San Juan County

SAN JUAN COUNTY

Multi-Jurisdictional All Hazard Mitigation Plan

2023

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PART I: PLANNING PROCESS

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

San Juan County, Utah and the incorporated communities that lie within the county boundaries are vulnerable to natural, technological, and manmade hazards that have the possibility of causing serious threats to the health, welfare, and security of its residents. The cost of response to and recovery from the potential disasters, in terms of potential loss of life or property, can be lessened when attention is turned to mitigating their impacts and effects before they occur or reoccur.

This Multi-Jurisdictional All Hazard Mitigation Plan seeks to identify the county's and individual communities' hazards and understand their impact on vulnerable populations and infrastructure. With that understanding, the plan sets forth solutions that, if implemented, have the potential to significantly reduce threat to life and property. The plan is based on the premise that hazard mitigation works. With increased attention to managing natural hazards, communities can reduce the threats to citizens and through proper land use and emergency planning can avoid creating new problems in the future. Many solutions can be implemented at minimal cost and social impact.

This is not an emergency response or management plan. Certainly, the plan can be used to identify weaknesses and refocus emergency response planning. Enhanced emergency response planning is an important mitigation strategy. However, the focus of this plan is to support better decision making directed toward avoidance of future risk and the implementation of activities or projects that will eliminate or reduce the risk for those that may already have exposure to a natural hazard threat.

The San Juan County Multi-Jurisdictional All Hazard Mitigation Plan was created with the goal of substantially and permanently reducing the county's vulnerability to natural hazards through sound public policy. By increasing public awareness of potential harm, documenting resources for risk reduction and loss prevention, and identifying activities to guide the development of less vulnerable and more sustainable communities, this plan aims to protect citizens, critical facilities, infrastructure, private property, and the natural environment.

1.2 PLAN ORGANIZATION

Part I of the plan provides a general overview of the plan and its planning process and identifies who was involved in revisions of the plan and the process used to develop this particular revision.

Part II contains a community profile of the county.

Part III provides a brief definition for each natural and manmade hazard. All hazards identified as affecting the county are analyzed at the county and incorporated city levels and then summarized in a hazard profile.

Part IV outlines the Mitigation Strategy and identifies the goals, objectives, and mitigation projects.

Part V details the plan maintenance process and provides a tentative timeline for updating the plan in the future.

The Appendix contains contact information for the planning team, meeting minutes, worksheets, agendas, survey social media advertisements, plan adoption and endorsement forms, and references.

1.3 PURPOSE

This plan exists to identify natural hazard threats to the community, prepare mitigation management strategies to address those threats, develop short-term and long-term goals and objectives for mitigation planning, and to fulfill federal, state, and local hazard mitigation planning obligations. The intention of this plan is to enhance awareness of and provide mitigation strategies for elected officials, agencies, and the public and develop actions which will minimize negative outcomes to San Juan County's citizens, the economy, and the environment due to potential natural hazard threats. The well-being of the county and local communities rests on reducing risks to life and property in the event of a natural hazard event.

1.4 HAZARD MITIGATION & HAZARDS

Hazard mitigation is defined as cost-effective actions that have the effect of reducing, limiting, or preventing the vulnerability of people, culture, property, and the environment to potentially damaging, harmful, or costly hazards. Hazard mitigation measures, which can be used to eliminate or minimize the risk to life, culture, and property, fall into three categories:

1. Those that keep the hazard away from people, property, and structures;
2. Those that keep people, property, or structures away from the hazard; and
3. Those that reduce the impact of the hazard on victims, e.g., insurance.

Hazard mitigation measures must be practical, cost effective, and culturally, environmentally, and politically acceptable. Actions taken to limit the vulnerability of society to hazards must not, in themselves, be costlier than the anticipated damages.

Hazard mitigation planning must be based on vulnerabilities and its primary focus must be on the point where capital investment and land use decisions are made. The placement of capital investments, whether for homes, roads, public utilities, pipelines, power plants, or public works, determine to a large extent the nature and degree of a community's hazard vulnerability. Once a capital facility is in place, there is little opportunity to reduce hazard vulnerability through correction of errors in location or construction. It is for this reason that often the most effective mitigation tools are zoning and other ordinances that manage development in high vulnerability areas and building codes that ensure that new buildings are constructed to withstand the damaging forces of anticipated hazards.

Because disaster events are generally infrequent, the nature and magnitude of the threat is often ignored or poorly understood. Thus, the priority to implement mitigation measures is low and implementation is slowed. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation management.

The Federal Emergency Management Agency (FEMA) requires that all natural hazards be analyzed by each jurisdiction completing a hazard mitigation plan. The hazards analyzed in this plan include the following:

Natural Hazards

- Severe Summer Weather
    - Extreme Heat
    - Lightning
    - Hail
    - Tornado

    - Straight-Line Wind
- Severe Winter Weather
    - Extreme Cold
    - Winter Storm
    - Avalanche
- Wildfire
- Flood
    - River or Stream Flood
    - Flash Flood
    - Dam Failure
- Drought
- Infestation

Geological Hazards

- Earthquake
- Landslide
- Problem Soils

Technological (Manmade) Hazards

- Hazardous Material Incident

Per FEMA's mandate to address all natural hazards, the following natural hazards were not included because these hazards do not directly impact San Juan County due to geographic location:

- Hurricane
- Sea Level Rise
- Storm Surge
- Tsunami
- Volcanic Eruption

1.5 SCOPE

The plan provides comprehensive natural hazard identification, risk assessment, vulnerability analysis, mitigation actions, and an implementation schedule.

1.6 PLAN GOALS & OBJECTIVES

The goals of the San Juan County Multi-Jurisdictional All Hazard Mitigation Plan include coordinating with local governments to develop San Juan County's plans and processes that meet the planning components identified in the FEMA Region VIII Crosswalk document, as well as Utah DEM planning expectations and public input from the local community. The overall objective is risk reduction from natural hazards in the state of Utah through implementing and updating county, regional, and the state of Utah mitigation plans.

1.7 AUTHORITIES

Federal

Public Law 93-288, as amended, established the basis for federal hazard mitigation activity in 1974. A section of this Act requires—as prerequisite for state receipt of future disaster assistance outlays—the identification, evaluation, and mitigation of hazards. Since 1974, many additional programs, regulations, and laws have expanded on the original legislation to establish hazard mitigation as a priority at all levels of government.

Several additional provisions were also included when PL 93-288 was amended by the Stafford Act that provide for the availability of significant mitigation measures in the aftermath of a presidentially declared disaster. Civil Preparedness Guide 1-3, Chapter 6—Hazard Mitigation Assistance Programs places emphasis on hazard mitigation planning directed toward hazards with a high impact and threat potential.

The Disaster Mitigation Act of 2000 (DMA 2000) was signed into Law on October 30, 2000 by President Bill Clinton. Section 322 defines mitigation planning requirements for state, local, and tribal governments.

State

The Governor's Emergency Operation Directive, the Robert T. Stafford Disaster Relief and Emergency Assistance Act, amendments to Public Law 93-288, as amended, Title 44, CFR, Federal Emergency Management Agency Regulations, as amended, State Emergency Management Act of 1981, Utah Code 53-2, 63-5, Disaster Response Recovery Act, 63-5A, Executive Order of the Governor, Executive Order 11, Emergency Interim Succession Act, 63-5B.

Local

Effective natural hazard mitigation is dependent upon local governments assuming a vital role. As such, each local government will review all present or potential damages, losses, and related impacts associated with natural hazards to determine what is required for mitigation action and planning. For San Juan County and the cities and town of San Juan County, the local executives responsible for implementing plans and policies are the county commissioners and city or town mayors. It is critical that local governments be prepared to participate in the post-disaster Hazard Mitigation Team process, as well as the pre-mitigation planning outlined in the Multi-Jurisdictional All Hazard Mitigation Plan.

CHAPTER 2 PLANNING PROCESS

2.1 PLANNING PROCESS

The 2023 San Juan County Multi-Jurisdictional All Hazard Mitigation Plan was completed through the collaborative efforts of the Utah Department of Public Safety Division of Emergency Management, County Emergency Manager, Fire Departments, Sheriff's Office, Public Works Department, Planning and Zoning Commission, Assessor's Offices, City, County, and State GIS Departments, Elected Officials, Public Employees, Utah Division of Forestry, Fire and State Lands, and citizens of the cities and town within San Juan County. Feedback was solicited through the San Juan County Local Hazard Mitigation Planning Team. During the plan development, the draft plan was posted on San Juan County's website on the Emergency Management page for public comments. All comments, questions, and discussions resulting from these activities were given thoughtful consideration as the plan was developed.

Additionally, many of the hazards described in this mitigation plan also affect counties adjacent to San Juan County. The draft of this plan was sent to each of these neighboring counties, and their input was considered and implemented. The 14 adjacent counties are listed below:

- Grand County, UT
- Kane County, UT
- Garfield County, UT
- Wayne County, UT
- Emery County, UT
- Mesa County, CO
- Montrose County, CO
- San Miguel County, CO
- Dolores County, CO
- Montezuma County, CO
- San Juan County, NM
- Apache County, AZ
- Navajo County, AZ
- Coconino County, AZ

2.2 PARTICIPATING JURISDICTIONS

This plan covers San Juan County, Utah, the cities of Monticello and Blanding, and the town of Bluff. Each of these jurisdictions participated in the update of the plan.

Table 2-1. Participating Jurisdictions Involvement

Jurisdiction	Attended at least one meeting	Represented at Mitigation Workshop	Met with Core Planning Team	Submitted at least one new mitigation action	Reviewed past mitigation actions
San Juan County	Yes	Yes	Yes	Yes	Yes
City of Monticello	No	No	No	Yes	Yes
City of Blanding	Yes	Yes	No	Yes	Yes
Town of Bluff	Yes	Yes	Yes	No	Yes

2.3 SAN JUAN COUNTY LOCAL HAZARD MITIGATION PLANNING TEAM

The San Juan County local hazard mitigation planning team is comprised of representatives from the San Juan County Local Emergency Planning Committee (LEPC), San Juan County department heads, and the

incorporated cities and town. Descriptions of the planning meetings follow in the next section below as well as with the meeting minutes in Appendix B.

Table 2-2. LEPC & Local Hazard Mitigation Planning Team

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
Bluff Town Council/Town of Bluff	Ann K. Leppanen	Mayor
Bluff Town Council	Luanne Hook	Town Council Member
Bluff Town Council	Linda Sosa	Records Officer
San Juan County Fire	David Gallegos	San Juan County Fire Chief
USU Extension	Reagan Wytsalucy	Extension Assistant Professor
City of Blanding	David Johnson	City Manager
Town of Bluff	Kathy Carson	Town Clerk
Town of Bluff	Erin Nelson	Town Manager
Bears Ears Partnership	Sylvia Taylor	Education Center Manager
Integrated Solutions Consulting	Jake Halley	Consultant

2.4 LOCAL HAZARD MITIGATION PLANNING MEETINGS & MITIGATION WORKSHOPS

Planning Team Kickoff Meeting—07/20/2022

The planning team held the Hazard Mitigation Plan update kickoff meeting virtually on July 20, 2022. This meeting served to provide an overview of the 2022 update process, provide roles and expectations, discuss public and stakeholder involvement, review project timelines and discuss needed data requests.

The attendance roster for the meeting is as follows:

Table 2-3. Attendance Roster—07/20/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
City of Blanding	Chaz Jacobson	Assistant Fire Chief
San Juan County Economic Tourism	Elaine Gizler	Director
NWS	Jeff Colton	Warning Coordination Meteorologist
Blanding City	Kim Palmer	Administrator
San Juan Southern Paiute Tribe	Louis Tallman	Tribal Council
San Juan County	Mack MacDonald	County Administrator
San Juan District	Matt Keyes	Human Resource Director
San Juan County	Mike Moulton	Public Health Response Coordinator
County Extension	Reagan Wytsalucy	Director
San Juan Fire	Ryan McArthur	Fire Warden

Agency	Representative	Position
San Juan EMS	Scott Burgess	Director
Grand County EMS	Shey Walker	Emergency Coordinator
Spanish Valley Water	Dawn Sanchez	Special Service District
San Juan County Road Depart	Todd Adair	Superintendent
Utah DEM	Whitney Coonrod	State Liaison
San Juan County Fire	David Gallegos	San Juan County Fire Chief
Utah DEM	Maranda Miller	Utah DEM Planner
Integrated Solutions Consulting	Jake Halley	Consultant

Planning Team Meeting #2—08/25/2022

The planning team met virtually on August 25, 2022, for the second time. The meeting served to review the community/public survey questionnaire results and incorporate the responses in the Hazard/Risk discussion, and begin the discussion related to new mitigation action ideas.

The attendance roster for the meeting is as follows:

Table 2-4. Attendance Roster—08/25/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
City of Blanding	Chaz Jacobson	Assistant Fire Chief
San Juan County Economic Tourism	Elaine Gizler	Director
NWS	Jeff Colton	Warning Coordination Meteorologist
Blanding City	Kim Palmer	Administrator
San Juan District	Matt Keyes	Human Resource Director
San Juan County	Mike Moulton	Public Health Response Coordinator
County Extension	Reagan Wytsalucy	Director
Grand County EMS	Shey Walker	Emergency Coordinator
Spanish Valley Water	Dawn Sanchez	Special Service District
Utah DEM	Whitney Coonrod	State Liason
San Juan County Fire	David Gallegos	San Juan County Fire Chief
Utah DEM	Maranda Miller	Utah DEM Planner
City of Blanding Public Works	Terry Ekker	Director
Integrated Solutions Consulting	Jake Halley	Consultant

Blanding Public Meeting—10/17/2022

The Core Planning Team met with each jurisdiction of San Juan County in October 2022 to discuss disaster mitigation for the community, beginning in the city of Blanding. This meeting was open to the public and held in the Blanding Senior Center at 177 E 200 N. Members of the LEPC participated.

The attendance roster for the meeting is as follows:

Table 2-5. Attendance Roster—10/17/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
USU Extension	Reagan Wytsalucy	Extension Assistant Professor
City of Blanding	David Johnson	City Manager
Integrated Solutions Consulting	Jake Halley	Consultant

Bluff Public Meeting—10/18/2022

The meeting in the town of Bluff was open to the public and held in the Bluff Community Center at 3rd East and Mulberry, Bluff Road. Members of the LEPC participated.

The attendance roster for the meeting is as follows:

Table 2-6. Attendance Roster—10/18/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
Bluff Town Council/Town of Bluff	Ann K. Leppanen	Mayor
San Juan County Fire	David Gallegos	San Juan County Fire Chief
Bluff Town Council	Luanne Hook	Town Council Member
Bluff resident/public member	Ned Krutsky	
Town of Bluff	Kathy Carson	Town Clerk
Town of Bluff	Erin Nelson	Town Manager
Bears Ears Partnership	Sylvia Taylor	Education Center Manager
Bluff Town Council	Linda Sosa	Records Officer
Bluff resident/public member	Kathleen Pakish	
Bluff resident/public member	Lois Young	
Bluff resident/public member	Ceil McDermott	
Integrated Solutions Consulting	Jake Halley	Consultant

La Sal Public Meeting—10/19/2022

The meeting in La Sal—a census-designated place—was open to the public and held in the La Sal Senior Center at 200 S. Firehouse Road. Members of the LEPC participated.

The attendance roster for the meeting is as follows:

Table 2-7. Attendance Roster—10/19/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
San Juan County Fire	David Gallegos	San Juan County Fire Chief

Agency	Representative	Position
San Juan County resident/public member	Ruth Thayn	
La Sal Senior Center	Maryanna Hutnik	La Sal Center Director
San Juan County resident/public member	Chuck Zimmerman	
Integrated Solutions Consulting	Jake Halley	Consultant

Monticello Public Meeting—10/20/2022

The meeting in Monticello was open to the public and held in the Monticello Senior Center at 648 S. Hideout Way. Members of the LEPC participated.

The attendance roster for the meeting is as follows:

Table 2-8. Attendance Roster—10/20/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
San Juan County Fire	David Gallegos	San Juan County Fire Chief
Monticello Senior Center	Martha Garner	Monticello Center Director
San Juan County resident/public member	Caroline Shumway	
San Juan County resident/public member	Jay Sallee	
Integrated Solutions Consulting	Jake Halley	Consultant

San Juan County Mitigation Workshop—10/20/2022

A mitigation workshop with members of the LEPC was held in Monticello to familiarize attendees with the topic of disaster mitigation, review current updates being made to the plan, and identify additional hazards of concern in the county. Members also submitted new mitigation projects for each jurisdiction in the county.

The attendance roster for the workshop is as follows:

Table 2-9. Attendance Roster—10/20/2022

Agency	Representative	Position
San Juan County Emergency Management	Tammy Gallegos	Emergency Manager
San Juan County Emergency Management	Natalie Freestone	Assistant Emergency Manager
Bluff Town Council/Town of Bluff	Ann K. Leppanen	Mayor
San Juan County Fire	David Gallegos	San Juan County Fire Chief
Bluff Town Council	Linda Sosa	Records Officer
Integrated Solutions Consulting	Jake Halley	Consultant

2.5 PUBLIC & STAKEHOLDER INVOLVEMENT

The general public must be given an opportunity to be involved in the planning process. As such, a number of public outreach activities were organized to ensure public participation and input was obtained.

2.5.1 Public Meetings

The meetings that took place on 10/17/2022 in Blanding, 10/18/2022 in Bluff, 10/19/2022 in La Sal, and 10/20/2022 in Monticello were advertised publicly and open to public participation. A flyer was created for each of the four public meetings and distributed in the local paper on 09/28/2022, 10/05/2022, and 10/12/2022, as well as posted daily on the county's social media. These flyers can be found in Appendix D.

2.5.2 Public Survey

A community preparedness study and survey was distributed to the public through Facebook and the San Juan Record, which is a local print and online newspaper, beginning in August 2022 until September 5, 2022. The purpose of the survey was to allow San Juan County residents and businesses to help the county update its emergency preparedness plans by providing feedback on how they respond to emergencies in the county and how the county can better serve them during an emergency. The San Juan County, Utah Facebook page recorded an engagement of 614 engagements, reaching 8,956 people over a period of three weeks. The San Juan Record reached 2,800 people a week (2,000 in print and 800 online subscribers) over a period of three weeks, making the total reach 8,400 people. The advertisement can be found in Appendix D.

2.5.3 Stakeholder Participation

Additional state and regional stakeholders participated in the 2023 update of the San Juan County Multi-Jurisdictional All Hazard Mitigation Plan:

- Utah Division of Emergency Management
- Utah Department of Transportation
- Utah State Police
- U.S. Bureau of Land Management

PART II: COMMUNITY PROFILE

CHAPTER 3 SAN JUAN COUNTY PROFILE

3.1 COMMUNITY DESCRIPTION

According to the 2020 American Community Survey 5-Year Estimates, San Juan County ranks 17th in total population among all 29 of Utah's counties (Utah Demographics, 2023). The Health Care & Social Assistance and Educational Services industries currently hold the highest number of employees of any other industry in the county. However, of the most specialized positions in the county, Mining, Quarrying, & Oil & Gas Extraction and Agriculture, Forestry, Fishing, & Hunting are the leading industries (Data USA, 2023).

Incorporated cities include Blanding and Monticello, and incorporated towns include Bluff. Census-designated places include Aneth, Halchita, Halls Crossing, La Sal, Mexican Hat, Montezuma Creek, Navajo Mountain, Oljato-Monument Valley, Spanish Valley, Tselakai Dezza, and White Mesa. Unincorporated communities include Eastland and Ucolo.

San Juan County was first home to the early Anasazi Basketmakers in 1300 A.D. and then the Navajo people later on. Now, the area is known for its abundant tourist sites, which include Lake Powell, Monument Valley, Four Corners National Monument, Rainbow Bridge, and Canyonlands (UEN, 2023). Bears Ears National Monument.

3.2 LOCATION

San Juan County is located in southeastern Utah. The county borders 14 other counties, which is more than any other county in the United States. It is bordered on the north by Grand County; on the northeast by Mesa County, CO and Montrose County, CO; on the east by San Miguel County, CO, Delores County, CO, and Montezuma County, CO; on the southeast by San Juan County, NM; on the south by Apache County, AZ and Navajo County, AZ; on the southwest by Coconino County, AZ; on the west by Kane County, Garfield County, and Wayne County; and on the northwest by Emery County. Total area of the county is 7,933 square miles, of which 113 square miles is water (U.S. Census QuickFacts, 2022). It is the largest county by area in Utah.

3.3 TOPOGRAPHY & VEGETATION

San Juan County is in the semi-arid desert region of southeastern Utah. The county's terrain generally slopes to the west and the south, with its highest point, Mount Peale, at 12,726 feet above sea level. Blanding has an elevation of 6,106 feet, Monticello has an elevation of 7,070 feet, and Bluff has an elevation of 4,324 feet. The Blue (Abajo) Mountains and the La Sal Mountains exceed 12,000 feet in elevation. Both ranges are covered with lush forests, contrasting the scenery below. The elevation change within the county is from nearly 13,000 feet in the La Sal Mountains to 3,000 feet at Lake Powell, a difference of about 10,000 feet.

The county's western and southern borders lie deep within gorges carved by the Colorado and San Juan Rivers. Tributary canyons, cutting through rock layers of the surrounding deserts, have carved the land up with chasms, cliffs, and plateaus. In the center of the county are Cedar Mesa, Comb Wash, Natural Bridges, and Hovenweep National Monuments. Canyonlands National Park lies mostly within the county borders. The eastern side of Glen Canyon National Recreation Area/Lake Powell is also in the county.

3.4 GEOLOGY

San Juan County is known for its rich deposits of oil, gas, and uranium. The county is located in the heart of the Colorado Plateau, and the land features many deep canyons cut from the Colorado River and related tributaries, as well as broad mesas, buttes, hogback ridges, sage plains, and isolated mountains. Geology plays a significant role in San Juan County's economy, as the county heavily focuses on mineral extraction and tourism. Local stone, copper, gold, silver, vanadium, and radium have all been quarried and mined from the county, too (UGS, 1992).

The unique rock landscapes, monuments, recreational areas, national and state parks, and other scenic areas all attract tourists year-round in San Juan County. The rivers, red rock, and mountains provide additional recreational opportunities. Cultural and archaeological resources are also abundant.

The area that is now the county was once underneath vast shallow oceans, which deposited carbonate-rich sediments that later became limestones and dolomites. According to the Utah Geological Survey, "approximately 320 million years ago, the Uncompahgre uplift (a mountainous-like island) began rising northeast of San Juan County. Along the southwest flank of the uplift, a large depression developed into what we now call the Paradox basin—a 20,000 square mile area that contained a restricted arm of the sea. Repeatedly, the sea water filled the basin, and each time retreated to cumulatively deposit thousands of feet of salt and other saline deposits. The Paradox basin, defined today by the area underlain by these salt deposits, covers southeastern Utah, including the northeastern two-thirds of San Juan County" (UGS, 1992).

When the sea eventually retreated, drier conditions transformed the area into large sandy deserts. During periods of wetter weather, dinosaurs roamed the region. These sand deposits later turned into the brightly colored sandstone cliffs and petrified sand dunes the county has now. Approximately 95 to 80 million years ago, the area was filled with marine water, and peat, which later turned into coal, formed in the swamps and marshes. The mountains were formed 30 million years ago as magma seeped up to the surface. The Colorado Plateau formed 15 million years ago and rose in elevation, and in the last 1.5 million years, rivers and erosion created the canyons, arches, natural bridges, fins, spires, and monuments (UGS, 1992). The map below depicts the many quaternary deposits and rocks that make up San Juan County's landscape.

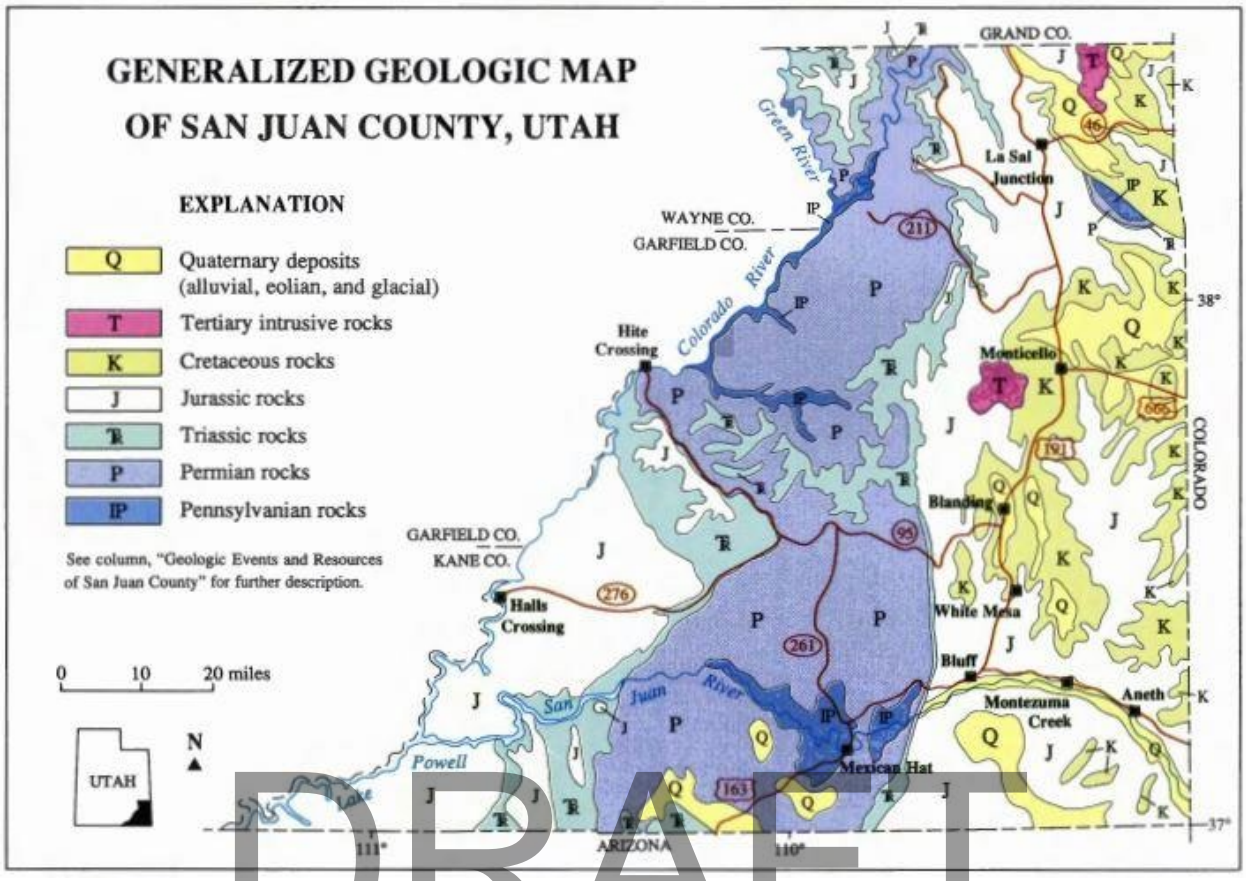


Figure 3-1. Generalized Geologic Map of San Juan County, Utah

3.4.1 Soils

San Juan County's land consists of six main soil groups: Reddish Brown soils, Sierozems, Calcisols, Alluvial soils, Lithosols, and Regosols. The first three of these six soil groups are made up of eolian material, diorite, andesite, dacite, sandstone, and alluvium. The last three soil groups primarily contain medium-textured to fine-textured alluvium and weathered shale. Eolian material is the most abundant soil type found in Monticello and Blanding (USDA, 1962).

3.5 CLIMATE

The climate in San Juan County is primarily dry, sub-humid continental. The climate becomes more semi-arid in the southernmost part of the county, south of Blanding. The difference in elevation causes the temperature to be slightly lower in Monticello than in Blanding.

In the summer, the average daily temperature in Blanding is 73.8°F with the warmest month of each year typically being July (NOWData, 2022). In the winter, the average daily temperature is 28.5°F in Blanding, and the coldest month is typically January (NOWData, 2022).

Average annual precipitation is approximately 13.29 inches in Blanding and 15.15 inches in Monticello (Western Regional Climate Center, 2022). Because the county's land area is so large, averages can vary dramatically from one community to another. The wettest month in Blanding is October, and the driest month is July. However, the wettest month in Monticello is August, and the driest month is June. The

growing season is usually June through October, with slightly longer periods in lower elevations. During this time the county receives approximately five to seven inches of precipitation, depending on location. The table below outlines monthly average maximum and minimum temperatures and average precipitation and snowfall recorded at Monticello and Blanding.

Table 3-1. Monticello and Blanding Monthly Climate Summary

Monticello, UT												
Average Maximum Temperature												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
35.5	39.8	47.8	57.9	67.5	78.0	83.6	81.0	73.6	62.4	47.6	37.6	59.4
Average Minimum Temperature												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
14.1	18.1	24.0	31.0	38.5	46.3	53.2	51.9	44.3	34.5	23.8	16.2	33.0
Average Total Precipitation												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
1.40	1.17	1.17	0.95	0.92	0.62	1.50	1.93	1.49	1.68	1.08	1.24	15.15
Average Total Snowfall												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
17.5	12.0	9.0	3.5	0.7	0.0	0.0	0.0	0.0	0.8	5.9	13.4	62.7
Blanding, UT												
Average Maximum Temperature												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
39.2	44.9	53.0	62.4	72.5	83.6	88.8	86.3	78.4	66.0	51.6	41.2	64.0
Average Minimum Temperature												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
17.3	22.4	28.0	34.5	42.4	51.1	58.2	56.4	48.6	38.2	27.0	19.3	37.0
Average Total Precipitation												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
1.40	1.22	1.02	0.86	0.71	0.44	1.15	1.36	1.28	1.44	1.03	1.39	13.29
Average Total Snowfall												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
10.9	7.4	4.3	1.9	0.2	0.0	0.0	0.0	0.0	0.4	3.2	10.1	38.3
Source: Western Regional Climate Center, 2022												

3.6 LAND OWNERSHIP

San Juan County has approximately 5.1 million total land acres. Federal land, administered by the Bureau of Land Management, holds the greatest land ownership in the county with 41% or approximately 2.1 million acres. The Navajo Nation has approximately 1.2 million acres (25%); the National Park Service has 589,000 acres (12%); the U.S. Forest Service encompasses about 450,000 acres (9%); the state of Utah owns 268,000 acres (5%); and State Parks have approximately 3,000 acres (less than 1%). Private ownership only makes up about 404,000 acres, which is just under 8% (SJ General Plan, 2018).

Since the county is 67% federal and state land, the land management policies of the corresponding governing agencies greatly impact the county's economy (SJ General Plan, 2018).

3.7 LAND USE & NATURAL RESOURCES

San Juan County is in the far southeastern portion of Utah within the Colorado Plateau along the Colorado and Arizona borders. It is the largest county in Utah and the 24th largest in the United States with approximately 7,933 total square miles. Some of the more famous attractions within San Juan County are Monument Valley, Canyonlands National Park, Bears Ears National Monument, Lake Powell, Four Corners area, and the Navajo Indian Reservation. The following table lists the land use statistics in the county.

Table 3-2. San Juan County Land Use

Land Use	Acres
Forest	1,890,662
Grain Crops	55,117
Conservation Reserve Program	36,079
Grass/Pasture/Haylands	26,733
Orchards/Vineyards	71
Row Crops	26,557
Shrub/Rangeland	2,937,699
Water	45,629
Developed	4,488
County Total	**5,023,035**
Source: NRCS, 2023	

The map below depicts the land use and jurisdictional boundaries throughout the county.

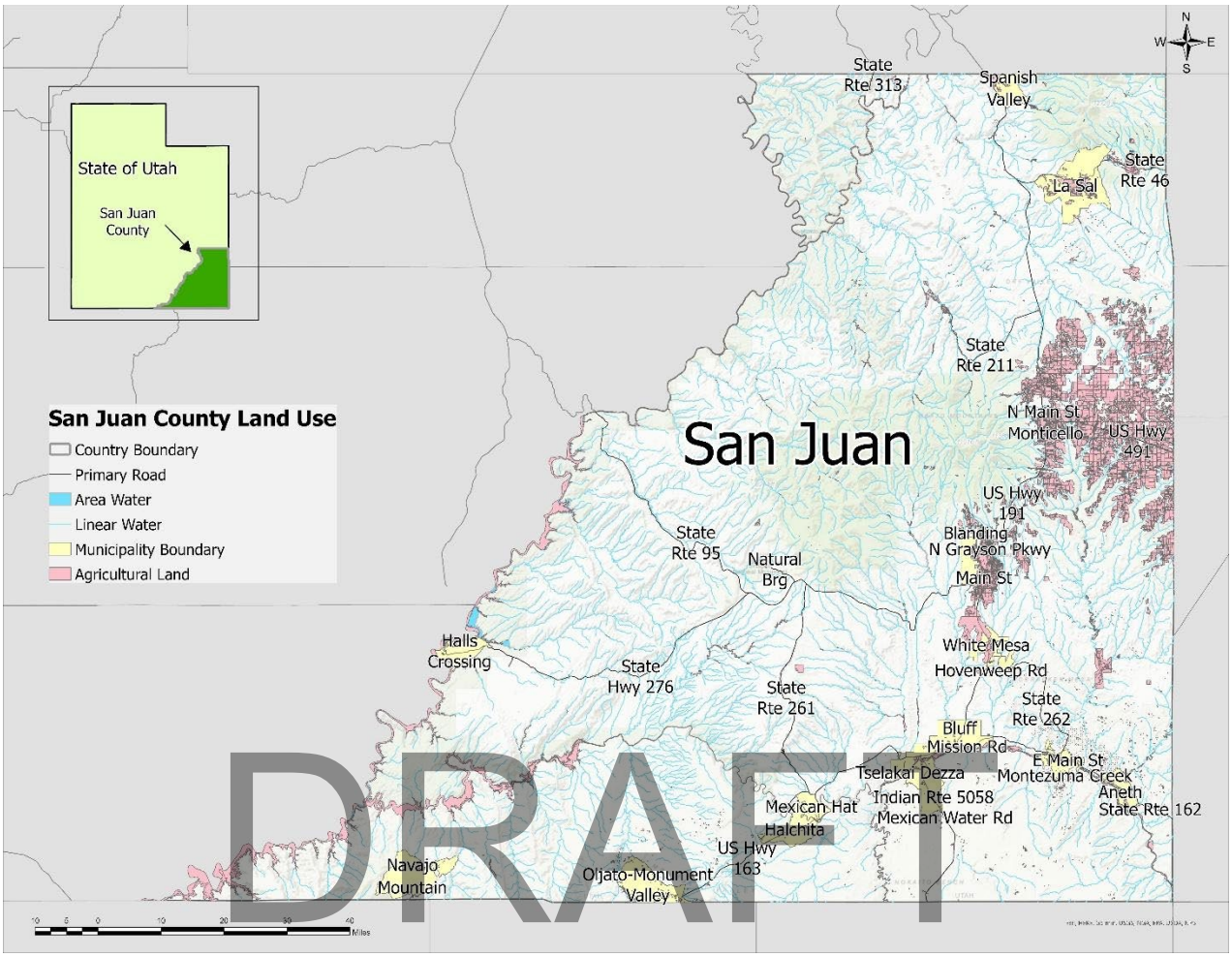


Figure 3-2. San Juan County Land Use

3.8 HISTORY

San Juan County is originally named after the San Juan River, which was named by the Dominguez-Escalante party. Prehistorically, the Anasazi Basketmakers inhabited the area and created many of the archeological ruins and items found throughout the county, such as cliff houses, pictographs, and petroglyphs. The Utes and Navajo Native Americans lived in the county after the Anasazi departed (SJ General Plan, 2018). The Navajo Nation still currently resides on a reservation in the southeast corner of the county on approximately 1.2 million acres. There is a portion of the Southern Utah Piaute Tribe and Ute Mountain Ute tribe within the county as well.

The first large group of white settlers came to the area in 1879 to scout out new land to settle. The expedition, made up of Latter-day Saint scouts, first opened up the Bluff area for settlement with the creation of Bluff Fort. After failing to irrigate effectively using the San Juan River, many people moved to Blanding and Monticello to raise cattle and livestock (SJ General Plan, 2018).

Gold, oil and gas, and uranium have been successfully mined throughout the county, providing many jobs for locals and boosting the county's economy. Tourism is also a primary resource in San Juan County.

3.9 DEMOGRAPHICS & POPULATION GROWTH

The demographics and population of an area are important to understand what the impacts of a natural hazard may be on communities now and in the future. In 2021, San Juan County had a population of 14,489 (U.S. Census QuickFacts, 2021). This is a slight decrease from the population taken during the 2020 Census, which was 14,518. The county saw a large uptick in growth in 2015 that lasted until 2019, reaching a peak of 15,358 in 2018. However, the population has been trending downward since 2020 when it dropped -5.16%.

The population trends for San Juan County and the three largest cities/town in the county are shown in the table below.

Table 3-3. San Juan County Population Trends

Area in County	2010	2020	Percent Change 2010–2020
Entire County	14,746	14,518	-1.55%
Monticello	1,972	1,824	-7.51%
Blanding	3,375	3,394	0.56%
Bluff	258	240	-6.98%
Source: U.S. Census Bureau, 2010, 2020			

Between 2010 and 2020, the county as a whole decreased in population by -1.55%, although there were periods of substantial growth and subsequent declines within that period. Monticello and Bluff both also decreased in population, with -7.51% and -6.98% declines respectively. The only city to experience growth in the county during this ten-year period was the city of Blanding, which grew by 0.56%.

Of the total population in the county, 50.0% are female (American Community Survey, 2019). 0.8% of residents were foreign born. The population is ethnically diverse with 48.0% of county residents listed as white and 48.5% of residents listed as American Indian. The county's racial and ethnic distribution is listed in the table below. Only the six most common ethnicities in the county are included, and some members of the population may identify as more than one race.

Table 3-4. San Juan County Racial and Ethnic Distribution

Race	Percent of Population
White	48.0%
Black or African American	0.4%
American Indian and Alaska Native	48.5%
Asian	0.6%
Native Hawaiian and Other Pacific Islander	0.1%
Hispanic or Latino	6.1%
Source: U.S. Census Bureau, 2020; American Community Survey, 2022	

3.10 ECONOMY

San Juan County has three mainland-based economic opportunities that are expected to lead growth. These are mineral (hard rock mining and oil/gas exploration), agriculture, and tourism. Other factors that affect economic enrichment involve mineral production, governmental operations (state and federal), tribal operation, oil and gas exploration, and wildlife recreation.

San Juan County's largest employment industry rests with federal, state, and local government, retail trade, and health and social services. Tourism and professional and technical services are also large employers that contribute to the county's economy. The adjusted unemployment rate is 4.2% for San Juan County as of October 2022 compared to the state of Utah unemployment rate of 2.1% and the United States unemployment rate of 3.7% for the same period (Utah Department of Workforce Services, 2022).

The median household income for San Juan County was reported to be $49,690, and the median home value was reported to be $128,700 in 2020. The poverty rate in the county is 18.6% (U.S. Census QuickFacts, 2020).

3.11 COUNTY FACILITIES/CRITICAL INFRASTRUCTURE

The following table lists important facilities in San Juan County:

Table 3-5. San Juan County Facilities and Critical Infrastructure

Facility Name	Facility Address	Phone Number
Health Services Building	735 S 200 W Blanding, UT	
Montezuma Creek Clinic	State Highway 162 Montezuma Creek, UT	435-651-3291
UNHS—Navajo Mountain Community Health Center	Mailing: P.O. Box 10100 Tonalea, AZ 86044 Physical: #2 Rainbow Rd Navajo Mountain, UT 86044	928-672-2498
Utah Navajo Health Systems	East Highway 262 P.O. Box 130 Montezuma Creek, UT 84534	435-651-3291
Monument Valley Health Center	Four Rock Door Canyon Monument Valley, UT 84536	435-727-3241
San Juan Hospital	380 W 100 N Monticello, UT 84535	435-587-2116
San Juan Clinic	380 W 100 N Monticello, UT 84535	435-587-5054
Blanding Clinic	804 N 400 W Blanding, UT 84511	435-678-2254
UNHS—Blanding Family Practice Community Health Center	910 S 300 W Blanding, UT 84511	435-678-3601
Blue Mountain Hospital	802 S 200 W Blanding, UT 84511	435-678-3993
Lake Powell School	1000 Ferry Rd 9 (Kane County) Lake Powell, UT 84533	435-684-2268
Blanding Elementary School	302 S 100 W Blanding, UT 84511	435-678-1871
La Sal Elementary School	State Highway 46 La Sal, UT 84530	435-678-1292
Bluff Elementary School	200 W Main St Bluff, UT 84512	435-678-1296
Montezuma Creek Elementary School	State Highway 262 Montezuma Creek, UT 84534	435-678-1261
Monticello Elementary School	197 N 200 W	435-587-2241

Facility Name	Facility Address	Phone Number
	Monticello, UT 84535	
Albert R. Lyman (ARL) Middle School	535 N 100 E Blanding, UT 84511	435-678-1398
Tse'Bli'Nidzisgai Elementary School	Highway 163, 10 West Medical Drive Monument Valley, UT 84536	435-678-1286
Monticello High School	164 S 200 W Monticello, UT 84535	435-678-1130
San Juan High School	300 N 100 E Blanding, UT 84511	435-678-1301
Whitehorse High School	P.O. Box 660 Montezuma Creek, UT 84534	435-651-3427
Monument Valley High School	U.S. State Highway 163 Monument Valley, UT 84536	435-678-1208
Navajo Mountain High School	Southwestern tip of San Juan County, UT Turn N off Navajo Highway 98 about 50 miles SW of Page, AZ and drive 40 miles N to where pavement ends	
San Juan County Jail House (Utah Department of Corrections)	297 South Main Monticello, UT 84535	435-587-2237
Monticello City Sanitary Treatment Plant	East end of Clay Hill Dr Monticello, UT	435-587-2271
San Juan Water Conservancy Office	62 N Main St Blanding, UT 84511	435-678-2596
Blanding Water Treatment	1999 North Reservoir Rd Blanding, UT 84511	435-678-2507
Monticello Water Treatment Plant	1580 W Abajo Dr Monticello, UT 84535	435-587-2618
Mexican Hat Special Service District	P.O. Box 535 Mexican Hat, UT 84531	
Bluff Service Area	P.O. Box 310 Bluff, UT 84512	
San Juan County Emergency Operations Center	881 E Center St Monticello, UT	435-587-3225
San Juan County Road Department	835 E Highway 491 Monticello, UT	435-587-3230
San Juan County Road Department	Montezuma Creek, UT	435-651-3269
Lisbon Valley Gas Plant	7 Rankine Rd P.O. Box 215 La Sal, UT 84532	
Blanding City Gas	84530	435-686-7600
Rocky Mountain Power—substation (Pinto)	Exit Monticello and head E on U.S. Highway 491. Substation is just S of the highway.	888-221-7070
Empire Electric	16 E 200 S STE D Monticello, UT 84535	435-587-2421
Gary-Williams Energy Facility	¾ miles S of Montezuma Creek, UT	
sPower Wind Farm	Mailing: 2180 S 1300 E Salt Lake City, UT 84106	

Facility Name	Facility Address	Phone Number
	Physical: Latigo Wind Park in southeastern San Juan County	
Blanding Ambulance Heliport (private)	San Juan Health Care Services 857 N 30 W Blanding, UT 84511	801-678-2034
Blanding Municipal Airport—BDG (public)	50 W 100 S Blanding, UT 84511	
Bluff Airport—66V (public)	Mailing: San Juan County 117 S Main St P.O. Box 338 Monticello, UT 84535 Physical: 4 miles SW of Bluff, UT 84512	435-587-3223
Fry Canyon Field Airport—UT74 (private)	Mailing: Bureau of Land Management P.O. Box 7 Monticello, UT 84535 Physical: 1 mile NW of Fry Canyon, UT 84533	435-587-1515
Cal Black Memorial Airport—U96 (public)	Mailing: San Juan County 117 S Main St P.O. Box 338 Monticello, UT 84535 Physical: 10 miles E of Halls Crossing, UT 84533	435-587-3223
La Sal Junction Airport—01UT (private)	Mailing: K McDougald P.O. Box 1330 McDougald Oil Co Moab, UT 84532 Physical: 6 miles W of La Sal, UT 84532	435-259-6156
A Z Minerals Corporation Airport—03UT (private)	Owner: Navajo Tribe Window Rock, AZ 86515 Physical: 7 miles SW of Mexican Hat, UT 84531	
Sky Ranch Airport—UT53 (private)	Mailing: Richard Tangren 8439 Placid St Las Vegas, NV 89123 Physical: 7 miles S of Moab, UT 84532	702-361-8850
Monticello Airport—U43 (public)	City of Monticello Highway 191 17 N 100 E Monticello, UT 84535	435-587-2271
Needles Outpost Airport—UT59 (private)	Owner: State of Utah Monticello, UT Physical: Near Moab	
Monument Valley Airport—UT25 (private)	RGJ Corporation P.O. Box 360001 Monument Valley, UT 84536	435-727-3225

Facility Name	Facility Address	Phone Number
Navajo Mountain Airport—04UT (private)	Mailing: Navajo Air Transportation P.O. Box 706 Window Rock, AZ 86515 Physical: 1 mile S of Navajo Mountain Trading Post, UT 86044	
Blanding City Fire Department	350 W 200 S Blanding, UT 84511	435-678-2837
Bluff Volunteer Fire Department	496 E Black Locust Ave Bluff, UT 84512	435-686-2315
La Sal Fire Department	200 S Fire House Rd La Sal, UT 84530	435-686-2315
Mexican Hat Fire Department (not manned)	100 U.S. Highway 163 P.O. Box 310434 Mexican Hat, UT 84531	435-587-3225
Eastland Volunteer Fire Department	Monticello City HC 63 Box 75 Monticello, UT	435-587-2732
Monticello Fire Department	Monticello City 17 N 100 E Monticello, UT 84535	435-587-2271
San Juan County Fire/Emergency Services	San Juan County 117 S Main St Monticello, UT 84535	435-587-3225
Montezuma Creek Fire Department	State RT. 262 P.O. Box 424 Montezuma Creek, UT 84534	435-651-3351
Cedar Point Fire Department	516 S County Rd 342 Monticello, UT 84535	435-587-3225
San Juan County Communications	Mack McDonald 117 S Main St Monticello, UT 84535	
Abajo Peak Communication Array (NOAA)	297 S Main St Monticello, UT 84535	435-587-2237
KAAJ	96 E 500 N Monticello, UT	435-587-3456
EAS Alerts from Utah-based radio and television stations (especially KCYN 97.1 FM Moab, UT)	1030 Bowling Alley Ln #3 Moab, UT 84532	435-259-1035
NWR Transmitter	162.475 38°/31'/44" N, -109°/19'/25" W	
Blanding Police Department	167 E 500 Nf Blanding, UT	435-678-2334 or 435-678-2916
San Juan County Sheriff Department	297 S Main St Monticello, UT 84535	435-587-2237
Highway Patrol Office	232 S 100 E Monticello, UT 84530	435-587-2000
Navajo Nation Police Department	Shiprock, NM	505-368-1350
Ute Law Enforcement Officer	Towaoc, CO	971-565-3706
KCYN 97.1 FM	1030 Bowling Alley Ln #3 Moab, UT 84532	435-259-1035

Facility Name	Facility Address	Phone Number
KTNN 600 AM	P.O. Box 2569 Window Rock, AZ 86515	928-871-3553
KRTZ 98.7 FM	2402 Hawkins St Cortez, CO 81321	970-565-6565
KTRA 102.1 FM	200 E Broadway Ave Farmington, NM 87401	505-325-1716
Red Rock Radio	49 S Main St Monticello, UT 84535	435-587-2277
Spanish Valley Clinic	5555 Old Airport Rd Moab, UT 84535	435-419-9210

The following map depicts the locations of San Juan County's critical facilities.

Figure 3-3. San Juan County Critical Facilities

The figure below outlines the city of Monticello's boundaries and critical infrastructure.

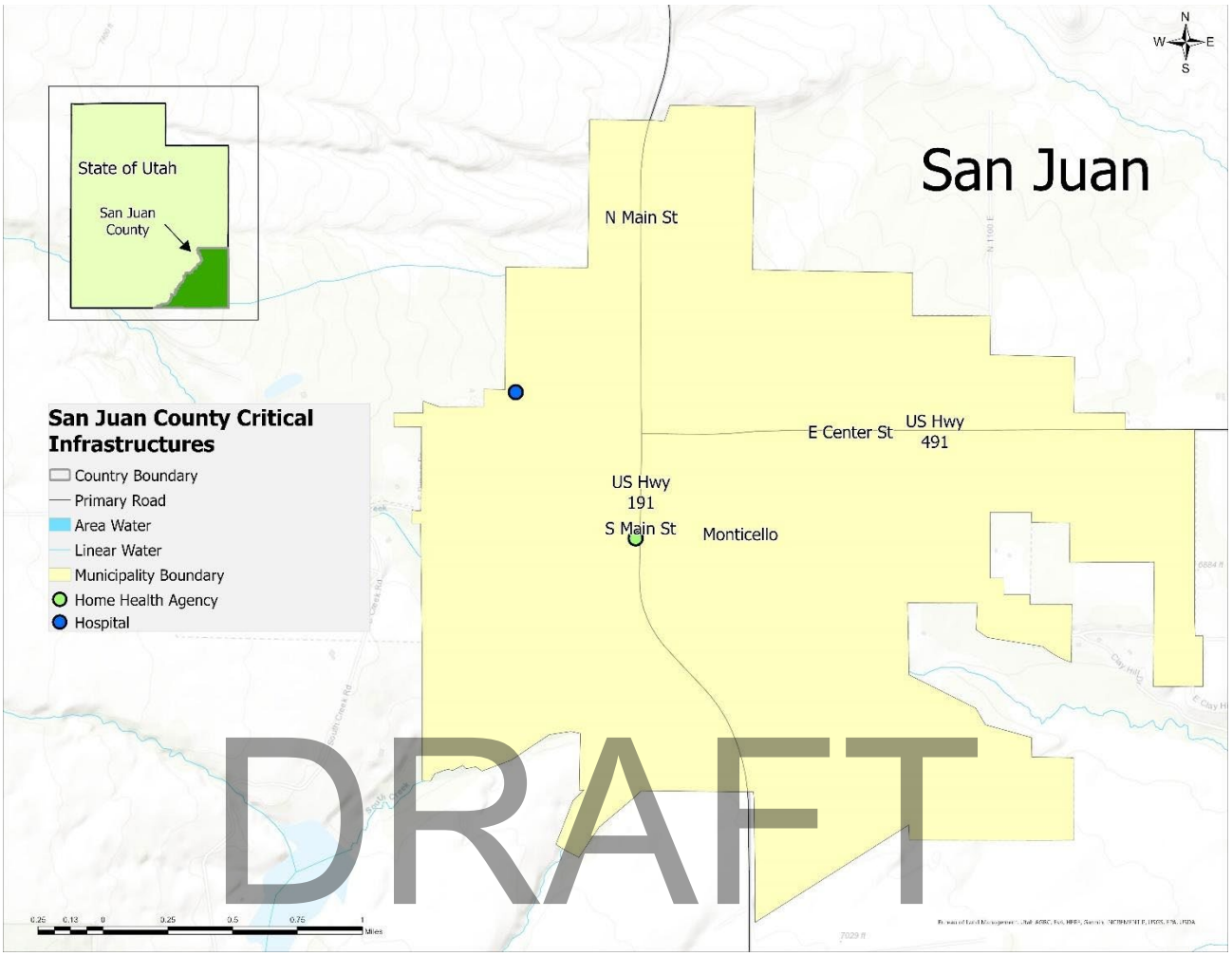


Figure 3-4. City of Monticello Critical Infrastructure

3.12 PUBLIC SERVICE FACILITIES

3.12.1 Sewer & Water

San Juan County has a total of 15 public and private water providers of culinary and/or agriculture water (SJ General Plan, 2018). The town of Bluff manages their own water system, which is made up of wells. Spanish Valley also only has wells. Other water systems serve businesses, churches, campgrounds, and subdivisions. Outside city boundaries and areas where a water system is not available, county residents must rely on private wells for culinary water.

The majority of water that the county uses originates from Indian Creek and is transported through an early pioneer tunnel through the mountain and dropping into Johnson Creek on the other side (SJ General Plan, 2018). The Dry Wash Reservoir is also important to the county's water system and holds approximately 550 acre-feet of water. Monticello Dam or Lloyd's Lake impounds 3,625 acre-feet of water. Recapture Dam impounds 9,240 acre-feet.

The sewer system in Blanding consists of main lines running through the roadways as part of a gravity-fed system, which is treated through sewage lagoons consisting of four cells. Monticello's sewer system

consists of main lines running through roadways as part of a gravity-fed system, which is treated through sewage lagoons consisting of four cells and one irrigation pond. Water from the irrigation pond is disposed of by users. All other areas in the county use a septic system (SJ General Plan, 2018).

3.12.2 Solid Waste Management

Solid waste in the unincorporated areas of the county is managed by the county itself. The county landfill is located near Blanding on Highway 191. Two transfer stations are located in San Juan County, Mexican Hat, and La Sal. Monticello and Blanding have a transfer station for certain materials, which is managed by the cities. Franchised waste haulers in the county haul the waste when needed. (SJ General Plan, 2018).

3.12.3 Public Utilities

Power is supplied to Monticello and Eastland from Empire Electric Association, Inc., which is located in Cortez, CO. Empire Electric Association, Inc. supplies 5 Megawatts at any given time. Blanding uses Utah Electric Utility and Rocky Mountain Power for power (Find Energy, 2023). Spanish Valley, La Sal, Bluff, and most other small communities in the county are supplied by Rocky Mountain Power. The Navajo Reservation receives power from the Navajo Tribal Utility Authority. Three of these companies offer net metering. Additionally, many rural farms and residences live off the grid and rely on solar or wind power (SJ General Plan, 2018).

Most telecommunication services are provided by Frontier through DSL (High Speed Internet, 2023). River Canyon Wireless provides fixed wireless internet, and Emery Telecom provides cable and fiber internet. T-Mobile Home Internet offers 5G connection. Viasat and HughesNet provide services through satellite.

Dominion Energy supplies natural gas to the city of Monticello and Blanding city supplies gas to the city of Blanding. All other locations in the county use privately purchased propane or butane (SJ General Plan, 2018).

3.13 WATER RESOURCES

3.13.1 Surface Water

The two major rivers in the county are the Colorado River along the county's west border and the San Juan River in the southern end of the county, which is a major tributary of the Colorado River.

There are 41 reservoirs and 12 lakes in San Juan County (Anyplace, 2023). There are also many small streams, creeks, springs, and canals in the county.

3.13.2 Groundwater

San Juan County has many wells that dip into the area's aquifers. A sole source aquifer provides at least 50% of the drinking water to the population living above the aquifer (SJ General Plan, 2018).

3.13.3 Irrigation

There are approximately 130,173 acres of cropland in San Juan County, of which 44,614 acres are harvested and 7,571 are irrigated (Wytsalucy, 2020). Irrigation water comes from seven different providers and originates from many sources, including the San Juan River, Recapture Creek, North and

South Creeks, Indian Creek, Johnson Creek, Gordon Reservoir, La Sal Creek, Beaver Creek, Deer Creek, Chicken Creek, and Verdure Creek (SJ General Plan, 2018). The city of Blanding does not provide secondary water, and there is not a pressurized irrigation system for residents. Residents use culinary water for outside watering needs. Monticello does have secondary water for irrigation.

3.14 TRANSPORTATION

3.14.1 Roadways

San Juan County has two public transit agencies—the Navajo Transit System and the Southeastern Utah District Health Department Care-a-Van—that provide bus services to locals throughout the county and neighboring areas. The Navajo Transit System serves and operates on the Navajo Nation throughout Arizona, New Mexico, and Utah. As of December 2022, they had nine routes running every weekday (Navajo Transit System, 2022). The Southeastern Utah District Health Department Care-a-Van shuttle program includes non-emergency transportation services for medical appointments.

The San Juan County Road Department maintains approximately 1,610 miles of dirt roads, 745 miles of gravel roads, and 371 miles of paved roads within the county (San Juan County, 2023). The major U.S. Highways include 191, 163, and 491. U.S. 191 runs from the northern San Juan County line south through Monticello, Blanding, Bluff, and on into the state of Arizona connecting with Highway 160. U.S. 491 travels from the Colorado state line west through Monticello. Perpendicular to U.S. 191 is U.S. 163, extending from Montezuma Creek, west through Bluff, and then southwesterly through Mexican Hat and on to the Arizona state line at Monument Valley.

Other routes include SR 46 through La Sal, SR 211 through Canyonlands National Park, SR 162 through Montezuma Creek, and SR 95, SR 276, SR 261, and SR 262, to name a few.

3.14.2 Bridges

The following table provides a list of all San Juan County bridge locations, owners, lengths, years constructed, and daily traffic counts, taken from the National Bridge Inventory.

Table 3-6. Bridges in San Juan County

Location	Owner	Length (ft)	Year Built	Average Daily Traffic Count
12 mi. SE of Monticello	County Highway Agency	11.9	1960	250
14 mi. W of Blanding	County Highway Agency	12.8	1955	7
5 mi. W of Verdure	County Highway Agency	11.2	1981	250
10 mi. N of La Sal Jct.	County Highway Agency	9.8	1950	13
12 mi. E of Jct. SR-191	County Highway Agency	20.4	2008	779
Source: National Bridge Inventory, 2022				

3.14.3 Airports

There are 14 airports in San Juan County, UT, though many of them are private airports, and one is a heliport owned and operated by San Juan Health Care Services (AirNav, 2022). There are four public airports in the county: Blanding Municipal Airport in Blanding, Bluff Airport in Bluff, Cal Black Memorial Airport in Halls Crossing, and Monticello Airport in Monticello. The details of these public airports are provided in the table below.

Table 3-7. Public Airports in San Juan County

Airport	Location	Surface	# of Runways	Aircraft Based on Field	Aircraft Operations
Blanding Municipal Airport	3 miles S of Blanding, UT	Asphalt, excellent condition	2	17	Avg 52/week
Bluff Airport	4 miles SW of Bluff, UT	Asphalt, fair condition	2	1	Avg 20/week
Cal Black Memorial Airport	10 miles E of Halls Crossing, UT	Asphalt, good condition	2	2	Avg 39/week
Monticello Airport	3 miles N of Monticello, UT	Asphalt, good condition	2	6	Avg 42/week
Source: AirNav, 2022					

3.15 HOUSING

According to the U.S. Census 2021 Population Estimates, San Juan County has 5,550 housing units. The number of housing units peaked at 6,027 units in 2020 after steady growth year by year since 2010. The emergence of the COVID-19 pandemic likely contributed to the recent decline in units. The current owner-occupied housing unit rate in the county is 78.1%. For renters, the median gross rent is $720. The median value of homes is $128,700, which is significantly less than the median home value of $305,400 for the state of Utah (U.S. Census QuickFacts, 2021).

3.16 EDUCATIONAL FACILITIES

As of the 2022–23 school year, San Juan County has 13 public schools serving 3,144 students. One private school serves 40 private students. San Juan County has two school districts—San Juan School District and Aneth Community School District. Five public high schools enroll 1,156 students. These schools include Monticello High School, San Juan High School, Whitehorse High School, Monument Valley High School, and Navajo Mountain High School. The county has one middle school called Albert R. Lyman Middle School that serves 325 students in Blanding. There are six elementary schools that serve 1,564 students, which include La Sal Elementary School, Monticello Elementary School, Blanding Elementary School, Bluff Elementary School, Montezuma Creek Elementary School, and Tse'Bii'Nidzisgai Elementary School. Aneth Community School is the only school in the Aneth Community School District, and it enrolls 99 students (Public School Review, 2022).

Additionally, Lake Powell School enrolls nine students in kindergarten through sixth grade (Public School Review, 2022). Although Lake Powell School is located just over San Juan County's western border in Kane County, the school serves some students who live in San Juan County.

Life Mission School is a private school in Monticello for grades pre-kindergarten to 10th grade with 40 students total. The school often works with homeschooling parents in the area to offer online and in-person education in conjunction with home learning (Public School Review, 2022).

3.17 HIGHER EDUCATION

19.2% of county residents 25 years of age or older have a bachelor's degree or higher (U.S. Census QuickFacts, 2022). Utah State University (USU) has a campus in Blanding with more than 90 undergraduate degrees and certificate programs (USU Blanding, 2023). The university also has smaller campuses in Monticello, Monument Valley, and Montezuma Creek. Moab hosts a USU campus just outside San Juan County's northern border. Additionally, USU has an extension location in Monticello where it offers research-based community education, resources, and programs in several topics (e.g., agriculture, business, food, health, home, finance, and 4-H and youth) to the community (USU Extension, 2023). The San Juan County Extension Office also runs online classes.

Monticello College offers bachelor's and master's degrees at their campus in Monticello. Monticello College is a liberal arts college that focuses on history, literature, science, foreign language, philosophy, leadership training, and other subjects while students live on the campus farm and engage in manual labor to operate the farm and grow their own food (Monticello College, 2022). Students also learn adobe, CEB construction, cob and straw bale construction, and other off-the-grid energy system skills. Tuition for an undergraduate degree is $7,052 per year.

3.18 RECREATION AREAS

San Juan County offers a plethora of recreational opportunities, including hunting, fishing, water sports, hiking, camping, sightseeing, and wildlife and nature photography. Additionally, miles and miles of wilderness allow for ATVing, mountain biking, rock climbing, horseback riding, kayaking, and river rafting. In the winter, cross-county skiing, snowshoeing, and snowmobiling are popular sports.

The Colorado and San Juan Rivers and Lake Powell have many sportsmen access sites for fishing and camping as well as boating, rafting, and swimming. The county and nearby regions have dozens of national monuments, national parks, state parks, tribal parks, primitive areas, national forests, and other recreation areas, such as Bears Ears National Monument, Canyonlands National Park, Dark Canyon, Dead Horse Point State Park, Four Corners, Glen Canyon National Recreation Area, Grand Gulch, Hovenweep National Monument, Manti-La Sal National Forest, Monument Valley, Natural Bridges National Monument, Rainbow Bridge National Monument, and many others.

The county is also known for its hundreds of scenic drives and outlooks throughout the region. These views are unique due to the vast array of terrain in the county, including arid desert, high-mountain forests, winding rivers, and deep canyons.

3.19 CULTURAL & HISTORICAL SITES

Sites in San Juan County listed on the National Register of Historic Places can be found in the table below.

Table 3-8. Historic Sites in San Juan County

Site	Address	City
Joseph Frederick Adams House	Off US 163	Bluff
Alkali Ridge	N/A	Monticello
Aneth Terrace Archeological District	N/A	Aneth
Big Westwater Ruin	N/A	Blanding
Bluff Historic District	Roughly bounded by Main St., US 191, 2nd E. St., and the bluffs	Bluff
Butler Wash Archeological District	N/A	Blanding
Cave Springs Cowboy Camp	Cave Springs vicinity	Moab
James Bean Decker House	UT 47	Bluff
Defiance House	N/A	Blanding
Edge of Cedars Indian Ruin	W. of Blanding	Blanding
Goulding's Trading Post	Off UT 47	Monument Valley
Grand Gulch Archeological District	N/A	Blanding
Hole-in-the-Rock Trail	Trail beginning at Escalante UT and ending at Bluff	Escalante
Hyland Hotel	116 S. 100 W.	Monticello
Indian Creek State Park	14 mi. N of Monticello	Monticello
Frederick Isaac and Mary M. Jones House	117 E. 200 S.	Monticello
Julien Inscription	Lower Red Lake vicinity	Moab
Kirk's Cabin Complex	Upper Salt Walsh	Moab
Lathrop Canyon Mine I	Lathrop Canyon	Moab
Lost Canyon Cowboy Camp	Lost Canyon vicinity	Moab
Murphy Trail and Bridge	Murphy Point vicinity	Moab
Natural Bridges Archeological District	N/A	Blanding
Neck and Cabin Springs Grazing Area	Grand View Point Rd.	Moab
Jens Nielson House	Off UT 47	Bluff
Old Fort Cabins	Off UT 47	Bluff
Oljato Trading Post	SW of Blanding	Blanding
Owachomo Bridge Trail	Armstrong Canyon	Blanding
Nancy Patterson Site	N/A	Blanding
Poncho House	N/A	Mexican Hat
Lemuel H. Redd Jr. House	UT 47	Bluff
Salt Creek Archeological District	N/A	Monticello
Sand Island Petroglyph Site	N/A	Bluff
John Albert Scorup House	UT 47	Bluff
St. Christopher's Episcopal Mission	UT 163	Bluff
Swallow's Nest	2 N. Grayson Pkwy.	Blanding
Westwater Canyon Archeological District	N/A	Blanding

Source: National Register of Historic Places, 2023

PART III: RISK ASSESSMENT

CHAPTER 4 HAZARD RISK SUMMARY

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. It allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. The process focuses on the following elements:

- Hazard identification—Use all available information to determine what types of disasters may affect a jurisdiction, how often they can occur, and their potential severity.
- Vulnerability identification—Determine the impact of natural hazard events on the people, property, environment, economy, and lands of the region.
- Cost evaluation—Estimate the cost of potential damage or cost that can be avoided by mitigation.

The risk assessment for this hazard mitigation plan update evaluates the risk of natural hazards prevalent in the planning area and meets requirements of the DMA (44 CFR, Section 201.6(c)(2)).

4.1 IDENTIFIED HAZARDS

There are countless hazards that pose a threat to human life, health, and well-being, and no attempt is made here to compile an exhaustive list. Those that are addressed in disaster planning are generally categorized as “natural” or “technological” (sometimes “manmade”). The FEMA website contains a thorough discussion and list of hazards in the section entitled “National Risk Index for Natural Hazards” (FEMA, 2022). Some hazards are a threat to all geographic areas while others (e.g., flooding) are more limited in their extent. Studies were conducted to determine which hazards are of concern in San Juan County.

San Juan County hazards were identified and their frequency of occurrence evaluated using a number of resources, including:

- 2018 San Juan County Pre-Disaster Natural Hazard Mitigation Plan
- San Juan County 2018 General Plan
- Hazard planning documents developed by state, federal, and private agencies
- NOAA weather data from the past 72 years
- Data from the United States Geological Survey (USGS) and the Utah State Geological Survey (UGS)

Hazards that have been identified as significant in this county and that will be considered in this plan are listed below.

Natural Hazards

- Severe Summer Weather
    - Extreme Heat
    - Lightning
    - Hail
    - Tornado
    - Straight-Line Wind
- Severe Winter Weather
    - Extreme Cold

    - Winter Storm
    - Avalanche
- Wildfire
- Flood
    - River or Stream Flood
    - Flash Flood
    - Dam Failure
- Drought
- Infestation

Geological Hazards

- Earthquake
- Landslide
- Problem Soils

Technological (Manmade) Hazards

- Hazardous Material Incident

Per FEMA's mandate to address all natural hazards, the following natural hazards were not included because these hazards do not directly impact San Juan County due to geographic location:

- Hurricane
- Sea Level Rise
- Storm Surge
- Tsunami
- Volcanic Eruption

4.2 HAZARD PROFILE

The risk assessments in the following chapters describe the risks associated with each identified hazard of concern. The following sections were used to describe each hazard and communicate each respective level of risk:

- **Hazard Description**—Each hazard profile contains a description of the general definition and causes of the hazard. It may also include background information for understanding the context of the hazard within San Juan County.
- **Location**—The location or region in San Juan County where each hazard may occur is described.
- **Historical Frequency & Probability of Future Occurrence**—This section identifies past hazard events of note that have occurred in San Juan County. It also includes the likelihood of each hazard occurring again if available.
- **Extent**—The strength or magnitude of each hazard is defined, usually through a form of measurement, such as a formula, scale, chart, or graph.
- **Impacts & Loss Estimates**—The potential impacts of each hazard on the county are discussed. This section also outlines the potential economic/monetary loss from a hazard event, in addition to loss of property, structures, facilities, systems, livestock, and life.
- **FEMA NRI Score**—The hazard-specific FEMA National Risk Index scores for each natural hazard is included.

- **Related Hazards**—The hazard profiles that fall under a greater hazard category can be found within this section.

4.3 RISK ASSESSMENT METHODOLOGY

Each hazard included in this plan was assessed and ranked based on a pre-defined hazard risk methodology consistent with FEMA's mitigation plan requirements. Information from the hazard profiles and input from subject matter experts were used to inform the hazard risk assessment process. The following is a description of the key factors.

4.3.1 Probability/Likelihood of Occurrence

The probability of occurrence of a hazard is indicated by a probability factor based on the likelihood of annual occurrence:

- **High**—Significant hazard event is likely to occur annually (Probability Factor = 3)
- **Medium**—Significant hazard event is likely to occur within 25 years (Probability Factor = 2)
- **Low**—Significant hazard event is likely to occur within 100 years (Probability Factor = 1)
- **Unlikely**—There is little to no probability of significant occurrence, or the recurrence interval is greater than every 100 years (Probability Factor = 0)

The assessment of hazard frequency is generally based on past hazard events in the area.

4.3.2 Extent

Extent was assessed in two categories: extent/intensity and catastrophic potential of the hazard. Numerical impact factors were assigned as follows:

Extent/Intensity—Extent is defined as the range of anticipated intensities of the identified hazards. Extent is most commonly expressed using various scientific scales, such as the Saffir Simpson Scale or Enhanced Fujita scale.

- **High**—Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident (Extent Factor = 3)
- **Medium**—Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident (Extent Factor = 2)
- **Low**—Historical and/or probabilistic models/studies for this hazard indicate the possibility of a low-intensity incident (Extent Factor = 1)
- **Unlikely**—Historical and/or probabilistic models/studies for this hazard indicate the possibility of little to no intensity (Extent Factor = 0)

Catastrophic—The potential that an occurrence of this hazard could be catastrophic.

- **High**—High potential that this hazard could be catastrophic (Extent Factor = 3)
- **Medium**—Medium potential that this hazard could be catastrophic (Extent Factor = 2)
- **Low**—Low potential that this hazard could be catastrophic (Extent Factor = 1)
- **Unlikely**—Virtually no potential that this hazard could be catastrophic (Extent Factor = 0)

Each category was assigned a weighting factor to reflect its significance, consistent with those typically used for measuring the benefits of hazard mitigation actions: a weighting factor of 3 was assigned for *Extent/Intensity* and its potential to be *Catastrophic*.

4.3.3 Vulnerability

Vulnerabilities were assessed in three categories: population exposure, property exposure, and exposure based on changes in development. Numerical impact factors were assigned as follows:

People—Values were assigned based on the percentage of the total population exposed to the hazard event.

- **High**—30% or more of the population is exposed to this hazard (Vulnerability Factor = 3)
- **Medium**—15% to 29% of the population is exposed to this hazard (Vulnerability Factor = 2)
- **Low**—14% or less of the population is exposed to this hazard (Vulnerability Factor = 1)
- **No Vulnerability**—None of the population is exposed to this hazard (Vulnerability Factor = 0)

Property Exposed—Values were assigned based on the percentage of the total property value exposed to the hazard event.

- **High**—25% or more of the total assessed property value is exposed to the hazard (Vulnerability Factor = 3)
- **Medium**—10% to 24% of the total assessed property value is exposed to the hazard (Vulnerability Factor = 2)
- **Low**—9% or less of the total assessed property value is exposed to the hazard (Vulnerability Factor = 1)
- **No Vulnerability**—None of the total assessed property value is exposed to the hazard (Vulnerability Factor = 0)

Changes in Development—Changes in development since the previous plan was approved have increased or decreased the community's vulnerability/exposure to this hazard.

- **High**—Changes in development have significantly increased the vulnerability/exposure of the community to this hazard (Vulnerability Factor = 3)
- **Medium**—Changes in development have increased the vulnerability/exposure of the community to this hazard, but not significantly (Vulnerability Factor = 2)
- **Low**—Changes in development have minimally increased the vulnerability/exposure of the community to this hazard (Vulnerability Factor = 1)
- **No Vulnerability**—Changes in development have had no effect and/or have decreased the vulnerability/exposure of the community to this hazard (Vulnerability Factor = 0)

Each category was assigned a weighting factor to reflect its significance, consistent with those typically used for measuring the benefits of hazard mitigation actions: a weighting factor of 3 was assigned for *People*, and a weighting factor of 1 was assigned for *Property Exposed* and *Changes in Development*.

4.3.4 Impact

Hazard impacts were assessed in five categories: underserved/equity, property damages, economic, future development, and climate change. Numerical impact factors were assigned as follows:

Underserved/Equity—Values were (1) assigned based on best available data for underserved populations vulnerable to the hazard event and (2) are likely to experience adverse/disproportionate impacts from the hazard incident resulting in greater disparity in equity.

- **High**—Underserved populations exposed to this hazard are likely to experience significant adverse/disproportionate impacts (Impact Factor = 3)
- **Medium**—Underserved populations exposed to this hazard are likely to experience some adverse/disproportionate impacts (Impact Factor = 2)
- **Low**—Underserved populations exposed to this hazard are likely to experience minimal adverse/disproportionate impacts (Impact Factor = 1)
- **No impact**—Underserved populations exposed to this hazard are not likely to experience significant adverse/disproportionate impacts (Impact Factor = 0)

Property Damages—Values were assigned based on the expected total property damages incurred from a hazard incident. It is important to note that values represent estimates of the loss from a major incident based on historical data or probabilistic models/studies.

- **High**—More than $5,000,000 in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction (Impact Factor = 3)
- **Medium**—More than $500,000 but less than $5,000,000 in property damages is expected from a single major hazard event, or expected damages are expected to more than 5%, but less than 15% of the property value within the jurisdiction (Impact Factor = 2)
- **Low**—Less than $500,000 in property damages is expected from a single major hazard event, or less than 5% of the property value within the jurisdiction (Impact Factor = 1)
- **No impact**—Little to no property damage is expected from a single major hazard event (Impact Factor = 0)

Economic—An estimation of the impact, expressed in terms of dollars, on the local economy is based on a loss of business revenue, crops, worker wages, and local tax revenues or on the impact on the local gross domestic product (GDP).

- **High**—Total economic impact is likely to be greater than $10,000,000 (Impact Factor = 3)
- **Medium**—Total economic impact is likely to be greater than $100,000 but less than or equal to $10,000,000 (Impact Factor = 2)
- **Low**—Total economic impact is not likely to be greater than $100,000 (Impact Factor = 1)
- **No Impact**—Virtually no significant economic impact (Impact Factor = 0)

Future Development—The potential that future development will have on increasing or decreasing the impact/consequence of this hazard.

- **High**—Future development trends will significantly increase the impact/consequence of this hazard (Impact Factor = 3)
- **Medium**—Future development trends will increase the impact/consequence of this hazard, but not significantly (Impact Factor = 2)
- **Low**—Future development trends will minimally increase impact/consequence of this hazard (Impact Factor = 1)
- **No Impact**—Future development trends will not increase the impact/consequence of this hazard and/or may even decrease the impact/consequence of this hazard (Impact Factor = 0)

Climate Change—The potential that climate change will increase the risk of this hazard (e.g., type, location, and range of anticipated intensities of the identified hazard and impacts).

- **High**—Climate change trends will significantly increase the risk of this hazard and its impacts (Impact Factor = 3)
- **Medium**—Climate change trends will increase the risk of this hazard and its impacts, but not significantly (Impact Factor = 2)
- **Low**—Climate change trends will minimally increase the risk of this hazard and its impacts (Impact Factor = 1)
- **No Impact**—Climate change trends will not increase the risk of this hazard and its impacts (Impact Factor = 0)

Each category was assigned a weighting factor to reflect its significance, consistent with those typically used for measuring the benefits of hazard mitigation actions: a weighting factor of 3 was assigned for *Underserved/Equity*, and a weighting factor of 2 was assigned for *Property Damages*. A weighting factor of 1 was assigned for *Economic*, *Future Development*, and *Climate Change*.

4.4 FEMA NRI RISK SCORES

The National Risk Index (NRI) is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather. Because not all hazards are applicable to San Juan County, only those hazards with a defined risk to the county are included.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and census tract (National Risk Index, 2023d). These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Double click the PDF icon below to access the full NRI Risk Comparison Report for the four census tracts in San Juan County (this is only accessible when utilizing the Microsoft Word version of the plan).

NRI Risk Comparison Report

4.4.1 Social Vulnerability

Social Vulnerability measures the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood.

Table 4-1. Social Vulnerability for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Social Vulnerability Score	Rating
942100	Unincorporated San Juan County	61.35	Very High
942000	Unincorporated San Juan County	58.40	Very High
978200	City of Blanding and Town of Bluff	36.69	Relatively High
978100	City of Monticello	34.08	Relatively Moderate

Census Tract	Communities in Census Tract	Social Vulnerability Score	Rating
Social Vulnerability is measured using the Social Vulnerability Index (SoVI) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI). Source: National Risk Index, 2023d; 2023e			

4.4.2 Community Resilience

Community Resilience measures a community's ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

Table 4-2. Community Resilience for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Community Resilience Score	Rating
942100	Unincorporated San Juan County	49.47	Very Low
942000	Unincorporated San Juan County	49.47	Very Low
978200	City of Blanding and Town of Bluff	49.47	Very Low
978100	City of Monticello	49.47	Very Low
Community Resilience is measured using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI). Source: National Risk Index, 2023a; 2023d			

4.4.3 Expected Annual Loss

The table below shows the overall expected annual loss score for the entire county based on all natural hazards. Hazard-specific scores are included in each hazard chapter under *Impacts & Loss Estimates*.

Table 4-3. Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	16.33	Relatively Low
942000	Unincorporated San Juan County	15.53	Relatively Low
978200	City of Blanding and Town of Bluff	18.88	Relatively Low
978100	City of Monticello	17.47	Relatively Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

4.4.4 Overall NRI Score

The table below shows the overall FEMA National Risk Index Score for the entire county based on all natural hazards. Hazard-specific scores are included in each hazard chapter under *FEMA NRI Score.*

Table 4-4. Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	32.57	Relatively High
942000	Unincorporated San Juan County	29.49	Relatively High
978200	City of Blanding and Town of Bluff	22.53	Relatively Moderate
978100	City of Monticello	19.36	Relatively Moderate
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

4.5 OVERALL RISK SCORES

The following table represents the new overall risk scores for San Juan County based on the described methodology. Following a data-driven quantitative assessment, the planning team utilized subject matter knowledge and expertise and further refined the scores.

Double click the Microsoft Excel icon below to access the full assessment and tool (this is only accessible when utilizing the Microsoft Word version of the plan).

San Juan County
HMP Hazard Rankin

4.5.1 San Juan County

Table 4-5. 2023 Hazard Risk Scores for San Juan County

Hazard Event	Probability	Consequence				Total Risk Score (Probability x Consequence)
	Probability Factor	Sum of Weighted Extent Factors	Sum of Weighted Vulnerability Factors	Sum of Weighted Impact Factors	Consequence Score	
Wildfire	3	12	8	13	33	59
Winter Storm	3	6	15	11	32	57
Drought	3	15	6	9	30	54
Flash Flood	3	9	8	12	29	53
Straight-Line Wind	3	9	10	7	26	48
Extreme Cold	3	6	9	10	25	46
Earthquake	2	9	15	6	30	38
Hazardous Material Incident	3	9	5	3	17	33
Hail	2	6	10	5	21	28
Infestation	3	9	0	4	13	26
Avalanche	2	6	5	2	13	18
Landslide	2	3	6	3	12	17
Dam Failure	1	9	6	8	23	16
Extreme Heat	1	3	9	8	20	14
Lightning	2	3	5	2	10	14
River or Stream Flood	1	3	6	5	14	10
Tornado	1	3	5	6	14	10
Problem Soils	1	3	6	0	9	7

Table 4-6. Hazard Risk Scores Legend

Probability Factor		Sum of Weighted Extent Factors		Sum of Weighted Vulnerability Factors		Sum of Weighted Impact Factors		Consequence Score		Total Risk Score	
1	Low (L)	0–6	Low (L)	0–6	Low (L)	0–8	Low (L)	0–25	Low (L)	0–25	Low (L)
2	Medium (M)	7–12	Medium (M)	7–12	Medium (M)	9–16	Medium (M)	26–45	Medium (M)	26–60	Medium (M)
3	High (H)	13–18	High (H)	13–18	High (H)	17–24	High (H)	46–60	High (H)	61–100	High (H)
**The legend—specifically the assignment of low, medium, and high—provides an additional means to qualitatively assess the Probability Factor, sum of Weighted Extent, Vulnerability, and Impact Factors, and the Total Risk Scores for each hazard. The Consequence Score represents the sum of the Extent, Vulnerability, and Impact Factors. The Total Risk Score is a measure of Probability and Consequence.*											

CHAPTER 5 SEVERE SUMMER WEATHER

5.1 HAZARD DESCRIPTION

Severe summer weather includes those hazards that are typically found during the spring, summer, and early fall season of the year in San Juan County. Severe summer weather can and does affect the entire county, and all critical facilities are susceptible to severe weather. Included in this category are extreme heat, lightning, hail, tornado, and straight-line wind. Each hazard is examined independently; however, it is recognized that these hazards typically occur together.

5.2 RELATED HAZARDS

5.2.1 Extreme Heat

Hazard Description

Potential Probability	X	Low
		Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Late spring, summer, and early fall	
Duration	Events may last hours to days	
Analysis Used	NOAA, NWS, EWG	

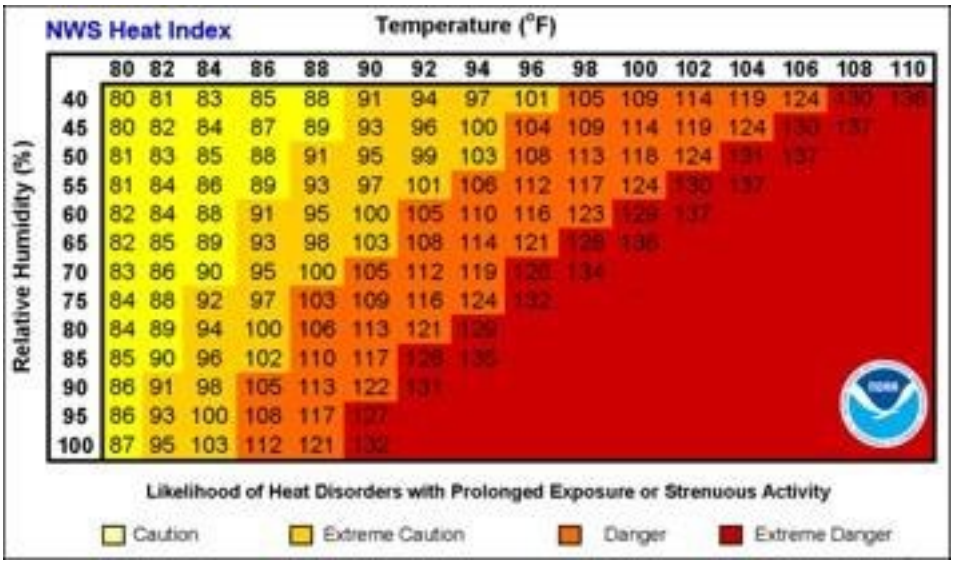
The term "extreme heat," sometimes called "heat wave," is to some extent a relative one describing a period when weather conditions include temperatures and humidity significantly higher than those usual for a particular geographic area.

Location

Due to the dry, semi-arid climate of San Juan County in desert southern Utah, the entire county may be affected by extreme heat.

Extent

The National Weather Service (NWS) issues alerts to the public based on its Heat Index (HI), which takes both temperature and humidity into account. The NWS will initiate alert procedures when the HI is expected to exceed 105°–110°F (depending on local climate) for at least two consecutive days (NWS, 2022a).



Historical Frequency & Probability of Future Occurrence

According to NWS available data, the record high temperature in the city of Blanding, Utah is 110°F in June 1905 (NOWData, 2022). July is historically the hottest month of the year in San Juan County, with an average temperature of 73.8°F in Blanding (NOWData, 2022). Blanding has had zero instances of extreme heat of 105°F or higher since August 1905. Blanding was the only community in San Juan County analyzed for extreme heat events due to its historical high temperatures, more complete data records, and larger population (the most populated city in the county).

Impacts & Loss Estimates

The primary impact of extreme heat is on human health, with disorders such as sunstroke, heat exhaustion, and heat cramps. Particularly susceptible are the elderly, small children, and persons with chronic illnesses. There are also undoubtedly indirect and chronic health effects from extreme heat, the magnitude of which are difficult or impossible to estimate. Environmental effects can include loss of wildlife and vegetation and increased probability of wildfires.

Extreme heat places high demands on electrical power supplies that can lead to blackouts or brownouts. Economic impacts result from such factors as increased energy prices and loss of business as people avoid leaving their homes to avoid the heat. Agricultural losses can also occur. During the years 1995–2020, the EWG reported $143,522 in crop insurance indemnities due to heat in San Juan County (EWG, 2022). The magnitude of these and other, more indirect impacts is, again, difficult to assess, but for severe heat waves, the economic impact has been estimated to be in the billions to hundreds of billions of dollars.

Effects of Climate Change on Probability of Future Events and Severity of Impacts

Table 5-1. Climate Projections for San Juan County, UT | Neighborhoods at Risk 2023

Heat Projections	By 2048, San Juan County is expected to experience 17 more days that reach above 95°F (from 38 days to 55 days per year).
	By 2048, San Juan County is expected to have a 2°F increase (from 55°F to 57°F) in average annual temperatures.
	Increasing annual temperatures can contribute to more frequent extreme heat events.
Source: Neighborhoods at Risk, 2023	

Table 5-2. Heat Wave: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	9.18	Relatively Low
942000	Unincorporated San Juan County	0.00	No Expected Annual Losses
978200	City of Blanding and Town of Bluff	5.12	Very Low
978100	City of Monticello	0.00	No Expected Annual Losses
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 5-3. Heat Wave: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	17.55	Relatively Moderate
942000	Unincorporated San Juan County	0.00	No Rating
978200	City of Blanding and Town of Bluff	5.85	Very Low
978100	City of Monticello	0.00	No Rating
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

5.2.2 Lightning

Hazard Description

Potential Probability		Low
	X	Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Late spring, summer, and early fall	
Duration	Storms that produce lightning may last hours to days	
Analysis Used	NOAA, NWS, Vaisala, NFPA, NIFC	

Lightning is defined by the NWS as "a visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground, or between the ground and a cloud." A lightning discharge may be over five miles in length, generate temperatures upwards of 50,000°F, and carry 50,000 volts of electrical potential. Lightning is most often associated with thunderstorm clouds, but lightning can strike as far as five to 10 miles from a storm. Thunder is caused by the rapid expansion of air heated by a lightning strike. Cloud-to-ground

lightning strikes occur with much less frequency in the northwestern U.S. than in other parts of the country.

Location

This hazard can affect the entire community and the state of Utah, but the risk to the community is low.

Extent

A lightning flash is created by a transfer of significant charge between two charged objects. Lightning discharges can occur inter-cloud, cloud-to-cloud, cloud-to-air, and cloud-to-ground. Cloud-to-ground (CG) lightning has the greatest risk to society. A CG stroke can kill, destroy equipment, start fires, and disturb power delivery systems.

Historical Frequency & Probability of Future Occurrence

Lightning is common in Utah, with an average of 1,040,446 lightning strikes per year in the state from 2015 to 2019 (Vaisala, 2020). However, this average is much less compared to other states, such as those in the Midwest and Southeast. For example, Florida received an average of 13,989,300 strikes per year within the same time period.

The Storm Events Database records Three significant lightning events in San Juan County (2022). On July 19, 2003, lightning struck a government employee duplex at the Needles housing area of Canyonlands National Park, blowing a hole in the roof of the duplex. The phone system in the community also failed during this time. The total damage was $1,000. The second event in San Juan County occurred on June 26, 2009 when lightning struck an oil battery in Monticello, heavily damaging two large oil tanks and other equipment. The property damage for this strike totaled approximately $100,000. The third event happened on 12/28/2022 lightning struck and hit a building/shed next to an oil well north of McCracken Mesa. The building was not able to be save property damage for this strike is still undetermined in review with owners insurance.

Impacts & Loss Estimates

Lightning is the second most deadly weather phenomenon in the U.S., being second only to floods. On average, 20 to 50 deaths per year are attributed to lightning nationally, and in Utah the average is less than one per year. The last death in Utah due to lightning was in 2016, with six total deaths in Utah since 2008 (NWS, 2022c). However, there have been no recorded deaths in San Juan County due to lightning. Despite the enormous energy carried by lightning, only about 10% of strikes are fatal (NWS, 2022b). Injuries include central nervous system damage, burns, cardiac effects, hearing loss, and trauma. The effects of central nervous system injuries tend to be long-lasting and severe, leading to such disorders as depression, alcoholism, chronic fatigue, and in some cases suicide. Lightning also strikes structures, causing fires and damaging electrical equipment. Wildland fires are often initiated by lightning strikes as are petroleum storage tank fires. About one third of all power outages are lightning-related.

The magnitude of economic losses is difficult to estimate. Between 2007 to 2011, $451 million in property damage was reported due to fires caused by lightning strikes in the U.S. (NFPA, 2013). The state of Utah experienced 527 fires caused by lightning strikes in 2021 alone (NIFC, 2021).

Table 5-4. Lightning: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	34.27	Relatively High

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942000	Unincorporated San Juan County	38.73	Relatively High
978200	City of Blanding and Town of Bluff	46.40	Very High
978100	City of Monticello	45.46	Very High
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 5-5. Lightning: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	54.68	Very High
942000	Unincorporated San Juan County	58.84	Very High
978200	City of Blanding and Town of Bluff	44.28	Very High
978100	City of Monticello	40.29	Very High
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

5.2.3 Hail

Hazard Description

Potential Probability		Low
	X	Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Late spring, summer, and early fall	
Duration	Hailstorms may last hours to days	
Analysis Used	NOAA, NWS, Weather on the Web, EWG, III, TORRO	

The NWS definition of hail is “showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud. Its size can vary from the defined minimum, a little over a quarter of an inch, up to 4.5 inches or larger.” Severe hail is defined as being 0.75 inches or more in diameter. The largest hailstones are formed in supercell thunderstorms because of their sustained updrafts and long duration.

Location

San Juan County can experience hailstorms countywide.

Extent

The TORRO Hailstorm Intensity Scale was developed by Jonathan Webb to measure and categorize hailstorms (TORRO, 2023). It extends from H0 (hard hail, no damage) to H10 (super hailstorm, extensive structural damage, risk of severe/fatal injuries) with its increments of intensity or damage potential related to hail size (distribution and maximum), texture, numbers, fall speed, speed of storm translation, and strength of the accompanying wind. The scale could be modified depending on factors such as building materials and types (e.g., whether roofing tiles are predominantly slate, shingle, or concrete).

Hail is considered severe when reaching a size of 0.75 inches in diameter or greater. The following map shows the locations in San Juan County where severe hail events with hailstones from 0.75 to 1.75 inches were recorded.

Figure 5-2. San Juan County Hail Size

Historical Frequency & Probability of Future Occurrence

In the 10-year period from 1986 to 1995, the NWS recorded severe hail in Utah on 101 occasions, while in the same time period, severe hail was recorded in Colorado nearly 1,400 times (Weather on the Web, 2022).

The Storm Events Database recorded 13 instances of severe hail in San Juan County since 1997. The hailstones from these events range in size from 0.75 inches to 1.75 inches (Storm Events Database, 2022).

Impacts & Loss Estimates

Deaths and injuries due to hail have occurred but are rare. Most impacts are economic, but hailstorms can also cause utility failure through damage to critical infrastructure. Hailstorms may also lead to car accidents and road closures.

Economic loss can be extensive, especially to agriculturally based economies. Hail is very damaging to crops. The EWG reported $286,028 in crop insurance indemnities due to hail during the years 1995–2020 in San Juan County (EWG, 2022). Severe hail may also cause extensive property damage, including damage to vehicle paint and bodywork, glass, shingles and roofs, plastic surfaces, etc. Through the Storm Events Database, San Juan County reported three severe hail events that resulted in $20,000 worth of property damage each, mostly due to broken windows in buildings and vehicles. Hail-related insured losses averaged between $8 billion to $14 billion each year in the years 2000–2019 in the U.S. (III, 2022).

Table 5-6. Hail: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	1.35	Very Low
942000	Unincorporated San Juan County	2.18	Very Low
978200	City of Blanding and Town of Bluff	2.53	Very Low
978100	City of Monticello	2.30	Very Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 5-7. Hail: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	2.88	Very Low
942000	Unincorporated San Juan County	4.42	Very Low
978200	City of Blanding and Town of Bluff	3.21	Very Low
978100	City of Monticello	2.72	Very Low
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

▪ 5.2.4 Tornado

Hazard Description

Potential Probability	X	Low
		Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide	

Seasonal Pattern or Conditions	Late spring, summer, and early fall
Duration	Tornadoes may last seconds to hours
Analysis Used	NOAA, NWS

The NWS describes a tornado as "a violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena" (NWS, 2022f). Like hail, most tornadoes are spawned by supercell thunderstorms. They usually last only a few minutes, although some have lasted more than an hour and traveled several miles.

Location

Although the risk is low, a tornado event is possible anywhere in the county.

Extent

Wind speeds within tornadoes are estimated based on the damage caused and expressed using the Enhanced Fujita (EF) Scale.

Table 5-8. Enhanced Fujita (EF) Scale for Estimation of Tornado Wind Speeds

EF Scale	Class	Windspeed (mph)	Windspeed (km/h)	Description
EF0	Weak	65–85	105–137	Gale
EF1	Weak	86–110	138–177	Weak
EF2	Strong	111–135	178–217	Strong
EF3	Strong	136–165	218–266	Severe
EF4	Violent	166–200	267–322	Devastating
EF5	Violent	> 200	> 322	Incredible
Source: NOAA Storm Prediction Center, 2022				

Historical Frequency & Probability of Future Occurrence

Tornado occurrence in San Juan County is extremely low. The Storm Events Database records only one tornado in the county since 1950, which occurred on June 6, 2015. As depicted in the map below, the EF0 tornado touched down near Comb Ridge east of Monument Valley in the southeastern part of the county. The tornado lasted approximately 15 minutes and traveled 75 miles over open desert before dissipating in western Colorado. No damage occurred.

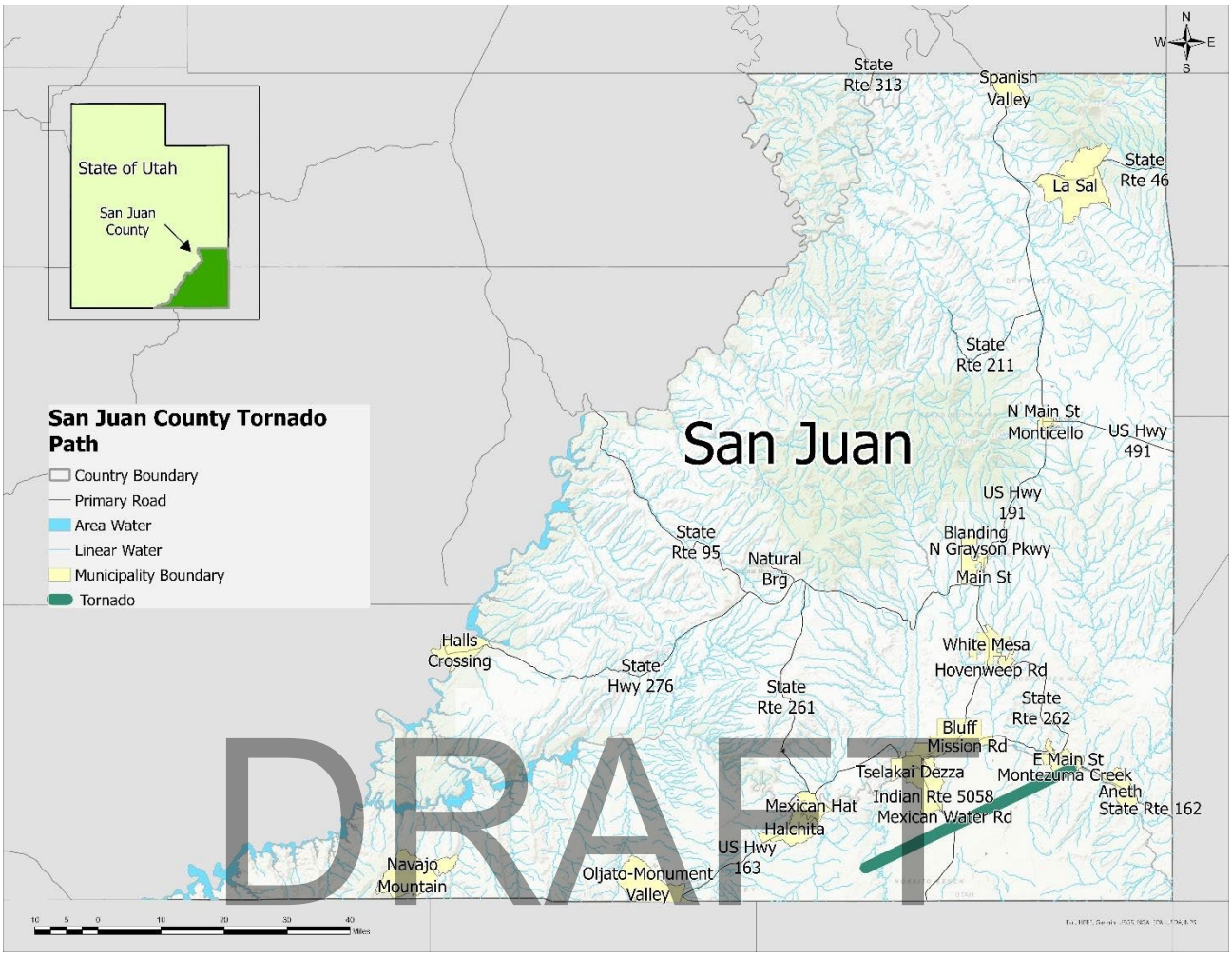


Figure 5-3. San Juan County 2015 Tornado Path

Impacts & Loss Estimates

Loss of utilities (primarily due to fallen trees and wind damage) is common following tornadoes, and depending on circumstances, communities might be deprived of almost any kind of goods and services including food, water, and medical care. Agriculturally, crop and livestock loss are also possible.

Table 5-9. Tornado: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	4.39	Very Low
942000	Unincorporated San Juan County	6.42	Very Low
978200	City of Blanding and Town of Bluff	6.89	Very Low
978100	City of Monticello	7.50	Very Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

There is no record of actual dollar losses in San Juan County due to tornadoes. However, the path of the one tornado that has been recorded in the county is depicted below along with critical facilities in the county.

Figure 5-4. San Juan County Tornado Impact Scenario

FEMA NRI Score

Table 5-10. Tornado: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	10.37	Very Low
942000	Unincorporated San Juan County	14.44	Very Low
978200	City of Blanding and Town of Bluff	9.73	Very Low
978100	City of Monticello	9.84	Very Low
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

5.2.5 Straight-Line Wind

Hazard Description

Potential Probability		Low
		Medium
	X	High
Potential Consequence		Low
	X	Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Late spring, summer, and early fall	
Duration	Events may last hours to days	
Analysis Used	NOAA, NWS, EWG	

The term "straight-line wind" is used to describe any wind not associated with rotation, particularly tornadoes. Of concern is high wind, defined by the NWS as "sustained wind speeds of 40 mph or greater, lasting for one hour or longer, or winds of 58 mph or greater for any duration." Like tornadoes, strong, straight-line winds are generated by thunderstorms, and they can cause similar damage. Straight-line wind speeds can approach 150 mph, equivalent to those in an EF3 tornado.

Location

Straight-line wind events affect the entire county.

Extent

The Beaufort Wind Scale explains different wind speeds based on how they would affect land conditions and sea conditions (NOAA, 2022).

Table 5-11. Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects on Land
0	Less than 1	Calm	Calm, smoke rises vertically
1	1–3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4–6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	7–10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	11–16	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	17–21	Fresh Breeze	Small trees in leaf begin to sway
6	22–27	Strong Breeze	Larger tree branches moving, whistling in wires
7	28–33	Near Gale	Whole trees moving, resistance felt walking against wind
8	34–40	Gale	Twigs breaking off trees, generally impedes progress
9	41–47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	48–55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56–63	Violent Storm	
12	64+	Hurricane	

Source: NOAA, 2022

The map below shows the location and speed of wind events in San Juan County.

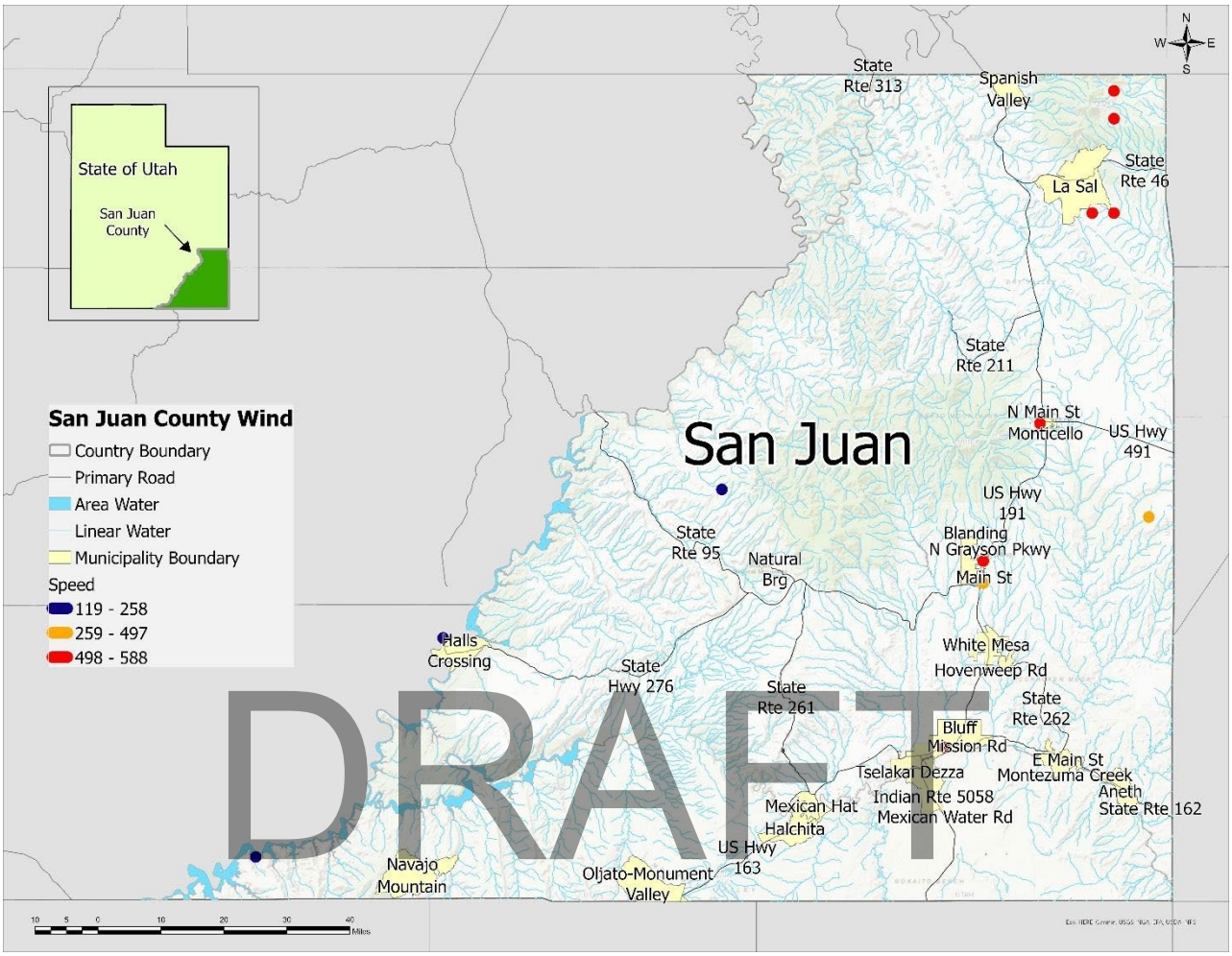


Figure 5-5. San Juan County Wind Speed

Historical Frequency & Probability of Future Occurrence

According to the Storm Events Database, there have been 40 reported high wind, thunderstorm wind, or strong wind events 40 mph or greater in San Juan County between 1988–2022, as seen in the table below. On April 21, 2021 a high wind event caused a small aircraft to crash at the Monument Valley Airport no injuries were reported.

Table 5-12. High Wind Events in San Juan County

Location Within County	Date	Wind Speed (kts.)
San Juan County	07/10/1988	55 kts.
San Juan County	08/01/1991	67 kts.
Blanding	06/20/1996	68 kts.
Blanding	09/12/1998	61 kts.
La Sal & Abajo Mountains	06/02/1999	50 kts.
Southeast Utah	04/18/2000	45 kts.
La Sal & Abajo Mountains	04/18/2000	53 kts.
Canyonlands	04/18/2000	53 kts.

Location Within County	Date	Wind Speed (kts.)
La Sal & Abajo Mountains	04/20/2001	50 kts.
Eastland	09/07/2002	70 kts.
Southeast Utah	09/09/2003	50 kts.
La Sal	06/28/2005	51 kts.
Bluff	09/09/2003	61 kts.
La Sal & Abajo Mountains	02/15/2006	74 kts.
La Sal & Abajo Mountains	04/05/2006	78 kts.
La Sal	05/22/2006	51 kts.
Monticello	05/27/2006	52 kts.
Blanding	06/07/2006	55 kts.
La Sal	06/07/2006	55 kts.
La Sal & Abajo Mountains	06/05/2007	49 kts.
Glen Canyon Recreation Area/Lake Powell	04/15/2008	53 kts.
Glen Canyon Recreation Area/Lake Powell	03/22/2009	56 kts.
Bluff	07/28/2009	65 kts.
Mexican Hat	07/28/2009	59 kts.
Glen Canyon Recreation Area/Lake Powell	04/05/2010	62 kts.
Glen Canyon Recreation Area/Lake Powell	04/12/2010	55 kts.
Glen Canyon Recreation Area/Lake Powell	10/06/2011	54 kts.
Glen Canyon Recreation Area/Lake Powell	01/21/2012	50 kts.
Glen Canyon Recreation Area/Lake Powell	03/30/2014	61 kts.
Canyonlands	04/14/2015	61 kts.
Glen Canyon Recreation Area/Lake Powell	03/06/2016	52 kts.
Glen Canyon Recreation Area/Lake Powell	03/22/2016	59 kts.
Glen Canyon Recreation Area/Lake Powell	11/17/2016	53 kts.
Glen Canyon Recreation Area/Lake Powell	04/12/2018	55 kts.
Canyonlands	09/29/2019	50 kts.
Aneth	06/05/2020	56 kts.
Blanding	06/05/2020	50 kts.
Blanding	06/06/2020	65 kts.
Canyonlands	09/08/2020	62 kts.
Southeast Utah	04/11/2022	51 kts.
Source: Storm Events Database, 2022		

Impacts & Loss Estimates

The impacts of straight-line winds are virtually the same as those from tornadoes with similar wind speeds. The damage is distinguishable from that of a tornado only in that the debris is generally deposited

in nearly parallel rows. Downbursts are particularly hazardous to aircraft in flight. A wind impact scenario for straight-line wind events in San Juan County is shown in the figure below.

Figure 5-6. San Juan County Wind Impact Scenario

Since 1998 there has been $243,000 in reported losses due to high wind, thunderstorm wind, and strong wind damage in San Juan County (Storm Events Database, 2022). Though losses aren't regularly reported, it is known that they occur because of the frequency and magnitude of high wind events. Additionally, the EWG reported $334,548 in crop indemnity payments in San Juan County due to wind and excess wind (1995–2020).

Table 5-13. Strong Wind: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	9.68	Very Low
942000	Unincorporated San Juan County	11.63	Relatively Low
978200	City of Blanding and Town of Bluff	13.00	Relatively Low
978100	City of Monticello	13.09	Relatively Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 5-14. Strong Wind: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	22.08	Relatively Moderate
942000	Unincorporated San Juan County	25.23	Relatively Moderate
978200	City of Blanding and Town of Bluff	17.73	Relatively Low
978100	City of Monticello	16.57	Relatively Low

Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d

CHAPTER 6 SEVERE WINTER WEATHER

6.1 HAZARD DESCRIPTION

Severe winter weather includes extreme cold, winter storm, and avalanche. Severe winter weather can and does affect the entire county, and all critical facilities are susceptible to severe weather. It should be noted that straight-line wind is also associated with severe winter storms, commonly referred to as blizzard conditions, where snow is driven by wind-caused drifting.

6.2 RELATED HAZARDS

6.2.1 Extreme Cold

Hazard Description

Potential Probability		Low
		Medium
	X	High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Winter months	
Duration	Events may last hours to days	
Analysis Used	NOAA, NWS, EWG	

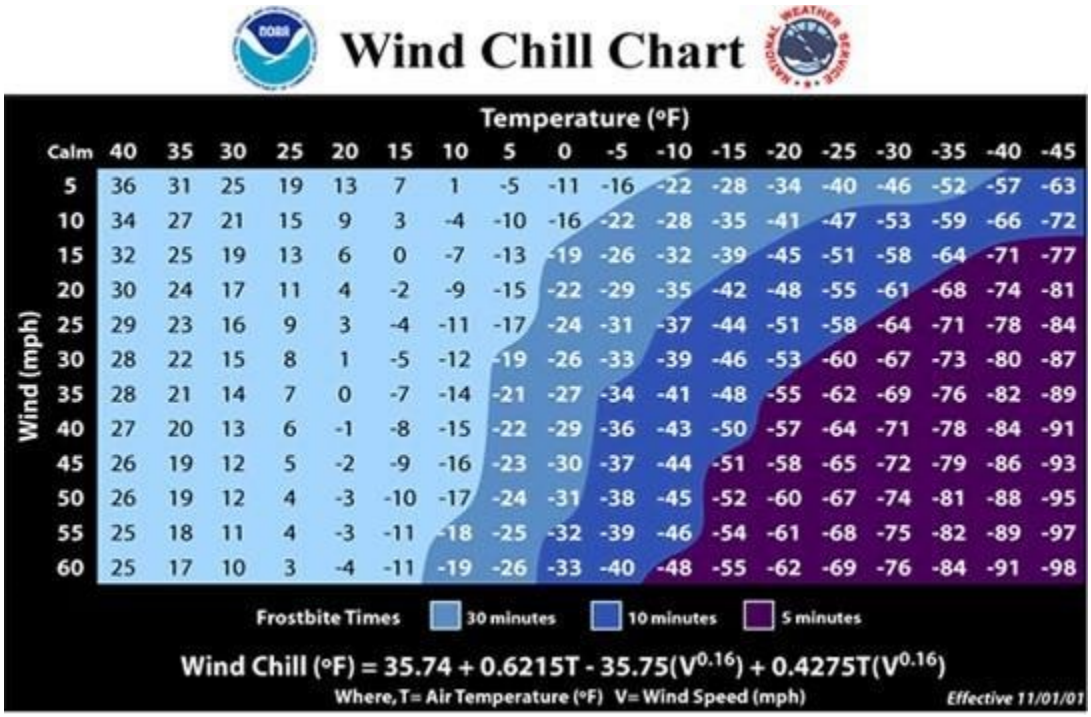
"Extreme cold" is another of the terms describing hazards that must be defined relative to what is considered normal in a given locale. What might be considered extreme cold varies considerably in the state of Utah where normal winter temperatures in the south are appreciably more moderate than those in the north. Very cold temperatures become a particular hazard when accompanied by winds of 10 mph or greater. As with extreme heat, extreme cold is of greatest concern when the condition persists for an extended period of time.

Location

Extreme cold temperatures affect the entire county.

Extent

The NWS has developed a formula for calculating wind chill based on temperature and wind speed and issues wind chill advisories in this region when the wind chill temperature is predicted to be -10°F or less with winds of 10 mph or higher for one hour or more. Wind chill warnings are issued when wind chill temperature will be -20°F or less with winds of 10 mph or higher for one hour or more (see the figure below).



Historical Frequency & Probability of Future Occurrence

According to NWS available data, the record low temperature in the city of Blanding is -23°F, which was recorded in February 1933 (NOWData, 2022). January is historically the coldest month of the year in San Juan County with an average temperature of 28.5°F in Blanding (NOWData, 2022). Cold clusters are particularly damaging. In January 2013, Blanding, UT experienced 10 days of the month with a low of 10°F or less. During the 10-year period from 2012–2022, Blanding recorded a total of 51 extreme cold days of 10°F or less (NOWData, 2022). Blanding was the only community in San Juan County analyzed for extreme cold events due to its historical cold temperatures, more complete data records, and larger population (the most populated city in the county). However, the city of Monticello still experiences extreme cold temperatures, as well, with the coldest temperature since 2012 recorded in the city being -6°F in December 2013 (NOWData, 2022).

Impacts & Loss Estimates

Health effects of exposure to extreme cold include hypothermia and frostbite, both of which can be life-threatening. Infants and the elderly are most susceptible. In the United States, approximately 1,300 deaths are attributed to hypothermia or cold exposure annually (Lane, 2018).

Extreme cold may cause loss of wildlife and vegetation and kill livestock and other domestic animals. Economic loss may result from flooding due to burst pipes, large demands on energy resources, and diminished business activity.

Extreme cold affects the individual, families, cities, and the county. Damage typically occurs to individual properties; however, city water systems are usually vulnerable to extreme cold. Repairs to water line freeze-ups and breaks typically require the roadways to be excavated, necessitating additional maintenance and repairs during the warmer months.

Extreme cold can cause death and injury especially to those working or stranded outside for prolonged periods. Economic loss is related to private individuals, businesses, and government agencies in heating

of homes and facilities. Additional losses can be expected to the livestock industry. During extreme cold periods the schools are closed to protect children traveling to and from school.

During the spring, summer, and fall, temperatures can drop low enough to produce frost. While such temperatures are not low enough to damage infrastructure or require extra heating costs, it can be devastating to crops. According to the EWG, $1,157,341 in crop indemnity payments were due to freeze, cold wet weather, cold winter, and frost in San Juan County for the period of 1995–2020. Extreme minimum temperatures can fall below freezing much of the fall, winter, and spring.

Table 6-1. Cold Wave: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	0.00	No Expected Annual Losses
942000	Unincorporated San Juan County	0.00	No Expected Annual Losses
978200	City of Blanding and Town of Bluff	0.00	No Expected Annual Losses
978100	City of Monticello	0.00	No Expected Annual Losses
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 6-2. Cold Wave: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	0.00	No Rating
942000	Unincorporated San Juan County	0.00	No Rating
978200	City of Blanding and Town of Bluff	0.00	No Rating
978100	City of Monticello	0.00	No Rating
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

▪ 6.2.2 Winter Storm

Hazard Description

Potential Probability		Low
		Medium
	X	High
Potential Consequence		Low
	X	Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Winter months	
Duration	Storms may last hours to days	

Analysis Used	NOAA, NWS, 2019 Utah Hazard Mitigation Plan, EWG

The NWS describes winter storm as weather conditions that produce heavy snow or significant ice accumulations. For the purposes of this analysis, a severe winter storm is defined as any winter condition where the potential exists for a blizzard (winds >/= 35mph and falling/drifting snow frequently reduce visibility < ¼ mile, for two hours or more), heavy snowfall (six inches or more snowfall in 24 hours in the valleys; nine inches or more snowfall in 24 hours in the mountains), ice storm, and/or strong winds.

Location

Severe winter storms are a risk countywide and occur frequently.

Extent

The magnitude or severity of a severe winter storm depends on several factors, including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, time of occurrence during the day and week (e.g., weekday versus weekend), and time of season.

Historical Frequency & Probability of Future Occurrence

According to the Storm Events Database, San Juan County has had 178 instances of severe winter storm since 2010 (classified under "blizzard," "heavy snow," "winter storm," and "winter weather"). In the last five years (2018–2022), the county has experienced 57 winter storm events.

Impacts & Loss Estimates

The impacts of the very cold temperatures that may accompany a severe winter storm are discussed in the previous section. Other life-threatening impacts are numerous. Motorists may be stranded by road closures or may become trapped in their automobiles in heavy snow and/or low visibility conditions. Bad road conditions cause automobiles to go out of control. People can be trapped in homes or buildings for long periods of time without food, heat, and utilities. Those who are ill may be deprived of medical care by being stranded or through loss of utilities and lack of personnel at care facilities. Use of heaters in automobiles and buildings by those who are stranded may result in fires or carbon monoxide poisoning. Fires during winter storm conditions are a particular hazard because fire service response is hindered or prevented by road conditions and because water supplies may be frozen. Emergency Services may also not be available if telephone service is lost. People who attempt to walk to safety through winter storm conditions often become disoriented and lost. Downed power lines not only deprive the community of electricity for heat and light but pose an electrocution hazard. Death and injury may also occur if heavy snow accumulation causes roofs to collapse. There have been 41 fatalities in Utah from 1962–2018 due to winter storms. About 70% of these fatalities occur in automobiles, while 25% are a result of people caught out in the elements (Utah Hazard Mitigation Plan, 2019).

The total economic impact in Utah for a 24-hour statewide winter storm is $66.36 million, including $42.81 million in lost wages and salaries and overtime, $18.26 million in lost retail sales, $3.32 million in federal taxes, and $1.98 million for state and local taxes (Utah Hazard Mitigation Plan, 2019). Economic impacts arise from numerous sources, including hindered transportation of goods and services; flooding due to burst water pipes; forced closing of businesses; inability of employees to reach the workplace; damage to homes and structures, automobiles, and other belongings by downed trees and branches; loss of livestock and vegetation; and many others. Loss of crops is also common. The EWG reported

$1,157,341 in crop indemnity payments due to freeze, cold wet weather, cold winter, and frost in San Juan County for the period of 1995–2020.

Table 6-3. Winter Weather: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	17.75	Relatively Low
942000	Unincorporated San Juan County	21.25	Relatively Moderate
978200	City of Blanding and Town of Bluff	25.51	Relatively Moderate
978100	City of Monticello	39.62	Relatively High
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

Table 6-4. Ice Storm: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	8.66	Very Low
942000	Unincorporated San Juan County	10.48	Very Low
978200	City of Blanding and Town of Bluff	11.35	Very Low
978100	City of Monticello	10.40	Very Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 6-5. Winter Weather: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	21.54	Relatively High
942000	Unincorporated San Juan County	24.54	Relatively High
978200	City of Blanding and Town of Bluff	18.51	Relatively High
978100	City of Monticello	26.71	Very High
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

Table 6-6. Ice Storm: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	14.26	Relatively Low
942000	Unincorporated San Juan County	16.43	Relatively Low
978200	City of Blanding and Town of Bluff	11.17	Relatively Low
978100	City of Monticello	9.52	Relatively Low
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

6.2.3 Avalanche

Hazard Description

Potential Probability		Low
	X	Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Winter months	
Duration	Events may last seconds to minutes; snowstorms that cause avalanches may last hours to days	
Analysis Used	NOAA, NWS, law enforcement reports, 2019 Utah Hazard Mitigation Plan, Utah Avalanche Center, local newspaper articles	

Snow avalanches are common in mountainous terrain where heavy snowfall accumulates on steep slopes. Avalanches generally occur on slopes between 30 and 45 degrees with 38 degrees being the "ideal" slope for development of avalanche conditions. They are often categorized as either "loose snow" or "slab" types. A loose snow avalanche is initiated when snow is dislodged at a point upslope and, in turn, dislodges more snow as it moves downward. Such avalanches usually grow wider and larger as they proceed but are usually somewhat limited in size. The generally more dangerous slab avalanche occurs when a cohesive mass of snow breaks free and moves downward, either as a single unit, or breaking into smaller pieces traveling together. Four factors combine to produce a slab avalanche: (1) a large mass of snow that is cohesive as a result of a single, large snowfall, or some physical change due to temperature, introduction of water content, or other factors, (2) some source of instability or weakness that forms a boundary capable of breaking free, (3) a surface, called a sliding layer, upon which the slab may easily slide and, (4) a triggering event, such as increased weight, strong vibration, wind, or a temperature increase, that overcomes the binding forces at, or further weakens the boundary of instability. It is estimated that around 90% of avalanches where victims are involved are triggered by their victims or those who accompany them.

Avalanches are comprised of three zones—the release zone where the mass breaks free and accelerates, the track where the mass travels downward at a relatively constant speed (often approaching 80 mph), and the runout zone where the mass slows and comes to rest. While the exact moment of an avalanche cannot be predicted, avalanche conditions are readily recognizable, and avalanches tend to recur on the same slopes year after year.

Location

Snow avalanches can occur anywhere in the county with mountains and/or slopes that accumulate with snow. However, the two primary avalanche zones in San Juan County are the La Sal Mountains in the Moab region and the Abajo Mountains, also known as the Blue Mountains (Utah Hazard Mitigation Plan, 2019).

Extent

The North American Public Avalanche Danger Scale is a tool used by avalanche forecasters throughout the U.S. to communicate the potential for avalanches to cause harm or injury to backcountry travelers.

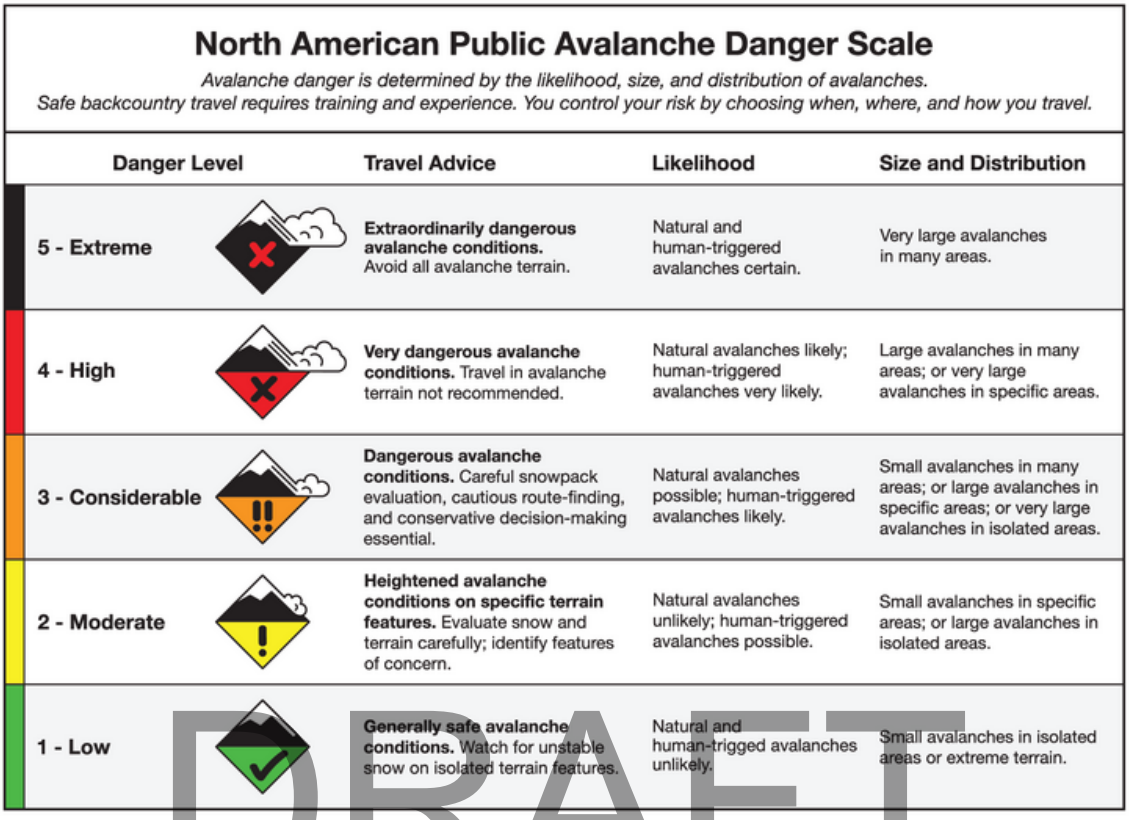


Figure 6-2. North American Public Avalanche Danger Scale

Historical Frequency & Probability of Future Occurrence

Avalanches occur often in San Juan County, but many go unreported and/or undetected. However, the Utah Avalanche Center records observations of avalanches throughout Utah, including in the Abajo and La Sal Mountains. An average of 22 avalanches are reported each winter season in the La Sal Mountains (Utah Avalanche Center, 2022) from avalanche forecasters and those in the public. Much less data exists for the Abajo Mountains, with only 1–5 avalanches reported each winter season to the Utah Avalanche Center.

Seven fatalities due to avalanches have been recorded in San Juan County since 1914, and all occurred in the La Sal Mountains (Utah Avalanche Center, 2022). The table below describes these events.

Table 6-7. Avalanche Fatalities in San Juan County

Date	Location	Trigger	# of Fatalities	Description
02/12/1992	Gold Basin, La Sal Mountains	Skier	4	6 experienced skiers from Moab were buried; 2 survivors, 4 fatalities
03/03/2012	Beaver Basin, La Sal Mountains	Snowmobiler	1	4 snowmobilers went on a snowmobile tour and triggered an avalanche after crossing the basin; an 18-year-old man from Norwood, CO was buried and died

Date	Location	Trigger	# of Fatalities	Description
01/25/2019	Dark Canyon, La Sal Mountains	Snowmobiler	1	6 snowmobilers and 2 snowbikers were riding in Dark Canyon when one of the snowmobilers triggered an avalanche and was buried; the victim was a 39-year-old man from Monticello
Source: Utah Avalanche Center, 2022; San Juan Record, 2019; KSL, 2012; Deseret News, 1992				

Impacts & Loss Estimates

It is common for avalanche impacts to be somewhat limited. Because avalanches usually occur in remote areas, the most frequent victims are recreational users of the slopes on which they occur. Of those who die in avalanches, approximately one third of the deaths are a result of trauma while the remaining two thirds are from suffocation. Trauma may be the result of being carried into obstructions, such as boulders and trees, or over cliffs, or from rocks, trees, or large chunks of snow being carried downward at high speed. Avalanches may also damage or destroy structures, break power lines, block roadways and railroads, and damage trees and vegetation.

As with landslides, losses from snow avalanches come from damage to roadways and the resulting snow and debris removal costs. Additionally, if a rescue and/or recovery is necessary for any people caught in the avalanche, physical and monetary resources must go toward rescue helicopters, rescue crew, rescue equipment, additional transport, medical treatment, etc., which can add up to thousands of dollars.

Table 6-8. Avalanche: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	33.25	Relatively Moderate
942000	Unincorporated San Juan County	33.25	Relatively Moderate
978200	City of Blanding and Town of Bluff	33.25	Relatively Moderate
978100	City of Monticello	33.25	Relatively Moderate
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

FEMA NRI Score

Table 6-9. Avalanche: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	47.57	Very High
942000	Unincorporated San Juan County	45.15	Very High
978200	City of Blanding and Town of Bluff	27.37	Relatively Moderate
978100	City of Monticello	25.24	Relatively Moderate
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

CHAPTER 7 WILDFIRE

7.1 HAZARD DESCRIPTION

Potential Probability		Low
		Medium
	X	High
Potential Consequence		Low
	X	Medium
		High
Location	Countywide, URWIN areas around Monticello and Blanding	
Seasonal Pattern or Conditions	Summer months. Wildfire-prone areas are areas affected by drought and/or heavily overgrown and dry brush and debris. Lightning and human triggers cause wildfires.	
Duration	Wildfires typically last days but can last months, depending on climate and fuel load as well as resources (financial, manpower) to extinguish the fire.	
Analysis Used	U.S. Forest Service, National Climate Center, FEMA, AGRC, County Hazard Analysis Plans, 2019 Utah Hazard Mitigation Plan, NWCG, Utah Forestry, Fire, & State Lands, local newspaper articles, Fire Business System, Utah Fire Marshall	

Wildfires—uncontrolled fires spreading through both naturally occurring and non-native vegetative fuel sources—are a significant hazard, often beginning unnoticed and spreading quickly while threatening any structures in its path. Wildfires can cover a large geographic area, can be ignited by natural or human sources, and are hard to predict. They help to maintain a healthy ecosystem and have been a natural and fundamental part of the world's forests and grasslands for millions of years. Fires cleanse and regenerate forests, giving new life to the soil and encouraging biodiversity. They are responsible for the evolution of many of the grasses, brushes, and tree species found in Utah (Utah Hazard Mitigation Plan, 2019).

Wildfires are classified as Wildland and Wildland-Urban Interface (WUI). Wildland fires occur in areas where development is essentially nonexistent except for roads, railroads, or power lines. WUI fires materialize in a geographical area where structures and other human development adjoins wildlands. A fireshed is an area that will adversely affect a community or high-value resource and/or asset if ignited (Utah Hazard Mitigation Plan, 2019).

7.2 LOCATION

On average in Utah, years with more spring rainfall typically have higher wildfire incidents in the summer and fall after vegetation dries out and becomes combustible material. Hot temperatures, high winds, and dry conditions brought on by years of drought have caused high mortality rates in low elevation timber and shrubs, all contributing to prime fire conditions (Utah Hazard Mitigation Plan, 2019).

San Juan County sees an average of 6 to 22 inches of precipitation per year. This is on the lower end of precipitation as San Juan County mostly consists of a semi-arid desert climate.

The map depicting the San Juan County Fire Size Potential Index below illustrates the areas at highest risk to wildfire.

7.3 EXTENT

The National Wildfire Coordinating Group (NWCG) classifies fire sizes using the following standards (NWCG, 2023). These standard data values are included in the data table below.

Size Class of Fire

- As to size of wildfire:
  - 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.

The State of Utah Division of Forestry, Fire, and State Lands provides five categories of wildfire risk, which are listed below:

- Extreme
- High
- Medium
- Low
- Very Low

These ratings cover all of San Juan County and are based on the type and density of vegetation in each area. Additional factors influencing wildfires, such as weather conditions, wind speed, and direction, are not considered in this risk assessment.

The following table includes the number of state-owned facilities inside extreme, very high, high, moderate-high, and moderate wildfire risk areas within San Juan County.

Table 7-1. San Juan County State-Owned Facilities

	Extreme Risk	Very High Risk	High Risk	Moderate-High Risk	Moderate Risk
Number of State-Owned Facilities	0	0	0	9	11

Additionally, the following map illustrates the potential fire size index throughout San Juan County.

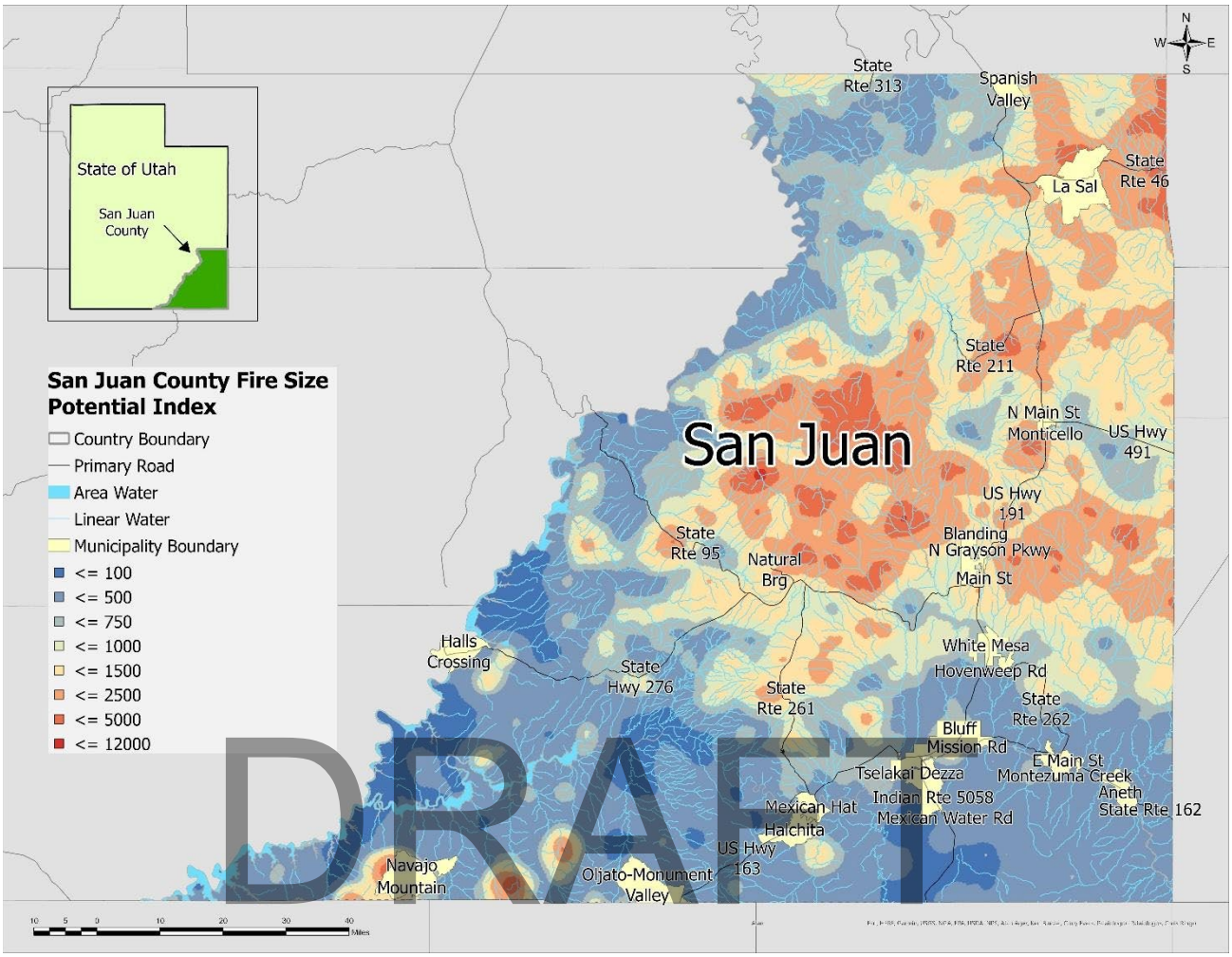
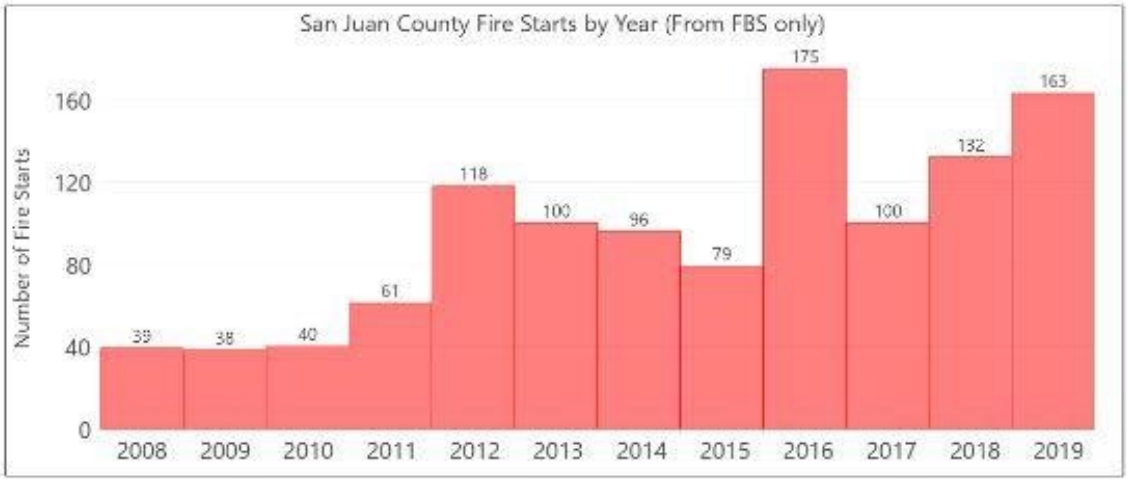


Figure 7-2. San Juan County Fire Size Potential Index

7.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

The state of Utah experienced 1,131 reported wildfires over 63,792 acres in 2021. This is a 62% decrease in human-caused fires from 2020 (Utah FFSL, 2021). One of the largest fires of 2021 began on June 9, 2021 in the La Sal Mountains of northern San Juan County (Pack Creek Fire) and burned 8,951 acres. This fire was human-caused and began when a group of people left their smoldering fire unattended in dry 90°F heat (Canyon Country Zephyr, 2021).

The State of Utah Division of Forestry, Fire, and State Lands uses the Fire Business System (FBS) to track and report fires throughout Utah (FBS, 2022). While the information below is not exhaustive, the following chart from the FBS displays the number of fire starts in San Juan County per year from 2008 to 2019.



The following table shows the number of fires and types of fires that occurred between 2010 and 2021 in Blanding, Bluff, and Monticello, according to the Utah Fire Marshall.

Table 7-2. San Juan County Fires (2010–2021)

Year	Fire Incident Type	Number of Fires
Blanding		
2010	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**
2011	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**
2012	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**
2013	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**
2014	Structure Fires	6
	Vehicle Fires	1
	Outside Fires	10
	All Other Fires	0
	Total Fires	**17**
2015	Structure Fires	3
	Vehicle Fires	2
	Outside Fires	4
	All Other Fires	0

Year	Fire Incident Type	Number of Fires
	Total Fires	**9**
2016	Structure Fires	5
	Vehicle Fires	2
	Outside Fires	18
	All Other Fires	0
	Total Fires	**25**
2017	Structure Fires	2
	Vehicle Fires	0
	Outside Fires	5
	All Other Fires	0
	Total Fires	**7**
2018	Structure Fires	5
	Vehicle Fires	0
	Outside Fires	7
	All Other Fires	1
	Total Fires	**13**
2019	Structure Fires	2
	Vehicle Fires	2
	Outside Fires	8
	All Other Fires	0
	Total Fires	**12**
2020	Structure Fires	2
	Vehicle Fires	3
	Outside Fires	21
	All Other Fires	1
	Total Fires	**27**
2021	Structure Fires	5
	Vehicle Fires	2
	Outside Fires	7
	All Other Fires	0
	Total Fires	**14**
Bluff		
2010	Structure Fires	1
	Vehicle Fires	0
	Outside Fires	4
	All Other Fires	0
	Total Fires	**5**
2011	Structure Fires	1
	Vehicle Fires	1
	Outside Fires	4
	All Other Fires	0
	Total Fires	**6**
2012	Structure Fires	1
	Vehicle Fires	0
	Outside Fires	5
	All Other Fires	0
	Total Fires	**6**
2013	Structure Fires	2
	Vehicle Fires	0

Year	Fire Incident Type	Number of Fires
	Outside Fires	1
	All Other Fires	0
	Total Fires	**3**
2014	Structure Fires	0
	Vehicle Fires	0
	Outside Fires	3
	All Other Fires	0
	Total Fires	**3**
2015	Structure Fires	0
	Vehicle Fires	3
	Outside Fires	1
	All Other Fires	0
	Total Fires	**4**
2016	Structure Fires	2
	Vehicle Fires	0
	Outside Fires	2
	All Other Fires	1
	Total Fires	**5**
2017	Structure Fires	2
	Vehicle Fires	0
	Outside Fires	2
	All Other Fires	0
	Total Fires	**4**
2018	Structure Fires	4
	Vehicle Fires	0
	Outside Fires	3
	All Other Fires	0
	Total Fires	**7**
2019	Structure Fires	1
	Vehicle Fires	0
	Outside Fires	3
	All Other Fires	0
	Total Fires	**4**
2020	Structure Fires	1
	Vehicle Fires	0
	Outside Fires	8
	All Other Fires	0
	Total Fires	**9**
2021	Structure Fires	3
	Vehicle Fires	1
	Outside Fires	1
	All Other Fires	0
	Total Fires	**5**
Monticello		
2010	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**

Year	Fire Incident Type	Number of Fires
2011	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**
2012	Structure Fires	N/A
	Vehicle Fires	N/A
	Outside Fires	N/A
	All Other Fires	N/A
	Total Fires	**N/A**
2013	Structure Fires	2
	Vehicle Fires	2
	Outside Fires	2
	All Other Fires	0
	Total Fires	**6**
2014	Structure Fires	2
	Vehicle Fires	0
	Outside Fires	1
	All Other Fires	0
	Total Fires	**3**
2015	Structure Fires	3
	Vehicle Fires	1
	Outside Fires	0
	All Other Fires	0
	Total Fires	**4**
2016	Structure Fires	2
	Vehicle Fires	2
	Outside Fires	3
	All Other Fires	0
	Total Fires	**7**
2017	Structure Fires	0
	Vehicle Fires	0
	Outside Fires	1
	All Other Fires	0
	Total Fires	**1**
2018	Structure Fires	4
	Vehicle Fires	5
	Outside Fires	10
	All Other Fires	1
	Total Fires	**20**
2019	Structure Fires	3
	Vehicle Fires	4
	Outside Fires	4
	All Other Fires	0
	Total Fires	**11**
2020	Structure Fires	4
	Vehicle Fires	1
	Outside Fires	9
	All Other Fires	0

Year	Fire Incident Type	Number of Fires
	Total Fires	**14**
2021	Structure Fires	2
	Vehicle Fires	3
	Outside Fires	8
	All Other Fires	0
	Total Fires	**13**
Source: Utah Fire Marshall, 2010–2021		

The map below depicts the fires per year with CFL greater than eight feet in San Juan County.

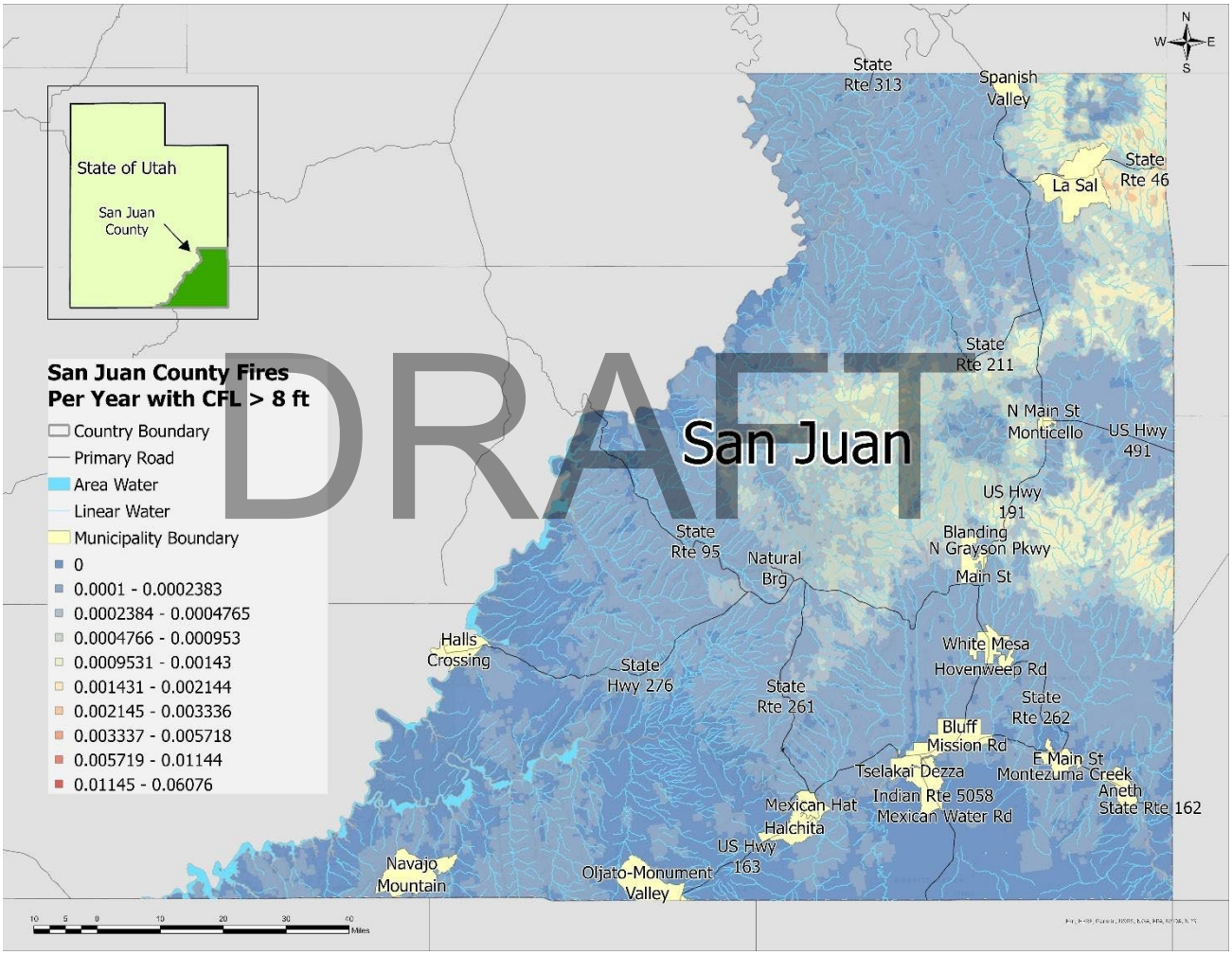


Figure 7-4. San Juan County Fires Per Year with CFL greater than 8 Feet

The next map shows the fire perimeters of fires in the county between 1999 and 2020.

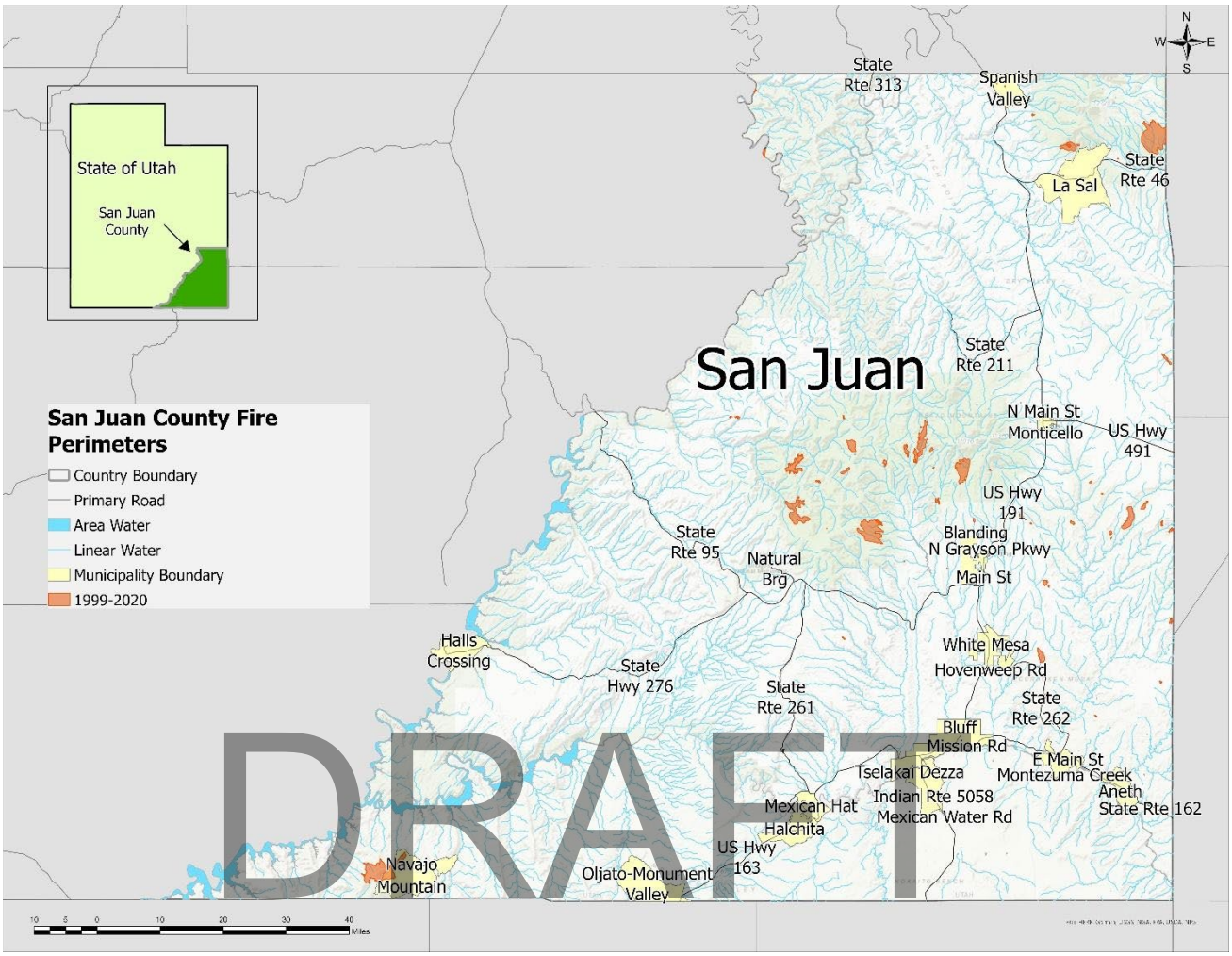


Figure 7-5. San Juan County Fire Perimeters

The table below summarizes the State of Utah Division of Forestry, Fire, and State Lands Fire Statistics for San Juan County from 1986 to 2018. They were all isolated but did considerable damage to property, and suppression was costly.

Table 7-3. State of Utah Division of Forestry, Fire, and State Lands Fire Statistics for San Juan County (1986–2018)

Date	Fire Name	Cause	Size Approximate Acres	Cost
June 6, 1986	White Mesa	MC	E	No Data
June 1, 1987	White Mesa #2	IN	D	No Data
June 18, 1987	McCraken Mesa	MC	E	No Data
June 19, 1987	White Mesa #4	IN	E	No Data
June 23, 1987	White Mesa #6	DB	D	No Data
July 4, 1987	Tank Draw	EQ	F	No Data
August 15, 1987	Two Mile Creek	LT	D	No Data
June 15, 1989	Pehrson	LT	E	No Data
July 23, 1990	Horny Toad	LT	D	No Data
August 9, 1990	Alfred Frost	LT	D	No Data
June 14, 1994	Willow Basin	EQ	F	No Data

Date	Fire Name	Cause	Size Approximate Acres	Cost
June 25, 1994	Haller (Wheatfield)	LT	D	No Data
June 29, 1994	Mustang	LT	D	No Data
July 14, 1994	Iron Canyon	LT	D	No Data
July 14, 1994	Peters Hill (Iron Canyon)	MC	D	No Data
March 21, 1996	Montezuma	DB	D	No Data
June 8, 1996	Dove Creek	LT	D	No Data
June 21, 1996	Eastland	LT	D	No Data
July 16, 1997	Wray	LT	D	No Data
July 17, 1997	Cajon Mesa	LT	E	No Data
June 1, 1998	Aneth Point	CF	D	No Data
July 9, 1999	McCraken	LT	E	No Data
May 19, 2002	South Canopy	LT	.10	$1219.00
June 4, 2002	South Point	LT	.25	$2826.00
June 15, 2002	Old Airport	EQ	5	$3008.00
July 7, 2002	Marco Polo	LT	.10	$,350.00
July 12, 2002	Horse	LT	1250	$188078.00
July 14, 2002	Canyons Complex	LT	10600	$2799000.00
July 14, 2002	Pine	LT	12	$15944.00
July 21, 2002	Ucola	LT	.20	$8190.00
August 5, 2002	Brimley	LT	.10	$2258.00
August 19, 2002	Peters Hill	LT	60	$12762.00
September 4, 2002	Hop Creek	LT	.10	$5,095.00
April 24, 2003	Flat Iron	DB	.50	$1004.00
June 18, 2003	Chicken	LT	.10	$2920.00
July 20, 2003	Big Ponderosa	LT	.10	$1226.00
June 27, 2003	Woodeshoe Fire	HC	2710	No Data
July 7, 2003	Highway	EQ	3	$2569.00
July 17, 2003	Lapper	LT	.10	$1950.00
July 22, 2003	Devil	LT	.10	$1146.00
August 12, 2003	Two Mile	LT	1	$4210.00
August 13, 2003	Big Fat Tree	LT	.10	$978.00
August 18, 2003	Quarters	LT	.25	$1115.00
June 16, 2004	Hop Creek	LT	.25	$2688.00
June 25, 2004	Brushy Basin	LT	.10	$1190.00
July 16, 2004	Cottonwood Cliffs	LT	.10	$1158.00
July 17, 2004	Dog Tank	LT	.10	$1125.00
May 24, 2005	Smith	DB	21	$13819.00
June 18, 2005	Blue	DB	.25	$1389.00
June 23, 2005	Blanding South	EQ	2.5	$1380.00
June 22, 2005	Adakai	DB	15	$1150.00
June 28, 2005	Bug	LT	3.3	$1391.00
June 30, 2005	Valentine	LT	206	$47464.00
July 3, 2005	Gas Plant	LT	3	$1890.00
July 13, 2005	Hovenweep	LT	28	$9255.00
July 14, 2005	Eastland	DB	1	$1260.00
July 14, 2005	Skid	LT	.10	$1920.00
July 18, 2005	Summit Canyon	LT	195	$1130.00

Date	Fire Name	Cause	Size Approximate Acres	Cost
July 22, 2005	Christy	LT	.10	$2240.00
July 24, 2005	Hop	LT	.10	$1692.00
May 19, 2006	Ken's Lake 1	DB	13	$1492.00
June 7, 2006	Dove Creek	LT	73	$59574.00
June 7, 2006	Cedar Point	LT	220	$64838.00
July 2, 2006	McCracken Mesa	LT	4.5	$2513.00
May 19, 2007	Hwy 211	LT	.10	$1160.00
June 20, 2007	Ucolo	DB	3	$1624.00
June 27, 2007	La Sal	DB	6.25	$6297.00
July 6, 2007	Sombraro	LT	.10	$1983.00
July 19, 2007	Gillman	LT	.25	$1425.00
July 14, 2007	Ramsey	E	46	$2005.00
July 21, 2007	Afton Hide	LT	.10	$1244.00
July 21, 2007	West Devil	LT	.10	$2239.00
July 28, 2007	Big Indian	LT	.10	$1244.00
July 28, 2007	Big Canyon	LT	.26	$6214.00
August 1, 2007	Dead Out Fire	LT	.10	$1834.00
August 13, 2007	Pole Canyon	LT	.10	$1800.00
August 22, 2007	Reservoir Road	DB	6	$1680.00
August 25, 2007	Jimmy	LT	1	$9451.00
September 3, 2007	Brumley	LT	.10	$2000.00
September 5, 2007	East Coyote #2	LT	.10	$1915.00
September 6, 2007	Ute	LT	.10	$1346.00
September 16, 2007	Hang Two	LT	.10	$2280.00
September 17, 2007	Pine Flats	LT	.10	$2280.00
June 29, 2008	Parison Ridge	LT	.10	$1107.00
July 3, 2008	Salvation Knoll	LT	.10	$5097.00
July 24, 2008	Oak Creek Canyon	LT	.10	$4004.00
July 27, 2008	9MM	LT	.10	$1521.00
September 13, 2008	Black Steer	LT	.25	$1035.00
July 7, 2009	Pine Ridge 2	LT	88	$103366.00
July 13, 2009	Pinyon	LT	68	$18510.00
July 20, 2009	Alkali	LT	.10	$2312.00
August 1, 2009	Ucolo	LT	3.50	$15433.00
August 2, 2009	Coal Bed North	LT	.10	$1931.00
August 6, 2009	Castleton View	LT	.10	$1130.00
August 15, 2009	Southern Horse	LT	.10	$1302.00
April 21, 2010	Comb Wash	LT	3	$1694.00
June 27, 2010	Alkali Point	LT	24.9	$5286.00
July 7, 2010	Elk	LT	.10	$1488.00
July 8, 2010	Brushy Ridge	LT	.10	$1305.00
July 25, 2010	Snyder Farm	LT	.37	$4542.00
August 16, 2010	Dry Wash Ridge	LT	.10	$1145.00
January 12, 2011	Oil Rig	EQ	.20	$1131.00
May 23, 2011	Browns Hole	LT	.10	$1517.00
June 16, 2011	Long Point	LT	.10	$1697.00
June 18, 2011	Plow	LT	.25	$1453.00
June 30, 2011	Dry Draw	LT	.40	$1375.00

Date	Fire Name	Cause	Size Approximate Acres	Cost
July 3, 2011	Raby	LT	56.5	$134631.00
July 15, 2011	Small Fry	LT	.30	$2568.00
July 16, 2011	East Canyon	LT	1.45	$12245.00
July 16, 2011	Fish Creek	LT	.25	$6560.00
July 17, 2011	Westwater Creek	LT	.10	$1186.00
July 17, 2011	Knuckles	LT	.10	$1663.00
July 20, 2011	Uranium	LT	.10	$1210.00
July 22, 2011	Mustang	LT	6.50	$3417.00
July 25, 2011	Intrepid	LT	.10	$1091.00
August 7, 2011	Redd	LT	.10	$1280.00
August 20, 2011	Three Step	LT	.68	$2321.00
August 24, 2011	Pipeline	LT	3.6	$3624.00
August 26, 2011	North Coal Bed	LT	.10	$1198.00
August 27, 2011	Buzzy	LT	.10	$1414.00
August 29, 2011	Harvey	LT	.10	$1129.00
August 30, 2011	Lonesome	LT	.10	$1008.00
September 1, 2011	Shirley	LT	.10	$1800.00
September 5, 2011	Ramses	LT	.10	$1065.00
March 24, 2012	Cottonwood	MC	.10	$1095.30
April 11, 2012	Alkali Creek	MC	.38	$1028.75
April 28, 2012	Spring Canyon	LT	.10	$2302.40
June 2, 2012	Johnson Creek	LT	.10	$1504.60
June 1, 2012	Verger	EQ	.25	$1029.80
June 9, 2012	Junction	MC	1.00	$3627.60
June 11, 2012	Patara	LT	.10	$1207.40
July 9, 2012	N.O. Beaver Shaft	LT	.25	$1033.90
July 10, 2012	Bear Trap	LT	.50	$2795.70
July 11, 2012	Patterson	EQ	0.1	$1023.00
January 22,2013	FLATS VEHICLE	DB	0.1	$1806.00
January 24,2013	BUG POINT	DB	0.1	$122.00
January 31,2013	FA CROSS CANYON	DB	0.1	$105.16
March 26,2013	BAILEY	FA	0	$68.80
April 12,2013	FA RANDALL	DB	0.1	$137.60
April 19,2013	HWY 491 MM 7	MC	0.1	$42.00
April 19,2013	CARTWRIGHT	EQ	0.1	$246.40
April 21,2013	TODIE SPRINGS	CF	0.1	$1090.80
April 30,2013	PIPELINE	FA	0	$269.40
May 5,2013	FA ROSIE LANE	LT	0.1	$159.60
May 6,2013	BIG INDIAN	LT	0.1	$586.60
May 7,2013	GRAND FLAT	LT	0.1	$428.00
May 8,2013	HORSEHEAD	LT	0.1	$269.40
May 18,2013	INDIAN CANYON	LT	0.1	$282.80
May 18,2013	MEADLEY	LT	0.1	$995.00
May 18, 2013	CARVER	FA	0	$226.00
May 27,2013	FA PINE RIDGE	LT	0.1	$19.00
May 18, 2017	SENIDENI	MC	0.76	$226.00
June 6, 2013	POWERLINE	LT	0.1	$822.80
June 13,2013	HARMONY	LT	0.1	$987.80

Date	Fire Name	Cause	Size Approximate Acres	Cost
June 16, 2013	NORTH PINE	LT	.10	$898.00
June 13,2013	LACKEY FAN	LT	904	$25339.50
June 13,2013	DARK CANYON	LT	350	$7,001.40
June 16,2013	SOUTH PINE	LT	0.5	$199.60
June 24,2013	NORTHERN PIKE	MC	0.1	$89.80
June 23,2014	HALIDAY	MC	0.1	$49.80
June 26,2013	FOY	CF	0.1	$179.60
June 27,2013	SHUMWAY POINT	EQ	0.2	$767.40
June 28,2013	FA MOKI DUGWAY	FA	0	$538.80
June 28,2013	PINE RIDGE	LT	1.8	$2287.20
July 2,2013	MIDDLE MESA	LT	0.1	$359.20
July 3,2013	FA BIG INDIAN ROCK	FA	0	$269.40
July 5,2013	FA MM 93 HWY 191	FA	0	$179.60
July 6,2013	FA HWY 191 MM 45	FA	0	$179.60
July 7,2013	JOHNSON	LT	0.1	$1,375.40
July 8,2013	MUSTANG	LT	0.1	$454.00
July 10,2013	BRUSHY BASIN	LT	2.75	$4138.50
July 14,2013	RECAPTURE CREEK	LT	0.1	$1077.60
July 15,2013	FA LEMS DRAW	LT	0.1	$523.80
July 14,2013	HALFWAY HOLLOW	LT	0.1	$74.80
July 16,2013	HOMESTAKE	LT	0.1	$956.20
July 15,2013	TURNER	LT	0.1	$294.80
July 15,2013	BLACK	LT	0.1	$407.80
July 15,2013	FOURTH RESERVOIR	LT	0.1	$68.80
July 16,2013	NORTH COTTONWOOD	LT	0.3	$718.40
July 19,2013	WILCOX	LT	0.1	$552.00
July 20,2013	PINE FLAT	LT	0.1	$766.40
July 18,2013	FA HWY 95 MM 100	FA	0	$552.00
July 19,2013	FRED	LT	0.1	$399.20
July 20,2013	MORMON PASTURE	LT	0.2	$847.50
July 23,2013	NEEDLES	LT	0.1	$299.40
July 20,2013	ANCIENTS	LT	0.1	$1243.00
July 28,2013	HORSEHEAD POINT	LT	0.1	$399.20
July 28,2013	STOWE	LT	0.1	$450.40
August 1, 2013	REDD VEHICLE	EQ	0.1	$614.20
August 1,2013	FA HOLE IN THE ROCK	LT	0.1	$299.40
August 2,2013	COYOTE WASH	LT	0.1	$399.20
August 4,2013	KOJAK	LT	0.1	$1297.40
August 5,2013	NATURAL	LT	0.1	$300.00
August 6,2013	GERMAN	LT	0.1	$851.20
August 19,2013	HATCH WASH	LT	0.1	$574.80
August 12,2013	BARRY	LT	0.1	$375.60
August 12,2013	SHUPE	LT	0.1	$601.60
August 12,2013	MCDONALD	LT	0.1	$685.60
August 12,2013	DAIRY LANE	LT	0.1	$953.60

Date	Fire Name	Cause	Size Approximate Acres	Cost
August 14,2013	FA MARTIN	DB	0.1	$74.80
August 17,2013	HANGDOG CREEK	LT	0.1	$548.80
August 18,2013	POLE SPRINGS	MC	0.3	$149.60
August 23,2013	TWO STEP	LT	0.1	$1126.80
September 1,2013	PAPOOSE	LT	0.1	$862.20
September 18,2013	BARTON	DB	0.2	$399.20
September 24,2013	FA FOY	FA	0	$199.60
October 21,2013	WAGON WHEEL	CF	0.1	$299.40
October 28,2013	WEST MONTEZUMA	MC	0.5	$2818.00
October 25,2015	FA BULL HOLLOW	FA	0	$99.80
November 4,2013	FA FLAT IRON	FA	0	$224.40
January 16,2014	HWY 191 MM 62	EQ	0.1	$103.00
March 19,2014	FA FOURTH RESERVIOR	FA	0	$269.40
March 12,2014	LITTLE BAULIES	LT	0.1	$678.00
March 12,2014	WEST COMB RIDGE	LT	0.1	$474.00
March 12,2014	PICKET	LT	0.1	$399.20
March 12,2014	ANTHONY	LT	0.1	$395.50
March 24,2014	FA HWY 46	FA	0	$42.00
March 29,2014	FA HWY 191 MM 90	FA	0	$213.60
May 10,2014	WOODENSHOE POINT	EQ	1	$853.10
May 23,2014	LISBON	LT	0.1	$1277.20
May 23,2014	WHEEL	LT	0.33	$399.20
May 24,2014	FA DEVILS CANYON	FA	0	$199.60
May 28,2014	FA MOUNTAIN SHADOWS	FA	0	$1008.40
June 2,2014	PINE FLATS	LT	0.1	$299.40
June 10,2014	TURTLE ROCK	LT	0.1	$69.80
June 11,2014	STEEN	LT	0.1	$349.00
June 12,2014	ALLEN	LT	0.1	$433.80
June 3,2014	C.F. PUGHE	CF	0.1	$47.40
June 17,2014	CLAY HILLS	MC	115	$598.80
June 17,2014	WEST SUMMIT	DB	0.1	$319.20
June 27,2014	FA ATWOOD	FA	0	$199.60
July 7,2014	BORDER	LT	0.98	$3310.80
July 8,2014	WILLOW	LT	0.1	$299.40
July 5,2014	JOHNSON CREEK	LT	0.1	$738.20
July 6,2014	HAMMOND CANYON	LT	0.1	$598.80
July 6,2014	MURPHY POINT	LT	0.1	$577.80
July 9,2014	FA UPPER 2 MILES	FA	0	$399.20
July 11,2014	BABYLON PASTURE	LT	1.4	$1434.50
July 13,2014	FA JUNCTION	FA	0	$598.80
July 13,2014	BLUE	LT	0.1	$199.60
July 14,2014	BLACK STEER	LT	0.1	$1501.80
July 15,2014	CANYON	LT	0.1	$846.40
July14,2014	Mustang Point	LT	0.1	$181.00

Date	Fire Name	Cause	Size Approximate Acres	Cost
July 31,2014	F.A Porter	FA	0	$139.00
July 16,2014	BOULDER	LT	0.1	$126.00
July 18,2014	BUG POINT	LT	1.09	$4139.40
July 21,2014	GOLD QUEEN	CF	0.1	$399.20
July 24,2014	GLADE	LT	0.1	$199.60
July 24,2014	CHINSTRAP	LT	0.1	$747.50
July 24,2014	WHITE FLATS	LT	0.1	$452.00
July 24,2014	OLD DUMP	LT	0.1	$1,239.00
July 24,2014	PEARSON	LT	0.1	$413.80
July 24,2014	PIUTE KNOLL	LT	0.1	$300.80
July 29,2014	FINGER	LT	0.1	$1389.80
July 29,2014	SUMMIT CANYON	LT	0.1	$798.40
July 29,2014	HALLOW	LT	0.1	$452.00
August 5,2014	FA INDIAN CREEK	FA	0	$299.20
August 4,2014	FA PETERS HILL	FA	0	$113.30
August 1,2014	SOUTH COALBED	LT	0.1	$223.60
August 5,2014	WILLOW BASIN	LT	0.1	$187.00
August 5,2014	WRAY	LT	0.1	$574.80
August 5,2014	DODGE	LT	0.1	$1293.30
August 8,2014	HALFWAY HALLOW	LT	0.1	$515.50
August 8,2014	HALFWAY HOLLOW	LT	0.1	$193.50
August 16,2014	MUSTANG	LT	0.1	$408.60
August 7,2014	SOP CANYON	LT	0.1	$718.50
August 14,2014	FA DRY WASH	FA	0	$239.50
August 12,2014	SPRING DRAW	MC	0.1	$417.60
August 14,2014	NORTH BIG INDIAN	LT	0.1	$383.20
August 19,2014	PIPELINE	LT	0.1	$670.60
August 28,2014	FA SEEP CREEK	FA	0	$99.80
August 27,2014	FA BARRY	FA	0	$99.80
August 5,2014	FA SQUARE TOWER	FA	0	$90.80
August 21,2014	FA BUG POINT	FA	0	$99.80
September 8,2014	FA BOULDER CREEK	FA	0	$99.80
September 6,2014	FA DARK CANYON LAKE	FA	0	$499.00
September 7,2014	PETERS RIM	LT	0.1	$499.00
September 17,2014	FA HWY 95 MM 87	FA	0	$423.20
October 20,2014	FA EDGE OF THECEDARS	FA	0	$139.00
December 3,2014	F.A. SWEAT LODGE	DB	0.1	$50.00
February 15,2015	CHURCH ROCK	MC	0.1	$139.60
April 30,2015	HATCH	MC	7.3	$890.00
May 23,2015	8 MILE	LT	0.1	$709.50
May 22,2015	LOCKERBY	LT	0.1	$451.50
May 19,2015	MULE CANYON	LT	0.1	$897.00
May 19,2015	DRY WASH	LT	0.1	$345.00
May 14,2015	CEDAR MESA	LT	0.1	$1104.00
May 8,2015	BULLDOG	LT	0.1	$1191.00

Date	Fire Name	Cause	Size Approximate Acres	Cost
May 9,2015	FALSE ALARM UCOLO	FA	0	$276.00
May 26,2015	SHIRTTAIL	LT	1.5	$1913.00
June 11,2015	F.A. MUSTANG MESA	FA	0	$1135.50
June 29, 2015	PINE RIDGE	LT	0.45	$565.00
July 14, 2015	BROWNS CANYON	DB	0.1	$420.00
July 2, 2015	HATCH WASH	LT	0.1	$87.50
July 4, 2015	ROCK CREEK	LT	0.1	$169.50
July 9, 2015	BIG INDIAN	LT	0.1	$339.00
September 9,2015	HIDEOUT CANYON	LT	2.6	$1364.00
September 13,2015	BLACK RIDGE	MC	3.7	$2252.00
September 14,2015	NORTH LA SAL	LT	0.1	$100.00
June 22,2016	FLATTOP	LT	1.7	$160.00
June 20,2016	COWBOY STREET	MC	0.3	$50.00
July 19,2016	ABAJO LOOP	LT	0.1	$87.50
August 15,2016	F.A. MUSTANG	FA	0	$757.70
September 5,2016	LISBON VALLEY	LT	0.1	$75.00
February 23,2017	ALIKALI RIDGE	MC	0	$1,687.00
March 8, 2017	INDIAN CREEK	MC	0	$1,482.00
April 12, 2017	EAST CANYON	MC	2.0	$110.00
May 1, 2017	CHURCH ROCK	MC	0.25	$375.00
May 6, 2017	ARCH CANYON	LT	0.1	$531.00
May 6, 2017	NATURL BRIDGE	LT	0.1	$79.00
May 7, 2017	LONG DRAW	LT	0.1	$175.00
May 13, 2017	WRAY MESA	LT	1.0	$3099.21
June 1, 2017	FALSE ALARM	FA	0	$363.00
June 3, 2017	CAUSEWAY	LT	90.0	$178,127.50
June 7, 2017	HWY 163 MM32	EQ	0.2	$117.36
June 20,2016	COWBOY STREET	MC	0.3	$50.00
July 19,2016	ABAJO LOOP	LT	0.1	$87.50
August 15,2016	F.A. MUSTANG	FA	0	$757.70
September 5,2016	LISBON VALLEY	LT	0.1	$75.00
February 23,2017	ALIKALI RIDGE	MC	0	$1,687.00
March 8, 2017	INDIAN CREEK	MC	0	$1,482.00
April 12, 2017	EAST CANYON	MC	2.0	$110.00
May 1, 2017	CHURCH ROCK	MC	0.25	$375.00
May 6, 2017	ARCH CANYON	LT	0.1	$531.00
May 6, 2017	NATURL BRIDGE	LT	0.1	$79.00
May 7, 2017	LONG DRAW	LT	0.1	$175.00
May 13, 2017	WRAY MESA	LT	1.0	$3099.21
June 1, 2017	FALSE ALARM	FA	0	$363.00
June 3, 2017	CAUSEWAY	LT	90.0	$178,127.50
June 7, 2017	HWY 163 MM32	EQ	0.2	$117.36
March 8, 2017	INDIAN CREEK	MC	0	$1,482.00
April 12, 2017	EAST CANYON	MC	2.0	$110.00
May 1, 2017	CHURCH ROCK	MC	0.25	$375.00
May 6, 2017	ARCH CANYON	LT	0.1	$531.00

Date	Fire Name	Cause	Size Approximate Acres	Cost
May 6, 2017	NATURL BRIDGE	LT	0.1	$79.00
May 7, 2017	LONG DRAW	LT	0.1	$175.00
May 13, 2017	WRAY MESA	LT	1.0	$3099.21
June 1, 2017	FALSE ALARM	FA	0	$363.00
June 3, 2017	CAUSEWAY	LT	90.0	$178,127.50
June 7, 2017	HWY 163 MM32	EQ	0.2	$117.36
June 8, 2017	LYMAN PARK	CF	0.1	$30.00
June 12, 2017	CORONADO	MS	0.5	$69.00
June 12, 2017	PETER SPRINGS	MS	1.3	$54.00
June 15, 2017	FALSE ALARM	FA	0	$456.26
June 21, 2017	FALSE ALARM	FA	0	$114.31
June 24, 2017	LA SAL	DB	0.25	$801.00
July 1, 2017	COAL BED	DB	8.7	$110.63
July 8, 2017	WEST SIDE	LT	0.1	$284.14
July 8, 2017	MONTEZUMA	LT	0.1	$62.62
July 9, 2017	HWY 261 MM 22	LT	0.1	$63.00
July 9, 2017	FALSE ALARM	FA	0	$411.85
July 10, 2017	SOUTH COTTONWOOD	LT	13.10	$10,708.70
July 10, 2017	WHISKERS	LT	0.1	$62.62
July 11, 2017	UCOLO	LT	0.1	$37.17
July 13, 2017	MULE	LT	0.1	$295.00
July 14, 2017	STRIKE	LT	0.1	$26.00
July 17, 2017	PEARSON	LT	0.1	$102.84
July 17, 2017	MAILBOX	LT	0.2	$50.57
July 18, 2017	BUG POINT	LT	0.1	$271.42
July 19, 2017	INDIAN PARK TWO	LT	0.1	$91.98
July 19,2017	BRIDGER JACK	LT	0.1	$64.00
July 19, 2017	JOE WILSON CANYON	LT	0.1	$777.00
July 19, 2017	HWY 191 MM 119	EQ	0.1	$173.67
July 19, 2017	BAULLIES	LT	0.1	$2043.87
July 20, 2017	FLAT IRON	LT	0.1	$62.61
July 20, 2017	BOULDER CUTOFF	LT	0.1	$5004.31
July 20, 2017	SEEP CREEK	LT	0.2	$110.16
July 21, 2017	ROUGH CANYON	LT	0.1	$62.61
July 22, 2017	ALKALI POINT	LT	0.1	$541.60
July 22, 2017	WHISKER	LT	0.1	$50.40
July 22, 2017	KANE GULCH	LT	0.1	$364.56
July 23, 2017	PETERS SPRING POINT	LT	8.0	$531.00
July 23, 2017	RECAPTURE CREEK	LT	0.1	$406.86
July 25, 2017	LANDING	LT	0.1	$463.95
July 27, 2017	HORSE HEAD CANYON	LT	0.1	$278.44
July 30, 2017	WARREN ALLEN	LT	0.1	$466.48
August 2, 2017	GRAND GULCH	LT	0.1	$390.40
August 3, 2017	FALSE ALARM	FA	0	$366.85

Date	Fire Name	Cause	Size Approximate Acres	Cost
August 8, 2017	BIG CANYON	LT	0.1	$1,129.63
August 10, 2017	WEST BOULDER POINT	DB	0.1	$25.00
August 12, 2017	BULLDOG CANYON	LT	0.1	$261.75
August 12, 2017	BULLDOG MESA	LT	0.1	$468.13
July 23, 2017	RECAPTURE CREEK	LT	0.1	$406.86
July 25, 2017	LANDING	LT	0.1	$463.95
July 27, 2017	HORSE HEAD CANYON	LT	0.1	$278.44
July 30, 2017	WARREN ALLEN	LT	0.1	$466.48
August 2, 2017	GRAND GULCH	LT	0.1	$390.40
August 3, 2017	FALSE ALARM	FA	0	$366.85
August 8, 2017	BIG CANYON	LT	0.1	$1,129.63
August 10, 2017	WEST BOULDER POINT	DB	0.1	$25.00
August 12, 2017	BULLDOG CANYON	LT	0.1	$261.75
August 12, 2017	BULLDOG MESA	LT	0.1	$468.13
August 12, 2017	BULLDOG RANCH	LT	0.1	$92.94
August 12, 2017	BULLPUP CANYON	LT	0.1	$424.63
August 17, 2017	WALKER ROAD	MC	70.0	$8,478.58
August 21, 2017	SOUTH MESA	LT	0.1	$835.84
August 26, 2017	LONG CANYON	LT	3.0	$7,781.96
August 30, 2017	MANCOS JIM	LT	2.0	$679.44
August 31, 2017	NOTCH	LT	0.1	$62.93
August 31, 2017	CHURCH	LT	0.1	$603.18
September 1, 2017	BULLET CANYON	LT	0.1	$437.93
September 4, 2017	MULE CANYON	LT	0.2	$63.00
September 4, 2017	LITTLE NOTCH	LT	0.14	$85.14
September 13, 2017	HALFWAY	LT	0.1	$134.21
September 13, 2017	NORTH FORK	LT	0.1	$235.92
September 14, 2017	HAMMOND	DB	0.1	$1,042.70
September 17, 2017	NOTCH CANYON	LT	1.3	$883.40
September 17, 2017	BABYLON	LT	0.1	$2,193.40
September 18, 2017	WOOD SHOE	LT	0.5	$3,074.14
October 13, 2017	JOHNSON RIDGE	DB	90.0	$657.40

7.5 IMPACTS & LOSS ESTIMATES

According to the 2019 Utah State Hazard Mitigation Plan, San Juan County has 14 schools, two hospitals, and 21 emergency response facilities that are exposed to potential wildfires. The combined value of the residential buildings in San Juan County is $755,552,000, and the combined value of non-residential buildings is $230,903,000. The total building value is $986,455,000 (Utah Hazard Mitigation Plan, 2019).

Potentially vulnerable populations may experience difficulty preparing for and responding to wildfire. The table below lists the vulnerable populations in San Juan County that may be at greater risk during a wildfire.

Table 7-4. Vulnerable Populations in San Juan County, UT

Vulnerability Category	Number	Percent
Families in poverty	611	18.1%
People with disabilities	2,661	17.7%
People over 65 years	2,157	14.1%
Difficulty with English	451	3.2%
Households with no car	323	7.1%
Mobile homes	772	16.9%
Source: Wildfire Risk, 2023		

The following table includes the number of commercial and residential structures (2020 median residential value $128,700) inside extreme, high, and moderate wildfire risk areas within San Juan County. The population within each of the areas is also included.

Table 7-5. Households and Population in Wildfire Area

	Extreme Risk	High Risk	Moderate Risk
Residential Units/Replacement Cost	151/$19,433,700	68/$8,751,600	178/$22,908,600
Population	604	272	712

The next table details the annual sales of the businesses inside each wildfire risk area and the assessed value of residential property in each wildfire risk area. Residential loss estimates do not include contents. Including the value of contents would increase the values listed by 50%.

Table 7-6. Businesses in Wildfire Area

City Name	Businesses in Extreme/Annual Sales	Businesses in High/Annual Sales	Businesses in Moderate/Annual Sales
Monticello	No known risk	No known risk	47/$54,900,000
Blanding	6/$3,900,000	4/$900,000	5/$6,900,000
Montezuma Creek	No known risk	No known risk	1/$600,000

The following table contains the number of acres in each wildfire risk area, within the municipal boundaries of the following cities in San Juan County.

Table 7-7. Wildfire Risk Area

City Name	Acres of Extreme	Acres of High	Acres of Moderate
Monticello	90.93	92.16	90.93
Blanding	162.17	109.44	15.79

The following tables list the critical facilities and infrastructure within Extreme, High, or Moderate wildfire risk areas.

Table 7-8. Critical Facilities in Wildfire Zones

Critical Facility	Name	Location
Oil Facility	Gary-Williams Energy Facility	¾ mile south of Montezuma Creek, UT
Oil Facility	Lisbon Valley Gas Plant	La Sal, UT
Natural Gas Facility	Northwest Pipeline	22 miles south of Hwy 191, near Moab, UT
School	Monticello High School	Monticello, UT
School	Monticello Elementary School	Monticello, UT
School	La Sal Elementary School	La Sal, UT
School	Navajo Mountain High School	Southwestern corner of San Juan County, UT
Health Clinic	Montezuma Creek Clinic	Montezuma Creek, UT
Health Clinic	UNHS—Navajo Mountain Community Health Center	Navajo Mountain, UT
Health Clinic	Utah Navajo Health Systems	Montezuma Creek, UT
Health Clinic	Monument Valley Health Center	Monument Valley, UT
Sanitary Treatment Plant	Monticello City Sanitary Treatment Plant	East end of Clay Hill Dr in Monticello, UT
Water Treatment Plant	Blanding Water Treatment	Blanding, UT
Water Treatment Plant	Monticello Water Treatment Plant	Monticello, UT
Special Service District	Bluff Service Area	Bluff, UT
Power Station	Rocky Mountain Power—substation (Pinto)	East on Hwy 491 near Monticello, UT
Power Station	Empire Electric	Monticello, UT
Wind Farm	sPower Latigo Wind Park	Southeastern San Juan County, UT
Airport	Blanding Ambulance Heliport (private)	Blanding, UT
Airport	Blanding Municipal Airport—BDG (public)	Blanding, UT
Airport	Fry Canyon Field Airport—UT74 (private)	1 mile NW of Fry Canyon, UT
Airport	La Sal Junction Airport—01UT (private)	6 miles west of La Sal, UT
Airport	Sky Ranch Airport—UT53 (private)	7 miles south of Moab, UT
Airport	Monticello Airport—U43 (public)	Monticello, UT
Airport	Navajo Mountain Airport—04UT (private)	1 mile south of Navajo Mountain Trading Post, UT
Fire Station	Blanding City Fire Department	Blanding, UT
Fire Station	Bluff Volunteer Fire Department	Bluff, UT
Fire Station	La Sal Fire Department	La Sal, UT
Fire Station	Eastland Volunteer Fire Department	Monticello, UT
Fire Station	Monticello Fire Department	Monticello, UT
Fire Station	Cedar Point Fire Department	Monticello, UT
Transmitter	NOAA Weather Radio (NWR) Transmitter	162.475 38°/31’/44” N, -109°/19’/25” W
Police Station	Blanding Police Department	Blanding, UT

Table 7-9. Infrastructure in Wildfire Area

Item	Length (Miles)	Replacement Cost
Local Roads	230.65	$576,625,000
State Highways	144.95	$274,750,000
U.S. Highways	0.00	$0
U.S. Interstates	0.00	$0
Power Lines	111.50	$5,652,381
Gas Lines	45.24	$11,466,508

Effects of Climate Change on Probability of Future Events and Severity of Impacts

Table 7-10. Climate Projections for San Juan County, UT | Neighborhoods at Risk 2023

Heat Projections	By 2048, San Juan County is expected to experience 17 more days that reach above 95°F (from 38 days to 55 days per year).
	By 2048, San Juan County is expected to have a 2°F increase (from 55°F to 57°F) in average annual temperatures.
	Increasing annual temperatures can contribute to longer and more catastrophic wildfire seasons.
Source: Neighborhoods at Risk, 2023	

Table 7-11. Wildfire: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	3.50	Relatively Low
942000	Unincorporated San Juan County	4.14	Relatively Low
978200	City of Blanding and Town of Bluff	13.66	Relatively Moderate
978100	City of Monticello	15.10	Relatively Moderate

Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d

The wildfire risk with relevant critical facilities of San Juan County, Monticello, and Blanding are depicted in the maps below.

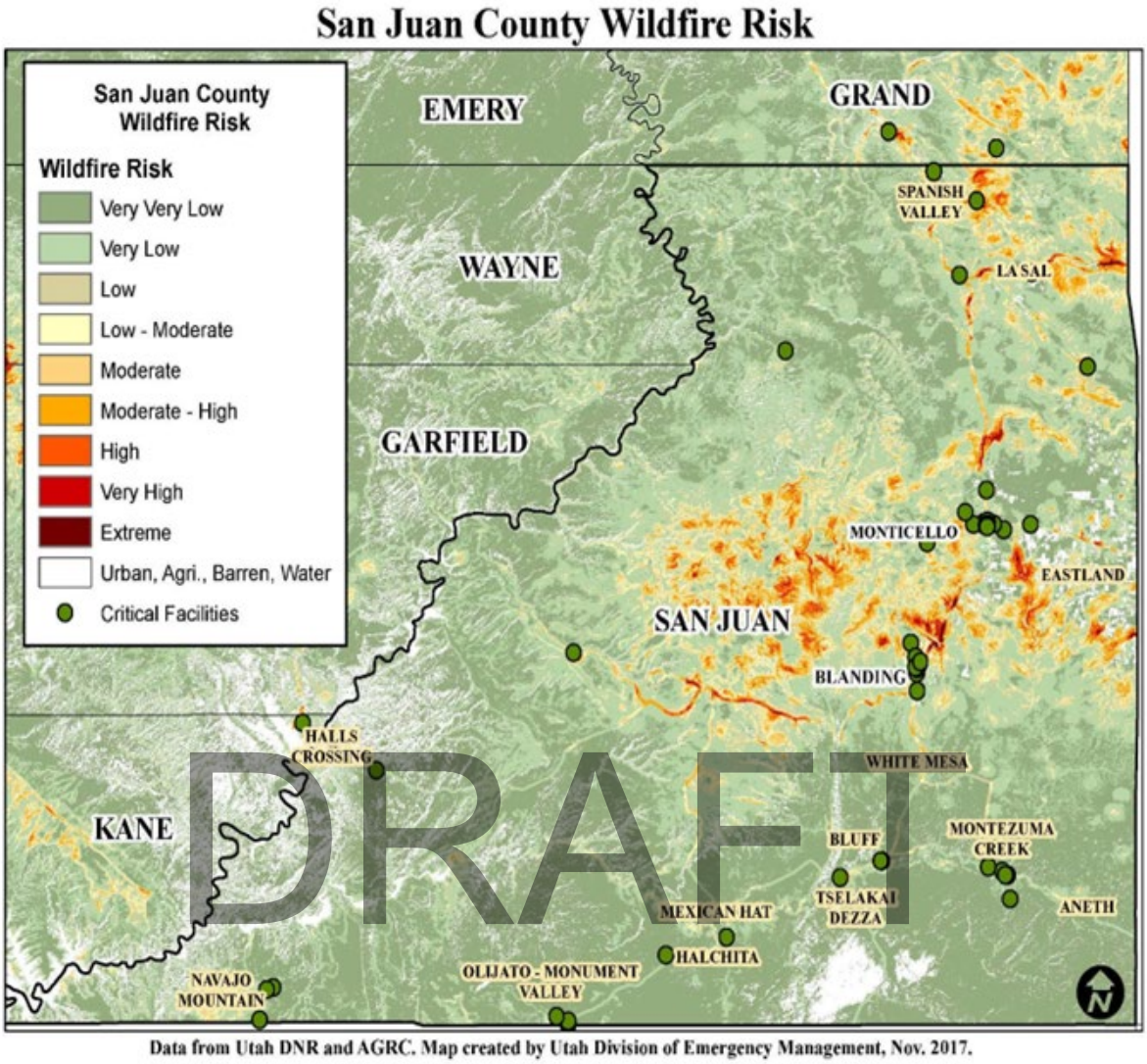


Figure 7-6. San Juan County Wildfire Risk

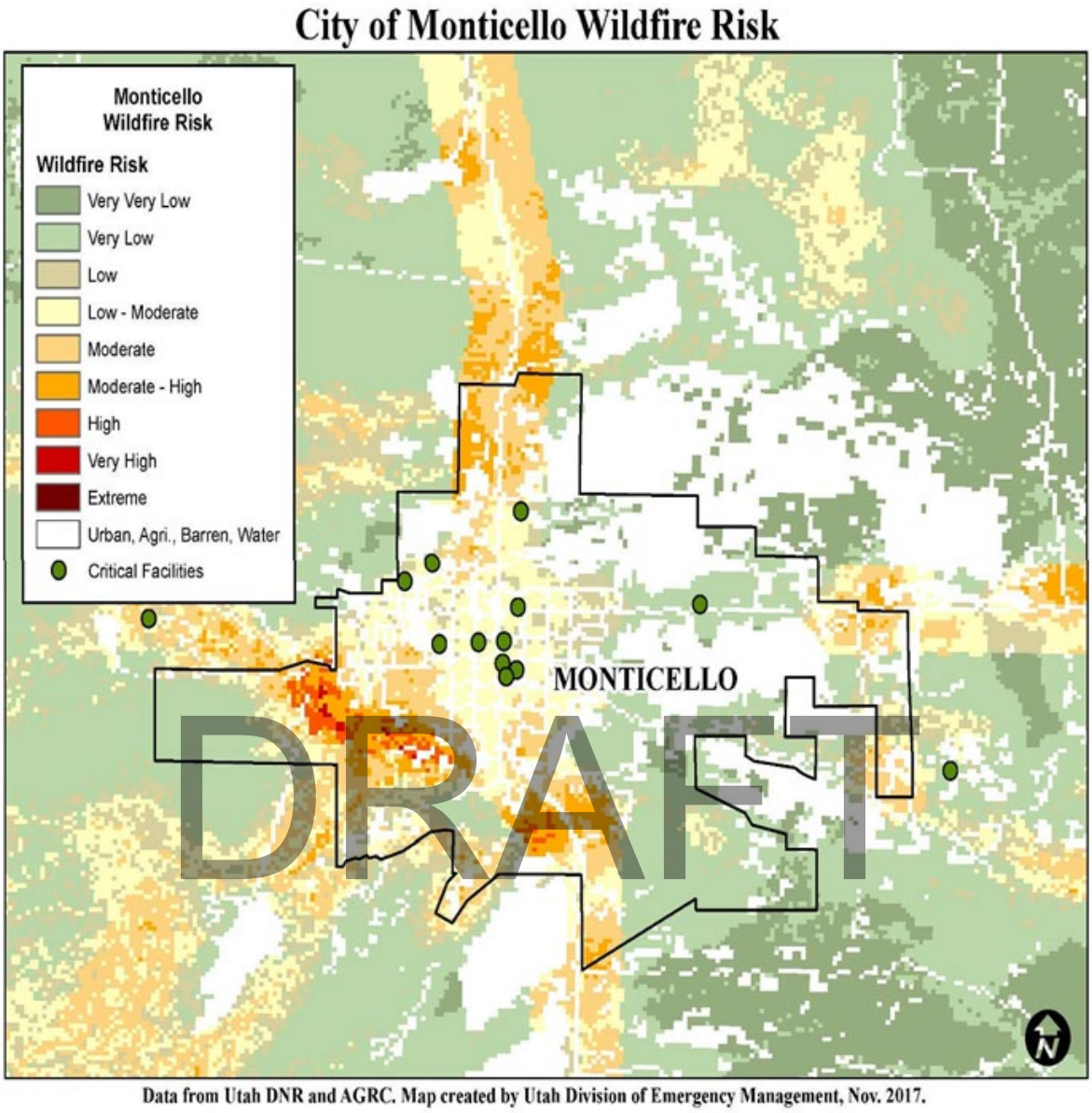


Figure 7-7. City of Monticello Wildfire Risk

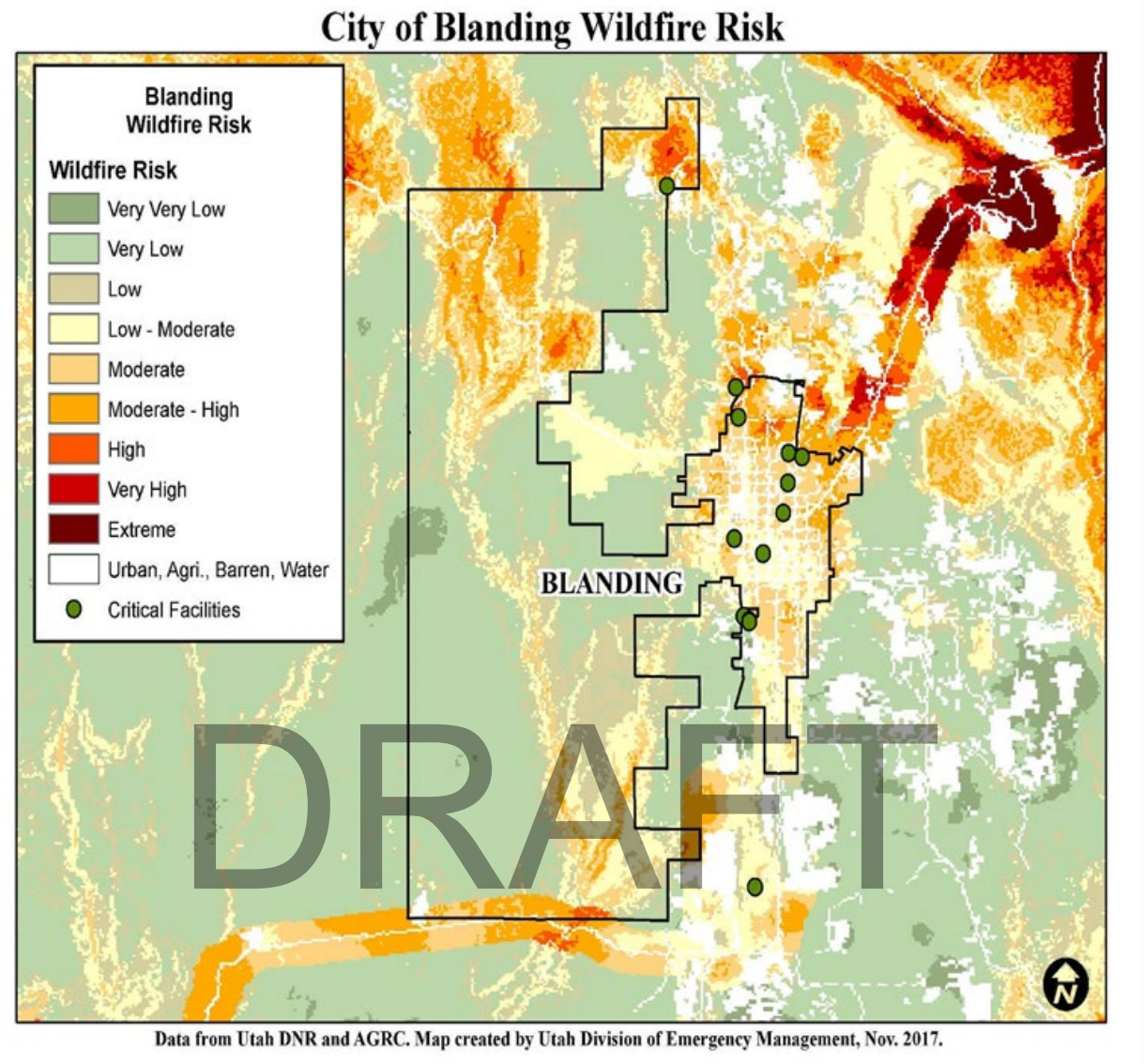


Figure 7-8. City of Blanding Wildfire Risk

7.5.1 Catastrophic Wildfires Cascading Effects

The occurrence of a catastrophic wildfire in San Juan County is fortunately a rare event. The post fire effect may produce a cascading series of events requiring immediate action and mitigation. The effect on the watershed may impinge upon the county or communities' wells, springs, and the water delivery system. There may be landslides, mudflows, and debris flow in the burn scar that may impact streams and reservoirs or damage infrastructure, such as roads and power transmission lines. Awareness of the potential of a catastrophic wildfire and considering a plan of action to implement if a catastrophic wildfire should occur may mitigate the effects on the county and communities of the cascading series of events.

7.6 FEMA NRI SCORE

Table 7-12. Wildfire: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	6.90	Relatively Low
942000	Unincorporated San Juan County	7.76	Relatively Low
978200	City of Blanding and Town of Bluff	16.10	Relatively Moderate
978100	City of Monticello	16.53	Relatively Moderate
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

CHAPTER 8 FLOOD

8.1 HAZARD DESCRIPTION

Flooding is defined by the National Weather Service (NWS) as "the inundation of normally dry areas as a result of increased water levels in an established water course." River flooding, the condition where the river rises to overflow its natural banks, may occur due to a number of causes, including prolonged, general rainfall, locally intense thunderstorms, snowmelt, and ice jams. In addition to these natural events, there are a number of factors controlled by human activity that may cause or contribute to flooding. These include dam failure (discussed below) and activities that increase the rate and amount of runoff, such as paving, reducing ground cover, and clearing forested areas. Flooding is a periodic event along most rivers, with the frequency depending on local conditions and controls, such as dams and levees. The land along rivers that is identified as being susceptible to flooding is called the floodplain.

Flooding is a dynamic natural process. Along rivers and streams, a cycle of erosion and deposition is continuously rearranging and rejuvenating the aquatic and terrestrial systems. Although many plants, animals, and insects have evolved to accommodate and take advantage of these ever-changing environments, property and infrastructure damage often occurs when people develop floodplains and natural processes are altered or ignored.

Flooding can also threaten life, safety, and health and often results in substantial damage to infrastructure, homes, and other property. The extent of damage caused by a flood depends on the topography, soils, and vegetation in an area, and the depth and duration of flooding, velocity of flow, rate of rise, and the amount and type of development in the floodplain.

8.2 TYPES OF FLOODING

Flooding can occur in a number of ways and many instances are not independent of each other and can occur simultaneously during a flood event. The types of flooding considered for this plan include:

- Heavy rainfall
- Urban stormwater overflow
- Rapid snowmelt
- Rising groundwater (generally in conjunction with heavy prolonged rainfall and saturated conditions)
- Riverine ice jams
- Flash floods
- Fluctuating lake levels
- Alluvial fan flooding
- Flooding from dam failure

8.3 RELATED HAZARDS

8.3.1 River or Stream Flood

Hazard Description

	X	Low

Potential Probability		Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Along the San Juan and Colorado Rivers and their respective larger tributaries	
Seasonal Pattern or Conditions	Heavy snowfall runoff in spring and early summer; monsoonal thunderstorms and heavy rainfall in late summer	
Duration	Flooding can last hours to days or even months.	
Analysis Used	FIS, FIRM, Army Corp of Engineers Flood Study, GIS data, DEM Hazus 100-Year Flood report, information from community residents, NOAA, NWS, NFIP, 2019 Utah Hazard Mitigation Plan, local newspaper articles	

River flooding—the condition where the river rises to overflow its natural banks—may occur due to a number of causes, including prolonged, general rainfall, locally intense thunderstorms, snowmelt, and ice jams.

Location

Riverine flooding occurs in the low-lying areas of the county adjacent to streams and rivers, such as the San Juan River and its tributaries.

The following locations are situated in floodplains and have suffered property damage in the past: McElmo Creek, Comb Wash, Cottonwood Wash, and Montezuma Creek near Bluff, Cottonwood Wash near Blanding, Butler Wash near Bluff, Comb Wash near Bluff and Blanding, White Canyon near Hite, and Lime Creek near Mexican Hat, Spanish Valley and Pack Creek

Bluff is in an alluvial fan below Cottonwood Wash and therefore is in a floodplain area as well as in a shallow groundwater zone. Mexican Hat is located near the San Juan River and is also in the floodplain. The city of Blanding resides on or near expansive soils; when water is introduced into these types of soils, the soil expands and damages or destroys foundations in homes and businesses.

Monticello, Bluff, Blanding, and Mexican Hat are likely to experience another flood event in the future.

Extent

The NFIP classifies floods through the use of recurrence intervals as seen in the chart below.

The federal standard for floodplain management under the National Flood Insurance Plan (NFIP) is the "100-year floodplain." This area is chosen using historical data such that in any given year there is a 1% chance of a "base flood" (also known as "100-year flood" or "regulatory flood"). A base flood is one that

Flood Recurrence Interval	Chance of occurrence during any given year
5 year	20%
10 year	10%
50 year	2%
100 year	1%
500 year	0.20%

covers or exceeds the 100-year floodplain. A "500-year floodplain" is an area with at least a .2% chance of flood occurrence in any given year (HUD Exchange, 2023).

Historical Frequency & Probability of Future Occurrence

The Storm Events Database from the NOAA lists one river flood event in San Juan County between 2010–2022.

Table 8-1. River Flood Events in San Juan County (2010–2022)

Location Within County	Date	Property Damage ($)	Cause
Grand County Airport	07/25/2021	$2,000	Monsoon, thunderstorms, heavy rain
Source: NOAA Storm Events Database, 2010–2022			

The Pack Creek Fire in the La Sal Mountains of northern San Juan County on June 9, 2021 burned 8,951 acres (Canyon Country Zephyr, 2021). The burn scar left from the fire has resulted in several floods that fill with debris from the fire. Four of these floods occurred in 2021 after the fire, and at least six flood events in the area occurred in 2022.

Impacts & Loss Estimates

Human death and injury sometimes occur as a result of river flooding but are not common. Human hazards during flooding include drowning, electrocution due to downed power lines, leaking gas lines, fires and explosions, hazardous chemicals, and displaced wildlife. Economic loss and disruption of social systems are often enormous. Floods may destroy or damage structures, furnishings, business assets including records, crops, livestock, roads, and highways. They often deprive large areas of electric service, potable water supplies, wastewater treatment, communications, and many other community services, including medical care, and may do so for long periods of time.

The 2019 Utah State Hazard Mitigation Plan records the flood vulnerabilities and loss estimates of people, residential units, and commercial units in San Juan County. The following table includes the number of vulnerable people and units in the county as well as the reported combined values of these units.

Table 8-2. Vulnerable Units in San Juan County

People	Residential Units		Commercial Units	
	Units	Value	Units	Value
424	77	$21,960,000	N/A	$1,410,000
Source: Utah State Hazard Mitigation Plan, 2019				

San Juan County participates in the National Flood Insurance Program (NFIP). As of 2019, the county had a total premium of $605, two policies, and $350,000 in total coverage (Utah Hazard Mitigation Plan, 2019). The county has had zero claims since becoming a participating community in 1978. Efforts were made to conduct HAZUS flood analyses for San Juan County during the update process; however due to a lack of Digital Elevation data (DEMs)for the county and incomplete flood hazard layer data from the NFIP the county the analyses were unable to be performed. Once digital elevation data is made available for the county, HAZUS-MH will be a valid tool for modeling the flood hazard and should be considered for future iterations of the San Juan County Hazard Mitigation plan updates.

Effects of Climate Change on Probability of Future Events and Severity of Impacts

Table 8-3. Climate Projections for San Juan County, UT | Neighborhoods at Risk 2023

Precipitation Projections	By 2048, San Juan County is expected to experience 0.03 more days of heavy precipitation per year (from 0.31 days to 0.34 days per year).
	By 2048, San Juan County is expected to have a 0.11" increase (from 10.04" to 10.15") in average annual precipitation.
	Heavy precipitation can lead to riverine flooding as the ground fails to absorb the high volume of precipitation that falls in a short period.
	Increasing annual precipitation can contribute to sustained flooding.
Source: Neighborhoods at Risk, 2023	

Table 8-4. Riverine Flooding: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	0.00	No Expected Annual Losses
942000	Unincorporated San Juan County	0.00	No Expected Annual Losses
978200	City of Blanding and Town of Bluff	0.00	No Expected Annual Losses
978100	City of Monticello	0.00	No Expected Annual Losses

Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d

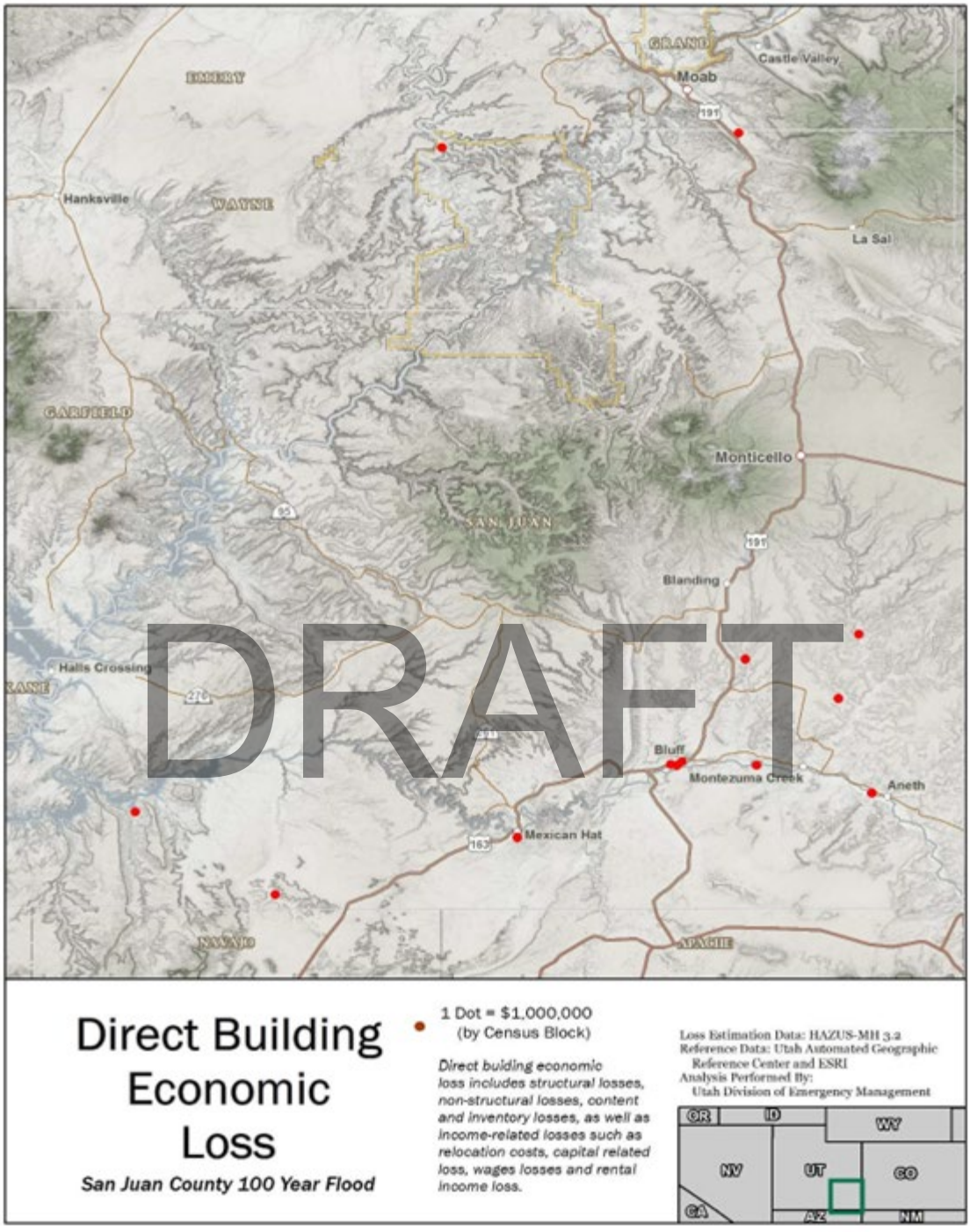


Figure 8-3. Direct Building Economic Loss

Figure 8-4. Building Inspection Needs

FEMA NRI Score

Table 8-5. Riverine Flooding: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	0.00	No Rating
942000	Unincorporated San Juan County	0.00	No Rating
978200	City of Blanding and Town of Bluff	0.00	No Rating
978100	City of Monticello	0.00	No Rating
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

▪ 8.3.2 Flash Flood

Hazard Description

Potential Probability		Low
		Medium
	X	High
Potential Consequence		Low
	X	Medium
		High
Location	Along the San Juan and Colorado Rivers and their respective larger tributaries; in slot canyons, gullies, and washes	
Seasonal Pattern or Conditions	Heavy snowfall runoff in spring and early summer; monsoonal thunderstorms and heavy rainfall in late summer	
Duration	Flooding can last hours to days or even months.	
Analysis Used	FIS, FIRM, Army Corp of Engineers Flood Study, GIS data, DEM Hazus 100-Year Flood report, information from community residents, NOAA, NWS, NFIP, 2019 Utah Hazard Mitigation Plan, local newspaper articles	

Flash flood is defined by the NWS as "a rapid and extreme flow of high water into a normally dry area or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters." Flash floods differ from floods (discussed above in River or Stream Flood) in the rapidity with which they develop. Floods generally develop over a period of several days, providing more warning time and time for preparation and evacuation. Flash floods occur with little or no warning. They may occur during thunderstorms due to rapid runoff from steep terrain, from areas where the soil is already saturated, or in urban areas where vegetation has been removed and pavement has replaced exposed soil. Flash floods may also arise as the result of dam failure (discussed below) or the breakup of ice jams.

Location

Flooding affects the majority of Utah due to heavy mountain precipitation and runoff. Consistent wildfires also exacerbate existing flood risks. Southern Utah especially has a higher risk of flash flooding because of its numerous slot canyons, gullies, and washes combined with heavy storm systems, although infrequent. Southern Utah can experience changes in the geography of the landscape from sediment movement during flash floods, as well (Utah Hazard Mitigation Plan, 2019).

The Pack Creek Fire Burn Area is particularly vulnerable to flash floods, as described below.

Extent

Flash floods occur suddenly within six hours of intense rainfall from a thunderstorm or several thunderstorms. Flash floods are common amongst San Juan County's many slot canyons, making these areas especially hazardous during rainfall.

Historical Frequency & Probability of Future Occurrence

The Storm Events Database from the NOAA lists 29 flash flood events and 16 debris flow events in San Juan County between 2010–2022. Many of these flood events occurred in the canyons and slot canyons of southern Utah. Additionally, the Pack Creek Fire in the La Sal Mountains of northern San Juan County on June 9, 2021 burned 8,951 acres (Canyon Country Zephyr, 2021). The burn scar left from the fire has resulted in several flash floods that are triggered by excessive rainfall over the burn scar, causing debris flow to move through the Pack Creek Burn Area. Four of these debris flows occurred in 2021 after the fire, and at least six debris flow events in the area occurred in 2022. The following table lists all flash flood and debris flow events since 2010.

Table 8-6. Flood Events in San Juan County (2010–2022)

Location Within County	Date	Event Type	Property Damage ($)	Cause
Monticello Airport	07/21/2010	Flash Flood	--	Strong thunderstorms, hail
Monument Valley Airport	07/28/2010	Flash Flood	$500	Strong thunderstorms, heavy rain
Monticello Airport	07/19/2011	Flash Flood	--	Strong thunderstorms, heavy rain
Grand County Airport	09/03/2012	Flash Flood	$5,000	Strong thunderstorms, heavy rain
Bluff	09/12/2012	Debris Flow	--	Heavy rain—caused flow of mud and water across Hwy 191
Montezuma Creek	01/26/2013	Debris Flow	--	Heavy rain—caused rock and debris slides
La Sal Junction Airport	05/09/2013	Flash Flood	--	Strong thunderstorms, heavy rain
Bluff Airport	07/15/2013	Flash Flood	$40,000	Monsoon, strong thunderstorms, heavy rain
La Sal Junction Airport	08/23/2013	Flash Flood	--	Monsoon, strong thunderstorms, heavy rain
Bluff	08/25/2013	Flash Flood	$10,000	Thunderstorms, heavy rain
Grand County Airport, Mexican Hat, Fry Canyon	08/26/2013	Flash Flood	--	Monsoonal thunderstorms, heavy rainfall
Monticello Airport	08/27/2013	Flash Flood	--	Monsoon, thunderstorms

Location Within County	Date	Event Type	Property Damage ($)	Cause
La Sal Junction Airport, Monticello Airport	09/09/2013	Flash Flood	--	Monsoon, heavy rain, thunderstorms
Mexican Hat	09/10/2013	Flash Flood	--	Monsoons
La Sal Junction Airport	09/13/2013	Flash Flood	--	Monsoon, heavy rain, thunderstorms
La Sal Junction Airport, Fry Canyon, Monticello Airport	09/14/2013	Flash Flood	--	Monsoon, heavy rain, thunderstorms
Blanding Municipal Airport	09/18/2013	Debris Flow	--	Cold front, hail—caused localized flooding and washed boulders
Monticello	09/22/2013	Flash Flood	--	Monsoon, strong thunderstorms, hail, heavy rain
La Sal Junction Airport	05/11/2014	Flash Flood	--	Deep moisture, heavy rain, snowfall
Monticello Airport	07/29/2014	Flash Flood	--	Monsoon, thunderstorms
Monticello Airport	08/04/2014	Flash Flood	--	Thunderstorms, heavy rain
La Sal Junction Airport	08/14/2014	Flash Flood	--	Heavy rain
Grand County Airport	09/09/2014	Flash Flood	--	Thunderstorms, heavy rain
Grand County Airport	02/10/2015	Debris Flow	--	Heavy rain, snow melt—caused rockslide of large boulders
La Sal Junction Airport	06/11/2015	Flash Flood	--	Thunderstorms, heavy rain
Blanding	06/13/2015	Flash Flood	$30,000	Strong thunderstorms, heavy rain
White Canyon	07/01/2016	Debris Flow	--	Heavy rain, thunderstorms—caused flow of muddy water, rocks, and debris
Mexican Hat	07/25/2017	Flash Flood	--	Thunderstorms, heavy rain
La Sal Junction	08/06/2017	Flash Flood	--	Thunderstorms, heavy rain
Fry Canyon	07/14/2018	Debris Flow	--	Heavy rain, thunderstorms—caused 4 inches of mud and silt on Hwy 261

Location Within County	Date	Event Type	Property Damage ($)	Cause
Mexican Hat	06/06/2020	Flash Flood	--	Severe storms, hail, strong wind, heavy rain
Grand County Airport, La Sal	07/14/2021	Debris Flow	--	Heavy rain, thunderstorms, monsoon—caused mud and debris flow in burn area
Grand County Airport	07/25/2021	Debris Flow	$50,000	Heavy rain, thunderstorms, monsoon—caused mud and debris flow in burn area
Grand County Airport, La Sal	07/28/2021	Debris Flow	--	Monsoon, heavy rain, thunderstorms—caused debris flows in burn area
Grand County Airport, La Sal	08/01/2021	Debris Flow	$2,500	Heavy rain, thunderstorms, monsoon—caused large mud and debris flow in burn area
Grand County Airport	08/26/2021	Debris Flow	$1,000	Heavy rain, thunderstorms—caused rock and debris flows on Hwy 191
Grand County Airport	07/26/2022	Debris Flow	$10,000	Monsoon, heavy rain, thunderstorms—caused debris flow in burn area
Grand County Airport	07/30/2022	Debris Flow	$2,500	Heavy rain, monsoon, thunderstorms—caused debris flow in burn area
Grand County Airport	07/31/2022	Debris Flow	$200	Heavy rain, monsoon, thunderstorms—caused debris flow in burn area
Grand County Airport	08/11/2022	Flash Flood	$500	Heavy rain, monsoon, thunderstorms
Grand County Airport	08/11/2022	Debris Flow	$1000	Heavy rain, monsoon, thunderstorms—caused debris flow in burn area
Monticello Airport	08/14/2022	Flash Flood	$5,000	Heavy rain, monsoon, thunderstorms
Grand County Airport	08/20/2022	Flash Flood	$250	Heavy rain, thunderstorms

Location Within County	Date	Event Type	Property Damage ($)	Cause
Grand County Airport	08/20/2022	Debris Flow	$250	Heavy rain, monsoon, thunderstorms—caused debris flow in burn area
Fry Canyon	08/26/2022	Flash Flood	$500	Heavy rain, thunderstorms
Source: NOAA Storm Events Database, 2010–2022				

Most recently, a significant flash flood in San Juan County near Monticello washed out large chunks of SR 211 between mileposts 15–17 on August 14, 2022. The Utah Department of Transportation closed U.S. Hwy 191 in both directions near the highway's junction with SR 211, which was also closed. Thunderstorms and heavy rain were a cause of the flash flooding. Photos of the damaged road can be seen below (Burt, 2022).

Figure 8-5. Flash Flood on 8/14/2022

Impacts & Loss Estimates

Because flash floods develop so rapidly, people on foot or in automobiles may be stranded or may be swept away and injured or drowned. They are characterized by high velocity water flow and large amounts of debris, both of which cause damage to or destroy structures and other objects in their path.

The 2019 Utah State Hazard Mitigation Plan records the flood vulnerabilities and loss estimates of people, residential units, and commercial units in San Juan County. The following table includes the number of vulnerable people and units in the county as well as the reported combined values of these units.

Table 8-7. Vulnerable Units in San Juan County

People	Residential Units		Commercial Units	
	Units	Value	Units	Value
424	77	$21,960,000	N/A	$1,410,000
Source: Utah State Hazard Mitigation Plan, 2019				

Effects of Climate Change on Probability of Future Events and Severity of Impacts

Table 8-8. Climate Projections for San Juan County, UT | Neighborhoods at Risk 2023

Precipitation Projections	By 2048, San Juan County is expected to experience 0.03 more days of heavy precipitation per year (from 0.31 days to 0.34 days per year).
	By 2048, San Juan County is expected to have a 0.11" increase (from 10.04" to 10.15") in average annual precipitation.
	Heavy precipitation can lead to flash floods as the ground fails to absorb the high volume of precipitation that falls in a short period.
	Increasing annual precipitation can contribute to sustained flooding.
Source: Neighborhoods at Risk, 2023	

8.3.3 Dam Failure

Hazard Description

Potential Probability	X	Low
		Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Dam locations are mainly located in the mid-eastern portion of the county.	
Seasonal Pattern or Conditions	Rainy Day Failure happens mainly during heavy precipitation events and can have some warning time. Sunny Day Failure happens with no warning at all and can happen at any time.	
Duration	Hours, days. Depends on spillway type and area, maximum cfs discharge, overflow or breach type, dam type. Refer to Dam Inventory for more information.	
Analysis Used	BOR inundation maps and plans, FIS, Water Rights, Utah Division of Water Rights and Dam Safety, local input, 2019 Utah Hazard Mitigation Plan, National Inventory of Dams	

Dam failure is the unintended release of impounded waters. Dams can fail for one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam
- Deliberate acts of sabotage
- Structural failure of materials used in dam construction
- Poor design and/or construction methods
- Movement and/or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment dams
- Piping and internal erosion of soil in embankment dams.
- Inadequate maintenance and upkeep

Failures may be categorized into two types: component failure of a structure that does not result in a significant reservoir release, and uncontrolled breach failure that leads to a significant release. With an uncontrolled breach failure of a manmade dam there is a sudden release of the impounded water, sometimes with little warning. The ensuing flood wave and flooding have enormous destructive power. The Dam Safety Program of the Utah Division of Water Rights is responsible for dam safety in Utah.

Location

San Juan County has a total of 174 dams throughout the county, with six high hazard and six moderate hazard dams that have the potential to cause significant loss to property and/or life in the event of a dam failure (the full list of dams and respective hazard ratings is available in *Extent*). As listed in the table below, there are several communities in San Juan County that would potentially be affected by a dam breach if one occurred.

Table 8-9. Vulnerable Downstream Communities in San Juan County

Dam Name	DWRi Hazard Rating	First Downstream Community	Distance in Miles
Bankhead, Lower	Low	La Sal	5
Blanding City No. 3	High	Blanding	4
Camp Jackson	Moderate	Blanding	17
Dry Wash No. 2	Moderate	Blanding	14
Starvation Canyon	High	Blanding	3
Gordon	Moderate	Monticello	5
Kens Lake	High	Moab	6
Lloyds Lake	High	Monticello	1
Monticello City No. 1	Low	Monticello	1
Monticello City No. 2	Low	Monticello	1

Extent

Dams in Utah are classified according to hazard, size, and use. There are three hazard ratings: high, moderate, and low. The hazard rating reflects proximity to people and property. High hazard dams are located where there are significant consequences downstream if the dam fails, such as loss of human life and significant property damage. Moderate hazard is typically defined as a dam whose failure will cause significant property destruction. Low hazard dams will cause minimal property destruction (Utah Hazard Mitigation Plan, 2019). As growth continues, homes are being built closer to dams, creating "hazard creep," which creates additional urgency to ensure dams meet safety standards and don't put lives and property at unnecessary risk (Dam Safety, 2023).

As seen in the table below, 174 dams are listed by the Utah Division of Water Rights (DWRi) Dam Safety in San Juan County (excluding inactive, planned, or under construction dams), with only six dams listed as having a high threat rating. A high threat rating means there is a possibility of life being lost due to dam failure. Six dams are listed as having a moderate hazard rating, meaning there would be significant downstream property loss if the dam were to fail. 145 dams have a low hazard rating, which means if a dam failure were to occur, there would be insignificant property loss; however, these dams should still be monitored. The remaining 17 dams do not have a hazard rating but are still listed in the database. The classification of a high hazard dam does not mean that the dam has a high probability of failure. Dam safety hazard classifications simply delineate the downstream consequences if a dam were to fail.

Potential dam failure in San Juan County is rated as "possible." If a dam were to breach in the county, the cities identified in the table in the *Location* section above would be affected.

The National Inventory of Dams (NID) ranks dams as high, significant, or low. The NID lists 12 dams in San Juan County that have a rating of high or significant. The map below shows the locations of these dams and their proximity to communities in the county.

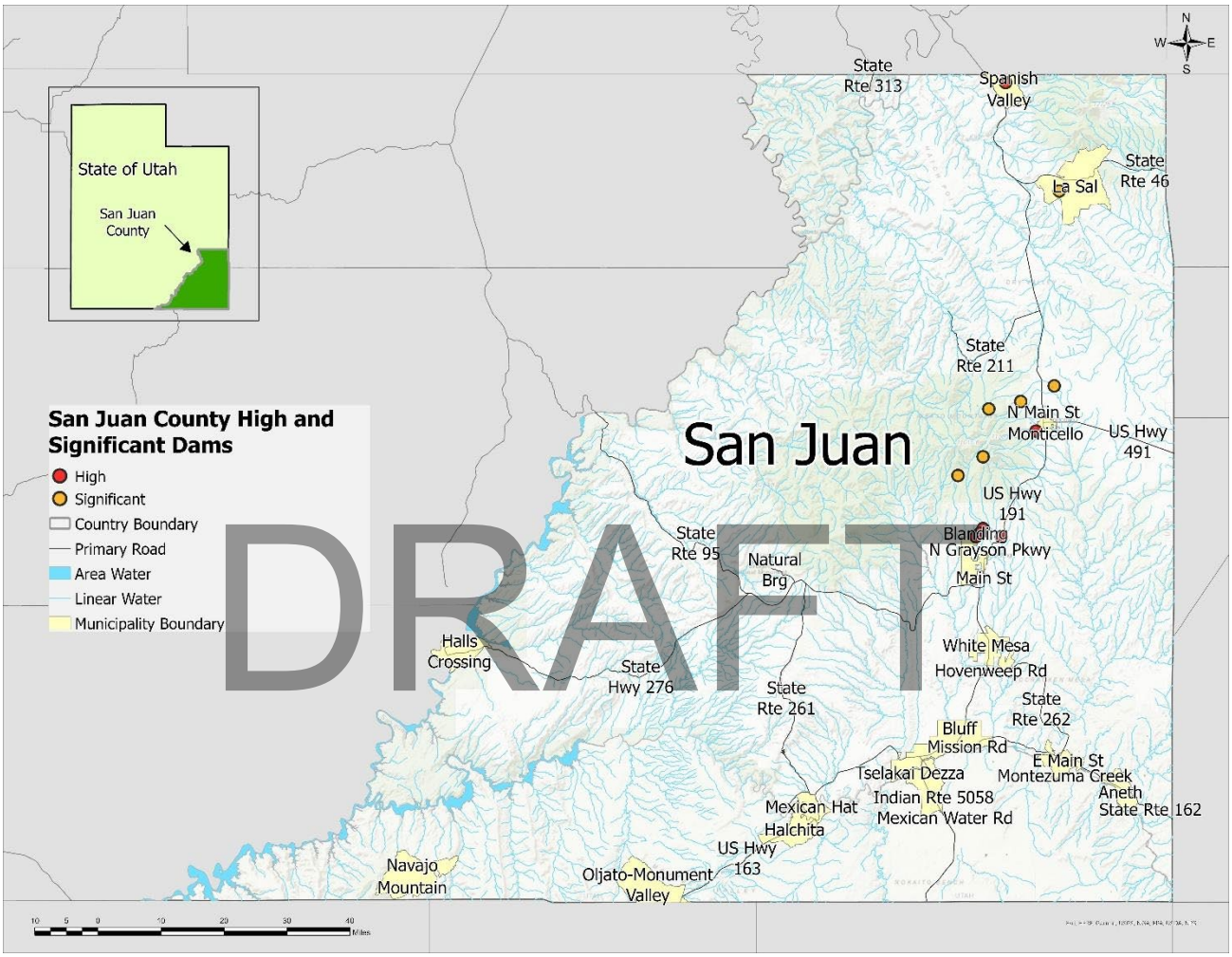


Figure 8-6. San Juan County High and Significant Dams

In addition to listing all the dams from DWRi Dam Safety in San Juan County, the following table notes all 12 dams from the National Inventory of Dams (NID) that have a rating of high or significant.

Table 8-10. Dams in San Juan County

	Dam Name	DWRi Hazard Rating	NID Hazard Rating
1	Blanding City No. 3	High	High
2	Blanding City No. 4	High	High
3	Kens Lake	High	High
4	Lloyd's Lake (Monticello)	High	High
5	Recapture Creek	High	High
6	Starvation Canyon	High	High

	Dam Name	DWRi Hazard Rating	NID Hazard Rating
7	Camp Jackson	Moderate	Significant
8	Dry Wash No. 2	Moderate	Significant
9	Gordon	Moderate	Significant
10	Keller	Moderate	Significant
11	Monticello Lake	Moderate	Significant
12	Rattlesnake Ranch No. 2 (Lower)	Moderate	Significant
13	Adams Ranch Dam	Low	
14	Adams, Lynn	Low	
15	Bailey (Upper)	Low	
16	Bailey, Lawrence P. 72R3-20	Low	
17	Bankhead (Lower)	Low	
18	Bears Ears Pond #2	Low	
19	Beaver Pond #1, Sec. 6	Low	
20	Beaver Pond #2, Sec. 6	Low	
21	Big Hole Reservoir	Low	
22	Blanding Wastewater Winter Storage	Low	
23	Blankenagle Reservoir	Low	
24	Blue Springs Reservoir	Low	
25	Brownell, Durwin H. 71R6-28	Low	
26	Brushy Basin Reservoir #1	Low	
27	Brushy Basin Reservoir #2	Low	
28	Brushy Basin Reservoir #3	Low	
29	Brushy Basin Reservoir #4	Low	
30	Buck Hollow	Low	
31	Buck Hollow Reservoir #2	Low	
32	Bull Dog Pond	Low	
33	Bureau of Land Management	Low	
34	Coyote Creek Pond	Low	
35	Dalton, Max	Low	
36	Davis Pocket Pond	Low	
37	De Jones, Cardon 72 72R5-1	Low	
38	Deer Flat Spring #2	Low	
39	Dervage, Michael	Low	
40	Devils Canyon Pond	Low	
41	Double Corrals Pasture Pond	Low	
42	Dugout	Low	
43	Dukes Pond	Low	
44	East Point Reservoir	Low	
45	Foy	Low	
46	Halls, F. Devere 70R6-2	Low	
47	Hammond Canyon Trail Reservoir	Low	
48	Harts Draw Pond	Low	
49	Harts Draw Pond #2	Low	
50	Harts Draw Pond #3	Low	
51	Harts Draw Pond #4	Low	
52	Hyde, Lee Afton 70R12-23	Low	
53	Iron Springs	Low	
54	Irvine Day Reservoir	Low	
55	J.N. Pasture Pond	Low	

	Dam Name	DWRi Hazard Rating	NID Hazard Rating
56	Jackson Spring Dugout	Low	
57	Johnson Creek Reservoir	Low	
58	Johnson Reservoir	Low	
59	Johnson Ridge Reservoir #1	Low	
60	Johnson Ridge Reservoir #2	Low	
61	Jones Pond	Low	
62	Knolls Reservoir	Low	
63	Laws, Boyd J. & Sandra P. 94-09-64MD	Low	
64	Lens Point Reservoir #1	Low	
65	Lens Point Reservoir #2	Low	
66	Lens Point Reservoir #3	Low	
67	Lisbon Valley Mining #1	Low	
68	Lisbon Valley Mining #2	Low	
69	Lisbon Valley Mining Co. LLC	Low	
70	Lisbon Valley Mining Co. LLC	Low	
71	Lisbon Valley Mining Co. LLC	Low	
72	Lisbon Valley Mining Co. LLC	Low	
73	Lisbon Valley Mining Company	Low	
74	Little Mountain Pond	Low	
75	Little Mountain Rim Pond	Low	
76	Lockhart Basin 72R3-21	Low	
77	Lower Hop Creek	Low	
78	Lower Pine Ridge Reservoir	Low	
79	Lower Trinity Reservoir	Low	
80	Lower West State Line	Low	
81	Lyman, Richard & Mary Ann	Low	
82	Lyman, Richard & Mary Ann	Low	
83	Lyman, Richard & Mary Ann	Low	
84	Martinez, Earl	Low	
85	Martinez, Earl	Low	
86	Martinez, Earl	Low	
87	Maverick Point Pond	Low	
88	Medicine Lake	Low	
89	Mikesell Family Trust	Low	
90	Miners Pond	Low	
91	Monticello City No. 1	Low	
92	Monticello City No. 2	Low	
93	Monticello City No. 3	Low	
94	Moore's Range Reservoir #1	Low	
95	Moore's Range Reservoir #2	Low	
96	Mormon Pasture Point Pond	Low	
97	Mud Ball Reservoir	Low	
98	Needles Overlook	Low	
99	Nielson, G.J. 72R4-14	Low	
100	Nielson, Norman F.	Low	
101	North Fork of Verdure Pond	Low	
102	Peters Point Pond #1	Low	
103	Peters Point Pond #2	Low	
104	Peters Point Pond #3	Low	

	Dam Name	DWRi Hazard Rating	NID Hazard Rating
105	Photo Reservoir	Low	
106	Pine Ridge #1	Low	
107	Pine Ridge #2	Low	
108	Pine Ridge #3	Low	
109	Pine Ridge #4	Low	
110	Pine Ridge #5	Low	
111	Pine Ridge #6	Low	
112	Pine Ridge #7	Low	
113	Pine Ridge Reservoir	Low	
114	Pole Canyon Reservoir	Low	
115	Porter, Eugene W. & Anne B. 71R5-11-2	Low	
116	Porter, Eugene W. & Anne B. 71R5-11-3	Low	
117	Provancha	Low	
118	Race Track Pond	Low	
119	Ramsay, Clarence R. 70R10-2	Low	
120	Recapture Bench Reservoir #1	Low	
121	Recapture Bench Reservoir #2	Low	
122	Recapture Road Pond	Low	
123	Reservoir Canyon Fork Pond	Low	
124	Reservoir Canyon Reservoir	Low	
125	Rio Algom Mining Corp. (Bisco) 90R296	Low	
126	Road Pond	Low	
127	Rocky Reservoir	Low	
128	Salt Creek Pond	Low	
129	Scorup Pond	Low	
130	Shay Ridge Pond	Low	
131	Shay Ridge Pond #1	Low	
132	Shay Ridge Pond #2	Low	
133	Shumway, Eugene 77R2-25	Low	
134	Sitla	Low	
135	Sitla—Baulies Pond	Low	
136	Sitla—Hart Point Pond	Low	
137	Sitla—John's Canyon Pond	Low	
138	Sitla—Pond #1	Low	
139	Sitla—Pond #2	Low	
140	Snyder No. 2	Low	
141	Snyder, Walter B. 77R26	Low	
142	Snyder, Walter B. 77B26	Low	
143	South Verdure Reservoir	Low	
144	State Line Ridge Reservoir	Low	
145	Stock, A.M. 85R42	Low	
146	Stocks, Fred & Brenda	Low	
147	Thornell Pond	Low	
148	Trinity Canyon Reservoir	Low	
149	Two Mile Road Reservoir	Low	
150	U.S. Forest Service 84R35	Low	
151	Verdure Pond	Low	
152	Washburn Pond	Low	
153	West Horse Pasture Pond	Low	

	Dam Name	DWRi Hazard Rating	NID Hazard Rating
154	White Mesa	Low	
155	White Mesa Tailings No. 4B	Low	
156	Woodenshoe Reservoir	Low	
157	Young Mill Pond	Low	
158	Bureau of Land Management 96-09-41MD		
159	Bureau of Land Management 96-09-42MD		
160	Calliham, Gerald 94-09-75MD		
161	Calliham, Gerald 94-09-76MD		
162	Deer Flat Spring #3 Pond 96-99-40MD		
163	Francom, Rowland & Christine 97-09-03MD		
164	Marian, Duane 97-09-08MD		
165	Monticello Millsite Pond #3		
166	Monticello Millsite Pond #4		
167	Monticello Repository Pond A		
168	Monticello Repository Pond B		
169	Monticello Repository Pond C		
170	Porter, Eugene W. & Anne B. 71R5-11		
171	Shumway, Danny 95-09-03MD		
172	Sky Ranch L.C. 98-05-35MD		
173	Tracy Balsley 96-05-21MD		
174	William Ewing Lucas 96-05-34MD		
Source: Utah Division of Water Rights, 2022; NID, 2022			

In San Juan County, Lloyds Lake is a high hazard dam owned by San Juan Water Conservancy District and was completed in 1984. The reservoir storage at spillway crest is 3,500 acre-feet, and the reservoir storage at dam crest is 4,300 acre-feet. The spillway type is an open channel, and the maximum dam breach flow would be 86,000 cfs with a 13-square mile drainage basin area. The first downstream

community is Monticello, which is one mile away. The inundation area below Lloyd's Lake is depicted in the map below along with Monticello's critical facilities.

Starvation Canyon Reservoir is a high hazard dam owned by Blanding City and was completed in 1985. The reservoir storage at spillway crest is 600 acres, and the reservoir storage at dam crest is 875 acres. The spillway type is an open channel, and the maximum dam breach flow would be 28,000 cfs with a one

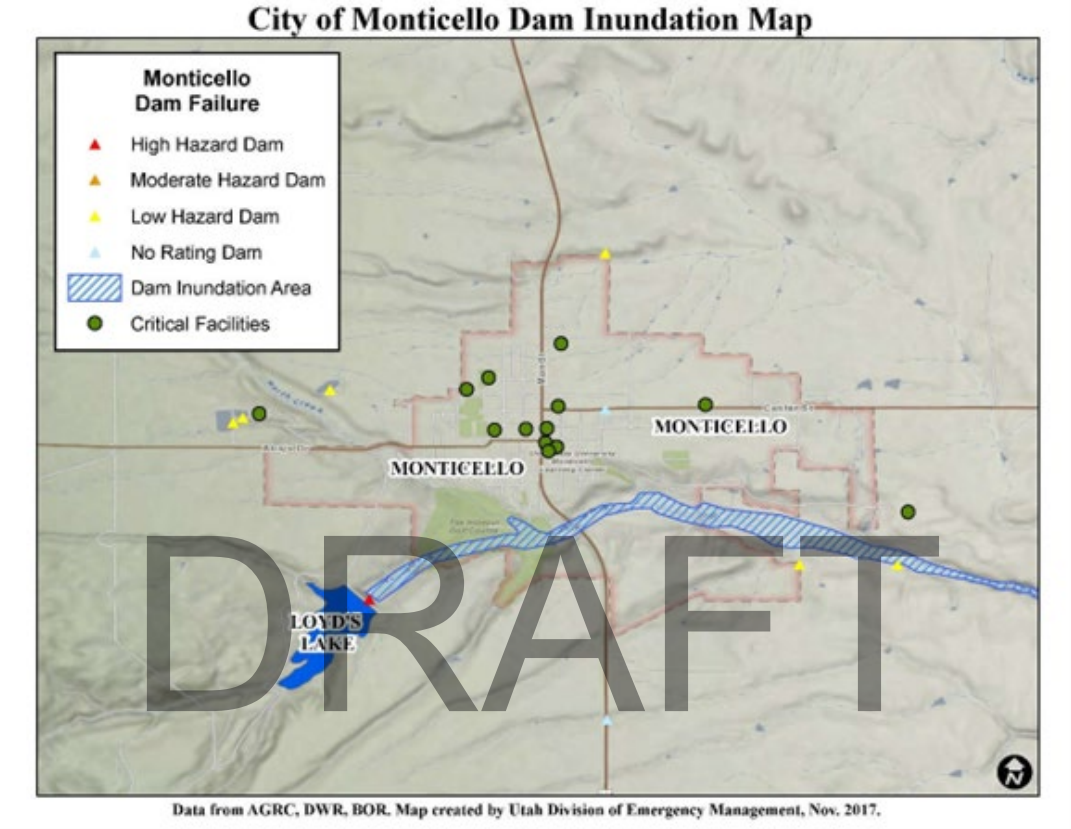


Figure . City of Monticello Dam Inundation Map

square mile drainage basin area. The first downstream community is Blanding, which is three miles away. The inundation area for the reservoirs and lakes above Blanding is depicted in the map below along with Blanding's critical facilities.

Recapture Creek has a high hazard dam rating. It is owned by San Juan Water Conservancy and was completed in 1984. The reservoir storage at spillway crest is 9,319 acre-feet, and the reservoir storage at dam crest is 16,000 acre-feet. The spillway type is open channel, and the maximum dam breach flow

would be 220,000 cfs with a 61 square mile drainage basin area. Recapture Creek does not have a downstream community; the dam water would flow into the San Juan River.

Historical Frequency & Probability of Future Occurrence

Presently, there is no historical record of dam failure in San Juan County. However, dam failure could

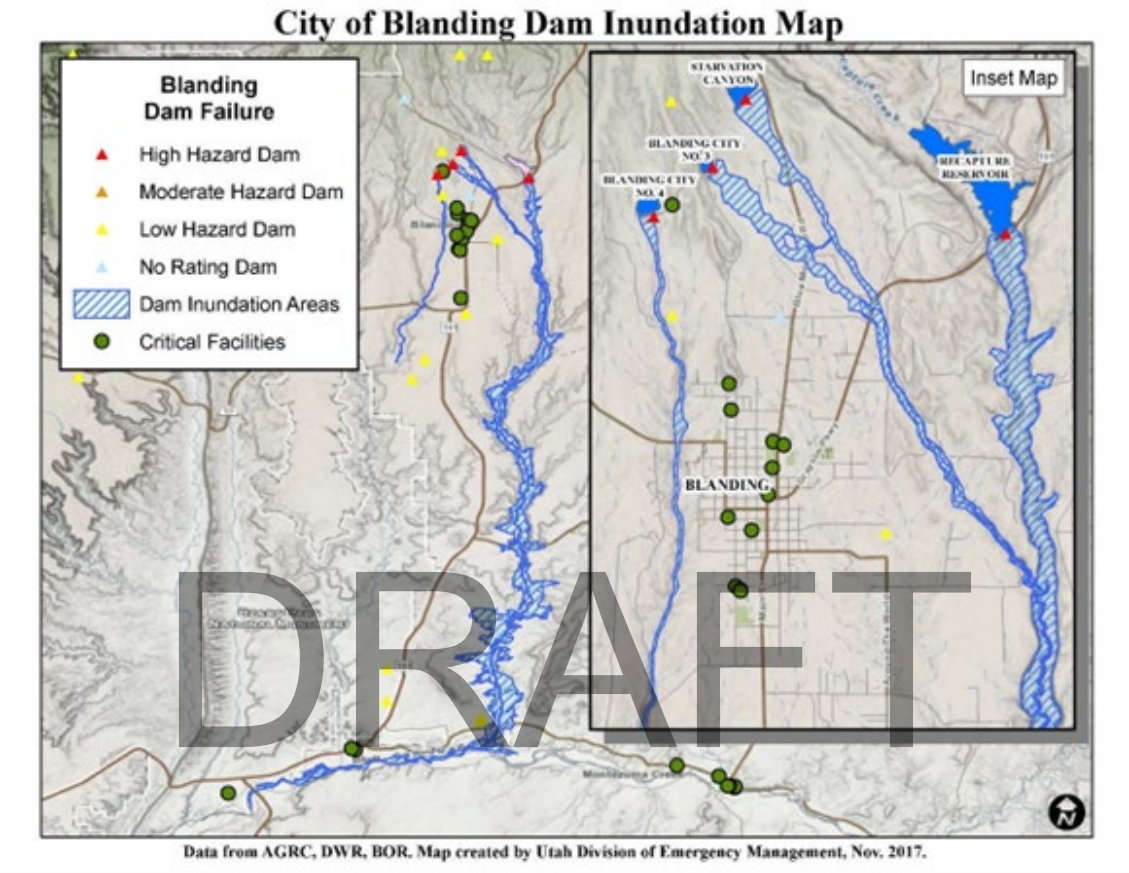


Figure . City of Blanding Dam Inundation Map

occur at any time without warning, so it's imperative to continue monitoring each dam in the county, especially those with high or moderate hazard ratings.

Impacts & Loss Estimates

The severity of a dam failure depends on the area surrounding the dam or levee, the volume and velocity of water that breaches the structure, and the structures and population in the area. A dam failure will result in flooding of normally protected areas, resulting in impacts similar to those seen that are within the normal floodplain.

The 2019 Utah State Hazard Mitigation Plan compiled the total potential dam inundation area for each county in Utah. For San Juan County, 18.74 square miles (out of 7,929.93 total square miles in the county) could potentially be affected by one or more dam failures. This is a percentage of 0.24%. The cities of Blanding and Monticello have the most potential for significant loss of life and/or property. The map below marks the high and significant hazard dams in the county with a one-mile buffer shown around each one. Many of the critical facilities in the county are indicated on the map, as well.

Figure 8-9. San Juan County Dam Impact Scenario

CHAPTER 9 DROUGHT

9.1 HAZARD DESCRIPTION

Potential Probability		Low
		Medium
	X	High
Potential Consequence		Low
	X	Medium
		High
Location	Countywide	
Seasonal Pattern or Conditions	Generally summer and early fall	
Duration	Drought events may last one month to several months to years	
Analysis Used	National Integrated Drought Information System, Utah State University Climate Information, National Drought Mitigation Center, 2019 Utah Hazard Mitigation Plan, NOAA, NWS, Utah Division of Water Resources, EWG	

Drought is an expected phase in the climactic cycle of almost any geographical region. Objective, quantitative definitions for drought exist but most authorities agree that, because of the many factors contributing to it and because its onset and relief are slow and indistinct, none is entirely satisfactory. According to the National Drought Mitigation Center, drought "originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector" (NDMC, 2022a). What is clear is that a condition perceived as "drought" in a given location is the result of a significant decrease in water supply relative to what is "normal" in that area.

It should be noted that water supply is not only controlled by precipitation (amount, frequency, and intensity) but also by other factors, including evaporation (which is increased by higher-than-normal heat and winds), transpiration, temperature, soil moisture, and human use.

Utah specifically is a dry landscape and is among one of the driest states in the country, receiving on average approximately 13 inches of precipitation per year (Utah Hazard Mitigation Plan, 2019). San Juan County is one of the driest counties in the state, as well.

9.2 LOCATION

San Juan County is subject to drought events due to its location on the high desert in Southeastern Utah. The drought events affect the county, incorporated cities and town, and the unincorporated communities.

9.3 EXTENT

The following figure displays the precipitation conditions for the United States using the Palmer Drought Severity Index, which is taken from the National Weather Service (NWS). The Palmer Drought Severity Index (PDSI) is a means of quantifying drought in terms of the prolonged and abnormal moisture deficiency or excess. This index indicates general conditions and not local variations caused by isolated rain. The PDSI is an important climatological tool for evaluating the scope, severity, and frequency of

prolonged periods of abnormally dry or wet weather. It can be used to help delineate disaster areas and indicate the availability of irrigation water supplies, reservoir levels, range conditions, amount of stock water, and potential intensity of forest fires (NWS, 2022e).

The PDSI expresses this comparison of moisture deficiency and moisture excess on a numerical scale that usually ranges from positive five to negative five. Positive values reflect excess moisture supplies, while negative values indicate moisture demands in excess of supplies.

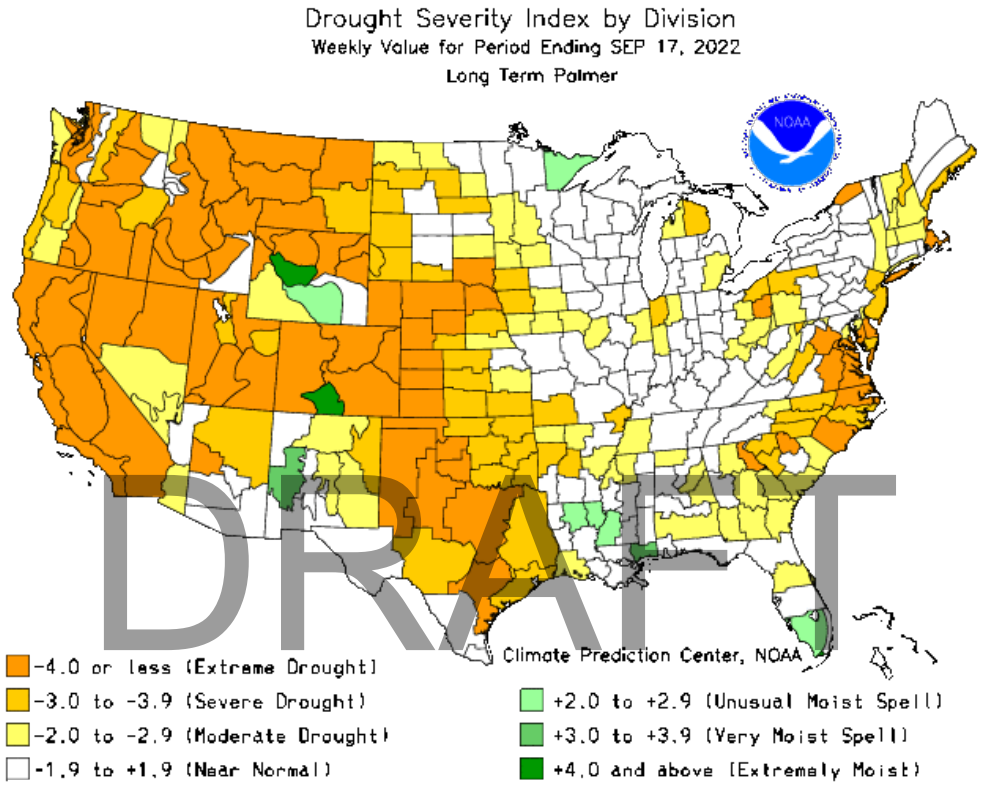


Figure 9-1. U.S. Drought Severity Index

The National Drought Mitigation Center also rates drought throughout the nation by intensity using a D0 (Abnormally Dry) to D4 (Exceptional Drought) scale, as seen in the map of Utah below. The majority of San Juan County is currently experiencing severe drought (NDMC, 2022b).

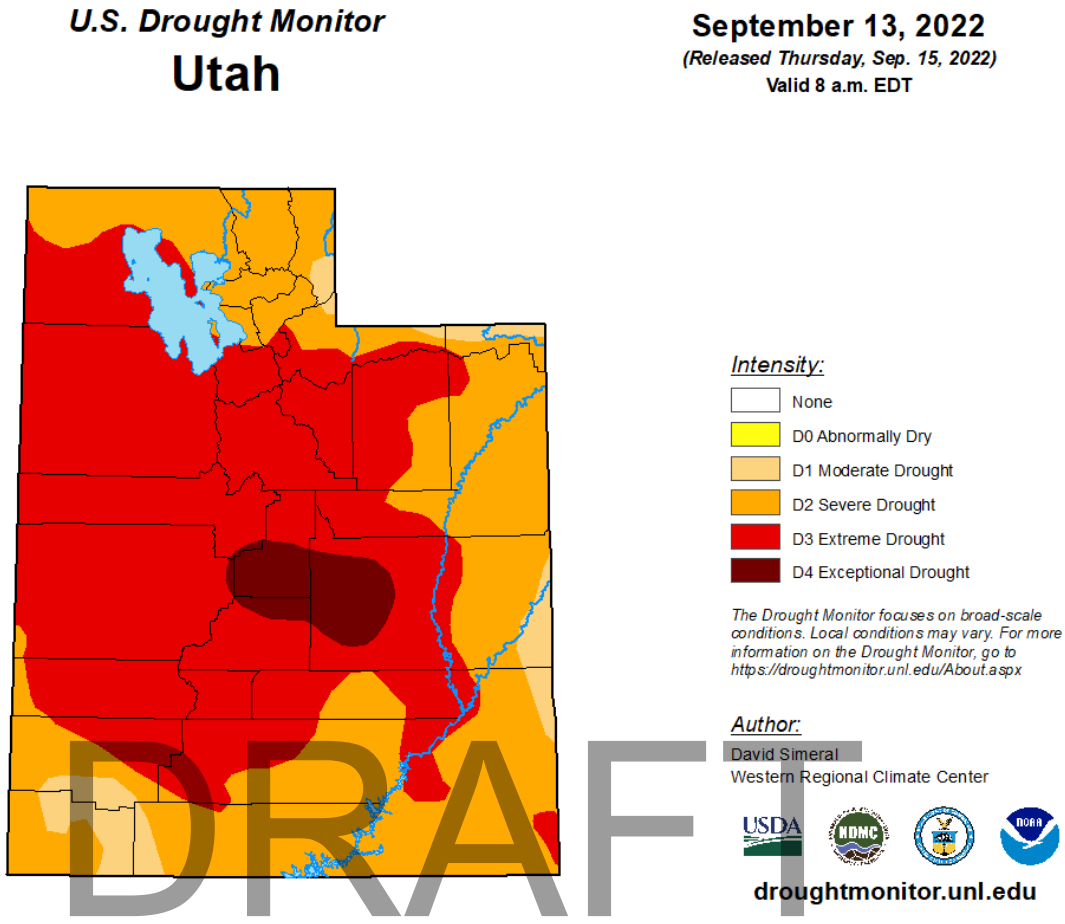


Figure 9-2. U.S. Drought Monitor Utah

9.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

Droughts are common occurrences in San Juan County. There have been several multi-year droughts in Utah since 1898, which are listed below (Utah Hazard Mitigation Plan, 2019). Utah has been in a prolonged drought since 1987.

- 1898–1905
- 1933–1943
- 1950–1966
- 1971–1977
- 1987–present

Most recently, the governor of Utah made a drought declaration for the entire state on April 21, 2022. As of September 13, 2022, 32 of Utah's largest 42 reservoirs are below 55% of capacity (Utah Water Resources, 2022). San Juan County has historically experienced prolonged drought events. The county has been in a drought every year since 2002 except the years 2016 and 2017 (Storm Events Database, 2022). The county is currently in a state of severe drought, with some parts of the county in extreme drought (NDMC, 2022b).

9.5 IMPACTS & LOSS ESTIMATES

Drought is agriculture's most expensive, frequent, and widespread form of natural disaster. Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services.

Impacts are commonly referred to as direct or indirect. Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of direct impacts. The consequences of these impacts illustrate indirect impacts. For example, a reduction in crop, rangeland, and forest productivity may result in reduced income for farmers and agribusiness, increased prices for food and timber, unemployment, reduced tax revenues because of reduced expenditures, increased crime, foreclosures on bank loans to farmers and businesses, migration, and disaster relief programs. The impacts of drought can be categorized as economic, environmental, or social.

Many economic impacts occur in agricultural and related sectors because of the reliance of these sectors on surface and subsurface water supplies. In the years 1995–2020, $7,356,792 was paid out to farmers in the form of crop indemnities in San Juan County due to loss of crops from drought (EWG, 2022). In addition to obvious losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. In fact, the EWG reported $709,183 in total indemnities in the county for crops lost to wind, heat, insects, and plant disease (1995–2020). Droughts also bring increased problems with insects and diseases to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk.

Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Reduced income for farmers has a ripple effect. Retailers and others who provide goods and services to farmers face reduced business. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls, and loss of tax revenue for local, state, and federal government. Less discretionary income affects the recreation and tourism industries. Prices for food, energy, and other products increase as supplies are reduced. In some cases, local shortages of certain goods result in the need to import these goods from outside the stricken region.

Effects of Climate Change on Probability of Future Events and Severity of Impacts

Table 9-1. Climate Projections for San Juan County, UT | Neighborhoods at Risk 2023

Heat Projections	By 2048, San Juan County is expected to experience 17 more days that reach above 95°F (from 38 days to 55 days per year).
	By 2048, San Juan County is expected to have a 2°F increase (from 55°F to 57°F) in average annual temperatures.
	Increasing annual temperatures can contribute to droughts.
Source: Neighborhoods at Risk, 2023	

Table 9-2. Drought: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	9.75	Relatively Moderate
942000	Unincorporated San Juan County	4.79	Relatively Low

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
978200	City of Blanding and Town of Bluff	5.86	Relatively Low
978100	City of Monticello	6.04	Relatively Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

9.6 FEMA NRI SCORE

Table 9-3. Drought: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	19.48	Relatively High
942000	Unincorporated San Juan County	9.12	Relatively Moderate
978200	City of Blanding and Town of Bluff	7.00	Relatively Low
978100	City of Monticello	6.70	Relatively Low
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

CHAPTER 10 EARTHQUAKE

10.1 HAZARD DESCRIPTION

Potential Probability		Low
	X	Medium
		High
Potential Consequence		Low
	X	Medium
		High
Location	Countywide, refer to earthquake quaternary faults map	
Seasonal Pattern or Conditions	Can occur at any time	
Duration	Event duration is short, but the recovery may be long term	
Analysis Used	USGS reports, DEM Hazus analysis, GIS data	

The U.S. Geological Survey (USGS) defines earthquake as "ground shaking caused by the sudden release of accumulated strain by an abrupt shift of rock along a fracture in the Earth or by volcanic or magmatic activity, or other sudden stress changes in the Earth." The hazards associated with earthquake are essentially secondary to ground shaking (also called seismic waves), which may cause buildings to collapse; displacement or cracking of the earth's surface; flooding as a result of damage to dams; and fires from ruptured gas lines, downed power lines, and other sources. Earthquakes cause both vertical and horizontal ground shaking, which varies both in amplitude (the amount of displacement of the seismic waves) and frequency (the number of seismic waves per unit time), usually lasting less than thirty seconds.

10.2 LOCATION

This hazard may affect every community in San Juan County.

10.3 EXTENT

Earthquakes are measured both in terms of their inherent "magnitude" and in terms of their local "intensity."

The magnitude of an earthquake is essentially a relative estimate of the total amount of seismic energy released and may be expressed using the familiar "Richter scale" or using the "moment magnitude scale" now favored by most technical authorities. On either scale, significant damage can be expected from earthquakes with a magnitude of about 5.0 or higher. What determines the amount of damage that might occur in any given location, however, is not the magnitude of the earthquake but the intensity at that particular place. Earthquake intensity decreases with distance from the earthquake's "epicenter" (its focal point) but also depends on local geological features, such as depth of sediment and bedrock layers.

Intensity is most commonly expressed using the "Modified Mercalli Intensity Scale" (MMI). Mercalli intensity is assigned based on eyewitness accounts. More quantitatively, intensity may be measured in terms of "peak ground acceleration" (PGA) expressed relative to the acceleration of gravity (g) and determined by seismographic instruments. The figure below displays the ground acceleration during seismic events in San Juan County.

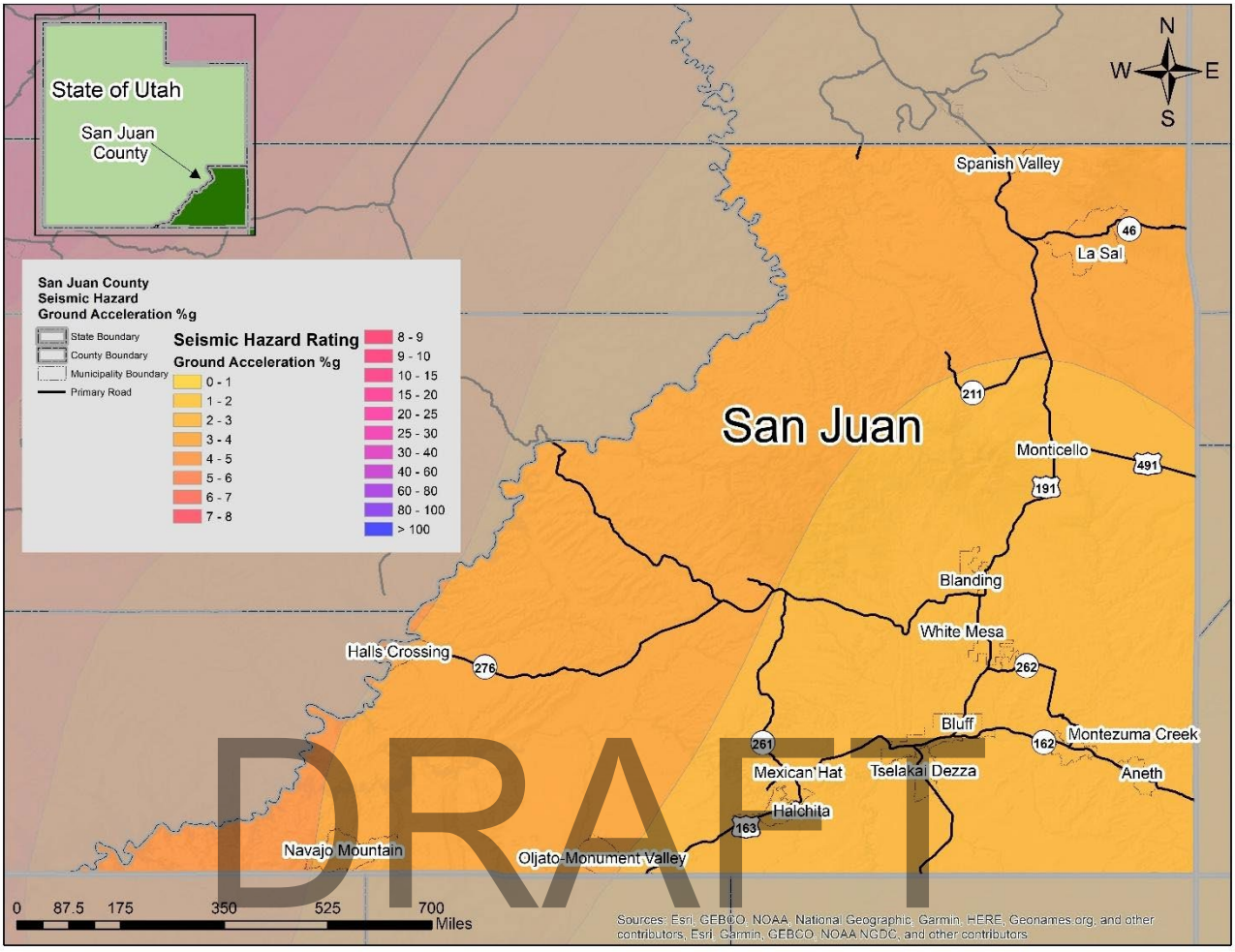


Figure 10-1. San Juan County Seismic Hazard Ground Acceleration

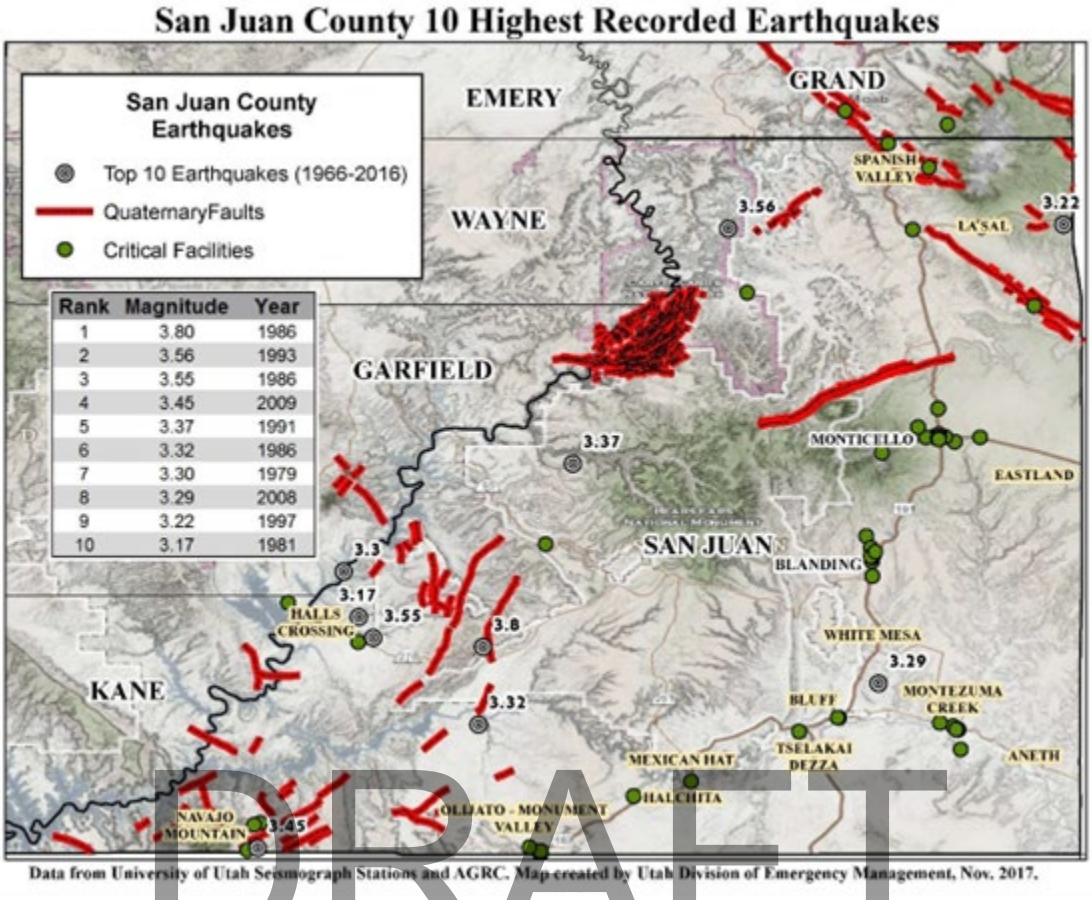
While Mercalli and PGA intensities are arrived at differently, they correlate reasonably well. While the locations most susceptible to earthquakes are known, there is little ability to predict an earthquake in the short term.

The following table correlates the MMI intensity with the Richter scale and effects of ground shaking:

Category	Effects	Richter Scale (approximate)
I. Instrumental	Not felt	1-2
II. Just perceptible	Felt by only a few people, especially on upper floors of tall buildings	3
III. Slight	Felt by people lying down, seated on a hard surface, or in the upper stories of tall buildings	3.5
IV. Perceptible	Felt indoors by many, by few outside; dishes and windows rattle	4
V. Rather strong	Generally felt by everyone; sleeping people may be awakened	4.5
VI. Strong	Trees sway, chandeliers swing, bells ring, some damage from falling objects	5
VII. Very strong	General alarm; walls and plaster crack	5.5
VIII. Destructive	Felt in moving vehicles; chimneys collapse; poorly constructed buildings seriously damaged	6
IX. Ruinous	Some houses collapse; pipes break	6.5
X. Disastrous	Obvious ground cracks; railroad tracks bent; some landslides on steep hillsides	7
XI. Very disastrous	Few buildings survive; bridges damaged or destroyed; all services interrupted (electrical, water, sewage, railroad); severe landslides	7.5
XII. Catastrophic	Total destruction; objects thrown into the air; river courses and topography altered	8

10.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

San Juan County experiences relatively few earthquakes, with most earthquakes in San Juan County occurring in unpopulated and remote areas. The map below illustrates the location of known earthquake quaternary fault lines in San Juan County, as well as the top 10 highest recorded earthquakes from 1966–2016.



The USGS keeps a record of earthquakes throughout the world in their Earthquake Catalog. The following table lists all earthquakes felt in San Juan County since 1980 with a magnitude of 3.5 or higher.

Table 10-1. Felt Earthquakes with Magnitude 3.5+ in San Juan County

Date	Location	Magnitude	MMI Rating (as felt in San Juan County)
11/07/1986	36 km E of Halls Crossing, UT	3.9	N/A
10/14/1993	36 km SW of Spanish Valley, UT	3.6	N/A
06/03/1999	Bedrock, CO	3.7	N/A
07/06/1999	27 km WNW of Naturita, CO	3.7	N/A
05/27/2000	29 km WNW of Naturita, CO	4.4	N/A
11/07/2004	30 km W of Naturita, CO	4.1	N/A
06/06/2008	Bluff, UT	3.6	IV
01/24/2013	Paradox, CO	3.9	III
03/01/2016	34 km N of Halls Crossing, UT	3.8	II
04/22/2017	Bluff, UT	3.7	IV
03/04/2019	Paradox, CO	4.5	II–III

Date	Location	Magnitude	MMI Rating (as felt in San Juan County)
11/08/2020	Bedrock, CO	3.8	II
12/08/2020	Bedrock, CO	3.7	II
12/20/2020	Bedrock, CO	4.3	III
Source: USGS, 2022			

The following map shows the location and magnitude range of past earthquakes in San Juan County.

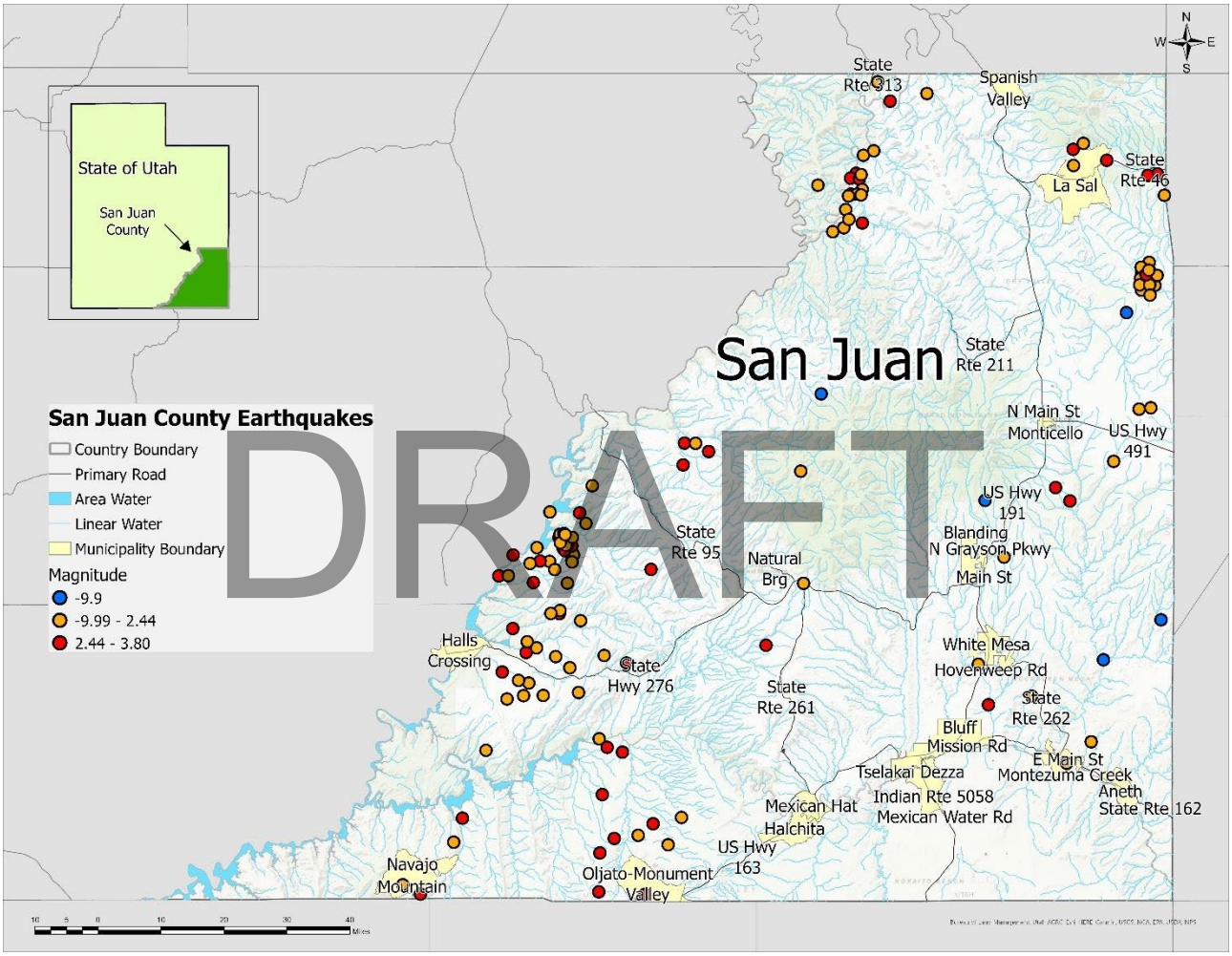


Figure 10-4. San Juan County Earthquakes

10.5 IMPACTS & LOSS ESTIMATES

Earthquakes are capable of catastrophic consequences, especially in urban areas. Worldwide, earthquakes have been known to cost thousands of lives and enormous economic and social losses. In minor earthquakes, damage may be done only to household goods, merchandise, and other building contents, and people are occasionally injured or killed by falling objects. More violent earthquakes may cause the full or partial collapse of buildings, bridges and overpasses, and other structures. Fires due to broken gas lines, downed power lines, and other sources are common following an earthquake and often account for much of the damage. Economic losses arise from destruction of structures and infrastructure, interruption

of business activity, and innumerable other sources. Utilities may be lost for long periods of time and all modes of transportation may be disrupted. Emergency Services, including medical, may be both disabled and overwhelmed. In addition to broken gas lines, other hazardous materials may be released.

Table 10-2. Earthquake: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	6.76	Very Low
942000	Unincorporated San Juan County	4.91	Very Low
978200	City of Blanding and Town of Bluff	10.24	Relatively Low
978100	City of Monticello	7.62	Relatively Low
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

The figure below shows the critical facilities in San Juan County that may be affected by ground acceleration during seismic events.

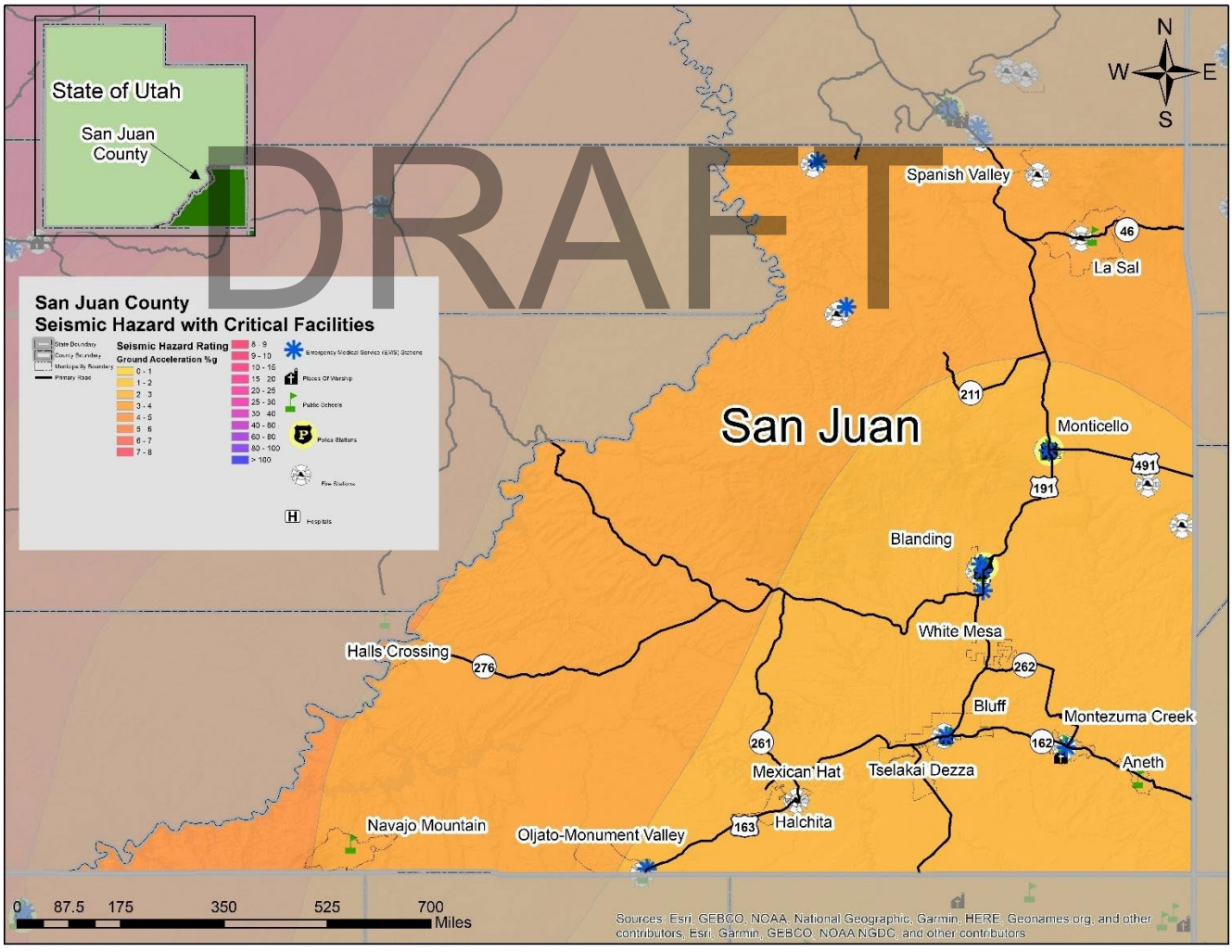


Figure 10-5. San Juan County Seismic Hazard with Critical Facilities

10.6 FEMA NRI SCORE

Table 10-3. Earthquake: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	15.22	Relatively Low
942000	Unincorporated San Juan County	10.51	Relatively Low
978200	City of Blanding and Town of Bluff	13.78	Relatively Low
978100	City of Monticello	9.52	Relatively Low
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

CHAPTER 11 INFESTATION

11.1 HAZARD DESCRIPTION

Potential Probability		Low
		Medium
	X	High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide agricultural lands, forested areas, areas of extreme drought	
Seasonal Pattern or Conditions	Summer, drought related	
Duration	Events may last months to years	
Analysis Used	UGS, DEM, AGRC, Utah Division of Forestry, Fire, & State Lands, USDA, Utah Forest Service, Utah State University Extension Service, local input, UMN, EWG	

San Juan County continues to experience an infestation problem of insects, disease, and noxious weeds. The unhealthy forests are conducive to insect and disease issues.

Several factors contribute to the decline in forest health, including lack of active management, poor grazing patterns, fire exclusion, and invasive/noxious weeds.

Cutworms have also been a problem within the cities and communities of San Juan County. Cutworms are moth larvae that come out at night to feed and attack the first part of the plant it encounters, such as the stem. They curl their bodies around the stem and feed on it. They are general feeders and will attack a large range of plants. Their feedings cause the plant to be cut off at just above the soil surface, hence their name. Cutworms can cause significant damage when their numbers are high, and they generally cause the most damage during spring and early summer when plants are small and slim (UMN, 2023). This type of infestation has a direct correlation to drought and is one of the secondary threats of drought. San Juan County is located within Climate Division 7. This division experiences a drought almost every two years. Each drought can last five or more years.

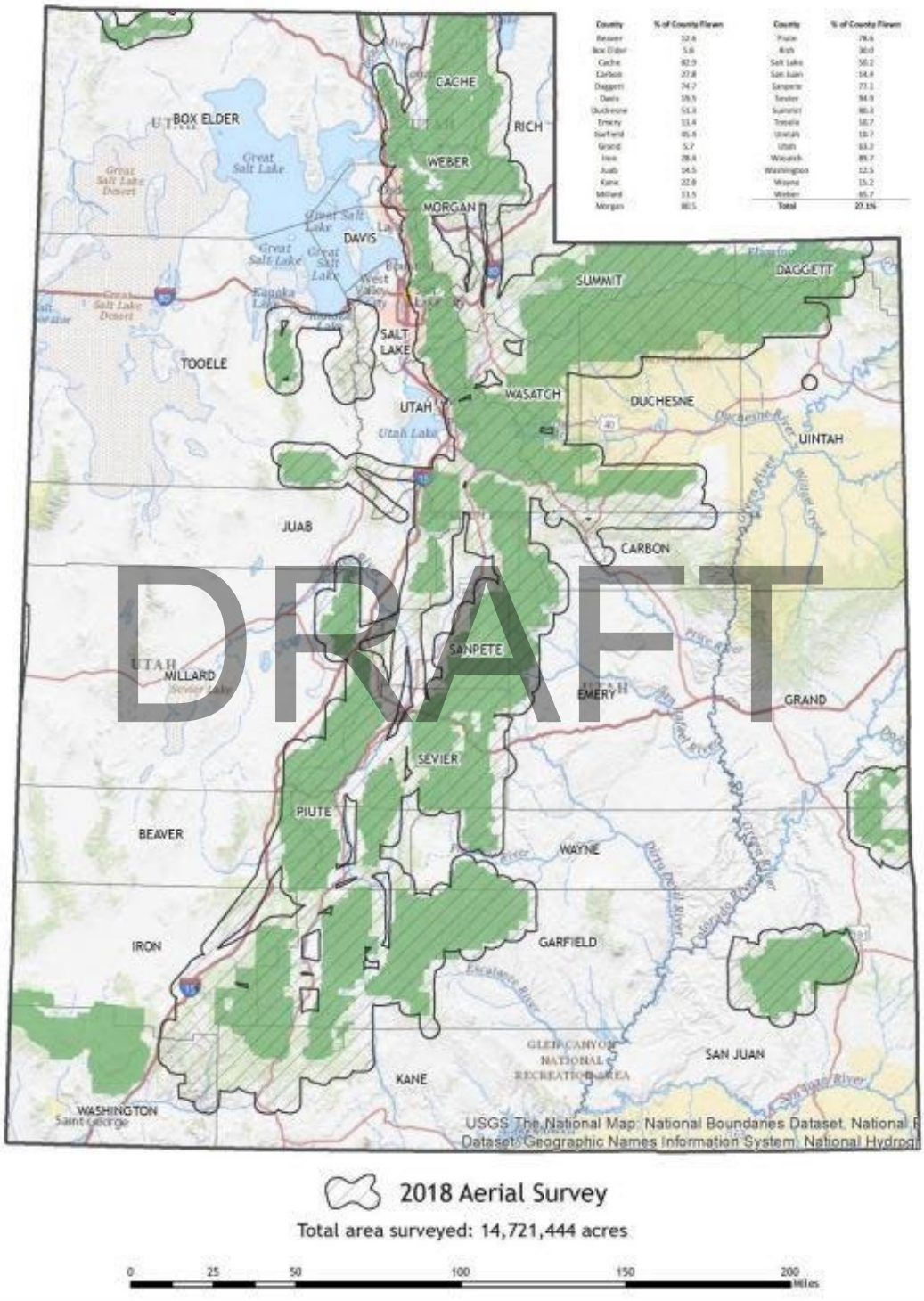
Three other prominent insect species that damage trees in San Juan County are the Douglas-fir beetle, piñon engraver beetle, and the Western Pine beetle (Utah Conditions Report, 2019).

Adequate precipitation and growing space are necessary to maintain tree vigor, thereby increasing tree resistance to insects and disease. The drought conditions persistent in San Juan County continue to place more stress on the forests already in poor health. The following insect and disease issues may not be the cause of poor forest health but a result of it (Utah Conditions Report, 2019).

11.2 LOCATION

The Forest Health Protection (FHP) offices of the USDA Forest Service conduct aerial detection surveys (ADS) each year to record and analyze the impacts of insects, diseases, and other disturbances on various tree species in every county in Utah. In 2018, 14.4% or 728,587 acres of San Juan County was flown and surveyed, as seen in the map below (Utah Conditions Report, 2019).

Surveyed Areas for the 2018 Aerial Insect and Disease Detection Survey



11.3 EXTENT

The USDA Forest Service, Forest Health Protection (FHP) offices conduct aerial detection surveys each year, as seen in the map above, and collect data that is used to describe mortality trends in the state from year to year. Mortality trends are described in terms of acres affected, although not all trees on these acres are dead. Additionally, not all forested lands are surveyed each year, and not all the same acres are surveyed (Utah Conditions Report, 2019).

The FHP quantifies the data by the percent of trees affected in large areas with insect and disease damage. Small areas are still recorded as points. The figure below shows the five-level classification system used to describe damage levels. Damage is recorded as a point, polygon, or grid cell feature, and one causal agent is assigned to each feature. Depending on the feature type, the intensity of the damage is recorded differently. For point data, trees affected are classified into one of the five levels that correspond to the number of trees killed associated with each point. For a polygon or grid cell data, the percentage of trees affected within each polygon or grid cell is classified into one of the five levels for each polygon or grid cell associated with all trees within the polygon or grid cell data as estimated by the observer (Utah Conditions Report, 2019).

Point Class	Trees Affected		Polygon or Grid Cell Class	Percent Trees Affected
1	1		1	1 to 3%
2	2 to 5		2	4 to 10%
3	6 to 15		3	11 to 20%
4	16 to 30		4	21 to 50%
5	>30		5	>50%

Figure 11-2. FHP Data Classification

Noxious weeds are also a continuing problem in San Juan County. The Utah Department of Agriculture and Food includes 54 weeds on the noxious weed list. These weeds are also classified using the five-category system below.

1A= Not known to exist in Utah. Significant risk of invasion.
1B= Limited distribution in Utah. EDRR (Former A Class)
2= Widely distributed in Utah, considered controllable (Former B Class)
3= Widely distributed in Utah, considered beyond control, control expansion (Former C Class)
4= Present in Utah. Prevent distribution through Seed law

11.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

San Juan County is affected by bark beetles and defoliators, as well as other natural agents, that break down and damage the county's forestlands. The two tables below show the acres affected by bark beetles and defoliators from 2015–2018 in San Juan County. As of December 2022, the most recent data is from 2018 from the USDA Forest Service.

Table 11-1. Bark Beetles in San Juan County Forestlands

	Mountain Pine Beetle	Western Pine Beetle	Douglas-fir Beetle	Spruce Beetle	Piñon Engraver	Fir Engraver Beetle	Subalpine Fir Mortality
2015							
# Acres Affected	--	--	304	29	5	388	898
2016							
# Acres Affected	8	98	362	10	75	46	69
2017							
# Acres Affected	--	130	202	53	14	--	117
2018							
# Acres Affected	--	19	1,256	--	26	61	19
Source: Utah Conditions Report, 2019							

Table 11-2. Defoliators in San Juan County Forestlands

	Western Spruce Budworm	Marssonina blight, Aspen	Aspen Decline	Aspen Dieback
2015				
# Acres Affected	1,728	--	1,109	--
2016				
# Acres Affected	7,685	45	481	42
2017				
# Acres Affected	5,110	824	--	784
2018				
# Acres Affected	1,623	--	--	7
Source: Utah Conditions Report, 2019				

Infestation will continue to be an issue in the future because of San Juan County's climate. The drought conditions, invasive weeds, insects, and species diversity are all affected by climate and will continue to be a limited problem for San Juan County's forestlands and communities.

11.5 IMPACTS & LOSS ESTIMATES

Insects and diseases play an important role in the function and nutrient cycling of forest ecosystems. In a healthy forest, endemic levels of insects and diseases remove weakened and stressed trees, thus thinning the forest and reducing competition for light, water, and nutrients. Dead trees provide habitat for a variety of wildlife species, such as perches for raptors and homes for cavity-nesting birds. The vigor of trees is an important factor in determining their susceptibility to attack by insects or diseases. Forests that are over-mature or over-dense often become susceptible to insect and disease outbreaks, creating considerable fuel and increasing the susceptibility of stands to fire (Utah FFSL, 2023). An increase in wildfires throughout the county due to the deteriorating health of forests causes considerable damage to property and negatively affects the county's economy.

Additionally, garden-dwelling pests, such as cutworms, can cause extensive crop damage in the county if left unchecked, resulting in large profit losses.

According to the Environmental Working Group (EWG), $146,530 in total crop indemnities were paid to farmers in San Juan County during the years 1995 to 2020 for crop loss due to insects. $4,197 has been paid during the same time period for losses due to plant disease (EWG, 2022).

CHAPTER 12 LANDSLIDE

12.1 HAZARD DESCRIPTION

Potential Probability		Low
	X	Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	SR 163, SR 95, SR 276; Monticello and Blanding	
Seasonal Pattern or Conditions	Runoff or heavy rain	
Duration	Events may last minutes to hours to months	
Analysis Used	San Juan County Emergency Manager, UDOT, NOAA, 2019 Utah Hazard Mitigation Plan	

The term "landslide" encompasses several types of occurrences (including mudslides) in which slope-forming materials, such as rock and soil, move downward under the influence of gravity. Such downward movement may occur as the result of an increase in the weight of slope-forming materials, an increase in the gradient (angle) of the slope, a decrease in the forces resisting downward motion (friction or material strength), or a combination of these factors. Factors that may trigger a landslide include weather-related events, such as heavy rainfall (one of the most common contributors), erosion, and freeze-thaw weakening of geologic structures; human causes, such as excavation and mining, deforestation, and vibration from explosions or other source; and geologic causes, such as earthquake and shearing or fissuring. The speed of descent ranges from sudden and rapid to an almost imperceptibly slow creep where effects are only observable over a period of months or years.

12.2 LOCATION

Spring run-off or heavy rain periods may cause expansion of soils, such as clay and large rock. This is mainly a problem on State Routes (SR) and is the responsibility of the Utah Department of Transportation (UDOT) to manage. However, routes that are affected can cause traffic and travel time delays. The landslide material affecting SR 276 mostly consists of clay and debris. This state road is located near Halls Crossing and used recreationally by those traveling to Lake Powell. Landslide hazard material on SR 95 and SR 163 consists of large rock and debris. SR 95 is a scenic by-way used primarily for recreational access between Hanksville, Blanding, and Halls Crossing, while SR 163 allows access from Bluff to Mexican Hat and supports residents in those communities. All three routes support traversing of emergency vehicles, tourism travel, and persons going to and from work.

12.3 EXTENT

Factors that influence landslides are soil type and steepness of slope. Soil type is a key indicator for landslide potential and is used by geologists and geotechnical engineers to determine soil stability for construction standards. Past movements are also a good indicator of where movements might possibly exist.

12.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

In 1986, a small landslide occurred in Monticello affecting the construction of a sewer line. An engineering study was conducted to determine how to mitigate the effects of the landslide.

Several small-scale rockslides and landslides occur annually in San Juan County, usually due to heavy rain and flash flooding. These rockslides are often classified as debris flows, in which moving water carries mud, rocks, and other debris over the affected areas. The following table from the NOAA Storm Events Database lists the debris flows that triggered rockslides/mudslides between 2010–2022 in the county.

Table 12-1. Rockslide/Mudslide Events in San Juan County (2010–2022)

Location Within County	Date	Description
Montezuma Creek	01/26/2013	Heavy rain caused rock and debris slides with boulders across Hwy 262
Blanding Municipal Airport	09/18/2013	Cold front and hail caused localized flooding and washed boulders onto Hwy 95
Grand County Airport	02/10/2015	Heavy rain and snow melt caused significant rockslide with large boulders, some the size of cars
Fry Canyon	07/14/2018	Heavy rain and thunderstorms caused 4 inches of mud and silt on Hwy 261, blocking the road

Source: NOAA Storm Events Database, 2010–2022

12.5 IMPACTS & LOSS ESTIMATES

Some of the many direct and indirect impacts of landslides are:

- Human and animal deaths and injuries and resulting productivity losses
- Damage or destruction of structures
- Destruction or blockage of roadways and resulting transportation interruption
- Loss of or reduced land usage
- Loss of industrial, agricultural, and forest productivity
- Reduced property values in areas threatened by landslide
- Loss of tourist revenues and recreational opportunities
- Damaged or destroyed infrastructure and utilities
- Damming or alteration of the course of streams and resulting flooding
- Reduced water quality

There is only limited information on the direct and indirect economic costs of geologic hazards in the U.S., such as landslides. However, it is estimated that landslides in the U.S. cause between $1.7 and $3.4 billion in damages each year (Utah Hazard Mitigation Plan, 2019).

Losses due to landslide events are generally tied to the repair of roadways or the removal of debris on roadways. These roads are maintained by UDOT. Limited course of mitigation may occur because it is

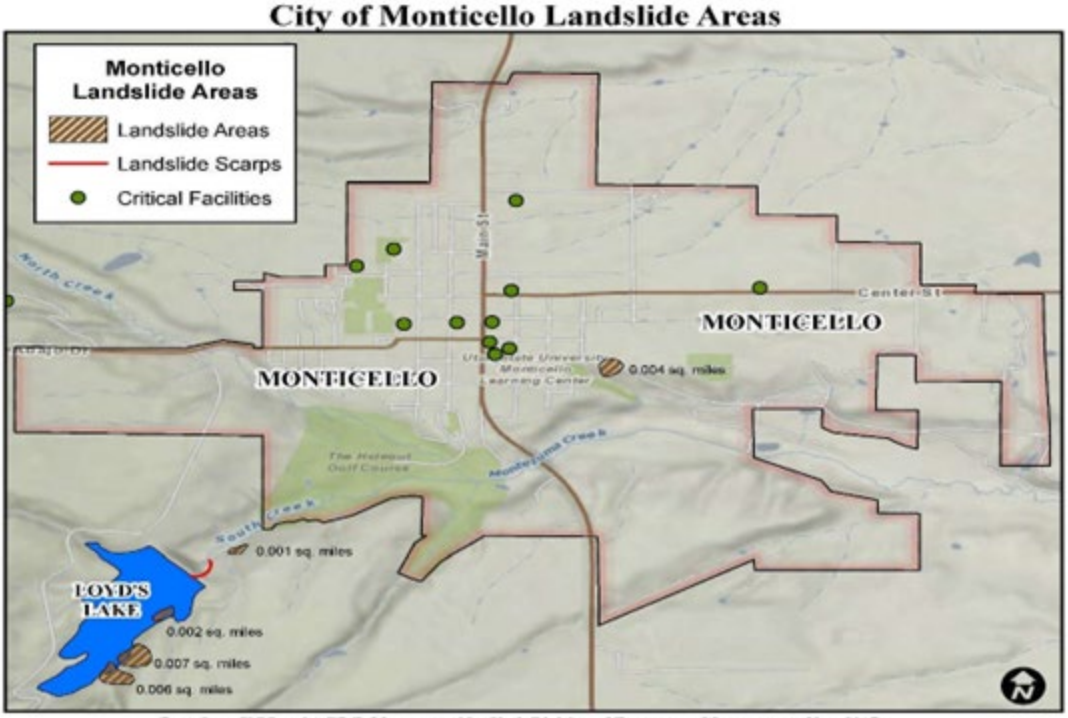
not economically feasible for UDOT to spend tax dollars to rebuild a new road route or remove the large facing walls of rock and soil.

Table 12-2. Landslide: Expected Annual Loss for San Juan County, UT | FEMA National Risk Index

Census Tract	Communities in Census Tract	Expected Annual Loss Score	Rating
942100	Unincorporated San Juan County	10.23	Relatively High
942000	Unincorporated San Juan County	12.17	Relatively High
978200	City of Blanding and Town of Bluff	22.46	Very High
978100	City of Monticello	11.26	Relatively High
Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio). Source: National Risk Index, 2023c; 2023d			

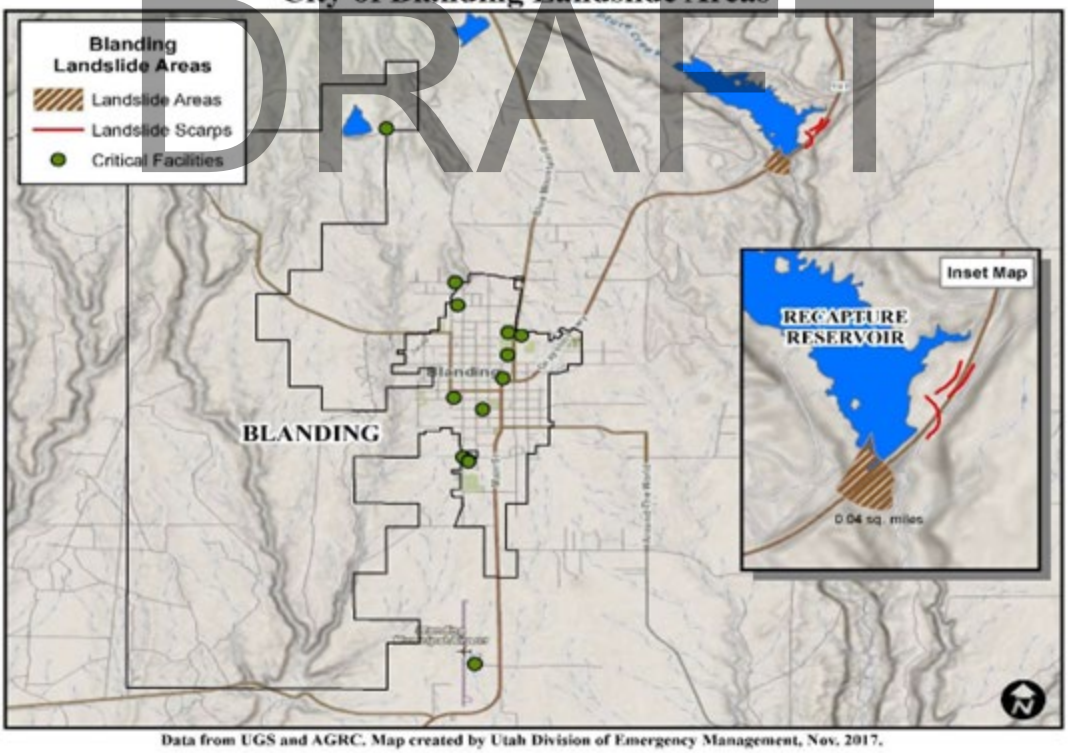
The following maps show the landslide areas and relevant critical facilities of Monticello, Blanding, and San Juan County as a whole.

City of Monticello Landslide Areas



Data from UGS and AGRC. Map created by Utah Division of Emergency Management, Nov. 2017.

City of Blanding Landslide Areas



Data from UGS and AGRC. Map created by Utah Division of Emergency Management, Nov. 2017.

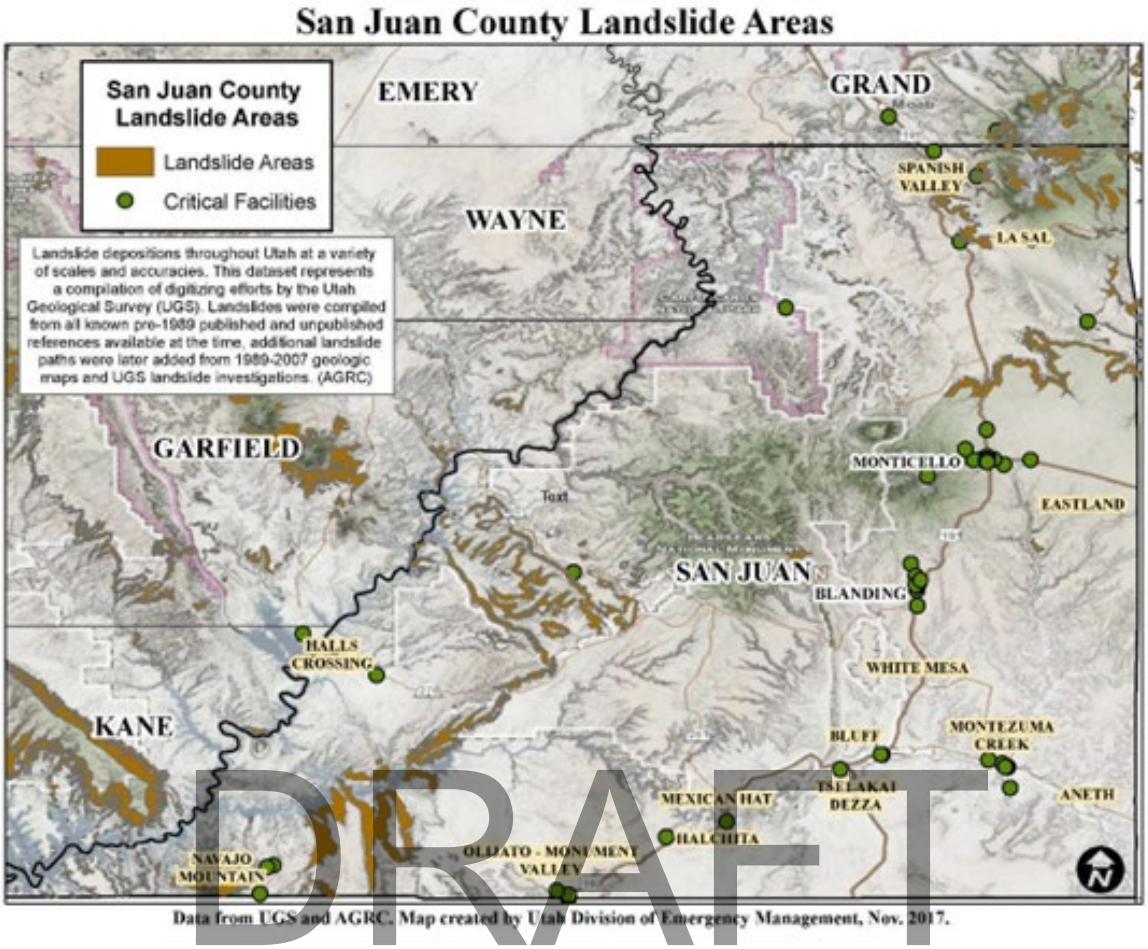


Figure 12-2. San Juan County Landslide Areas

12.6 FEMA NRI SCORE

Table 12-3. Landslide: Overall National Risk Index Score for San Juan County, UT

Census Tract	Communities in Census Tract	FEMA National Risk Index Score	Rating
942100	Unincorporated San Juan County	17.70	Relatively High
942000	Unincorporated San Juan County	20.05	Relatively High
978200	City of Blanding and Town of Bluff	23.24	Very High
978100	City of Monticello	10.82	Relatively High
Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index). Source: National Risk Index, 2023b; 2023d			

CHAPTER 13 PROBLEM SOILS

13.1 HAZARD DESCRIPTION

Potential Probability	X	Low
		Medium
		High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide, specifically around transportation corridors	
Seasonal Pattern or Conditions	Year-round event	
Duration	Ongoing variable	
Analysis Used	San Juan County Emergency Management, 2019 Utah Hazard Mitigation Plan, Utah Geologic Survey	

Problem soils, such as expansive, compressible, and collapsible soils, can cause extensive damage to structures and foundations. Land subsidence, earth fissures, and radon gas are a few of the effects of problem soils and rock. Problem soils also prevent or limit successful crop production because the land is not fertile or productive, and there is a possibility of erosion hazard when cultivated.

13.2 LOCATION

Soils made of heavy clay can be found from the White Mesa community located south and east of the county to the Arizona border. When the moisture content in the area increases, roads tend to buckle, thus affecting local transportation corridors. Alkali soils are also an agent in these areas. The responsibility to fix or mitigate these problems with the roadways lies with the county for county roads and Utah Department of Transportation for State Routes.

The Utah Geological Survey has mapped the Halls Crossing and Glen Canyon areas of San Juan County for problem soil hazards. They have also mapped the Lake Powell area in the lower left corner of the county. Common problem soil and rock hazards in these areas include collapsible soils, highly corrosive rock, low to moderately susceptible soil and rock, and geologically young sand deposits (UGS, 2022b).

13.3 EXTENT

Collapsible soil susceptibility is measured by the Utah Geologic Survey and divided into six categories, as seen below:

- Highly Collapsible Soils
- Collapsible Soil 1
- Collapsible Soil 2
- Collapsible Soil 3
- Collapsible Soil 4
- Bedrock

Corrosive soil and rock susceptibility is measured and divided into five categories:

- Highly Corrosive Rock
- Moderately Corrosive Rock
- Highly Corrosive Soil
- Moderately Corrosive Soil
- Concealed Corrosive Soil

Expansive soil and rock susceptibility is measured and divided into eight categories:

- Highly Susceptible Soil
- Highly Susceptible Rock
- Moderately Susceptible Soil
- Moderately Susceptible Rock
- Low Susceptibility Soil
- Low Susceptibility Rock
- Concealed
- Area Unlikely to Contain Expansive Soil or Rock

13.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

Sinkholes have recently become a subject of concern. Montezuma Canyon Road (County Road B146) had a very large sinkhole occurrence where it was too costly to provide fill dirt; therefore, the road was moved to accommodate vehicle travel. Some residential orchard property and buildings have also been affected by smaller sinkholes.

13.5 IMPACTS & LOSS ESTIMATES

In addition to damage to structures and foundations, problem soils may also damage pavements after construction, resulting in high maintenance and replacement costs, along with increased legal and financial liability from pavement separation and gaps causing possible trip hazards. Future maintenance may disrupt business activities, resulting in increased costs or loss of revenue. While problem soils have caused significant infrastructure damage and economic impact, there have been no deaths recorded in Utah due to problem soils directly (Utah Hazard Mitigation Plan, 2019).

Due to the nature of problem soils, since it rests upon moisture content and geologic makeup throughout the county, it is difficult to mitigate. Transportation corridors have existed for decades throughout the county, and road structures were made during times when soil analysis was not utilized as it is today. When it is economically and environmentally feasible, roads may be relocated to accommodate vehicle travel. However, where building construction is an issue, building codes are followed to ensure lives and lands are protected.

Further studies and data will need to be explored to evolve the mitigation efforts and responses to avoid building and continuous repairing of problems caused by problem soils, including the sinkhole phenomenon.

CHAPTER 14 HAZARDOUS MATERIAL INCIDENT

14.1 HAZARD DESCRIPTION

Potential Probability		Low
		Medium
	X	High
Potential Consequence	X	Low
		Medium
		High
Location	Countywide, especially along highways	
Seasonal Pattern or Conditions	Can occur at any time	
Duration	Event duration is typically short, but may take several days to weeks to clean up releases	
Analysis Used	PHMSA, National Response Center, EPA, U.S. DOT, NFPA	

Substances that, because of their chemical or physical characteristics, are hazardous to humans and living organisms, property, and the environment are regulated by the U.S. Environmental Protection Agency (EPA) and, when transported in commerce, by the U.S. Department of Transportation (DOT). EPA regulations address "hazardous substances" and "extremely hazardous substances."

The EPA chooses to specifically list hazardous substances and extremely hazardous substances rather than providing objective definitions. Hazardous substances, as listed, are generally materials that, if released into the environment, tend to persist for long periods and pose long-term health hazards for living organisms. They are primarily chronic rather than acute health hazards.

Regulations require that spills of these materials into the environment in amounts at or above their individual "reportable quantities" must be reported to the EPA. Extremely hazardous substances, on the other hand, while also generally toxic materials, are acute health hazards that, when released, are immediately dangerous to the life of humans and animals and can cause serious damage to the environment. There are currently 355 specifically listed extremely hazardous substances listed along with their individual threshold planning quantities (TPQ) (eCFR, 2022).

When facilities have these materials in quantities at or above the TPQ, they must submit "Tier II" information to appropriate state and/or local agencies to facilitate emergency planning.

DOT regulations provide the following definition for the term "hazardous material": A hazardous material is "a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce" and has been designated as hazardous under section 5103 of federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of the same chapter (U.S. Compliance, 2020).

When a substance meets the DOT definition of a hazardous material, it must be transported under safety regulations providing for appropriate packaging, communication of hazards, and proper shipping controls.

In addition to EPA and DOT regulations, the National Fire Protection Association (NFPA) develops codes and standards for the safe storage and use of hazardous materials. These codes and standards are generally adopted locally and include the use of the NFPA 704 standard for communication of chemical hazards in terms of health, fire, instability (previously called "reactivity"), and other special hazards (such as water reactivity and oxidizer characteristics).

While somewhat differently defined by the above organizations, the term "hazardous material" may be generally understood to encompass substances that have the capability to harm humans and other living organisms, property, and/or the environment. There is also no universally-accepted, objective definition of the term "hazardous material event." A useful working definition, however, might be framed as "any actual or threatened uncontrolled release of a hazardous material, its hazardous reaction products, or the energy released by its reactions that poses a significant risk to human life and health, property, and/or the environment."

14.2 LOCATION

Hazardous materials are widely used, stored, and transported; a hazardous material release incident could take place almost anywhere. Moreover, many hazardous materials are used, stored, and transported in very large quantities, so the impacts of a release incident may be widespread and powerful. Hazardous material incidents usually occur on major highways and railways.

14.3 EXTENT

Diamond-shaped NFPA 704 signs ranking the health, fire, and instability hazards on a numerical scale from zero (least) to four (greatest) along with any special hazards are usually required to be posted on chemical storage buildings, tanks, and other facilities. Similar NFPA 704 labels may also be required on individual containers stored and/or used inside facilities.

14.4 HISTORICAL FREQUENCY & PROBABILITY OF FUTURE OCCURRENCE

There have been several releases of hazardous materials in San Juan County. Most releases are due to packages that contain hazardous substances leaking or becoming damaged in transit, which are usually controlled and cleaned up quickly. However, the county has also had several releases into the San Juan River. The following table shows hazardous material incidents that have occurred in San Juan County since 2017.

Table 14-1. Hazardous Materials Incidents

Date	Location	Mode of Release	Hazardous Material	Quantity Released	Description
01/12/2017	Blanding, UT	Highway	Uranium Ore Concentrates	30,870 DPM/100CM	Leaking drum, ripped plastic lining inside trailer, interior and exterior of trailer contaminated
07/15/2017	Halls Crossing, UT	Manhole	Sewage	N/A	Sewage overflowed

Date	Location	Mode of Release	Hazardous Material	Quantity Released	Description
					from manhole into storm drain and main channel
10/18/2017	Aneth, UT	Water Injection Line	Produced Water	N/A	Corroded water injection line leaked produced water into San Juan River
01/25/2018	La Sal, UT	Hose	Copper Sulfate	N/A	Hose broke while transferring material
02/04/2018	La Sal, UT	Sump Pump	Copper Sulfate	N/A	Cap on sump pump failed
08/06/2018	Halls Crossing, UT	Motorboat	Motor Oil	N/A	Leaking outboard motor, released in water
01/07/2019	Montezuma Creek, UT	Pipeline	Unknown Materials	3 barrels	Leaking non-PHMSA regulated gathering line
03/01/2019	Montezuma Creek, UT	Wellhead Gathering Facility	Crude Oil	5.75 barrels	Leaking header from wellhead gathering facility, leaked 3–4 barrels into San Juan River with reports of it still in river 3 weeks later
06/20/2019, 06/26/2019, 07/24/2019	Halls Crossing, UT	Pipeline	Sewage	N/A	3 separate reports of sewage leaking into Lake Powell from piping at a marina's pump-out station due to equipment failure
01/24/2020	Monticello, UT	Highway	Corrosive Liquid, Acidic, Organic, N.O.S.	5 LGA	Tractor and trailers overturned in transit
02/05/2020	Monticello, UT	Highway	Paraformaldehyde	2 SLB	Seams of bags were compromised

Date	Location	Mode of Release	Hazardous Material	Quantity Released	Description
Source: PHMSA, 2017–2022; National Response Center, 2017–2022					

The Toxics Release Inventory (TRI) database lists only one industrial facility in San Juan County—the Moab Site Asphalt Plant Concrete Batch in Moab, UT. This facility borders Grand County, UT but is located just inside San Juan County. The facility has had one TRI release, which consisted of one pound of lead released on land in 2020 (EPA, 2022). White Mesa Mill located approximately 7 miles south of Blanding city is the only operating conventional uranium and vanadium mill within the Untied States, due to security measures no additional information is provided within this plan update.

14.5 IMPACTS & LOSS ESTIMATES

Because hazardous materials are so widely used, stored, and transported, a hazardous material event could take place almost anywhere. Further, many hazardous materials are used, stored, and transported in very large quantities, so the impacts of an event may be widespread and powerful. Regulations and safety practices make such large-scale events unlikely, but smaller scale incidents may have severe impacts, including:

- Human deaths, injuries, and permanent disabilities
- Livestock/animal deaths
- Destruction of vegetation and crops
- Property damage and destruction
- Pollution of groundwater, drinking water supplies, and the environment
- Contamination of foodstuffs, property, land, and structures
- Temporary or long-term closure of transportation routes and/or facilities
- Loss of business and industrial productivity
- Utility outages
- Clean-up and restoration costs
- Losses and inconvenience due to evacuation
- Loss of valuable chemical product

Losses due to the release of hazardous materials is linked specifically to two areas: (1) response, including evacuation, and (2) cleanup. San Juan County has not had a significant hazardous materials incident; however, releases of hydrocarbon fuels are a constant threat. Cleanup of these releases is the responsibility of the spiller.

CHAPTER 15 CAPABILITY ASSESSMENT

15.1 JURISDICTIONAL CAPABILITY ASSESSMENT

15.1.1 San Juan County

Table 15-1. San Juan County Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Effect of Loss Reduction			Comments
		Support	Facilitate	Hinder	
San Juan County Emergency Management	Emergency Operations Plan 2022; Family Emergency Manual 2020	X			EOP: "Hazard Analysis" section on page 15; EOP acknowledges Mitigation Plan on page 18 in "Hazard Assessment" FEM: emergency preparedness lists; includes info and action plans about many hazards from Mitigation Plan
San Juan County Planning and Zoning	2018 General Plan; 2022 Land Use, Development, and Management Ordinance; SITLA South Valley Community Structure Plan	X			General Plan: No hazards section, but includes resource info about fires, floods, noxious weeds, and earthquakes; page 110 references economic considerations when developing floodplain and river terrace areas
San Juan County Fire	Firefighting; Emergency Medical Services; Fire Department By-Laws and SOPs; Fire Policy for Approved Development/ Construction	X			
San Juan County Sheriff's Department	Crime in Utah 2020	X			
San Juan County Road Department	Transportation planning	X			
San Juan County Public Health	All Hazards Public Health Emergency Preparedness and Response Guide	X			Includes 7 hazards from the Mitigation Plan

15.1.2 City of Monticello

Table 15-2. City of Monticello Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Effect of Loss Reduction			Comments
		Support	Facilitate	Hinder	
City of Monticello	2018 General Plan	X			Page 57 references a land use overlay zone that necessitates building stipulations in flood zones
City of Monticello Law Enforcement	Law enforcement	X			
City of Monticello Public Works	Public utilities; 2019 Water Quality Report	X			

15.1.3 City of Blanding

Table 15-3. City of Blanding Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Effect of Loss Reduction			Comments
		Support	Facilitate	Hinder	
City of Blanding	2013 General Plan	X			No mention of hazard mitigation; page 8 references special zoning, development permits, and regulations in environmentally sensitive areas
Blanding Fire and Rescue	Firefighting; search and rescue	X			
Blanding Police Department	Law enforcement	X			
City of Blanding Public Works and Utilities	Public utilities	X			

15.1.4 Town of Bluff

Table 15-4. Town of Bluff Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Effect of Loss Reduction			Comments
		Support	Facilitate	Hinder	
Town of Bluff	2019 General Plan	X			Flooding, landslides/rockslides, problem soils, noxious weeds, and

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Effect of Loss Reduction			Comments
		Support	Facilitate	Hinder	
					fire hazards are noted
Town of Bluff Planning and Zoning Commission	Zoning Ordinances	X			Page 24 references building in or near wetlands, riparian areas, and floodways
Bluff Volunteer Fire Department	Firefighting; EMS; search and rescue	X			

15.2 PUBLIC SAFETY AGENCIES

15.2.1 Fire Protection

The Utah Fire Marshall lists 13 fire departments in San Juan County, which include Blanding Fire Department, Bluff Fire Department, Eastland Volunteer Fire Department, La Sal Fire Department, Mexican Hat Fire Department, Montezuma Creek Fire Department, Monticello City Fire Department, Monument Valley Fire Department, San Juan County/Monticello Area Fire Department, Cedar Point Fire Department, (2020). The county's fire chief is David Gallegos who is based in Monticello. Blanding, Bluff, La Sal, Montezuma Creek, Monticello, and Monument Valley all have fire departments with rescue capabilities for accidents on highways (San Juan County, 2023).

When needed, San Juan County also has access to fire crews and resources from the U.S. Forest Service, BLM, National Park Service, U.S. Fish and Wildlife Service, and the U.S. Bureau of Indian Affairs (SJ General Plan, 2018). The state of Utah trains and provides hand crews and engine crews, as well.

15.2.2 Healthcare Facilities

San Juan County has two hospitals and several health clinics. San Juan Hospital is located in Monticello and provides 24/7 emergency services, a variety of surgery options, radiology and lab services, and OB services (San Juan Health, 2023). The 29-bed facility also partners with the University of Utah for cardiological services and with Intermountain Healthcare for remote telehealth services for critical care. The hospital has been in service since 1947, shortly after the end of World War II. San Juan Health, which runs the hospital, also has three clinics in Blanding, Monticello, and Spanish Valley.

Blue Mountain Hospital in Blanding is a 24/7 critical access hospital that provides comprehensive healthcare services, including dialysis, obstetrics, emergency care, orthopedics, and more (Blue Mountain Hospital, 2023). Blue Mountain Hospital also works closely with Utah Navajo Health Systems, Intermountain Healthcare, University of Utah Health, Revere Health, and Newport Health. The hospital has been open since 2009.

The Utah Navajo Health System (UNHS) began operating in 2000 and now has four health clinics in Blanding, Monument Valley, Montezuma Creek, and Navajo Mountain (UNHS, 2023). The UNHS administrative and corporate headquarters is located in Montezuma Creek. The organization serves many of the rural communities in southeastern Utah, including those on the Navajo Nation reservation. Services include optometry, chiropractic, dental, a pharmacy, non-emergency patient transportation, behavioral health services, EMS services, and a radiology department. UNHS also regularly works with the University of Utah, WIC, and Blue Mountain Hospital.

15.2.3 Emergency Services

San Juan County Emergency Management is located in Monticello, Utah and is under the direction of Tammy Gallegos, who is the county's Emergency Manager.

EMS for the county are dispatched from the Department of Public Safety Price Communications Center that is located in Price Utah. EMTs are paid volunteers and are all certified by the state of Utah, Bureau of EMS. San Juan County EMS also has a mutual aid agreement with Grand County EMS through which air ambulance services are provided. These include Classic Helicopter Services, Care Flight, Air Care One, St. Mary's Hospital, and Farmington Regional Medical Center (San Juan County, 2023). Additional ambulance services are provided by UNHS EMS and Navajo Nation EMS.

Several air ambulance and helicopter transport/rescue companies service the San Juan County area, including, but not limited to, Classic Air Medical, Guardian Flight, Eagle Air Med, and the Utah Department of Public Safety Aero Bureau.

15.2.4 Law Enforcement & Public Safety

The Utah Department of Public Safety (DPS) includes one participating law enforcement agency in San Juan County, which is the San Juan County Sheriff's Office. The Sheriff's Office is located at 297 S. Main Street, Monticello, Utah 84535. The Sheriff's Office provides law enforcement throughout the county where other primary law enforcement agencies do not exist. As of 2016, there are BLM-administered lands, U.S. Forest Service lands, SITLA lands, one National Park, one National Recreation Area, and four National Monuments in the county that each have their own attendant law enforcement authorities in addition to the county sheriff.

Blanding Police Department is located at 167 East 500 North in Blanding and does not participate in the Utah DPS (Blanding City, 2023).

The Highway Patrol Office in the county is located at 232 S 100 E in Monticello, UT.

The Navajo Nation Police Department is stationed in Shiprock, NM, but services the Navajo Nation in the southern part of the county. A Ute Law Enforcement Officer from Towaoc, CO also provides law enforcement services to small parts of the county.

15.3 LAND USE PLANNING

This section of the San Juan County Multi-Jurisdictional All Hazard Mitigation Plan examines the relationship between the county's General Plan, Land Use or Zoning Ordinances, and the AHMP. Incorporating hazard mitigation practices into land use planning is extremely important as future developments are planned and constructed. Through proper planning within the individual jurisdictions, risk to property owners can be reduced and future disaster related economic losses avoided. Land Use and Mitigation Planning Integration are seen as critical components of the mitigation program in San Juan County.

San Juan County's General Plan was last revised and adopted in 2018. The plan should be reviewed and updated to address condition changes within the county and the economy.

15.3.1 City of Monticello

The city of Monticello updated their General Plan in 2018. The plan establishes how Monticello "will provide for the health, safety, and welfare of its citizens in the present and future" (Monticello General Plan, 2018). It describes the city's plans and goals for transportation, city services, public safety, moderate income housing, community promotion and economic development, recreations, parks, aesthetics, historic preservation, energy conservation, and land use. It also complements the community profile in the Mitigation Plan by detailing the location, climate, watershed, history, and demographics of the area. However, it is recommended that the city of Monticello include an update to their General Plan in which they add a Hazardous Areas section that outlines each hazard in the Mitigation Plan to more fully align with the Mitigation Plan.

15.3.2 City of Blanding

The city of Blanding's General Plan was adopted in 2013. While the plan was written several years ago, it includes many of the same concerns and topics that Monticello's General Plan includes, such as overall growth and urbanization, economic development, land use, housing, parks and recreation, transportation and circulation, urban design, and public facilities (Blanding General Plan, 2013). It is recommended that the city of Blanding update their General Plan and include a Hazardous Areas section that outlines each hazard in the Mitigation Plan.

15.3.3 Town of Bluff

The town of Bluff updated their General Plan in 2019. The plan covers land use, transportation, economic development, heritage and historic preservation, health, safety, and infrastructure, development constraints, and implementation and enforcement (Bluff General Plan, 2019). Just as with Monticello and Blanding, it is recommended that Bluff's General Plan is updated to include a Hazardous Areas section that outlines each hazard in the Mitigation Plan.

15.4 NFIP CONTINUITY STRATEGY

San Juan County participates in the National Flood Insurance Program (NFIP) as does the city of Monticello. San Juan County's participation in the regular phase of the National Flood Insurance Program began December 11, 1985. The city of Monticello began its participation in the emergency program of the NFIP on December 6, 1999. Blanding and Bluff do not participate.

San Juan County has no communities within the 100-year floodplain hazard area that are not participating in the NFIP. San Juan County has no communities under suspension or revocation of participation in the NFIP.

Table 15-5. NFIP Participation and Repetitive Loss

NFIP Participation Category	San Juan County	City of Monticello
FIRM Date	01/31/1978	12/24/1976
Participating in CRS (Class)	N/A	N/A
Number of NFIP Policies	3	0
Are FIRMs Digital or Paper?	Paper	Paper
Repetitive Loss Properties	0	0
Severe Repetitive Loss Properties	0	0
Source: FEMA Repetitive Losses/BCX Claims Utah, 2022		

PART IV: MITIGATION STRATEGY

CHAPTER 16 MITIGATION GOALS

These goals describe the broad direction that San Juan County will take to select mitigation projects, which are designed specifically to address risks posed by natural and manmade hazards. The goals are steppingstones between the mission statement and the specific objectives developed for the individual mitigation projects. The mitigation projects refer to these goals by their number given below.

1. Reduce the potential of loss of life and injury.
    a. Identify natural and manmade hazards that threaten life in San Juan County.
2. To preserve and enhance the quality of life throughout San Juan County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage and economic losses.
    a. Implement programs and projects that assist in protecting lives by making homes, businesses, essential facilities, critical infrastructure, and other property more resistant to losses from all hazards.
    b. Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventive measures for existing development in areas vulnerable to natural hazards.
    c. Protect life and property by implementing state-of-the-art standards, codes, and construction procedures.
3. Improved collaboration and cooperation throughout San Juan County and the cities of Monticello and Blanding and town of Bluff.
    a. Continue developing and strengthening inter-jurisdictional coordination in the area of emergency services.
    b. Continue providing county and city emergency services with training and equipment to address all identified hazards.
4. Incorporate and integrate hazard mitigation strategies into all appropriate plans and policies.
5. Enhanced communication, public information, and education of risks and threats in San Juan County to empower personal preparedness and responsibility.
    a. Increase public awareness of existing threats and the means to reduce these threats by conducting educational and outreach programs to all the various community groups in the county.
    b. Provide informational items, partnership opportunities, and funding resource information to assist in implementing mitigation activities.
6. Continuity of government services and business operations.

CHAPTER 17 MITIGATION STRATEGIES

17.1 MITIGATION ACTION PLAN

The action plan helps to prioritize mitigation initiatives according to a benefit/cost analysis of the proposed projects and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The action plan also provides the framework for how the proposed projects and initiatives will be implemented and administered over the next five years.

17.1.1 Mitigation Strategy/Action Timeline Parameters

While the preference is to provide definitive project completion dates, this is not possible for every mitigation strategy/action. Therefore, the parameters for the timeline (Projected Completion Date) are as follows:

- **Short-term**—To be completed in 1 to 5 years
- **Long-term**—To be completed in greater than 5 years
- **Ongoing**—Currently being implemented under existing programs but without a definite completion date

17.1.2 Mitigation Strategy/Action Benefit Parameters

Benefit ratings are defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

17.1.3 Mitigation Strategy/Action Estimated Cost Parameters

While the preference is to provide definitive costs (dollar figures) for each mitigation strategy/action, this is not possible for every mitigation strategy/action. Therefore, the estimated costs for the mitigation initiatives identified in this plan are identified as high, medium, or low, using the following ranges:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (e.g., bonds, grants, and fee increases).
- **Medium**—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

17.1.4 Mitigation Strategy/Action Prioritization Process

The action plan must be prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant

Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) grant program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

The priorities are defined as follows:

- **High**—A project that addressed numerous goals or hazards, has benefits that exceed cost, has funding secured or is an ongoing project, and meets eligibility requirements for the HMGP or BRIC grant program. High priority projects can be completed in the short term (1 to 5 years).
- **Medium**—A project that addressed multiple goals and hazards, that has benefits that exceed costs, and for which funding has not been secured but that is grant eligible under HMGP, BRIC, or other grant programs. The project can be completed in the short term once funding is secured. Medium priority projects will become high priority projects once funding is secured.
- **Low**—A project that will address few or no goals, mitigate the risk of one or few hazards, has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for HMGP or BRIC grant funding, and for which the timeline for completion is long term (1 to 10 years). Low priority projects may be eligible for other sources of grant funding from other programs.

For many of the strategies identified in this action plan, the partners may seek financial assistance under the HMGP or HMA programs, both of which require detailed benefit/cost analyses. These analyses will be performed on projects at the time of application using the FEMA benefit-cost model. For projects not seeking financial assistance from grant programs that require detailed analysis, the partners reserve the right to define "benefits" according to parameters that meet the goals and objectives of this plan.

17.2 MITIGATION PROJECTS

Listed below are the goals and objectives developed by the mitigation plan and the priority projects that were developed to address the risks posed. Included in the list are a rough estimate of cost and an anticipated period for further investigation, project development, and implementation.

17.2.1 New Mitigation Projects

San Juan County New Projects

Table 17-1. New Mitigation Project 1

Mitigation Project: Promote waterwise landscaping through Every Door Mail Direct and utility bills.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff	High	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
3, 5		Drought	29	High		San Juan County, cities, and town	
Action/Implementation Plan and Project Description:							

Table 17-2. New Mitigation Project 2

Mitigation Project: Promote water saving conservation through Every Door Mail Direct, social media, and community events.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)

Mitigation Project: Promote water saving conservation through Every Door Mail Direct, social media, and community events.							
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff	High	Ongoing, 2028	$3,000	Low

Applicable Goal(s)	Hazard(s) Mitigated	STAPLEE Score	Benefit Analysis (Low, Medium, High)	Potential Funding Source(s)
3, 5	Drought	29	High	San Juan County, cities, and town

Action/Implementation Plan and Project Description:

Table 17-3. New Mitigation Project 3

Mitigation Project: Update locations of high-risk dams within the county.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff	Low	Ongoing, 2028	$1,000	Low

Applicable Goal(s)	Hazard(s) Mitigated	STAPLEE Score	Benefit Analysis (Low, Medium, High)	Potential Funding Source(s)
1, 5	Dam Failure	29	Low	San Juan County

Action/Implementation Plan and Project Description:

Table 17-4. New Mitigation Project 4

Mitigation Project: Provide hazard education flyer for dam failure risk at the county fair or community event.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff	Low	Ongoing, 2028	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 5		Dam Failure	29	Low		San Juan County, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-5. New Mitigation Project 5

Mitigation Project: Promote awareness of pipelines in the county and maintain communication with pipeline owners through LEPC.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Emergency Management	Low	Ongoing, 2028	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	

Mitigation Project: Promote awareness of pipelines in the county and maintain communication with pipeline owners through LEPC.				
3, 5	Earthquake	29	Low	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-6. New Mitigation Project 6

Mitigation Project: Partner with Utah School and Institutional Trust Lands Administration (SITLA) to develop floodplain plan and mapping for the Spanish Valley area.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	SITLA	SITLA	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
3, 4		Flood	29	High		SITLA	
Action/Implementation Plan and Project Description:							

Table 17-7. New Mitigation Project 7

Mitigation Project: Upsize culvert at CR 145 Kane Creek.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Flood	29		High	San Juan County, FEMA	
Action/Implementation Plan and Project Description:							
Note: The creek makes the road impassable for residents to get out during flooding. It is a remote road that takes 2+ hours to respond to.							

Table 17-8. New Mitigation Project 8

Mitigation Project: Upsize culvert at CR 185 Mt. Peale.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Upsize culvert at CR 185 Mt. Peale.				
1, 2	Flood	29	High	San Juan County, FEMA
Action/Implementation Plan and Project Description:				
Note: The creek can make the road impassable to residents with no alternate route.				

Table 17-9. New Mitigation Project 9

Mitigation Project: Upsize culvert at CR 206 Perkins.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Flood	29		High	San Juan County, FEMA	
Action/Implementation Plan and Project Description:							
Note: The low water crossing is inadequate and requires continued maintenance to keep the road accessible.							

Table 17-10. New Mitigation Project 10

Mitigation Project: Upsize culvert at CR 195 Sunny Acres.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Flood	29		High	San Juan County, FEMA	
Action/Implementation Plan and Project Description:							
Note: The low water crossing is inadequate and requires continued maintenance to keep the road accessible.							

Table 17-11. New Mitigation Project 11

Mitigation Project: Upsize culvert at CR 1021 West Coronado.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Upsize culvert at CR 1021 West Coronado.				
1, 2	Flood	29	High	San Juan County, FEMA
Action/Implementation Plan and Project Description:				
Note: No drainage, which causes flooding to residents' properties.				

Table 17-12. New Mitigation Project 12

Mitigation Project: Upsize culvert at CR 1701 Rio Grande.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Flood	29		High	San Juan County/FEMA	
Action/Implementation Plan and Project Description:							
Note: No drainage, which causes flooding to residents' properties.							

Table 17-13. New Mitigation Project 13

Mitigation Project: Upsize culvert at CR 157 Mill Creek.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Flood	29		High	San Juan County, FEMA	
Action/Implementation Plan and Project Description:							
Note: Flooding washes road out so Water District is unable to reach water collection site. Needs shoulder reinforcements.							

Table 17-14. New Mitigation Project 14

Mitigation Project: Upsize culvert at CR 173 Pole Canyon.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Upsize culvert at CR 173 Pole Canyon.				
1, 2	Flood	29	High	San Juan County, FEMA
Action/Implementation Plan and Project Description:				
Note: Flooding is eroding ditch so it's wider than overhead bridge. Residents will have no way out if bridge washes out. Needs shoulder rip rap and grout.				

Table 17-15. New Mitigation Project 15

Mitigation Project: Partner with Floodplain Manager to review the floodplain ordinance.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	Low	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
3, 4		Flood	29	Low		San Juan County, Utah DEM	
Action/Implementation Plan and Project Description:							

Table 17-16. New Mitigation Project 16

Mitigation Project: Promote upstream vegetation management through educational flyers.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	Low	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
3, 5		Flood	29		Low	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-17. New Mitigation Project 17

Mitigation Project: Construct a debris catchment basin at the La Sal Cutoff Road to help mitigate the debris flow from the Pack Creek Burn Scar.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	$85,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Construct a debris catchment basin at the La Sal Cutoff Road to help mitigate the debris flow from the Pack Creek Burn Scar.				
1, 2	Flood	29	High	San Juan County, FEMA
Action/Implementation Plan and Project Description:				

Table 17-18. New Mitigation Project 18

Mitigation Project: Maintain a supply of sandbags for flooding.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	$10,000	Medium
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Flood	29		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-19. New Mitigation Project 19

Mitigation Project: Partner with NRCS to complete the Pack Creek Project as the area constantly floods since the 2021 fire.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County, Natural Resources Conservation Service (NRCS)	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		Flood	29	High		San Juan County, NRCS, Private sources	
Action/Implementation Plan and Project Description:							

Table 17-20. New Mitigation Project 20

Mitigation Project: Conduct a flow study at the port of entry.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah State Fire Marshal	High	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	

Mitigation Project: Conduct a flow study at the port of entry.				
1, 3, 4	Hazardous Materials Incident	29	High	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-21. New Mitigation Project 21

Mitigation Project: Develop Hazmat Awareness/Responder Teams and Protocols and Implement strategies within the HazMat Plan.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah State Fire Marshal	High	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 4, 5		Hazardous Materials Incident	29		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-22. New Mitigation Project 22

Mitigation Project: Participate in the yearly pipeline meetings.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah State Fire Marshal	High	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
3, 6		Hazardous Materials Incident	29		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-23. New Mitigation Project 23

Mitigation Project: Educate the public about standing water and the hazards of mosquitoes.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County Public Health	Low	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Educate the public about standing water and the hazards of mosquitoes.				
1, 3, 5	Infestation	29	Low	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-24. New Mitigation Project 24

Mitigation Project: Educate the public about rodent infestation and the hantavirus.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County Public Health	Low	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 5		Infestation	29		Low	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-25. New Mitigation Project 25

Mitigation Project: Increase landslide risk awareness through educational events.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff	Low	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 5		Landslide	29	Low		San Juan County, cities, and town	
Action/Implementation Plan and Project Description:							

Table 17-26. New Mitigation Project 26

Mitigation Project: Assess assets at high risk from landslides.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff, UDOT	Low	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	

Mitigation Project: Assess assets at high risk from landslides.				
1, 3	Landslide	29	Low	San Juan County, cities, and town; UDOT
Action/Implementation Plan and Project Description:				

Table 17-27. New Mitigation Project 27

Mitigation Project: Develop a response plan to promote nonpharmaceutical interventions, hand hygiene, travel restrictions, school closures, and social distancing until a vaccine is in place.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County Public Health, San Juan School District, Law Enforcement	Medium	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 4, 5		Communicable Disease	29	Medium		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-28. New Mitigation Project 28

Mitigation Project: Develop a vaccination site plan for communities within the county.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County Public Health, San Juan School District, Law Enforcement	Medium	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 4, 5		Communicable Disease	29	Medium		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-29. New Mitigation Project 29

Mitigation Project: Inform residents of radon testing possibilities through social media, flyers, and information on utility bills.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff, San Juan Health	Medium	Ongoing, 2028	$3,000	Low

Mitigation Project: Inform residents of radon testing possibilities through social media, flyers, and information on utility bills.				
Applicable Goal(s)	**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**
1, 5	Problem Soils	29	Medium	San Juan County, cities, and town
Action/Implementation Plan and Project Description:				

Table 17-30. New Mitigation Project 30

Mitigation Project: Provide fact sheets on radon on new building permit applications.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	City of Monticello, City of Blanding, Town of Bluff	Medium	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 4, 5		Problem Soils	29	Medium		San Juan County, cities, and town	
Action/Implementation Plan and Project Description:							

Table 17-31. New Mitigation Project 31

Mitigation Project: Purchase snowplow truck to keep access open to critical access roads in La Sal during severe weather.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2		Severe Weather	29		High	San Juan County, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-32. New Mitigation Project 32

Mitigation Project: Increase public awareness about severe weather with an educational booth at the county fair or other public events.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	Medium	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Increase public awareness about severe weather with an educational booth at the county fair or other public events.				
1, 3, 5	Severe Weather	29	Medium	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-33. New Mitigation Project 33

Mitigation Project: Implement strategies within the current county Community Wildfire Protection Plan.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2028	$30,000/year	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 4		Wildfire	29	High		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-34. New Mitigation Project 34

Mitigation Project: Send Every Door Mail Direct information to residents about brush/tree removal and creating defensible space.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2028	$3,000/year	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 5		Wildfire	29			San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-35. New Mitigation Project 35

Mitigation Project: Create a brochure that recommends fire extinguishers included in building permit applications.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	Medium	Ongoing, 2028	$1,000/year	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Create a brochure that recommends fire extinguishers included in building permit applications.				
1, 3, 4, 5	Wildfire	29	Medium	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-36. New Mitigation Project 36

Mitigation Project: Purchase a new fire truck for the Spanish Valley area to assist with fires in the community and in the Pack Creek WUI area.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire, and State Lands; FEMA	High	Ongoing, 2028	$250,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		Wildfire	29	High		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-37. New Mitigation Project 37

Mitigation Project: Educate residents on wildfire risk reduction through defensible space with Every Door Mail Direct.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands; FEMA	High	Ongoing, 2024	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 5		Wildfire	29	High		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-38. New Mitigation Project 38

Mitigation Project: Educate residents on county and city burn permit processes and requirements with Every Door Mail Direct.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2025	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	

Mitigation Project: Educate residents on county and city burn permit processes and requirements with Every Door Mail Direct.				
1, 3, 4, 5	Wildfire	29	High	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-39. New Mitigation Project 39

Mitigation Project: Educate residents on dangers of unattended fires with Every Door Mail Direct.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2026	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 5		Wildfire	29	High		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-40. New Mitigation Project 40

Mitigation Project: Educate residents on Firewise landscaping with Every Door Mail Direct.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2027	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 5		Wildfire	29		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-41. New Mitigation Project 41

Mitigation Project: Update the San Juan County Wildfire Protection Plan.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2023	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Update the San Juan County Wildfire Protection Plan.				
1, 3, 4	Wildfire	29	High	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-42. New Mitigation Project 42

Mitigation Project: Educate owners and managers of new buildings on the newly adopted county fire policy.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2028	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 4, 5		Wildfire	29	High		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-43. New Mitigation Project 43

Mitigation Project: Educate owners and managers of new buildings on the newly adopted county fire building requirements.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2028	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 4, 5		Wildfire	29		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-44. New Mitigation Project 44

Mitigation Project: Educate the public on water conservation practices for home landscapes and farms (e.g., xeriscape, waterwise practices, turf management, gardening, small farms, watershed maintenance/protection, and soil moisture/health best practices).							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	USU Extension	County municipalities, conservation districts, county departments	Medium to High	Ongoing, 2023	$30,000/year	Medium

Mitigation Project: Educate the public on water conservation practices for home landscapes and farms (e.g., xeriscape, waterwise practices, turf management, gardening, small farms, watershed maintenance/protection, and soil moisture/health best practices).			
Applicable Goal(s)	**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**
3, 5	Drought, Infestation, Problem Soils	28	Medium	Internal USU Extension, USDA disaster relief funding
Action/Implementation Plan and Project Description:				

Table 17-45. New Mitigation Project 45

Mitigation Project: Implement Phase 1 to plan a multi-purpose facility with indoor and outdoor capabilities for housing livestock and sheltering owners who want to remain with their animals during natural disasters or livestock quarantines.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County, USDA, FEMA	High	Ongoing, 2025	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		All Hazards	29	High		San Juan County, USDA, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-46. New Mitigation Project 46

Mitigation Project: Implement Phase 2 to construct a multi-purpose facility with indoor and outdoor capabilities for housing livestock and sheltering owners who want to remain with their animals during natural disasters or livestock quarantines.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County, USDA, FEMA	High	Ongoing, 2025	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		All Hazards	29		High	San Juan County, USDA, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-47. New Mitigation Project 47

Mitigation Project: Implement Phase 1 to plan a multi-purpose facility in Spanish Valley for Law Enforcement, Road Department, Fire, EMS, and Emergency Management to gather and residents to shelter in the event of a local hazard incident.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County, USDA, FEMA	High	Ongoing, 2025	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Implement Phase 1 to plan a multi-purpose facility in Spanish Valley for Law Enforcement, Road Department, Fire, EMS, and Emergency Management to gather and residents to shelter in the event of a local hazard incident.				
1, 2, 3	All Hazards	29	High	San Juan County, USDA, FEMA
Action/Implementation Plan and Project Description:				

Table 17-48. New Mitigation Project 48

Mitigation Project: Implement Phase 2 to construct a multi-purpose facility in Spanish Valley for Law Enforcement, Road Department, Fire, EMS, and Emergency Management to gather and residents to shelter in the event of a local hazard incident.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County, USDA, FEMA	High	Ongoing, 2025	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		All Hazards	29		High	San Juan County, USDA, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-49. New Mitigation Project 49

Mitigation Project: Provide backup generators for county wells and buildings in remote communities for heating/cooling/oxygen and feeding stations and to keep wells operational during outages.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		All Hazards	29		High	San Juan County, FEMA, SHSP	
Action/Implementation Plan and Project Description:							

Table 17-50. New Mitigation Project 50

Mitigation Project: Encourage residents to sign up for Reverse 911 and the San Juan Ready App through Every Door Mail Direct.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	San Juan County	San Juan County	San Juan County	High	Ongoing, 2028	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Encourage residents to sign up for Reverse 911 and the San Juan Ready App through Every Door Mail Direct.				
1, 3, 5	All Hazards	29	High	San Juan County, FEMA
Action/Implementation Plan and Project Description:				

City of Monticello New Projects

Table 17-51. New Mitigation Project 51

Mitigation Project: Purchase and install generator for emergency backup power at the City Fire Station/Public Works Shop.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	City of Monticello	City of Monticello	San Juan County	High	Ongoing, 2025	$10,000–$20,000	Medium
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		All Hazards	29	High		City of Monticello, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-52. New Mitigation Project 52

Mitigation Project: Purchase and install generator for emergency backup power at the City Offices.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	City of Monticello	City of Monticello	San Juan County	High	Ongoing, 2025	$10,000–$20,000	Medium
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		All Hazards	29		High	City of Monticello, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-53. New Mitigation Project 53

Mitigation Project: Purchase and install generator for emergency backup power at the Water Treatment Plant.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	City of Monticello	City of Monticello	San Juan County	High	Ongoing, 2025	$30,000–$50,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Purchase and install generator for emergency backup power at the Water Treatment Plant.				
1, 2, 3	All Hazards	29	High	City of Monticello, FEMA
Action/Implementation Plan and Project Description:				

City of Blanding New Projects

Table 17-54. New Mitigation Project 54

Mitigation Project: Begin fuel reduction work of approximately 100+ acres of heavy brush and trees around Blanding's major water source to prevent fires from causing problems with local drinking water due to erosion and disrupting access to the lake.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	City of Blanding	City of Blanding Public Works, Blanding Fire Department	San Juan County		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		Wildfire, Flood	29				
Action/Implementation Plan and Project Description:							

Table 17-55. New Mitigation Project 55

Mitigation Project: Add backup water storage tanks in the City of Blanding Dialysis Center in case of water emergency due to drought, wildfire, or debris flows within the watershed.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2023	City of Blanding	City of Blanding Dialysis Center	San Juan County		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		Drought, Wildfire, Flood	N/A				
Action/Implementation Plan and Project Description:							
Note: The City of Blanding Dialysis Center is the sole provider of dialysis services in the county.							

17.2.2 Ongoing Mitigation Projects

San Juan County Ongoing Projects

Table 17-56. Ongoing Mitigation Project 1

Mitigation Project: Create defensible space to mitigate damage to the communication towers on the Abajo Peak, Cedar Mesa, and Colorado Communication sites.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)

Mitigation Project: Create defensible space to mitigate damage to the communication towers on the Abajo Peak, Cedar Mesa, and Colorado Communication sites.							
2018	San Juan County	San Juan County	Utah Division of Forestry, Fire & State Lands; Forest Service	High	Ongoing	$40,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		Wildfire	N/A	High		State of Utah, San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-57. Ongoing Mitigation Project 2

Mitigation Project: Create defensible space to mitigate damage to homes and businesses within the county that are in the wildland interface, including through the use of, but not limited to, fire breaks.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	County Volunteer Fire Departments	High	Ongoing	$60,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		Wildfire	N/A	High		San Juan County, FEMA	
Action/Implementation Plan and Project Description:							

Table 17-58. Ongoing Mitigation Project 3

Mitigation Project: Purchase fire equipment.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	San Juan County	San Juan County Fire	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		Wildfire	N/A			San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-59. Ongoing Mitigation Project 4

Mitigation Project: Provide Firewise workshops and Firewise brochures in new building permit applications.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County Fire Department	N/A	High	Ongoing	$5,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Provide Firewise workshops and Firewise brochures in new building permit applications.				
1, 3, 4, 5	Wildfire	N/A	High	San Juan County, FEMA
Action/Implementation Plan and Project Description:				

Table 17-60. Ongoing Mitigation Project 5

Mitigation Project: Partner with the U.S. Forest Service and the cities of Monticello and Blanding regarding the cleanup of the watersheds. Groom watersheds of dead and down vegetation.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County, State of Utah, Forest Service	Utah Division of Forestry, Fire & State Lands	High	Ongoing, 2028	$50,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 2, 3		Wildfire	29	High		San Juan County, State of Utah, FEMA	
Action/Implementation Plan and Project Description:							
Note: Updated during 2023 revision to include partnering with the U.S. Forest Service and cities to clean up the watersheds.							

Table 17-61. Completed/Ongoing Mitigation Project 6

Mitigation Project: Clear the overgrowth of tamarisk trees on the San Juan River banks.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	BLM	N/A	Medium	Ongoing	$40,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		Wildfire	N/A		Medium	FEMA	
Action/Implementation Plan and Project Description:							

Table 17-62.Deferred due to staffing issues Mitigation Project 7

Mitigation Project: Develop mapping and education materials to show problem soil areas in San Juan County.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	Medium	Ongoing	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Develop mapping and education materials to show problem soil areas in San Juan County.				
3, 4, 5	Problem Soils	N/A	Medium	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-63. Ongoing Mitigation Project 8

Mitigation Project: Improve soil conditions throughout the county to reduce soil and wind erosion, which will reduce damage to crops, grazing lands, etc.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	Soil Conservation District		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
2, 3		Problem Soils	N/A			San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-64. Ongoing Specific Locations Identified in new Projects Mitigation Project 9

Mitigation Project: Mitigate road flooding in Spanish Valley Pack Creek, North Cottonwood, South Cottonwood, and Butler Washes by adding rip rap covered with wire to the stream bed banks to provide stability.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	Spanish Valley area	High	Ongoing	$200,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		Flood	N/A		High	San Juan County	
Action/Implementation Plan and Project Description:							

17-65. Ongoing Specific Locations Identified in new Project Mitigation Project 10

Mitigation Project: Contract with an engineering firm to study and establish the boundaries of the floodplain in Spanish Valley caused by Ken's Lake, Pack Creek, and stormwater runoff.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	Private contractor, Spanish Valley area	High	Ongoing	$250,000	High
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Contract with an engineering firm to study and establish the boundaries of the floodplain in Spanish Valley caused by Ken's Lake, Pack Creek, and stormwater runoff.				
2, 3, 4	Flood	N/A	High	Private property developers, San Juan County, State of Utah
Action/Implementation Plan and Project Description:				

Table 17-66. Ongoing Mitigation Project 11

Mitigation Project: Create outreach documents for flood awareness and insurance.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	San Juan County	San Juan County	N/A	Medium	Ongoing	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
1, 3, 4		Flood	N/A	Medium		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-67. Ongoing Mitigation Project 12

Mitigation Project: Establish agreements and plans for emergency shelters in the event of dam failure. Develop public information on dam failure to include evacuation routes and sheltering plans.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 4, 5		Dam Failure	N/A			San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-68. Ongoing Mitigation Project 13

Mitigation Project: Provide educational materials for residents on the hazards of earthquakes, including, but not limited to, brochures and educational content at public events.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	San Juan County	San Juan County	Utah Division of Emergency Management	Low	Ongoing, 2028	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Provide educational materials for residents on the hazards of earthquakes, including, but not limited to, brochures and educational content at public events.				
1, 3, 5	Earthquake	29	Low	San Juan County
Action/Implementation Plan and Project Description:				
Note: Updated during 2023 plan revision.				

Table 17-69. Ongoing Mitigation Project 14

Mitigation Project: Encourage residents and all partners to participate in the Great Utah ShakeOut.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	Utah Division of Emergency Management	Low	Ongoing	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
3, 5		Earthquake	29	Low		San Juan County	
Action/Implementation Plan and Project Description:							
Note: Updated during 2023 plan revision.							

Table 17-70. Ongoing Mitigation Project 15

Mitigation Project: Procure weather radios and provide severe weather safety information and education to residents about monitoring the NOAA weather radio.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	San Juan County	Medium	Ongoing, 2028	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3, 5		Severe Weather, Flood, Wildfire	29		Medium	San Juan County, FEMA	
Action/Implementation Plan and Project Description:							
Note: Updated during 2023 plan revision to include procuring weather radios rather than simply providing safety information.							

Table 17-71. Ongoing Mitigation Project 16

Mitigation Project: Promote tree trimming around power lines to mitigate damage due to high winds.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	High	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Promote tree trimming around power lines to mitigate damage due to high winds.				
1, 2, 3	Severe Weather	N/A	High	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-72. Ongoing Mitigation Project 17

Mitigation Project: Produce lightning brochures for lightning awareness.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	High	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 5		Severe Summer Weather	N/A		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-73. Ongoing Mitigation Project 18

Mitigation Project: Produce brochure about hailstorms.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	Medium	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 5		Severe Summer Weather	N/A		Medium	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-74. Ongoing Mitigation Project 19

Mitigation Project: Educate families and travelers on emergency preparedness during winter months by continuing to participate in the Weather Nation Ambassador Program.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	High	Ongoing	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Educate families and travelers on emergency preparedness during winter months by continuing to participate in the Weather Nation Ambassador Program.				
1, 3, 5	Severe Winter Weather	N/A	High	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-75. Ongoing Mitigation Project 20

Mitigation Project: Promote CO2 detector awareness.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	High	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 5		Severe Winter Weather	N/A		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-76. Ongoing Mitigation Project 21

Mitigation Project: Promote awareness of Utah Special Needs Registry.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	High	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 5		Severe Winter Weather	N/A		High	San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-77. Ongoing Mitigation Project 22

Mitigation Project: Encourage residents and businesses to trim trees before winter months to prevent power outages due to tree limbs falling on power lines and boxes.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	Low	Ongoing	$1,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Encourage residents and businesses to trim trees before winter months to prevent power outages due to tree limbs falling on power lines and boxes.				
1, 2, 3, 5	Severe Winter Weather	N/A	Low	San Juan County
Action/Implementation Plan and Project Description:				

Table 17-78. Ongoing Mitigation Project 23

Mitigation Project: Keep community informed of drought conditions throughout the county through social media, news articles, and personal appearances at community events.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	Soil Conservation District	High	Ongoing	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
3, 5		Drought	N/A	High		San Juan County	
Action/Implementation Plan and Project Description:							

Table 17-79. Ongoing Mitigation Project 24

Mitigation Project: Create GIS data of landslide areas, especially Hwy 95 and the Comb Wash Cutoff.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County, UDOT	N/A	High	Ongoing	$10,000	Medium
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 3, 4		Landslide	N/A		High	San Juan County, UDOT	
Action/Implementation Plan and Project Description:							

Table 17-80. Ongoing Mitigation Project 25

Mitigation Project: Reduce potential of landslides on county and state highways through removal of material, placement of larger culverts, and re-routing of existing highways.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	San Juan County	San Juan County Road Department, UDOT	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Reduce potential of landslides on county and state highways through removal of material, placement of larger culverts, and re-routing of existing highways.				
1, 2, 3	Landslide	N/A		San Juan County
Action/Implementation Plan and Project Description:				

Table 17-81. Ongoing Mitigation Project 26

Mitigation Project: Develop and implement an All Hazards public awareness program.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	San Juan County	San Juan County	N/A	High	Ongoing	$3,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3, 4, 5		All Hazards	N/A		High	San Juan County	
Action/Implementation Plan and Project Description:							

City of Monticello Ongoing Projects

Table 17-82. Ongoing Mitigation Project 27

Mitigation Project: Purchase new fire truck for the city of Monticello.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2012	City of Monticello	City of Monticello, San Juan County Fire	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		Wildfire	N/A			City of Monticello	
Action/Implementation Plan and Project Description:							

Table 17-83. Ongoing Mitigation Project 28

Mitigation Project: Mitigate the effects of thunderstorms in Monticello by acquiring an additional generator, emergency response kits, and winter weather rescue gear.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2017	City of Monticello	Monticello Emergency Manager, city employees	N/A	High	Ongoing	$15,000	Medium

Mitigation Project: Mitigate the effects of thunderstorms in Monticello by acquiring an additional generator, emergency response kits, and winter weather rescue gear.				
Applicable Goal(s)	**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**
1, 2	Severe Summer Weather	N/A	High	City of Monticello, State of Utah
Action/Implementation Plan and Project Description:				

Table 17-84. Ongoing Mitigation Project 29

Mitigation Project: Spread public awareness about drought through social media, news articles, and brochures at community events.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2017	City of Monticello	City of Monticello	N/A	High	Ongoing	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**	**Benefit Analysis** (Low, Medium, High)		**Potential Funding Source(s)**	
3, 5		Drought	N/A	High		City of Monticello	
Action/Implementation Plan and Project Description:							

Table 17-85. Ongoing Mitigation Project 30

Mitigation Project: Encourage water conservation throughout the community.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	City of Monticello	City of Monticello	N/A	High	Ongoing	$2,000	Low
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
3, 5		Drought	N/A		High	City of Monticello	
Action/Implementation Plan and Project Description:							

Table 17-86. Ongoing Mitigation Project 31

Mitigation Project: Update building permits in possible flood areas, especially around Lloyds Lake.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2018	City of Monticello	City of Monticello, Public Works, JD Engineering	Lloyds Lake	High	Ongoing	$5,000	Medium
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	

Mitigation Project: Update building permits in possible flood areas, especially around Lloyds Lake.				
1, 3, 4	Dam Failure	N/A	High	City of Monticello
Action/Implementation Plan and Project Description:				

Table 17-87. Ongoing Mitigation Project 32

Mitigation Project: Upgrade and improve water and sewer lines.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	City of Monticello	City of Monticello, Public Works	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
2, 3		Flood	N/A			City of Monticello	
Action/Implementation Plan and Project Description:							

City of Blanding Ongoing Projects

Table 17-88. Ongoing Mitigation Project 33

Mitigation Project: Upgrade and improve sewer collection line.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)
2014	City of Blanding	City of Blanding, Public Works	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
2, 3		Flood	N/A			City of Blanding	
Action/Implementation Plan and Project Description:							

Town of Bluff Ongoing Projects

Table 17-89. Ongoing Mitigation Project 34

Mitigation Project: Upgrade the stormwater and floodwater infrastructure throughout the town.							
Year Initiated	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Supporting Agencies/ Organizations**	**Priority and Level of Importance** (Low, Medium, High)	**Projected Completion Date** (Short-term, Long-term, or Ongoing)	**Estimated Cost**	**Cost Analysis** (Low, Medium, High)

Mitigation Project: Upgrade the stormwater and floodwater infrastructure throughout the town.							
2014	Town of Bluff	Town of Bluff, Public Works	N/A		Ongoing	N/A	N/A
Applicable Goal(s)		**Hazard(s) Mitigated**	**STAPLEE Score**		**Benefit Analysis** (Low, Medium, High)	**Potential Funding Source(s)**	
1, 2, 3		Flood	N/A			Town of Bluff	
Action/Implementation Plan and Project Description:							

17.2.3 Completed Mitigation Projects

Table 17-90. Completed Mitigation Projects

COMPLETED MITIGATION PROJECTS						
Mitigation Project	**Year Initiated**	**Applicable Jurisdiction**	**Lead Agency/ Organization**	**Priority** (Low, Medium, High)	**Status**	**Hazard(s) Mitigated**
San Juan County (County-Led)						
Improve and sustain current levee to mitigate flooding in the St. Christopher Mission area in Bluff.	2018	San Juan County	San Juan County	High	Completed	Flood
Provide expansion of suitable storage space for accessibility during emergency situations.	2015	San Juan County	San Juan County	--	Completed	All Hazards
Update Dry Wash Dam.	2014	San Juan County	San Juan Conservancy District	--	Completed	Dam Failure
Enlarge and improve safety of Dry Wash Reservoir.	2014	San Juan County	San Juan Conservancy District	--	Completed	Flood

COMPLETED MITIGATION PROJECTS						
Conduct Water and Sewer Study.	2014	San Juan County	Spanish Valley Special Service District (SSD)	--	Completed	Flood
City of Monticello						
Expand Eastland Fire Station.	2013	City of Monticello	Eastland Volunteer Fire Department	--	Completed	Wildfire

PART V: PLAN MAINTENANCE

CHAPTER 18 PLAN MAINTENANCE

The San Juan County AHMP maintenance process includes a schedule for annual monitoring and evaluation of the programmatic outcomes established in the plan and for producing a formal plan revision every five years.

18.1 FORMAL REVIEW PROCESS

The plan may be reviewed on an annual basis by the Emergency Manager and reviewed and revised every five years by the San Juan County Local Emergency Planning Committee (LEPC) to determine the effectiveness of programs and to reflect changes that may affect mitigation priorities. The Emergency Manager or designee will be responsible for contacting the Committee members and organizing the review. Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the plan. The Committee will review the goals and action items to determine their relevance to changing situations in the county as well as changes in federal policy, and to ensure they are addressing current and expected conditions. The Committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified, given any new available data. The organizations responsible for the various action items will report on the status of the projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised or removed.

The Emergency Manager or designee will be responsible for ensuring the updating of the plan. The Emergency Manager will also notify all holders of the plan and affected stakeholders when changes have been made. Every five years the updated plan will be submitted to the Utah Division of Emergency Management and to the Federal Emergency Management Agency for review and approval.

18.2 CONTINUED PUBLIC INVOLVEMENT

San Juan County Emergency Management is dedicated to involving the public directly in the review and updates of the plan. The Emergency Manager is responsible for the review and update of the plan. The public will also have the opportunity to provide input into plan revisions and updates, as well as adjacent counties. Copies of the plan will be kept by appropriate County departments and outside agencies.

Public meetings will be held when deemed necessary by the Emergency Manager. The meetings will provide a forum where the public can express concerns, opinions, or new alternatives that can then be included in the plan. The Board of County Commissioners will be responsible for using county resources to publicize the public meetings and maintain public involvement.

To further facilitate continued public involvement in the planning process, San Juan County will ensure that:

- San Juan County Emergency Management will keep a copy of the plan on hand at their office for review and comment by the public.
- A public meeting will be held annually to provide the public with a forum for discussing concerns, opinions, and ideas with the Local Emergency Planning Committee.

18.3 MONITORING, EVALUATING, & UPDATING THE PLAN

To ensure the San Juan County Multi-Jurisdictional All Hazard Mitigation Plan continues to provide an appropriate path for risk reduction throughout the county, it is necessary to regularly evaluate and update it. San Juan County Emergency Management will be responsible for monitoring the status of the plan and gathering appropriate parties to report the status of mitigation actions. The Local Emergency Planning Committee (LEPC) will convene on an annual basis to determine the progress of the identified mitigation actions. The Committee will also be an active participant in the next plan update. As the County All Hazard Mitigation Plan matures, new stakeholders will be identified and encouraged to join the existing Committee.

San Juan County Emergency Management is responsible for contacting Committee members and organizing the annual meeting. The Committee's responsibilities include:

- Annually review each goal and objective to determine its relevance and appropriateness.
- Monitor and evaluate the mitigation strategies in this plan to ensure the document reflects current hazard analyses, development trends, code changes, and risk analyses and perceptions.
- Ensure the appropriate implementation of annual status reports and regular maintenance of the plan. The Committee will hear progress reports from the parties responsible for the various implementation actions to monitor progress.
- Create future action plans and mitigation strategies. These should be carefully assessed and prioritized using the benefit-cost analysis (BCA) methodology that FEMA has developed.
- Ensure the public is invited to comment and be involved in mitigation plan updates.
- Ensure the county complies with all applicable federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR.
- Reassess the plan in light of any major hazard event. The Committee will convene within 45 days of any major event to review all applicable data and to consider the risk assessment, plan goals, objectives, and action items given the impact of the hazard event.
- Review the hazard mitigation plan in connection to other plans, projects, developments, and other significant initiatives.
- Coordinate with appropriate municipalities and authorities to incorporate regional initiatives that transcend the boundaries of the county.
- Update the plan every five years and submit for FEMA approval.
- Amend the plan whenever necessary to reflect changes in state or federal laws and statutes required in 44 CFR.

18.4 THE FIVE-YEAR ACTION PLAN

This section outlines the implementation agenda that the Committee should follow five years following adoption of this plan, and then every five years thereafter. The Local Emergency Planning Committee (LEPC), led by San Juan County Emergency Management, is responsible to ensure the All Hazard Mitigation Plan is updated every five years.

The Committee will consider the following an action plan for the first 5-year planning cycle. It should be noted that the schedule below can be modified as necessary and does not include any meetings and/or activities that would be necessary following a disaster event (which would include reconvening the Committee within 45 days of a disaster or emergency to determine what mitigation projects should be

prioritized during the community recovery). If an emergency meeting of the Committee occurs, this proposed schedule may be altered to fit any new needs.

Year 0

- 2023: Update All Hazard Mitigation Plan, including a series of Committee meetings and public meetings. Submit 2023 Multi-Jurisdictional All Hazard Mitigation Plan for FEMA approval.
- March 2023 – December 2023: Work on mitigation actions, San Juan County Emergency Management to stay in contact with lead departments to keep tabs on project status.
- March 2023: Reconvene Committee for first annual LEPC meeting. Introduce the concept of mitigation plan integration with other planning documents. Host first annual public meeting.

Year 1

- April 2023 – March 2024: Work on mitigation actions, San Juan County Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts.
- March 2024: Reconvene Committee for annual LEPC meeting. Discuss opportunities for mitigation plan integration with other planning documents. Discuss recent hazards. Update status of projects. Host public meeting.

Year 2

- April 2024 – March 2025: Work on mitigation actions, San Juan County Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts.
- March 2025: Reconvene Committee for annual LEPC meeting. Discuss opportunities for mitigation plan integration with other planning documents. Discuss recent hazards. Update status of projects. Host public meeting.

Year 3

- April 2025 – March 2026: Work on mitigation actions, San Juan County Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts.
- March 2026: Reconvene Committee for annual LEPC meeting. Discuss opportunities for mitigation plan integration with other planning documents. Discuss recent hazards. Update status of projects. Host public meeting.
- Fall 2026: Apply for Building Resilient Infrastructure and Communities or Hazard Mitigation Grant Program funds to update next iteration of mitigation plan.

Year 4

- April 2026 – March 2027: Work on mitigation actions, San Juan County Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts. Update 2023 San Juan County Multi-Jurisdictional All Hazard Mitigation Plan, including a series of LEPC meetings and public meetings.
- March 2027: Reconvene Committee for annual LEPC meeting. Discuss opportunities for mitigation plan integration with other planning documents. Discuss recent hazards. Update status of projects.

Year 5

- March 2028: Submit 2028 San Juan County Multi-Jurisdictional All Hazard Mitigation Plan for FEMA approval. Repeat.

18.5 ANNUAL LOCAL EMERGENCY PLANNING COMMITTEE MEETINGS

During each annual Local Emergency Planning Committee (LEPC) meeting, the Committee will be responsible for a brief evaluation of the 2023 All Hazard Mitigation Plan and to review the progress on mitigation actions.

18.5.1 Plan Evaluation

To evaluate the plan, the Committee should answer the following questions:

- Are the goals and objectives still relevant?
- Is the risk assessment still appropriate, or has the nature of the hazard and/or vulnerability changed over time?
- Are current resources appropriate for implementing this plan?
- Have lead agencies participated as originally proposed?
- Has the public been adequately involved in the process? Are their comments being heard?
- Have departments been integrating mitigation into their planning documents?

If the answer to each of the above questions is "yes," the plan evaluation is complete. If any questions are answered with a "no," the identified gap must be addressed.

18.5.2 Review of Mitigation Actions

Once the plan evaluation is complete, the Committee must review the status of the mitigation actions. To do so, the Committee should answer the following questions:

- Have the mitigation actions been implemented as planned?
- Have outcomes been adequate?
- What problems have occurred in the implementation process?

18.5.3 Meeting Documentation

Each annual LEPC meeting must be documented, including the plan evaluation and review of mitigation actions. Mitigation actions have been formatted to facilitate the annual review process.

18.6 IMPLEMENTATION THROUGH EXISTING PROGRAMS

Hazard mitigation practices must be incorporated within existing plans, projects, and programs. Therefore, the involvement of all departments, private non-profits, private industry, and appropriate jurisdictions is necessary in order to find mitigation opportunities within existing or planned projects and programs. To execute this, San Juan County Emergency Management will assist and coordinate resources for the mitigation actions and provide strategic outreach to implement mitigation actions that meet the goals and objectives identified in this plan.

APPENDIX

APPENDIX A: LEPC, PLANNING TEAM, & PARTICIPATING MEMBERS CONTACT LIST

Name	Position	Email	Phone Number
Tammy Gallegos	San Juan County Emergency Manager	tgallegos@sanjuancounty.org	435-587-3225
Natalie Freestone	San Juan County Assistant Emergency Manager	nfreestone@sanjuancounty.org	435-587-3225
Ann K. Leppanen	Bluff Mayor	ann@townofbluff.org	651-341-9074
Luanne Hook	Bluff Town Council Member	luanne@townofbluff.org	435-672-9990
Linda Sosa	Bluff Records Officer	linda@townofbluff.org	435-672-9990
David Gallegos	San Juan County Fire Chief	dgallegos@sanjuancounty.org	435-459-9583
Reagan Wytsalucy	USU Extension Assistant Professor	reagan.wytsalucy@usu.edu	435-587-3239
David Johnson	Blanding City Manager	djohnson@blanding-ut.gov	435-678-2791
Kathy Carson	Bluff Town Clerk	kamcarson@gmail.com	435-459-4619
Erin Nelson	Bluff Town Manager	manager@townofbluff.org	720-280-4934
Sylvia Taylor	Bears Ears Partnership Education Center Manager	sylvia@bearsearspartnership.org	970-799-7770
Jake Halley	Integrated Solutions Consultant	jacob.halley@i-s-consulting.com	318-381-3429

APPENDIX B: MEETING MINUTES

Blanding Public Meeting—10/17/2022

The Core Planning Team met with each jurisdiction of San Juan County in October 2022 to discuss disaster mitigation for the community, beginning in the city of Blanding. This meeting was open to the public and held in the Blanding Senior Center at 177 E 200 N. Members of the LEPC participated.

Bluff Public Meeting—10/18/2022

The Core Planning Team met with each jurisdiction of San Juan County in October 2022 to discuss disaster mitigation for the community. The meeting in the town of Bluff was open to the public and held in the Bluff Community Center at 3rd East and Mulberry, Bluff Road. Members of the LEPC participated.

La Sal Public Meeting—10/19/2022

The Core Planning Team met with each jurisdiction of San Juan County in October 2022 to discuss disaster mitigation for the community. The meeting in La Sal—a census-designated place—was open to the public and held in the La Sal Senior Center at 200 S. Firehouse Road. Members of the LEPC participated.

Monticello Public Meeting—10/20/2022

The Core Planning Team met with each jurisdiction of San Juan County in October 2022 to discuss disaster mitigation for the community. The meeting in Monticello was open to the public and held in the Monticello Senior Center at 648 S. Hideout Way. Members of the LEPC participated.

San Juan County Mitigation Workshop—10/20/2022

A mitigation workshop with members of the LEPC was held in Monticello to familiarize attendees with the topic of disaster mitigation, review current updates being made to the plan, and identify additional hazards of concern in the county. Members also submitted new mitigation projects for each jurisdiction in the county.

APPENDIX C: MEETING WORKSHEETS, AGENDAS, & SIGN-IN SHEETS

Blanding Public Meeting—10/17/2022

Public Meeting Invite:

Sign-In Sheet:

- SIGN-IN SHEET: Hazard Mitigation Plan Update -

Hazard Mitigation Plan: Public Meeting Blanding (10/17/2022)
San Juan County, Utah

Name	Agency	Phone	E-mail
Reagan Wytsalucy	USU Extension	(435)587-3239	reagan.wytsalucy@usu.edu
David Johnson	Blanding City	(435)678-2791	djohnson@blanding-ut.gov
Tammy Gallegos	SJC Ext	435-581-3225	tgallegos@sanjuancounty.org
Jalen Holley	ISC	385 381.3428	jacob.holley@i-s-consulting.com

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Bluff Public Meeting—10/18/2022

Public Meeting Invite:

Sign-In Sheet:

- SIGN-IN SHEET: Hazard Mitigation Plan Update -

Hazard Mitigation Plan: Public Meeting Bluff (10/18/2022)
San Juan County, Utah

Name	Agency	Phone	E-mail
Tamony Gallegos	SJC EM	435-587-3225	tgallegos@sanjuancounty.org
Natalie Freestone	SJC EM	435-587-3225	nfreestone@sanjuancounty.org
Ann K. Leppanen	Bluff town email	651-341-9074	ann@townofbluff.org
Luanne Hood	Bluff town email	435-672-9990	luanne@townofbluff.org
Ned Kentsky	Bluff Res. Kent	970 529 3743	nedkentsky@gmail.com
Kathy Carson	Bluff Resident	435-459-4619	Kamcarson@gmail
Erin Nelson	Town of Bluff	720-280-4934	manager@townofbluff.org
Sylvia Taylor	Bears Ears Partnership	970.799.7770	Sylvia@BearsEarsPartnership.org
LINDA SOSA	Town of Bluff	435-672-9990	linda@townofbluff
Kathleen Lakish	Bluff resident	720 822 2062	kpakish@gmail.com
LOIS YOUNG	BLUFF RESIDENT	505-727-1181	VISIONQUEST@gmail.com
Ceil McDermott	"	435 459 9583	Veryceil@yahoo.com
David Gallegos	San Juan County Fire	(435) 459-1808	dgallegos@sanjuancounty.org
Jake Hall	FSC		

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La Sal Public Meeting—10/19/2022

Public Meeting Invite:

Sign-In Sheet:

- SIGN-IN SHEET: Hazard Mitigation Plan Update -

Hazard Mitigation Plan: Public Meeting La Sal (10/19/2022)
San Juan County, Utah

Name	Agency	Phone	E-mail
CRZIMMERMAN	SJC Resident	435-686-2294	
Ruth Thayn	SJC Resident	435-686-2566	
Natalie Freestone	SJC EM	435-587-3225	nfreestone@sanjuancounty.org
Tammy Gallegos	SJC EM	435-587-3225	tgallegos@Sanjuancounty.org
David Gallegos	SJC fire	435-587-3225	dgallegos@Sanjuancounty.org
MARYANNA HUTNIK	SJC RES	435-686-2294	MARYANNA@FRONTIERNET.NET
CHUCK ZIMMERMAN	SJC RES	"	"
Jake Halley	ISC		

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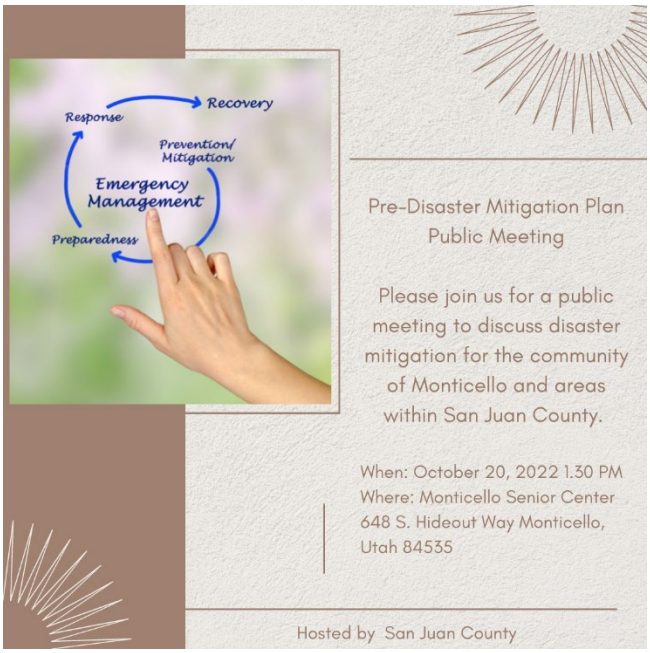
Monticello Public Meeting—10/20/2022

Public Meeting Invite:



Sign-In Sheet:

- SIGN-IN SHEET: Hazard Mitigation Plan Update -

Hazard Mitigation Plan: Public Meeting Monticello (10/20/2022)
San Juan County, Utah

Name	Agency	Phone	E-mail
Martha Garner	Resident	435-459-2103	pinknascar@gmail.com
Caroline Shumway	Resident	435-459-2144	shumwaycaroline@yahoo.com
Jay Sollee	Resident	435-587-3122	~
Tammy Gallegos	SJC EM	435-587-3225	tgallegos@sanjuancounty.org
Natalie Freestone	SJC EM	435-587-3225	nfreestone@sanjuancounty.org
David Gallegos	S.J.C. Fire	(435)-587-3225	dgallegos@sanjuancounty.org
Jake Hadley	ISC		

1

San Juan County Mitigation Workshop—10/20/2022

Meeting Invite:

Sign-In Sheet:

- SIGN-IN SHEET: Hazard Mitigation Plan Update - Workshop Oct. 20, 2022

Name		Phone	E-mail
LINDA SOSA	BLUFF	435-672-9990	linda@townofbluff.org
Ann Leppanen	Bluff	435-672-9990	ann@townofbluff.org
Jake Halley	ISC	318.381.3429	jacob.halley@i-3-consulting.com
Natalie Freestone	SJC EM	435-587-3225	nfreestone@sanjuancounty.org
Tammy Gallegos	SJC EM	435-587-3225	tgallegos@sanjuancounty.org
David Gallegos	SJC Fire/EM	(435)-587-3225	dgallegos@sanjuancounty.org
Jake Halley	ISC		

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New Mitigation Action Worksheet:

Handout: New Mitigation Actions (San Juan County)

Name:

Organization/Department:

E-mail:

Phone:

New Mitigation Action (Please Describe):

Year Initiated	**2022 (New Mitigation Action)**
Applicable Jurisdiction	
Lead Agency/Organization	
Supporting Agencies/Organizations	
Potential Funding Source	
Estimated Cost	
Benefits (loss avoided)	
Projected Completion Date	
PRIORITY (High, Medium, Low)	

Please indicate if the mitigation goals and objectives below are applicable to the new mitigation action/project). Check All That Apply.

X	Place an "X" by the applicable goals, if applicable
	Goal 1. Eliminate or reduce the long-term risk to human life and property from identified natural hazards.
	Goal 2. Aid both the private and public sectors in understanding the risks they may be exposed to and find mitigation strategies to reduce those risks.
	Goal 3. Avoid risk of exposure to identified natural hazards.
	Goal 4. Minimize the impacts of those risks when they cannot be avoided.
	Goal 5. Mitigate the impacts of damage because of identified natural hazards.
	Goal 6. Accomplish mitigation strategies in such a way that negative environmental impacts are minimized.
	Goal 7. Provide a basis for funding; prioritizing of natural hazard mitigation projects.
	Goal 8. Establish a county platform to enable all the communities to take advantage of shared goals and resources.

Page 1 of 2

This mitigation action:

Instructions: Circle the best option

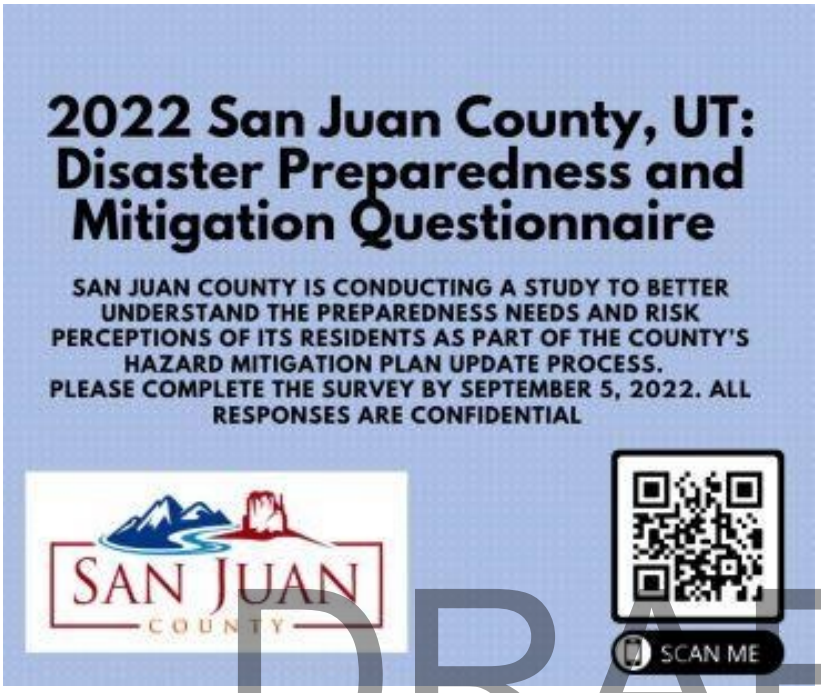
	Strongly Disagree (1)	Disagree (2)	Neither Agree or Disagree (3)	Agree (4)	Strongly Agree (5)
Social: Do you agree or disagree that the mitigation action is more likely to: be acceptable to the community; does not adversely affect a particular segment of the population; does not cause relocation of lower income people, and is compatible with the community's social and cultural values.	1	2	3	4	5
Technical: Do you agree or disagree that the mitigation action is technically effective in providing a long-term reduction of losses and has minimal secondary adverse impacts.	1	2	3	4	5
Administrative: Do you agree or disagree that your jurisdiction/organization has the necessary staffing and funding to carry-out this mitigation action.	1	2	3	4	5
Political: Do you agree or disagree that the mitigation action has the support of the public and stakeholders who have been offered an opportunity to participate in the planning process.	1	2	3	4	5
Legal: Do you agree or disagree that the jurisdiction or implementing agency has the legal authority to implement and enforce the mitigation action.	1	2	3	4	5
Economic: Budget constraints can significantly deter the implementation of mitigation actions. Do you agree or disagree that the mitigation action is cost-effective, as determined by a cost benefit review, and is possible to fund.	1	2	3	4	5
Environmental: Do you agree or disagree that the mitigation action is sustainable and does not have an adverse effect on the environment, complies with federal, state, and local environmental regulations, and is consistent with the community's environmental goals.	1	2	3	4	5

Place an "X" by the hazard(s) this action/project will mitigate:

Mitigated Hazards			
X	Place an "X" by the applicable hazard		
	Severe Weather		HAZMAT
	Flooding		
	Wildfire		
	Drought		
	Dam Failure		
	Infestation		
	Problem Soils		
	Earthquake		
	Pandemic		All Hazards

APPENDIX D: SOCIAL MEDIA & NEWSPAPER ADVERTISEMENT FOR PUBLIC SURVEY

Social Media and Newspaper Advertisement:



APPENDIX E: PLAN ADOPTION & ENDORSEMENT FORMS

This will be inserted upon State and FEMA approval.

APPENDIX F: REFERENCES

AirNav, 2022. *AirNav*. https://www.airnav.com/airport/KBDG

American Community Survey, 2020. San Juan County, Utah. *U.S. Census Bureau*, American Community Survey 5-Year Estimates. https://data.census.gov/cedsci/table?q=san%20juan%20county,%20Utah

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