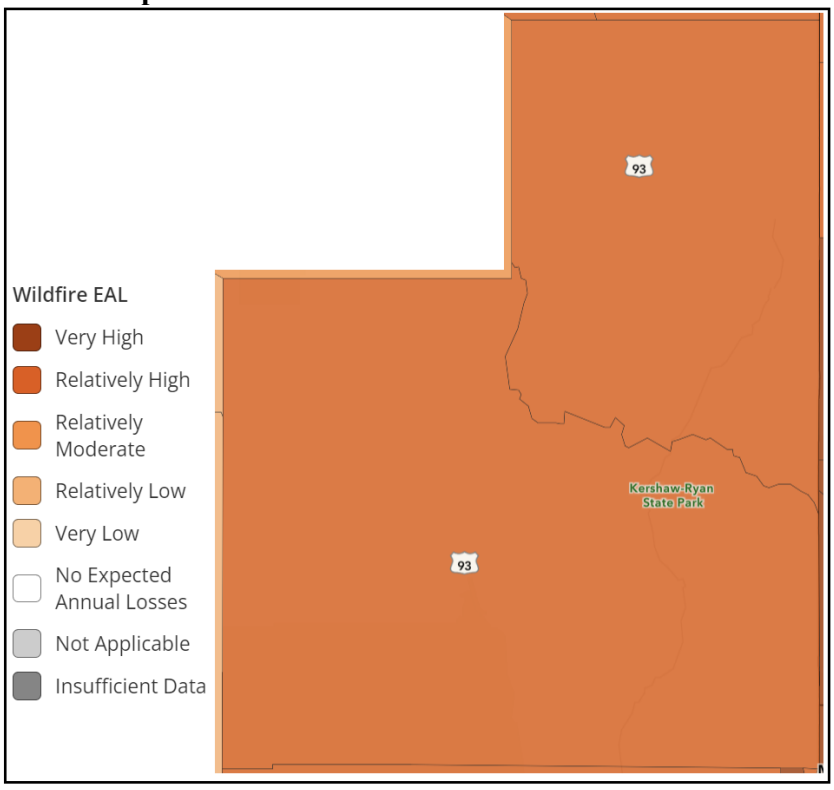
The following maps were created indicating the potential risk to participating jurisdictions (as indicated by census tract) from wildfires:

Map 71: FEMA NRI Jurisdictional Wildfires Risk



Source: FEMA NRI

Map 72: FEMA NRI Jurisdictional Wildfires EAL



Source: FEMA NRI

The following table indicates the FEMA NRI and EAL analysis for Lincoln County and the City of Caliente for wildfire:

Table 77: Lincoln County FEMA NRI and EAL for Wildfire by County

Jurisdiction	Risk Index	EAL
Lincoln County	Relatively Moderate	Relatively Moderate
Caliente	Relatively High	Relatively High

Source: FEMA NRI

Section 5 –Capability Assessment

5.1 Introduction

This capability overview for Lincoln County and the City of Caliente documents programs, policies, and funding mechanisms for participating jurisdictions. All listed capabilities documented in the previous HMP were reviewed for relevance and updated to reflect the current environment, as necessary. Additionally, any programs, policies, or funding mechanisms that are no longer applicable, are outdated, or are no longer in existence have been removed. As part of this process, updated jurisdictional capability profiles were sent for review and, if necessary, further revision.

This section of the plan discusses the current capacity of regional communities to mitigate the effects of identified hazards. A capability assessment is conducted to determine the ability of a jurisdiction to execute a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects.

A capability assessment helps to determine which mitigation actions are practical based on a jurisdiction's fiscal, staffing and political resources, and consists of:

- An inventory of relevant plans, ordinances, or programs already in place
- An analysis capacity to carry them out.

A thoughtful review of jurisdictional capabilities will assist in determining gaps that could limit current or proposed mitigation activities, or potentially aggravate a jurisdiction's vulnerability to an identified hazard. Additionally, a capability assessment can detail current successful mitigation actions that should continue to receive support.

Currently, the Lincoln County Emergency Management Office has the primary responsibility for directing the hazard mitigation planning process for all jurisdictions in Lincoln County. Additionally, further augmenting emergency management capabilities, the Nevada Division of Emergency Management / Homeland Security aids with state and federal mitigation and emergency management initiatives and available funding opportunities.

Technical capabilities are generally based on financial capabilities. In general, Lincoln County has a small but dedicated staff for planning, engineering, and mapping, but often lack funding for needed projects and positions. It should be noted that the Nevada Division of Emergency Management / Homeland Security offers a variety of programs to provide technical expertise, including mapping and planning.

The following table details both Lincoln County and City of Caliente departments and positions and their roles in supporting hazard mitigation planning:

Table 78: Local Jurisdiction Department and Positions Supporting Mitigation Planning

Department or Position	Description	Role in Mitigation
Building Officials	Implements and enforces building codes and zoning ordinances.	Ensures construction standards are consistently applied.
Emergency Management Director	Directs local response, recovery, and mitigation programs.	Develops Local Emergency Operations Plan, Continuity Plans, and Hazard Mitigation Plans, helping to minimize loss of life and property damage.
NFIP Coordinator	Oversees compliance with the NFIP and addresses flood determinations, mapping issues, and construction standards within Special Flood Hazard Areas.	Reviews floodplain/building permits for structures within floodplains and inspects developments to determine compliance with the community development standards and NFIP requirements. Explains floodplain development requirements to community leaders, citizens, and the general public.

Table 78: Local Jurisdiction Department and Positions Supporting Mitigation Planning

Department or Position	Description	Role in Mitigation
Planning Boards	Recommends land use regulations	Coordinates with the NFIP Coordinator and the Hazard Mitigation Committee through the mitigation planning process and the implementation of the plans.
Public Works Departments	Responsible for municipal drainage and storm water management systems.	Provides for the ongoing maintenance and upgrading of local storm water systems to help reduce flood risks.
Elected Leadership	Approves ordinances and bylaws and facilitates capital improvements budget and plan.	Provide leadership and approval for local hazard mitigation plans, projects, grants, and programs.

5.2 Regulation of Development

The regulation of development plays a crucial role in helping a community become more resilient in the face of various hazards. Effective regulation of development contributes to community resilience through:

- Risk Reduction: Regulations guide land use and construction practices, ensuring that they provide strong protection against hazards.
- Public Safety: Building codes and land-use regulations establish minimum safety standards for construction, including structural integrity, fire resistance, and the use of resilient materials.
- Infrastructure Resilience: Regulations may require infrastructure improvements, such as the construction of resilient roads, bridges, utility systems, and drainage systems. This strengthens a community's ability to withstand hazards, ensures the continued operation of critical services, and aids in recovery.
- Floodplain Management: Regulations in flood-prone areas can mandate elevation requirements for new construction, ensuring that structures are built above the base flood elevation. This minimizes flood damage, reduces the need for costly post-disaster repairs, and protects property values.
- Land Use Planning: Effective land-use planning helps communities avoid inappropriate development in areas at high risk of hazards.
- Community Awareness: Public education and outreach can be incorporated into regulations, requiring communities to inform residents about local hazards, evacuation routes, and preparedness. Informed residents are more likely to take protective measures and respond effectively to disasters.

The following sections provide further detail on building codes, zoning ordinances, and floodplain management.

Building Codes

In Nevada, the authority for enacting and enforcing building codes lies with local governments, such as cities and counties. Each jurisdiction can adopt its own building codes, which can be based on national or international building codes like the International Building Code or the International Residential Code.

Building codes establish general minimum construction standards and are enforced through authorized local building inspection agencies and inspectors. Building codes provide for:

- Life Safety: Building codes include provisions for fire safety, emergency egress, and the use of fire-resistant materials.
- Accessibility and Life Support: Building codes incorporate accessibility standards, ensuring that buildings are designed to accommodate all individuals. This is crucial during and after disasters when people with mobility issues may require assistance. Accessible features also benefit emergency responders and support recovery efforts.
- Retrofitting Existing Buildings: Building codes may require the retrofitting of older structures to meet modern safety standards.

- Public Awareness: Building codes promote public awareness of hazards and the importance of resilient construction. This can lead to informed decision-making by property owners, builders, and developers, resulting in safer structures.

Key hazard resistant building code provisions found in current building codes include:

- Structural Design Requirements: Provides requirements for the structural design of buildings to ensure their resistance to various hazards, including earthquakes, high winds, and snow loads. These requirements are aimed at enhancing the overall structural integrity and safety of buildings.
- Wind Design Requirements: Provides specific provisions for wind design, considering the geographical location of the structure. Wind loads are calculated based on factors such as wind speed, exposure, and building height.
- Seismic Design Requirements: Incorporates seismic design provisions to address earthquake hazards. The code includes seismic design categories and requirements for the design and construction of buildings in seismic-prone regions.
- Flood-Resistant Design Requirements: Includes provisions related to flood-resistant design, particularly in areas prone to flooding. It may specify elevation requirements, construction materials, and other considerations to reduce the risk of flood damage. The vast majority of the regulations required by the NFIP are included within the International Building Code and the International Residential Code.
- Fire-Resistant Construction Requirements: Requirements for fire-resistant construction are included to mitigate the risk of fire hazards. This includes specifications for fire-resistant materials, assemblies, and building features.
- Material and Construction Standard Requirements: Establishes standards for building materials and construction methods to ensure the durability and safety of structures, considering various hazards.

Building and development are overseen by the Lincoln County Building Department and the Caliente Building Department. These departments assure that the construction and modification of all structures within the unincorporated areas of the county and within the City of Caliente meet the minimum standards as established by the State of Nevada. The departments administer and enforce building, heating, ventilation, air conditioning, electrical, and plumbing standards for the protection of life, health, environment, public safety, and the conservation of energy in the design and construction of buildings and structures. This department also serves as the building permit and inspection agency for all participating jurisdictions to ensure compliance with all applicable building laws. Current Codes enforced include:

- 2012 Int'l Building Code
- 2012 Int'l Residential Code
- 2012 Int'l Energy Conservation Code
- 2012 Uniform Plumbing Code
- 2012 Uniform Mechanical Code
- 2012 Int'l Mechanical Code
- 2012 Int'l Property Maintenance Code
- 2012 Int'l Swimming Pool, and Spa Code
- 2012 National Electric Code
- 2012 Int'l Fire Code

As part of this planning effort, personnel charged with regulating or overseeing development were given the opportunity to review and comment of the elements of this plan. The following personnel were identified:

Table 79: Lincoln County Building or Development Stakeholders

Jurisdiction	Name	Title
Lincoln County	Cory Lytle	Director, Building Department
Caliente	Ken Dixon	Building Inspector

Zoning Ordinances

Zoning ordinances in Lincoln County and the City of Caliente govern land use, development, and building requirements. These ordinances work by dividing the land into different zoning districts and establishing rules and guidelines for land use, building placement, density, and setback within the zoning districts. In general, zoning ordinances establish:

- **Zoning districts:** Areas designated for specific types of land use, such as residential, commercial, industrial, agricultural, mixed-use, or special districts.
- **Land usage within a zoning district:** Specifications as to which activities, buildings, and operations are permitted in each zoning district.
- **Enforcement:** Zoning ordinances are enforced by the local building department or zoning enforcement officers.

Zoning is the traditional, and most common, tool available to local jurisdictions to control the use of land. Zoning is used to promote health, safety, and the general welfare of the community. Zoning is used to dictate the type of land use and to set minimum specifications for use such as lot size, building height and setbacks, and density of population.

Zoning ordinances play a significant role in enhancing hazard resilience for communities and can help reduce vulnerability to various natural and man-made hazards by regulating land use and development practices. In Lincoln County, locally instituted and enforced zoning ordinances provide for:

- Land Use Planning: Zoning ordinances designate land use zones within a community, ensuring that certain areas are reserved for particular uses. This can prevent the construction of critical infrastructure, homes, or businesses in high-risk zones, such as floodplains or wildfire-prone areas.
- Setback Requirements: Zoning ordinances often mandate specific setbacks, which are distances between structures and property lines or natural features. These setbacks can help prevent buildings from being too close to potential hazards, potentially reducing the risk of damage.
- Building Height and Design Standards: Zoning codes can establish building height limits to reduce exposure to certain hazards. Design standards, including materials and construction methods, can be specified to make structures more resilient.
- Floodplain Management: Many zoning ordinances incorporate floodplain regulations, which dictate where and how buildings can be constructed within flood-prone areas. These regulations may require buildings to be elevated, use flood-resistant materials, or include openings to allow floodwaters to pass through.
- Wildfire Mitigation Zones: In regions susceptible to wildfires, zoning ordinances can establish wildfire mitigation zones with specific requirements for defensible space, fire-resistant landscaping, and building materials to reduce the risk of wildfires spreading to structures.

Properly applied, zoning restriction and historic preservation are some of the most effective hazard mitigation tools available against a wide variety of hazards.

Floodplain Management Ordinances

Floodplain ordinances and management are one of the most effective hazard mitigation tools available against flooding. Local floodplain ordinances, required for NFIP participants, are often used to prevent inappropriate development in floodplains and to reduce flood hazards. In general, they allow the jurisdiction to:

- Minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage.
- Prevent and minimize loss of life, injuries, and property damage in flood hazard areas.
- Promote the public health, safety and welfare of citizens in flood hazard areas.
- Manage planned growth.
- Grant permits for use in development within special flood hazard areas that are consistent with the community ordinance and the NFIP under 44 CFR 60.3.

The NFIP floodplain management regulations work alongside local building codes by providing specific flood-related requirements that must be met in addition to general building code standards. In NFIP communities, when constructing or substantially improving a structure in a Special Flood Hazard Area (SFHA), the structure must be elevated to or above the Base Flood Elevation (BFE), which is a requirement imposed by the NFIP's regulations.

The following table details the status of these c odes and ordinances for participating jurisdictions:

Table 80: Jurisdictional Codes and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Zoning Ordinance
Lincoln County	x	x	x
Caliente	x	x	x

5.3 Jurisdictional Compliance with NFIP

All NFIP participating jurisdictions are required to meet the minimum standards set forth in the program. The jurisdictions' NFIP coordinator ensures all new construction projects are properly surveyed and receive an elevation certificate.

NFIP participants are committed to continued involvement and compliance. To help facilitate compliance, NFIP participating jurisdictions:

- Adopted floodplain regulations through local ordinance
- Enforces floodplain ordinances through building restrictions
- Regulates new construction in Special Flood Hazard Areas as outlined in their floodplain ordinance
- Utilizes FEMA DFIRMs, where available
- Monitors floodplain activities

Please see Table 61 on page 101 for current effective map dates for each participating community.

As part of this planning effort, Lincoln County NFIP Coordinators were given the opportunity to review and comment of the elements of this plan. The following individuals designated as NFIP Coordinators identified:

Table 81: Lincoln County Jurisdictional NFIP Coordinators

Jurisdiction	NFIP Coordinator	Title
Lincoln County	Cory Lytle	Director, Building Department
Caliente	Ken Dixon	Building Inspector

Source: Lincoln County

Participation in the NFIP is based on an agreement between the municipality and the federal government. If a municipality agrees to adopt and enforce a floodplain ordinance designed to reduce future flood risks, all citizens in the participating municipality can purchase flood insurance.

In Lincoln County, as part of NFIP participation, communities must:

- Use current NFIP flood maps in adopting floodplain management regulations.
- Require permits for all development in SFHAs
- Ensure that development does not increase the flood hazard on other properties.
- Meet current elevation standards. Ensuring the lowest occupied floor is elevated to or above the base flood elevation indicated on the NFIP flood map.

While most floodplain requirements have been incorporated into the current Building Codes, some additional provisions and regulations may be required by a community. Communities participating in the NFIP are required to adopt, enforce and maintain a local floodplain ordinance as a stipulation of compliance with the program. The purpose of this ordinance is to ensure public safety, minimize impact to persons and property from flooding, protect watercourses from

encroachment, and maintain the capability of floodplains to retain and carry off floodwaters. The local floodplain administrator is typically the municipal official responsible for overseeing the enforcement and update of the document.

Floodplain ordinances are typically enforced by law enforcement departments or code enforcement offices. In general, the enforcement process generally works as follows:

- Identification of Violations: Violations are often identified through various means, such as citizen complaints, routine inspections, or observations by enforcement officers.
- Notification: Once a violation is identified, the responsible party is typically notified of the violation. This notification may come in the form of a written citation, warning letter, or verbal communication depending on the severity of the violation and local procedures.
- Correction Notice: In many cases, the responsible party is given a certain amount of time to correct the violation. They may be required to remedy the situation, obtain necessary permits, or comply with specific regulations.
- Follow-up Inspections: After the designated correction period, enforcement officers may conduct follow-up inspections to ensure that the violation has been addressed satisfactorily.
- Penalties and Fines: If the responsible party fails to comply with the ordinance or correct the violation within the specified timeframe, they may face penalties or fines. These penalties can vary depending on the nature and severity of the violation and may escalate for repeated offenses.
- Legal Action: In cases of persistent non-compliance or serious violations, local authorities may initiate legal proceedings against the responsible party. This can involve court appearances, injunctions, or other legal measures to compel compliance.

The following figure represents both pre- and post-disaster community NFIP requirements:

Figure 3: Pre- and Post-Disaster Community NFIP requirements

Source: FEMA

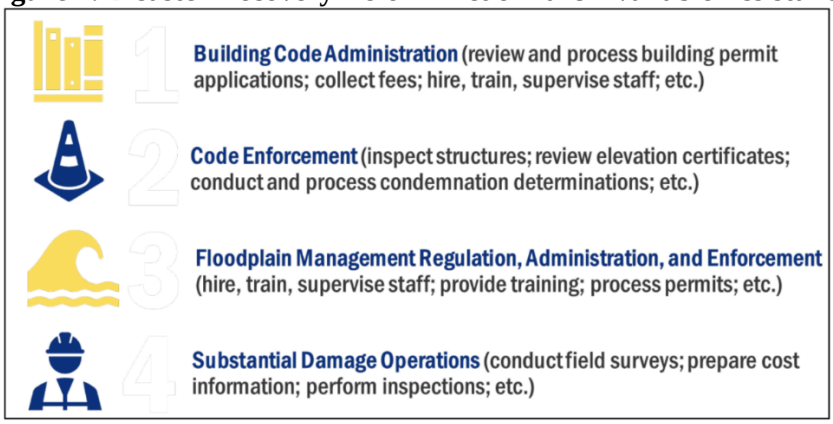
When structures located in the SFHAs are substantially modified (more than 50% damaged or improved) they are required to be brought into compliance with current NFIP standards and local building codes. In cases of repairs being conducted as a result of damage, jurisdictional NFIP Coordinators are responsible for substantial damage and improvement determinations. These determinations are required for compliance in the NFIP and must be completed before residents begin repairs or permits are issued.

However, the May 2020 Report to Congressional Committees on the National Flood Insurance Program by the United States Government Accountability indicates "FEMA generally does not collect or analyze the results of these assessments, limiting its ability to ensure the process operates as intended. Furthermore, FEMA has not clarified how communities can access NFIP claims data. Such data would help communities target substantial damage assessments after a flood." This has been found to be true in Lincoln County, with submitted information and data underutilized and some FEMA available data unshared and/or unadvertised.

Section 1206 of the Disaster Recovery Reform Act of 2018 authorizes the FEMA to provide communities with the resources to administer and enforce building code and floodplain management ordinances following a major disaster declaration through FEMA's Public Assistance Program. To be eligible for reimbursement under the Public Assistance Program, including for the Disaster Recovery Reform Act of 2018 Section 1206, communities must be designated for Public Assistance permanent work under a major disaster declaration and be legally responsible to administer and

enforce building codes or floodplain management regulations. Communities must also be in good standing with the NFIP. Available assistance includes:

Figure 4: Disaster Recovery Reform Act of 2018 Available Assistance



Source: FEMA

It is worth noting that this assistance is available for a variety of hazards occurrence types, not just flooding.

Key to achieving across the board reduction in flood damages is a robust community assistance, education, and awareness program. As such, NFIP participating jurisdictions will continue to develop both electronic (including social media) and in person outreach activities.

5.4 Jurisdictional Plans

Planning plays a critical role in hazard mitigation by helping communities identify, assess, and reduce risks associated with natural and man-made hazards. Effective planning involves a proactive, strategic, and comprehensive approach to minimize the impact of disasters and enhance community resilience. Jurisdictions were asked if they had completed the following plans:

- Comprehensive Plan: A comprehensive plan establishes the overall vision for a jurisdiction and serves as a guide to decision making, and generally contains information on demographics, land use, transportation, and facilities. As a comprehensive plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.
- Emergency Operations Plan: An emergency operations plan outlines the responsibility and means and methods by which resources are deployed during and following an emergency or disaster. In Lincoln County, the overarching county provides emergency operation planning for jurisdictions within its borders.
- Fire Mitigation Plan: A fire mitigation plan is used to mitigate a jurisdiction's wildfire risk and vulnerability. The plan documents areas with an elevated risk of wildfires, and identifies the actions taken to decrease the risk. A fire mitigaion plan can influence and prioritize future funding for hazardous fuel reduction projects, including where and how federal agencies implement fuel reduction projects on federal lands.
- Flood Mitigation Assistance Plan: The purpose of the flood mitigation assistance plan is to reduce or eliminate the long-term risk of flood damage to buildings and other structures insured under the NFIP.

The following table details the status of these plan types for each participating jurisdiction:

Table 82: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Emergency Operations Plan	Fire Mitigation Plan	Flood Mitigation Assistance Plan
Lincoln County	x	x		
Caliente	x	x		

Note: Blank indicates no plan

5.5 Challenges and Opportunities for Capability Improvement

As always, challenges exist for all participating jurisdictions due to the day-to-day demands of the working environment including staffing issues, budget restrictions, and staffing turnover. These issues can, and do, impact the utilization and incorporation of the HMP and the completion of identified hazard mitigation projects.

As part of this planning process, the MPC worked to identify gaps and deficiencies identified in the completion of this HMP. Resulting from this assessment is a series of problem statements, concise descriptions of issues or challenges that need to be addressed. These problem statements were determined to be applicable to all participating jurisdictions:

- Continued climate change is driving an increased incidence of major hazard occurrences, stressing the response, recovery, and mitigation capabilities of even the most prepared jurisdiction.
- Available funding for the completion of hazard mitigation projects is at a premium, with all participating jurisdiction seeing minimal room in the budget for any required project match.
- The difficulties in applying for and managing hazard mitigation grants is a challenge for both the City of Caliente and Lincoln County
- Staffing at all levels is stretched thin, with many personnel wearing multiple hats, compromising mitigation capabilities.

Improving capabilities can lead to enhanced performance, increased efficiency, and better outcomes in hazard mitigation planning and implementation. The following identify recommended improvements for all jurisdictions, with some recommendations being applicable to all jurisdictions, and other being specific to identified jurisdictions:

- Lincoln County and the City of Caliente should build a relationship with local meteorologists and the NWS to give priority access to rapidly developing weather conditions.
- Lincoln County and the City of Caliente could receive instruction from FEMA Region IX on grant application and grant management strategies. These classes could aid in receiving available grant funding.
- Lincoln County and the City of Caliente should consider adoption of the 2021 International Building Codes to ensure current constructions standards, including climate resiliency standards.
- Both Lincoln County and the City of Caliente would benefit from the creation of a comprehensive plan to help plan and budget for hazard mitigation measures, policies, and procedures
- Current NFIP participants should apply for membership in the CRS to allow citizens to receive discounts off their federally backed flood insurance policies.
- Lincoln County and the City of Caliente should explore engaging in public-private emergency planning partnerships to further increase hazard resiliency through the infusion of additional funding and expertise to help complete mitigation projects.

Additionally, to help overcome many of these identified challenges, participating jurisdictions will work collaboratively using the following strategies, as appropriate:

- Innovation and Adaptation: Foster a culture of innovation and adaptability. Encourage employees to think creatively, embrace change, and explore new ways of doing things to overcome challenges.
- Training and Development: Invest in training and development to enhance skills and knowledge.
- Communication Improvement: Enhance communications and provide clear and transparent communication when sharing information, aligning teams, and addressing concerns.
- Collaboration and Teamwork: Encourage collaboration and teamwork which allows for the pooling of diverse skills and perspectives, leading to more effective problem-solving (the MPC is a good example of effective use of this strategy).
- Technology Adoption: Embrace technology to streamline operations and enhance productivity.
- Agile Project Management: Implement agile project management methodologies to enhance flexibility and responsiveness to changing conditions. Agile approaches allow teams to adapt quickly to challenges.

As appropriate, these strategies will be tailored for specific circumstances, with a combination of these strategies often being more effective than relying on a single approach.

Section 6 – Mitigation Strategy

6.1 Introduction

As part of this planning effort, Lincoln County worked to minimize the risk of future impacts from identified hazards to all citizens of the region. In an attempt to shape future regulations, ordinances and policy decisions the MPC reviewed, revised, and developed a comprehensive hazard mitigation strategy. This comprehensive strategy includes:

- Goals to guide the selection of activities to mitigate and reduce potential loss.
- A discussion of funding capabilities for hazard mitigation projects.
- Identification, evaluation, and prioritization of mitigation actions along with potential funding sources.

Lincoln County's mitigation strategy promotes long-term hazard resilience that will have a positive impact on quality-of-life issues. By minimizing both the exposure to, and potential impacts from, identified hazards jurisdictions can expect to minimize injuries and loss of life, reduce property damage, and minimize the day to day social and economic disruptions that follow hazard events.

6.2 Goals and Objectives

Lincoln County's overall mitigation goal is to minimize the protect lives and properties within the region from the impacts of hazards identified in this plan. Based on discussion with the discussions by the MPC, it was determined that the goals (desired outcomes) identified in the previous HMP remained viable and valid. The following represent the identified goals and objectives for the 2024 HMP:

- **Goal 1:** Reduce the risk to the people and property from the identified hazards in this plan.
- **Goal 2:** Work to protect all vulnerable populations, structures, and critical facilities from the impacts of the identified hazards.
- **Goal 3:** Improve public outreach initiatives to include education, awareness, and partnerships with all entities in order to enhance the understanding identified hazards and hazard mitigation opportunities.
- **Goal 4:** Enhance communication and coordination among all agencies and between agencies and the public.

The Lincoln County MPC will continuously evaluate these identified goals and objectives against current capabilities and conditions. As part of this process, the MPC will collect and analyze data and feedback from plan stakeholders to help identify gaps, roadblocks, and achievements. Using this information, strategies will be developed to bridge identified gaps, remove identified roadblocks, and celebrate identified successes in achieving the goals of this HMP. Additionally, when necessary, the Lincoln County MPC will modify, update, or expand identified goals based on the review process.

In addition, the Lincoln County MPC will work with all local, county, regional, and state agencies and policy makers to help integrate the goals delineated in the HMP and goals and plans for combating climate change.

6.3 Review and Creation of Hazard Mitigation Actions

Hazard mitigation actions are proactive measures taken to reduce or eliminate the long-term risk and impact of natural and human-made hazards. These actions are designed to minimize the damage caused by disasters and contribute to the overall resilience of communities and infrastructure.

For this plan update members of the MPC were provided with a complete list of previously identified mitigation actions and asked to review them to determine their status. Previously identified mitigation status was reported using the following definitions:

- **Completed:** The action has been fully completed.
- **Not Completed:** The action was not started or has been started and is not completed.
- **Revised:** Action has been revised to reflect current planning environment or identified changes.
- **Cancelled:** The action has been removed from consideration due to either a lack of resources or changing mitigation priorities.

- **Ongoing:** The action is completed and has become an ongoing activity or capability.

Additionally, MPC members and stakeholders were provided with opportunities to identify and incorporate newly identified actions based on the changing hazard environment or previously unidentified needs.

In preparing a mitigation strategy all reasonable and obtainable mitigation actions were considered to help achieve the general goals. Priorities were developed based on past damage, existing exposure to risk, and weaknesses identified by the State and local capability assessments. In identifying mitigation actions, the following activities were considered:

- The use of applicable building construction standards.
- Hazard avoidance through appropriate land-use practices.
- Relocation, retrofitting, or removal of structures at risk.
- Removal or elimination of the hazard.
- Reduction or limitation of the amount or size of the hazard.
- Segregation of the hazard from that which is to be protected.
- Modification of the basic characteristics of the hazard.
- Control of the rate of release of the hazard.
- Provision of protective systems or equipment for both cyber and physical risks.
- Establishment of hazard warning and communication procedures.
- Redundancy or duplication of essential personnel, critical systems, equipment, and information materials.

In general, all identified mitigation actions were classified under one of the following broad categories:

- **Local plans and regulations:** Actions that create or update plans to reflect situational changes and/or actions that aid in the creation, revision, or adoption of regulations related to hazard mitigation and management.
- **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- **Preparedness and response:** Emergency response or operational preparedness actions.
- **Public education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.
- **Structural:** Actions that the modification of existing buildings or structures or involve the construction of structures to reduce the impact of hazard.

6.4 Prioritization of Mitigation Actions

The MPC and subject matter experts worked together to prioritize both previously identified and newly identified hazard mitigation actions. The methodology used to determine mitigation action priorities was based upon the following:

- Review of the updated risk assessments.
- Review of revised goals and objectives.
- Review of capabilities.

A multi-pronged and flexible analysis method was used for determining and prioritizing mitigation actions. An initial review of previously identified but not completed actions was conducted to ensure that, based on current condition and capabilities, the actions were still viable. Actions that were considered viable were retained in this plan update, with minor revisions completed as necessary.

For identified actions that were retained, and for newly identified actions, the FEMA recommended Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria were used to assist with prioritization. The following table details the STAPLEE criteria:

Table 83: STAPLEE Review Criteria

Criteria	Discussion	Example Considerations
Social	There should be community acceptance and support for the mitigation action?	Does the action have community acceptance? Will the proposed action adversely affect one segment of the population?
Technical	The proposed mitigation action should be technically feasible and should provide a long-term reduction in losses.	How effective is the action in avoiding or reducing future losses? Does it solve a problem or only a symptom? Does the action create additional problems?
Administrative	Personnel and administrative capabilities should be available to administer all phases of the project.	Are the staffing and administrative capabilities to implement the action in place? Is there someone to coordinate and lead the effort?
Political	Political support for the mitigation action needs to be present.	Is the action politically acceptable? Have political leaders been involved in the planning process? Is there a political champion to help see the project to completion?
Legal	The legal authority to implement the actions need to be in place or possible with the passing of laws or regulations.	Does the legal authority to implement the proposed action exist? Are there potential legal repercussions?
Economic	The current budget (and/or general obligation bonds or other instruments) need to be in place to fully fund the mitigation action.	Do the potential benefits of this action exceed the potential costs? Has funding been secured for the proposed action? What are the potential funding sources (public, non-profit, and private)? How will this action affect the fiscal capability of the community(s)? Does the action contribute to other community goals, such as capital improvements or economic development?
Environmental	Actions should interface with the need for sustainable and environmentally healthy communities. Also, statutory considerations, such as the National Environmental Policy Act need to considered for federal funds.	How will the action affect the environment? Will the action need environmental regulatory approvals? Will it meet federal, state, and local state regulatory requirements? Are endangered or threatened species likely to be affected?

Based on the prioritization review, the MPC assigned each action the following prioritized ranking:

- **High Priority:** Actions that provide substantial progress towards improving resiliency and are determined as potentially urgent in nature by the MPC. This would include actions that strongly support the reduction of high hazard risks and meet mitigation goals. Additionally, actions in this ranking may have imminent funding availability or strong community support.
- **Medium Priority:** Actions that provide reasonable progress towards improving resiliency and are determined as moderately urgent in nature by the MPC. This would include actions that would lessen impact hazard events, but not eliminate the impact completely.
- **Low Priority:** Actions that provide incremental progress towards improving resiliency and are determined as slightly urgent in nature by the MPC. This would include actions that are generally the responsibility of the local community, actions outside the normal authority of the State, or actions whose cost/benefit analysis returns a low yield.

6.5 Mitigation Action Funding Sources

It is generally recognized that mitigation actions help realize long term savings by preventing future losses due to hazard events. However, many mitigation actions are beyond the budgetary capabilities of a single jurisdiction. This section provides a general description of some of the avenues available to defray the cost of implementing mitigation actions.

FEMA provides financial assistance to state, local, tribal, and territorial governments, as well as certain private non-profit organizations, to implement projects that help reduce the risk and impact of future disasters. These grant programs are designed to support initiatives aimed at mitigating hazards and improving resilience. The main grant program offered by FEMA for hazard mitigation is the Hazard Mitigation Assistance (HMA) program. The HMA program includes four subprograms, the Hazard Mitigation Grant Program (HMGP), the HMGP Post-Fire, Building Resilient Infrastructure and Communities (BRIC), and the Flood Mitigation Assistance (FMA) grant program. Applicants to these grant programs are required to submit project proposals that demonstrate the effectiveness of their proposed mitigation projects. The eligibility criteria, application process, and specific requirements for each program are outlined by FEMA in their guidelines and announcements, which are typically published on FEMA's website.

The following provides a general overview of major grant funding streams:

- **HMGP and HMGP Fire:** The HMGP grants assist in implementing long-term hazard mitigation measures following Presidential disaster declarations, including fire declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.
- **BRIC:** BRIC supports states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency. Working in coordination with BRIC, the National Mitigation Investment Strategy is intended to provide a national, whole-community approach to investments in mitigation activities and risk management.
- **FMA Grant Program:** FMA is a competitive grant program that provides funding to states, local communities, federally recognized tribes and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the NFIP. FEMA chooses recipients based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project. FEMA requires state, local, tribal and territorial governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for hazard mitigation assistance projects.

The following table summarizes HMA grants programs:

Chart 13: HMA Grant Program Summary

HMA Program Comparison	HMGP	HMGP Post Fire	BRIC	FMA
Program Type	Post-disaster	Post-disaster	Pre-disaster	Pre-disaster
Funding Availability	Presidentially declared disaster	FMAG-declared disaster	6% set aside from federal post-disaster grant funding	Annual appropriations
Competitive?	No	No	Yes	Yes
Eligible Applicants	States, federally recognized tribes, territories and the District of Columbia (DC)	States, federally recognized tribes, territories and DC	States, federally recognized tribes, territories and DC	States, federally recognized tribes, territories and DC
Eligible Subapplicants	State agencies, local governments, tribes and private nonprofit organizations	State agencies, local governments, tribes and private nonprofit organizations	State agencies, local governments and tribes	State agencies, local governments and tribes
Hazard Mitigation Plan Requirement	Yes	Yes	Yes	Yes
NFIP Participation	Communities with projects in Special Flood Hazard Areas (SFHAs)	Communities with projects in SFHAs	Communities with projects in SFHAs	Subapplicants and properties

Additionally, the following provide available grant funding avenues for hazard mitigation projects:

- **Rehabilitation Of High Hazard Potential Dam (HHPD) Grant Program:** HHPD awards provide technical, planning, design and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. A state or territory with an enacted dam safety program, the State Administrative Agency, or an equivalent state agency, is eligible for the grant.
- **Emergency Management Performance Grant:** Program provides state, local, tribal and territorial emergency management agencies with the resources required for implementation of the National Preparedness System and works toward the National Preparedness Goal of a secure and resilient nation. Allowable costs support efforts to build and sustain core capabilities across the prevention, protection, mitigation, response and recovery mission areas.
- **State Homeland Security Program:** Program includes a suite of risk-based grants to assist state, local, tribal and territorial efforts in preventing, protecting against, mitigating, responding to and recovering from acts of terrorism and other threats. This grant provides grantees with the resources required for implementation of the National Preparedness System and working toward the National Preparedness Goal of a secure and resilient nation.
- **Nonprofit Security Grant Program:** Program is one of three grant programs that support DHS/FEMA's focus on enhancing the ability of state, local, tribal, and territorial governments, as well as nonprofits, to prevent,

protect against, prepare for, and respond to terrorist or other extremist attacks. These grant programs are part of a comprehensive set of measures authorized by Congress and implemented by DHS to help strengthen the nation's communities against potential terrorist or other extremist attacks. Among the five basic homeland security missions noted in the DHS Strategic Plan for Fiscal Years 2020-2024

- **Public Assistance Program:** The mission of FEMA's Public Assistance program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. Through the Public Assistance program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain private non-profit organizations. The Public Assistance Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process. The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The grantee determines how the non-Federal share (up to 25%) is split with the eligible applicants.
- **Individual Assistance Program:** After a disaster, the federal government determines if any county in the state meets the criteria for individual disaster assistance. The decision is based on damage related to the severity and magnitude of the event. When a county receives an Individual Assistance declaration from the President of the United States, anyone who lives in that county can apply for assistance.
- **Small Business Administration Disaster Loans:** The Small Business Administration provides low-interest disaster loans to homeowners, renters, businesses of all sizes, and most private nonprofit organizations. Small Business Administration disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.
- **The Housing and Urban Development Agency**: Provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.
- **Community Development Block Grant Program**: This is a flexible program that provides communities with resources to address a wide range of unique community development needs. The program provides annual grants on a formula basis to general units of local government and States.
- **Individual and Households, Other Needs Assistance Program:** This program provides financial assistance to individuals or households who sustain damage or develop serious needs because of a natural or man-made disaster. The funding share is 75% federal funds and 25% state funds. The program provides grants for necessary expenses and serious needs that cannot be provided for by insurance, another federal program, or other source of assistance. The current maximum allowable amount for any one disaster to individuals or families is $25,000. The program gives funds for disaster-related necessary expenses and serious needs, including personal property, transportation, medical and dental, funeral, essential tools, flood insurance, and moving and storage.
- **WUI Grants:** The 10-Year Comprehensive Strategy focuses on assisting people and communities in the WUI to moderate the threat of catastrophic fire through the four broad goals of improving prevention and suppression, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. The WUI Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, re duction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance.

Small and impoverished communities that receive grants may receive a federal cost share of up to 90% of the total amount approved under the grant award. As defined in 44 CFR 201.2, a small and impoverished community is:

- A community of 3,000 or fewer individuals that is identified by the State as a rural community
- Is not a remote area within the corporate boundaries of a larger city
- Is economically disadvantaged, by having an average per capita annual income of residents not exceeding 80% of national, per capita income
- The local unemployment rate exceeds by one percentage point or more, the most recently reported, average yearly national unemployment rate
- Any other factors identified in the State Plan in which the community is located

6.6 Completed Mitigation Actions

Lincoln County and the City of Caliente remain committed to investigating and obtaining all available grant funding for the completion of hazard mitigation projects. Since the completion of the previous HMP in 2016 one of the identified mitigation actions have been completed, as follows:

Table 84: Completed Hazard Mitigation Actions

Previous HMP Action Number	Description
6.B	Complete improvement of street and address signage so that emergency responders can easily locate at risk homes or areas in all communities of low visibility during a wildland fire event.

Neither Lincoln County nor the City of Caliente have received any FEMA Hazard Mitigation Grant funding (HMGP, BRIC, PDM, FMAG) as of this plan. However, the following non-FEMA grants and funding have been awarded.

- In 2024 Lincoln County Emergency Management announced a grant award of $92,124 from the Nevada Department of Public Safety's Office of Criminal Justice Assistance. This Coronavirus Emergency Supplemental Funding grant allows for the acquisition of five LUCAS Chest Compression Systems, significantly improving the safety and effectiveness of life-saving care provided by Emergency Medical Services personnel
- In 2022 Lincoln County Fire District received a $100,000 loan and $50,000 grant to replace two aged fire trucks with a newer vehicle.
- In November 2020 Lincoln County received $751,500 for a drainage project in Pioche form the Community Development Block Grant program.
- Coronavirus State and Local Fiscal Recovery Funds through the American Rescue Plan Act:
    - The American Rescue Plan Act provides the Lincoln County Commission with $3,800,000 in direct federal aid.
    - The American Rescue Plan Act provides the City of Caliente with $1,445,585 in direct federal aid.

6.7 Jurisdictional Mitigation Actions

To support the mitigation goals identified in this HMP, both Lincoln County and the City of Caliente identified a comprehensive range mitigation projects and activities. The selected set carefully takes an all-hazards approach to mitigation while simultaneously addressing each of the plan's profiled hazards. The list of mitigation actions is based upon the potential to reduce risk to life and property with an emphasis on ease of implementation, community and agency support, consistency with local jurisdictions' plans and capabilities, available funding, and jurisdictional vulnerability.

It is important to note that since the previous HMP, requirements for plan approval have changed. In the previous plan, all jurisdictions identified only a few actions, with many of the actions identified at the county level to cover local participants. As such, the actions in this plan have been re-written and reclassified on a wholesale basis to ensure each participating jurisdiction has identified at least one action per identified hazard. In doing so, presenting a comparison to previously identified actions in impractical. However, any actions previously identified that have been completed are noted to illustrate successes.

Lincoln County and the City of Caliente acknowledge that the adoption and approval of this plan does not obligate the completion of each identified action. Rather, the MPC understands that progress should be shown in mitigation efforts which may include the completion of mitigation actions or other actions or progress in achieving the goals of the HMP.

A revised version of the requirement allows for a more tailored approach to mitigation planning, ensuring that communities address the hazards most relevant to their circumstances while also acknowledging that not all hazards may be equally significant across different areas. It promotes a more efficient use of resources by focusing efforts on mitigating the most pressing risks faced by each community.

Lincoln County and the City of Caliente elected to delete mitigation actions that were considered part of a standard operating procedure (programmatic) or that were outside of control (private sector). Deleted actions are identified in the following table along with the reason for deletion.

Table 85: Deleted Hazard Mitigation Actions

Previous HMP Action Number	Description	Rationale for Removal
1.A	Update Master Plan to be Consistent with Hazard Mitigation Plan.	Programmatic
1.B	Develop GIS hazard maps	Programmatic
1.C	Seek new data from other government, academic and private org. for Hazard mitigation and Emergency Management response	Programmatic
1.D	Share Hazard Information between city, county, and public and private organizations through public awareness	Programmatic
1.E	Develop. Database w/ inventory of hazard areas that can be used for passive recreation.	Programmatic
1.F	Review FEMA grant application procedures and establish internal procedures to streamline the application process.	Programmatic
1.G	Apply for Pre-Disaster Mitigation and Hazard Mitigation Grant Program grants to fund mitigation actions identified in this HMP.	Programmatic
2.A	Establish a budget and identify funding sources for mitigation outreach.	Programmatic
4.A	Enforce the International Building Code provisions pertaining to grading and construction relative to seismic hazards, with special emphasis regarding construction of any building in close proximity to existing fault lines.	Programmatic
4.3	Encourage utility companies to evaluate the seismic risk to their high-pressure transmission pipelines and implement mitigation measures such as automatic shut-off valves in SE corner of Lincoln County.	Programmatic
5.A	County, City, and FEMA update the remaining outdated FIRMs into new DFIRMs and ensure any new developments have the requirement to complete FIRMs as part of permit.	Programmatic
5.A.1	Apply for Letter of Map Revision upon completion of CYC Bridge Installation, based on removal of obstruction.	Programmatic
5.C	Ensure mobile home parks are not located within the 100-year floodplain or near a major fault.	Programmatic
5.E	Ensure that the NV State Engineers Office inspects high hazard dams in the planning area on a timely basis, per NRS 535.030.	Programmatic
6.E	Develop an annual free curbside weed removal pick-up program.	Programmatic
6.G	Develop a fuel reduction program to clear vegetation around and under electrical transmission lines, sub-stations and rights of way	Private sector
7.A	Protect existing assets, as well as new development, from severe winds.	Standard IBC Practice
7.C	Improve the safety and reliability of overhead lines through improved design, maintenance, right-of-way management, and inter-utility cooperation.	Private sector
7.D	Ensure all new construction is in compliance with wind design standards	Standard IBC Practice

The following actions, identified in the previous hazard mitigation plan, have been carried forward to this plan. Please note that the action description may have been updated for clarity:

Table 86: Carried Over Hazard Mitigation Actions

New Action Number	Previous Action Number	Description
Lincoln County 3	2.B	Work with school district to develop a public outreach campaign that teaches children how to avoid danger and behave during an emergency.
Lincoln County 3	2.C	Support the efforts and education of people with disabilities to prepare for disasters.
Lincoln County 3	2.D	Develop a joint City-County public outreach campaign about hazards risks and hazard mitigation efforts that homeowners can initiate and implement to enhance natural hazard safety in their own community.

Table 86: Carried Over Hazard Mitigation Actions

New Action Number	Previous Action Number	Description
Lincoln County 1	2.E	Obtain emergency generators to reduce impact of hazards on critical facilities.
Lincoln County 7	3.A	Develop. and adopt a water conservation ordinance that may stipulate landscaping requirements, hours for irrigation, retro-fitting motels and households for low-flow toilets and showers, and penalties for wasting water.
Lincoln County 3	3.B	Pursue the creation of a water conservation and public awareness program.
Lincoln County 8	4.B	Seismically retrofit critical facilities that are in close proximity to a fault line.
Lincoln County 9	4.C	Implement a program to repair/replace Unreinforced Masonry (URM) buildings. Inspect the identified URM buildings to evaluate safety issues
Lincoln County 3	4.D	Develop and provide managers of mobile home parks with information on how to improve the seismic performance of mobile homes.
Lincoln County 11	5.B	County and City continue their participation in the NFIP and enforce their respective floodplain ordinances.
Lincoln County 13	5.D	Designate all floodways as Open Space, as it is done in Alamo.
Lincoln County 14	5.F	Install culverts and storm water facilities to relieve floodwater
Lincoln County 15	5.G	Remove sediment from river and wash to allow flow during flood periods
Lincoln County 12	5.H	Attempt to relocate existing mobile home park out of 100-year flood zone.
Lincoln County 19	6.A	Ensure that adequate fuels reduction treatments are in place and that all new development within the planning area meets the National Fire Code and Standards.
Lincoln County 20	6.C	Develop and adopt defensible space measures for existing as well as any new master planned communities and subdivisions.
Lincoln County 3	6.D	Develop a public outreach campaign of the extreme wildland fire dangers and steps that can be taken to reduce these dangers.
Lincoln County 19	6.F	Work with the BLM and the NDF to conduct fuel reduction on federal property surrounding all communities within the planning area.
Lincoln County 19	7.B	Develop restrictions on planting large or rapidly growing trees near power lines and major arterials.
Lincoln County 15	7.E	Adopt Meadow Valley Wash TRT measures to relieve siltation and lower flood risk from MV south of US 93 bridge 219

For each identified action, the following applies:

- New actions that have been added to this plan update are identified as such
- Some actions have been reassigned or reclassified. In these cases, not all information is provided under the original listing, rather the newly assigned responsible entity has been given the opportunity to detail the requested information
- All mitigation action information was provided by jurisdictional officials through outreach from the MPC

The following table provides a mitigation action cross check for each participating jurisdiction.

Table 87: Participating Jurisdiction Mitigation Action Cross Check

Hazard	Lincoln County	Caliente
All Hazards	1, 2, 3, 4, 5	1, 2, 3
Dam Failure	6, 7	4, 5
Drought	8, 9, 10	6, 7
Earthquake	11, 12	8
Extreme Heat	13, 14	9
Flood	15, 16, 17, 18, 19, 20, 21	10, 11, 12
Strong Wind	22, 23	13, 14

Table 87: Participating Jurisdiction Mitigation Action Cross Check

Hazard	Lincoln County	Caliente
Wildfire	24, 25	15, 16

-: Jurisdiction not impacted by identified hazard

The following tables identify mitigation action items for each participating jurisdiction, along with the following information:

- Hazard addressed
- Responsible party
- Overall priority
- Goal(s) addressed
- Estimated cost
- Potential funding source
- Proposed completion timeframe
- Current status

It is important to note that when assigning a responsible party for these actions the participating jurisdictions have limited staff and departments. As such, the overall assignment has been given to the highest-ranking employee or overarching department.

Table 88: Lincoln County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Lincoln County 1	Install generators in all county facilities to ensure the continuous function of government activities.	All hazards	Emergency Manager, Facilities Director	High	1, 2	$10,000 to $50,000 per location	HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Lincoln County 2	Purchase electronic mobile traffic notification signs.	All Hazards	Emergency Manager, Public Works Director	Medium	1, 2	$35,000 - $50,000	HMGP, Local budgets	Five years	New
Lincoln County 3	Conduct education programs on all hazards for citizens and businesses of Lincoln County.	All hazards	Emergency Manager	Medium	3	$500 per event	HMGP, BRIC, Local budgets	Three years	Carried over due to lack of staffing
Lincoln County 4	Develop restrictions on planting large or rapidly growing trees near power lines and major arterials.	All hazards	Emergency Manager, County Manager	Low	1, 2, 4	Staff time	Local budgets	Five years	Carried over due to lack of political sponsorship
Lincoln County 5	Conduct a regular tree trimming and tree wire installation program.	All hazards	Emergency Manager	High	1, 2	$25,000 per occurrence	Local budgets	Continuous	New
Lincoln County 6	Conduct a GIS driven analysis of all assets in identified high hazard dam inundation areas for the determination of long-term projects to reduce or eliminate the vulnerability of these identified assets.	Dam Failure	Emergency Manager, IT Director, NFIP Coordinator	Medium	1, 2	Staff time	Local budgets	Five years	New
Lincoln County 7	Post permanent signage showing evacuation and higher ground routes in identified inundation areas.	Dam Failure	Emergency Manager, GIS Director, NFIP Coordinator	Medium	1, 2	Staff time and $10,000	Local budgets	Five years	New
Lincoln County 8	Develop. and adopt a water conservation ordinance that stipulates	Drought	Emergency Manager,	Low	1, 2, 3, 4	Staff time	Local budgets	Five years	Carried over due to lack

Table 88: Lincoln County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	landscaping requirements, hours for irrigation, retrofitting with low-flow outlets, and penalties for wasting water.		County Manager						of political sponsorship
Lincoln County 9	Replace existing plantings with low water native plants at all jurisdictional owned facilities	Drought	Facilities Director	Medium	1, 2	$5,000 - $20,000 per facility	HMGP, BRIC, Local budgets	Ten years	New
Lincoln County 10	Conduct regular water use seminars to provide information on low flow utilities, low water native plants, and conservation methods.	Drought	Emergency Manager	Medium	3, 4	$1,000 per class	Local budgets	Yearly	New
Lincoln County 11	Seismically retrofit critical facilities that are in close proximity to a fault line.	Earthquake	Emergency Manager, Facilities Director	Low	1, 2	Facility and size dependent	HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Lincoln County 12	Implement a program to repair/replace Unreinforced Masonry buildings. Inspect identified buildings to evaluate safety issues.	Earthquake	Emergency Manager	Low	1, 2	Facility and size dependent	HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Lincoln County 13	Modernization HVAC systems in jurisdictional facilities.	Extreme Heat	Facilities Director	Low	1, 2	$25,000 per facility	HMGP, BRIC, Local budgets	Five years	New
Lincoln County 14	Identify and prepare county buildings for usage as heat shelters.	Extreme Heat	Facilities Director	Low	1, 2	$2,000 per facility	BRIC, Local budgets	Five years	New
Lincoln County 15	Continue to participate in, and enforce provisions of, NFIP.	Flood	NFIP Administrator	High	1, 2	Staff time	Local budget	On-going	On-going

Table 88: Lincoln County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Lincoln County 16	Purchase and demolish, or relocate, flood prone properties	Flood	Emergency Manager, NFIP Administrator	High	1, 2	Per property cost	FMA, HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Lincoln County 17	Designate all floodways as Open Space	Flood	Emergency Manager, NFIP Administrator	High	1, 3	Staff Time	Local budgets	Five years	Carried over, lack of political sponsor
Lincoln County 18	Construct rainwater retention/detention ponds at strategic locations.	Flood	NFIP Administrator, Public Works Director	Medium	1, 2	Facility size dependent	HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Lincoln County 19	Procure permanent signage to warn of flood hazard areas.	Flood	NFIP Administrator, Emergency Manager	Medium	1, 2	Location dependent	HMGP, Local budgets	Five years	New
Lincoln County 20	Adopt Meadow Valley Wash TRT measures to relieve siltation and lower flood risk from MV south of US 93 bridge 219	Flood	NFIP Administrator, Emergency Manager	Medium	1, 2	Not determined	HMGP, BRIC, Local budgets	Five years	Carried over due to lack of funding
Lincoln County 21	Remove sediment from river and wash to allow flow during flood periods	Flood	NFIP Administrator, Emergency Manager	Medium	1, 2	Not determined	HMGP, BRIC, Local budgets	Five years	Carried over due to lack of funding
Lincoln County 22	Install signage on highways in known high wind areas alerting high profile vehicles of hazard.	Strong Wind	Lincoln County Public Works Director	Medium	1, 2	$20,000	HMGP, BRIC, Local budgets	Five years	New
Lincoln County 23	Require any County owned facility renovation or construction to meet most current wind standards.	Strong Wind	Lincoln County Public Works Director	Medium	1, 2	Facility size dependent	HMGP, BRIC, Local budgets	Continuous	New

Table 88: Lincoln County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Lincoln County 24	Conduct a fuel thinning program on all county owned and managed land to reduce potential wildfire hazard.	Wildfire	Lincoln County Emergency Manager, Fire Chiefs	Medium	1, 2	$500 per acre	HMGP, BRIC, Local budgets	Continuous	On-going
Lincoln County 25	Create defensible space buffers at all critical facilities	Wildfire	Fire Chiefs, Emergency Manager	High	1, 2	Facility size dependent	HMGP, BRIC, Local budgets	As required	Carried over due to lack of funding

Table 89: Caliente Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Caliente 1	Purchase and install critical facility backup generators to ensure the continuous function of government activities.	All hazards	Caliente City Manager	High	1, 2	$25,000 - $50,000 per facility	HMGP, BRIC, Local budgets	Five years	Carried over due to lack of funding
Caliente 2	Institute a tree and brush trimming program near utility lines serving Caliente facilities.	All hazards	Caliente City Manager	Medium	1, 2	$20,000	HMGP, BRIC, Local budgets	As required	New
Caliente 3	Conduct education programs on all hazards for citizens and businesses of Caliente.	All hazards	Caliente City Manager	Medium	3	Staff Time	Local budgets	As required	Carried over due to lack of staff
Caliente 4	Install evacuation route and high ground signage in any high hazard dam potential inundation areas.	Dam Failure	Caliente City Manager	Medium	1, 2, 3, 4	$5,000 per location	HMGP, Local budgets	Five years	New
Caliente 5	In conjunction with Lincoln County, conduct a GIS driven analysis of all assets in identified high hazard dam inundation areas for the determination of long-term projects to reduce or eliminate the vulnerability of these identified assets.	Dam Failure	Caliente City Manager r, IT Director, NFIP Coordinator	Medium	1, 2	Staff time	Local budgets	Five years	New
Caliente 6	Replace existing plantings with low water native plants at all jurisdictional owned facilities	Drought	Caliente Facilities Director	Medium	1, 2	$5,000 - $20,000 per facility	HMGP, BRIC, Local budgets	Ten years	New

Table 89: Caliente Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Caliente 7	In conjunction with Lincoln County, conduct regular water use seminars to provide information on low flow utilities, low water native plants, and conservation methods.	Drought	Caliente City Manager	Medium	3, 4	$1,000 per class	Local budgets	Yearly	New
Caliente 8	Seismically retrofit critical facilities that are in close proximity to a fault line.	Earthquake	Caliente Facilities Director	Low	1, 2	$5,000 - $20,000 per facility	HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Caliente 9	Identify and prepare local facilities to serve as heating/cooling centers.	Extreme Temperature	Caliente Facilities Director	Medium	1, 2	$3,000 per facility	HMGP, Local budgets	Five years	New
Caliente 10	Continue to participate meet requirements of the NFIP.	Flood	Caliente NFIP Coordinator	High	1, 2	Staff time	Local budgets	Continuous	On-going
Caliente 11	Construct rainwater retention/detention ponds at strategic locations.	Flood	Caliente City Manager	Low	1, 2	Location and size dependent	HMGP, BRIC, Local budgets	As required	Carried over due to lack of funding
Caliente 12	Clean and repair drainage ditches to maintain capacity.	Flood	Caliente City Manager, Public Works Director	Low	1, 2	Location, length, and size dependent	HMGP, BRIC, Local budgets	Ten years	Carried over due to lack of funding
Caliente 13	Install signage on highways in known high wind areas alerting high profile vehicles of hazard.	Strong Wind	Caliente City Manager, Public Works Director	Medium	1, 2	$20,000	HMGP, BRIC, Local budgets	Five years	New
Caliente 14	Require any Caliente owned facility renovation or construction to meet	Strong Wind	Public Works Director	Medium	1, 2	Facility size dependent	HMGP, BRIC, Local budgets	Continuous	New

Table 89: Caliente Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	most current wind standards.								
Caliente 15	Create defensible space buffers at all critical facilities	Wildfire	Caliente Fire Chief	High	1, 2	Facility size dependent	HMGP, BRIC, Local budgets	As required	Carried over due to lack of funding
Caliente 16	Conduct a citizen wildland management seminar to help inform citizens of actions they can take to minimize both likelihood of wildfire and wildfire impacts on home and properties.	Wildfire	Caliente Fire Chief	High	1, 2, 3	Facility size dependent	HMGP, BRIC, Local budgets	As required	Carried over due to lack of funding

Prior to the implementation of any action further feasibility analysis will be performed. Additionally, a Benefit-Cost Analysis that determines the future risk reduction benefits of a hazard mitigation project and compares those benefits to its costs will be conducted as required. Applicants and sub-applicants will use FEMA approved methodologies and tools, such as the Benefit-Cost Analysis Toolkit, to demonstrate the cost-effectiveness of their projects. The result of the analysis is a Benefit-Cost Ratio, and a project is considered cost-effective when the Benefit-Cost Ratio is 1.0 or greater. Depending on the project, either a full Benefit-Cost Analysis will be completed by entering documented values into the FEMA Benefit-Cost Analysis Toolkit, which calculates a benefit-cost ratio or, if the project meets specified criteria, a streamlined Benefit-Cost Analysis may be completed (FEMA's cost-effectiveness requirement is never waived).

6.8 Mitigation Action Implementation and Monitoring

Lincoln County and the City of Caliente are responsible for implementing their identified mitigation actions. To foster accountability and increase the likelihood that actions will be implemented, every proposed action is assigned to a specific department or position as a champion. In general:

- The identified champion will be responsible for tracking and reporting on action status.
- The identified champion should provide input on whether the action as implemented is successful in reducing vulnerability, if applicable.
- If the action is unsuccessful in reducing vulnerability, the identified champion will be tasked with identifying deficiencies and additional required actions.

Additionally, each action has been assigned a proposed completion timeframe to determine if the action is being implemented according to plan.

In general, the Lincoln County Emergency Management Office is responsible for monitoring the progress of mitigation activities and projects throughout the county in conjunction with the City of Caliente. To facilitate the tracking of any awarded hazard mitigation grants, the Lincoln County MPC will compile a list of projects funded throughout the calendar year, if any, and add it to an electronic database. Additionally, the Lincoln County MPC will monitor information on any other mitigation projects that were not funded through hazard mitigation grants.

To track mitigation projects from initiation to closeout, participating jurisdictions will use a project tracking spreadsheet that includes, at a minimum, the following information:

- Applicant/Subrecipient
- Grant Identifier
- Contractor
- Total Cost Estimate
- Federal/Local share
- Award Date
- Period of Performance
- Quarterly Reports
- Subrecipient Risk
- Reimbursements

Upon completion of a project, a member of the awarded jurisdiction, a member of the Lincoln County MPC, and a State of Nevada representative will conduct a closeout site visit to:

- Review all files and documents
- Review all procurement files and contracts to third parties
- Take photos of the completed project

Project closeout packages will generally be submitted 90 days after a project has been completed, and will include the following:

- Summary of documentation
- Pictures of completed project
- Materials, labor, and equipment forms, if required
- Close-out certification

6.9 Hazard Mitigation Plan Incorporation and Integration

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various county and local plans. Unfortunately, previous versions of the Lincoln County HMP have not been incorporated into jurisdictional planning efforts. Under the leadership of the MPC, it is hoped that when future revisions occur to these other plans, they will be measured against the contents of this HMP. Plan integration will help:

- Align community goals, objectives, and prime concerns
- Avoid lost opportunities
- Eliminate duplication of effort

In cooperation with the MPC, all Lincoln County and City of Caliente departments will be actively courted on incorporating elements of this hazard mitigation plan for any relevant plan, code or ordinance revision or creation. Each department will be encouraged to implement actions that minimize loss of life and property damage from hazards. Whenever possible, each Lincoln County and the City of Caliente will use existing plans, policies, procedures, and programs to aid in the implementation of identified hazard mitigation actions.

On a local level, hazard mitigation plans can be integrated into various planning documents and initiatives to ensure a comprehensive and coordinated approach to reducing the impact of hazards. Local level plans where hazard mitigation strategies can be integrated include:

- Comprehensive Plans: Helps guide long term community development to ensure future resilience against identified hazards.
- Threat and Hazard Identification and Risk Assessment: Utilizes information from the HMP to understand the specific threats and hazards that may impact the community. This informs the development of strategies and resource allocation for emergency management capabilities, ensuring that the community is well-prepared to respond effectively.
- Comprehensive Land-Use Plans: Helps guide the development and zoning decisions in a way that minimizes vulnerability to hazards. This includes avoiding construction in high-risk areas and encouraging resilient building practices.
- Emergency Operations Plans: Contributes to detailing specific actions to be taken before, during, and after disasters to reduce vulnerability and enhance community resilience.
- Climate Action Plans: Can help address both short-term hazards and long-term climate-related risks. This includes considerations for extreme temperatures and changes in precipitation patterns.
- Transportation Plans: Helps ensure the resilience of transportation infrastructure to hazards such as floods, and earthquakes. This may involve designing infrastructure to withstand extreme weather events.
- Infrastructure Master Plans: Contributes to the design, construction, and maintenance of critical infrastructure, such as water supply systems, roads, bridges, and utility networks.
- Community Development Plans: Helps ensure that new development projects align with hazard resilience goals. This may involve establishing building codes that prioritize hazard-resistant construction.
- Open Space and Recreation Plans: Provides for the consideration of green infrastructure and open spaces for flood control, wildfire buffers, and other hazard mitigation purposes.
- School Emergency Plans: Enhances the safety and resilience of educational facilities. This may involve retrofitting buildings, establishing evacuation routes, and conducting regular drills.
- Public Health Preparedness Plans: Addresses potential health risks associated with hazards. This includes planning for medical surge capacity, disease prevention, and healthcare facility resilience.

Integration of hazard mitigation into these various plans ensures that resilience efforts are embedded in the broader fabric of community development. Coordination and collaboration among different sectors and stakeholders are essential for the successful implementation of hazard mitigation strategies on the local level. Plan incorporation and integration is crucial for creating a cohesive and coordinated approach to address various aspects of hazard mitigation. All stakeholders and participating jurisdictions utilize similar internal procedures for plan incorporation and integration. The following represent commonly utilized methods by all participating jurisdictions:

- Cross-Referencing: Identify and cross-reference relevant sections of different plans and policies. This involves explicitly noting connections between the goals, strategies, and actions outlined in one plan with those in others.
- Consistency Checks: Conduct consistency checks to ensure that the language, objectives, and strategies in different plans and policies align with each other.
- Joint Planning Committees: Establish joint planning committees or task forces that involve representatives from different departments or agencies responsible for various plans (for example, the MPC). These committees facilitate communication, collaboration, and the coordination of planning efforts across sectors.
- Collaborative Workshops and Meetings: Organize collaborative workshops and meetings to bring together stakeholders involved in different planning processes (as seen in the planning meetings for the HMP). These forums provide an opportunity for stakeholders to share information and discuss common goals.
- Alignment with State and Regional Plans: Ensure that local plans align with broader regional and state plans. This involves considering regional and state priorities and incorporating them into local planning efforts to create a harmonized approach to development.
- Data Sharing and Analysis: Share relevant data among planning efforts and conduct joint data analysis. This helps in creating a common understanding of the challenges and opportunities, facilitating evidence-based decision-making across different plans.
- Unified Implementation Strategies: This involves identifying common actions and initiatives that contribute to the achievement of multiple goals outlined in various plans.

Lincoln County has good working relationships with the City of Caliente, the State of Nevada, and FEMA indicating great potential for plan incorporation and integration across the planning area. Where appropriate, the Lincoln County MPC will take the lead in integrating this HMP into overarching plans, codes, ordinances and any other relevant documents, policies, or procedures.

Section 7 – Plan Maintenance

7.1 Introduction

The HMP is a living document that will be updated and submitted to FEMA for approval every five years as required by 44 CRF 201.4. During the five-year cycle, the plan will undergo continuous monitoring and evaluation to ensure that the policies, procedures, priorities, and state environment established in the plan reflect current conditions. Lincoln County will utilize the MPC to provide plan updates, revisions, and data collection for future HMP planning purposes.

7.2 Plan Maintenance Responsibilities

The Lincoln County Emergency Management Office serves as the lead coordinating agency for plan maintenance. Additional assistance in the plan maintenance process is provided by members of the MPC, subject matter experts, and representatives of local jurisdictions.

The Lincoln County Emergency Management Office will facilitate the review and revision of the HMP every five years. The review and revision will be an ongoing process. This process will incorporate all of the revisions made during the life of the plan, especially newly obtained data on hazard occurrence or identified vulnerability.

7.3 Plan Review Meetings

The MPC will meet annually for the first two years after plan approval. MPC members will determine the meeting dates and locations and will ensure that the meetings are open to all interested parties. The Lincoln County Emergency Manager will be the main point of contact for these meetings and will maintain attendance and meeting minutes.

The purpose of these meetings is to discuss capability changes, the status of proposed projects, and any new studies or mapping that may inform the HMP. Should a specific plan element or section require revision or amendment due to a state or federal legislation or policy change, the MPC will work with the Nevada Division of Emergency Management / Homeland Security to complete a plan addendum and submit it to FEMA as quickly as is practicable.

During these meetings, and in order to monitor HMP progress, the following information will be tracked:

- How the actions from the mitigation strategy are being pursued and completed
    - Are actions being prioritized
- How the plan goals and objectives are being carried out
- How mitigation funding mechanisms are being utilized
- How is technical assistance being received

Additionally, the MPC will monitor the following elements to ensure the HMP is current and correct:

- Reviewing the hazards and determining if any of them have changed
- Determining if there are new hazards that pose a risk to the state
- Ensuring goals and objectives are still relevant
- Determining if any actions have been completed or are deemed irrelevant
- Determining if new actions should be added
- Determining if capabilities have changed

After each meeting, the MPC will compile a meeting report for usage in future plan revisions.

In addition to these meetings, MPC members will monitor and evaluate the progress of mitigation projects via quarterly reports, site visits, correspondence, and reimbursements. Completed projects will be evaluated for loss avoidance and alignment with local development plans.

The State of Nevada may request a non-scheduled report on the monitoring, evaluation, or updating of any portion of the HMP due to irregular progress on mitigation actions and or projects, in the aftermath of a hazard event, or for any reason deemed appropriate.

7.4 Plan Monitoring and Situational Change

Plan monitoring can be defined as the ongoing process by which stakeholders obtain regular feedback on the progress being made towards achieving their goals and objectives. In the more limited approach, monitoring may focus on tracking projects and the use of the agency's resources. In the broader approach, monitoring also involves tracking strategies and actions being taken by partners and non-partners, and figuring out what new strategies and actions need to be taken to ensure progress towards the most important results.

The MPC will track and record all substantial situational changes and will address, as appropriate, the following questions:

- Is the mitigation project under, over, or on budget?
- Is the mitigation project behind, ahead of, or on schedule?
- Are there any changes in jurisdictional capabilities which impact the plan?
- Are there any changes in jurisdictional hazard risk?
- Has the mitigation action been initiated, or its initiation planned?
- Is the current process of prioritizing mitigation actions and projects appropriate and accurate?
- Has the current method of incorporating mitigation actions and projects yielded a comprehensive action and project strategy to address seen and unforeseen hazards?
- If applicable, has participation in a mitigation action's collaboration been regular?
- Was a negative result caused directly or indirectly by insufficient levels of public outreach?
- If any, what plan updates occurred, why they occurred, and what is their impact?

7.5 Post-Disaster Review

After each Presidential disaster declaration, and in coordination with FEMA and the Nevada Division of Emergency Management / Homeland Security, the MPC will convene to document impacts on Lincoln County and to determine if any mitigation actions should be considered to reduce future risk. This will allow for the development of hazard mitigation recommendations to FEMA during the disaster operation as well as to update the mitigation strategy as needed. The post-disaster review may coincide with established meetings or may be convened as separate events.

7.6 Plan Evaluation

A plan evaluation is a rigorous and independent assessment of either completed or ongoing activities to determine the extent to which they are achieving stated goals and contributing to decision making.

A plan evaluation report will be completed when the situation dictates. The following situations are typical examples of when an evaluation will be necessary.

- Post hazard event
- Post training exercise
- Post tabletop or drill exercise
- Significant change or completion of a mitigation project
- Significant change or completion of a mitigation action

An evaluation report will ask the following questions in response to the previously listed events.

- Do the mitigation objectives and goals continue to address the current hazards?
- Are there new or previously unforeseen hazards?
- Does a change in hazard vulnerability demand a change of or addition of mitigation actions or projects?
- Does a change in the mitigation strategy demand a change of or addition of mitigation actions or projects?
- Are current resources appropriate for implementing a mitigation project?
- Was the outcome of a mitigation action/project expected?
- Are there implementation problems?

- Was the public engaged to the point where they were satisfied with current engagement strategies?
- Did the public participate in a number that produced a positive yield on the plan, action, or project?
- Are there coordination problems?

7.7 Plan Updates

Typically, the updating of a HMP is initiated upon the completion of a plan evaluation when the evaluation determines an update is appropriate. A plan update also occurs every five years per FEMA guidelines or at any time it is deemed necessary by MPC.

According to FEMA DMA 2000 guidelines for mitigation planning, Lincoln County will begin the update process three years from this plan's adoption. An increase in meeting tempo to twice a year will allow MPC to gather relevant information needed for the next plan update. The following meeting schedule indicates the tasks to be performed during this plan update period:

- **2027 Spring Meeting:** The MPC will begin updating the risk assessment portion of the plan. Hazards will be analyzed to determine if they are still relevant, if location should be updated, and if new hazards should be added. Previous occurrences will be reviewed to help determine the probability of future events.
- **2027 Fall Meeting:** The MPC will begin updating the vulnerability assessment. The MPC will update the vulnerability assessment portion of the plan. Data will need to be gathered for assets, critical facilities, building stock values, jurisdictional damages, etc.
- **2028 Spring Meeting:** The MPC will review information received and determine if the goals and objectives are still relevant and if new ones should be added. Actions will be reviewed to determine if they should remain in the plan, have been completed, or are no longer relevant. The MPC will review the potential funding sources for each action.
- **2028 Fall Meeting:** As appropriate, a new MPC for Lincoln County will be formed to take over the planning process. The new MPC will evaluate the policies, programs, capabilities, and funding sources from the previous plan to determine if they are still accurate and if any new items should be added.
- **2029 Spring Meeting:** The new MPC will review the draft copy of the mitigation plan and make comments and updates if necessary. Formal submittal to FEMA for re-approval will follow.

In general, the following steps will be taken to complete the next HMP revision:

Table 90: Lincoln County HMP Update Task List

Task	Action
1	Evaluate and update the planning process.
2	Review the stakeholder contact list and identify new stakeholders.
3	Initiate plan outreach and discussion, including a stakeholder meeting.
4	Consider the addition, removal, or modification of hazards identified in the plan.
5	Update and revise membership of the MPC.
6	Evaluate risk assessment methodologies and data sources.
7	Evaluate and update critical facility inventory information.
8	Evaluate and update the hazard profiles.
9	Evaluate and update the risk assessment summary.
10	Evaluate and update the mitigation strategy, including proposed mitigation actions.
11	Evaluate and update the mitigation implementation system.
12	Integrate new and updated local plans.
13	Evaluate and update other plans sections.
14	Identify and add any additional sections or information needed.
15	Review updated plan in its entirety.
16	Conduct updated plan outreach, including public information, comment period, and meetings.
17	Integrate additional comments received.
18	Finalize plan document.

Table 90: Lincoln County HMP Update Task List

Task	Action
19	Complete crosswalk and submit final plan to FEMA for review and approval.
20	Make additional modifications as required.
21	Obtain jurisdictional adoption resolutions.

7.8 Continued Public Involvement

Lincoln County and the City of Caliente are dedicated to involving the public in the continual shaping of the HMP and in the development of its mitigation projects and activities.

The Lincoln County MPC will continue to keep the public informed about hazard mitigation projects and activities through jurisdictional websites, and as appropriate, public announcements. The public will also be invited to participate in all meetings to review and discuss the mitigation-related events. Additionally, participating jurisdictions will present to public officials in a public forum concerning the progress of mitigation actions identified in this plan as progress is made.

Copies of the Lincoln County HMP will be made available to the public. Methods of public availability may include electronically posted on a website or a hard copy kept at a jurisdictional office.

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Appendix A – Lincoln County Adoption Documentation and FEMA Region IX Approval Documentation

Appendix B – Community Feedback